ch2m. TRANSMITTAL

To: Mr. Nolin Moon, P.E.
Florida Department of Environmental Protection
South District Office
2295 Victoria Avenue, Suite 364
Fort Myers, FL 33901

From: R. J. "Bo" Bruner III, P.E.

Attn: Mr. Nolin Moon, P.E.

Date: May 24, 2015

Re: Request for Certification of Completion of Long-Term Care and Release from Consent Order 89-0466 – Amendment No. 3 for the Stock Island Landfill (WACS #79636)

We Are Sending You:

Method of shipment: FedEx

☑	Attached	Under separate cover via	
	Drawings	Documents	Tracings
	Prints	Specifications	Catalogs
	Copy of letter	Other:	

Quantity	Description
2 Hardcopies	Request for Certification of Completion of Long-Term Care and Release from Consent Order 89-0466 – Amendment No. 3 for the Stock Island Landfill (WACS #79636)
1 Electronic Copy	Request for Certification of Completion of Long-Term Care and Release from Consent Order 89-0466 – Amendment No. 3 for the Stock Island Landfill (WACS #79636)

If the material received is not as listed, please notify us at once.

Remarks:

Received Electronically
May 24, 2016
South District

Copy To: Gus Rios/FDEP (Administrator, Marathon Branch Office)
Dee Dee Green/City of Key West
John Paul Castro/City of Key West
Elizabeth Ignoffo/City of Key West
Sean McCoy/CH2M

Stock Island Landfill (WACS #79636)

Certification of Completion of Long-Term Care Report

Prepared for the
Florida Department of Environmental Protection

South District Office
2295 Victoria Avenue, Suite 364
Fort Myers, FL 33901
Marathon Branch Office
2796 Overseas Highway, Suite 221
Marathon, FL 33050

On behalf of the
City of Key West
P.O. Box 1409
Key West, Florida 33041

Submitted by

ch2m SM

May 2016

EN0519161144GNV

CH2M
3011 S.W. Williston Road
Gainesville, Florida 32608
O +1 352 384 7023
F +1 352 213 3466
www.ch2m.com

Nolin Moon, P.E.
Environmental Manager, Domestic & Industrial Waste Water
South District Office
2295 Victoria Avenue, Suite 364
Fort Myers, FL 33901

May 24, 2016

Subject: Request for Certification of Completion of Long-Term Care and Release from Consent Order 89-0466 – Amendment No. 3 for the Stock Island Landfill (WACS #79636).

Dear Mr. Moon,

On behalf of the City of Key West ("City"), CH2M HILL Engineers, Inc. ("Engineer") has prepared the following request for Certification of Completion of Long-Term Care for the Stock Island Landfill (WACS #79636), as well as a concurrent request for release from Consent Order 89-0466 – Amendment No. 3 (Report, Appendix I).

This request was prepared in accordance with the requirements of Chapter 62-701.620, Florida Administrative Code (F.A.C.) for FDEP review. The following technical report and included appendices address subsidence, barrier layer effectiveness, stormwater management, landfill gas production, groundwater monitoring data, and perpetual care of the property post long-term care.

Following conclusion of the Long-Term Care period, the City proposes to continue maintenance of the property with specific maintenance activities included in the Stabilization Report (Appendix II).

Should you have any questions regarding the attached submittal, please do not hesitate to contact me at 352-384-7023 or by email at: bo.bruner@ch2m.com.

Sincerely,
CH2M Engineers, Inc.

R.J. (Bo) Bruner III, P.E.
Senior Technologist

ATTACHMENTS

cc: Mr. Gus Rios, Administrator, FDEP Marathon Office
Mr. John Paul Castro, Utilities Director, City of Key West
Ms. Dee Dee Green, Solid Waste Coordinator, City of Key West
Ms. Elizabeth Ignoffo, Contract & Permit Engineer, City of Key West
Mr. Sean McCoy, Project Manager, CH2M

Stock Island Landfill (WACS #79636) Certification of Completion of Long-Term Care Report

Prepared for the

Florida Department of Environmental Protection

South District Office
2295 Victoria Avenue, Suite 364
Fort Myers, FL 33901

Marathon Branch Office
2796 Overseas Highway, Suite 221
Marathon, FL 33050

On behalf of the

City of Key West
P.O. Box 1409
Key West, Florida 33041

May 2016

3011 S.W. Williston Road
Gainesville, FL 32608-3928

R. J. (Bo) Bruner III, P.E.
Florida P.E. No. 35951

TABLE OF CONTENTS

Appendices

1 INTRODUCTION

On behalf of the City of Key West ("City"), CH2M HILL Engineers, Inc. ("Engineer") has prepared the following Certification of Completion of Long-Term Care for the Stock Island Landfill (WACS #79636), as well as request for release from Consent Order 89-0466 – Amendment No. 3 (included as Appendix I).

For background, the City of Key West encompasses both the main island known as Key West, some small nearby islands, and a portion of the island to the east called Stock Island, specifically the portion of Stock Island north of US Highway -1 commonly referred to as North Stock Island (NSI). NSI was annexed into the City along with the closed City landfill prominent on the landscape, reaching an elevation of approximately 90 feet (NAVD88).

The Stock Island Landfill was closed in two phases; Phase I was closed in 1990 and Phase II was closed in 1992. The landfill was closed by placing 18 inches of screening sand over one layer of 30-mil PVC geomembrane, which, in turn, overlies 6 inches of bedding sand. Phase I and II construction information not pertinent to this Report is included on OCULUS and therefore omitted from inclusion in this report.

In accordance with the included Consent Order, the City is respectfully requesting the Florida Department of Environmental Protection ("FDEP") release the City from Long-Term Care of the Stock Island Landfill, as defined by 62-701, Florida Administrative Code (FAC) and the current Consent Order (89-0466 – Amendment No. 3). This request is contingent on the City continuing perpetual care of the property, with specifics included in *Section 4, Summary and Conclusions* and in the *Stabilization Report* (Appendix II).

In addition, in accordance with the requirements of Chapter 62-701.620(6), the technical report required in Paragraph 62-701.510(8)(b), FAC is included as a separate technical report. Please see Appendix III for the *Stock Island Landfill Water Quality Monitoring Technical Report (June 2011-December 2015)*.

This overall Report was prepared in accordance with the requirements of Chapter 62-701.620, FAC, for FDEP review. This technical report, including appendices, addresses subsidence, barrier layer effectiveness, stormwater management, landfill gas production, groundwater monitoring data, and perpetual care of the property throughout the post long-term care period.

2 STABILIZATION REPORT

The Stock Island Landfill Stabilization Report is located in Appendix II.

3 WATER QUALITY MONITORING TECHNICAL REPORT (June 2011-December 2015)

The Water Quality Monitoring Technical Report (June 2011-December 2015) is located in Appendix III.

4 SUMMARY AND CONCLUSIONS

On behalf of the City of Key West, CH2M HILL Engineers, Inc. has prepared this notification of certification, signed and sealed by a professional engineer, verifying that long-term care of the Stock Island Landfill has been completed in accordance with the Closure Plan (Appendix IV) and is to be included in the landfill operating record.

The Engineer noted no signs of subsidence anywhere on the landfill. Slopes and the top shelf were relatively smooth, easily navigable by a mower. In addition, there were no signs of extensive erosion and no signs of the exposed polyvinyl chloride (PVC) geomembrane cap. The cover system appeared intact and operational.

Stormwater management is performed in accordance with the South Florida Water Management District Permit 44-00076-S. Stormwater structures, berms, and terraces appeared undamaged and functional with minimal or no signs of erosion. The inspection was conducted during a dry period; therefore, the functionality of the system was not observed. The system will continue to be managed in accordance with the aforementioned permit.

In addition to analysis of recent topography, the Stabilization Report (Appendix II) includes a comparison of recent topography and the 2007 FDEM LiDAR survey within the landfill footprint. Comparison of topography dating back approximately nine (9) years and what was obtained recently indicates the only areas of subsidence were either repaired as part of the subsidence repair work described in Section 2.2, or low areas located at stormwater drainage inlets where the 2007 LiDAR failed to obtain the same level of accuracy as recent topographic mapping. Sideslopes and the top shelf exhibited no significant subsidence in the comparison. It is the Engineer's conclusion that the comparison between recent topography and the 2007 FDEM LiDAR survey indicates significant subsidence of the waste has ceased in accordance with Chapter 62-701.620(1)(c), F.A.C.

Sampling of the landfill gas vents indicated the presence of methane and hydrogen sulfide in seven (7) of the vents on the top shelf of the landfill with trace amounts of methane in a few additional wells. Sampling of the remaining vents indicated no measurable methane or hydrogen sulfide. Landfill gas measurements indicated the intermittent presence of landfill gas at the deeper vents (i.e. those on the top shelf), with no indication the vents on the sideslope are producing gas in consistently measureable amounts. Although LFG production is still occurring, it is occurring at a slow rate and only detectable in the deepest portion of the landfill; therefore, LFG production in and of itself should not prevent the termination of long-term care of the landfill.

Regarding groundwater, semi-annual water quality sampling events for groundwater monitoring wells at the Stock Island Landfill over the 5-year-period, June 2011 - December 2015, were reviewed and evaluated. Only one groundwater parameter was found to occasionally exceed the Groundwater Cleanup Target Levels (GCTLs) set forth in Chapter 62-777, F.A.C. This parameter was TDS at Well #2 and Well #3. Both of these wells are between the landfill and the Gulf of Mexico. The background water condition is due to the Gulf of Mexico tidal influence the groundwater incurs through the highly permeable formations. Therefore, the TDS GCTL exceedance should not be seen as a potential concern for leachate leaks. The other parameters that have been monitored have not shown any GCTL exceedance or concerning data trends. The data analyzed during the reporting period indicated the landfill does not impact groundwater at concentrations that may be expected to result in violations of Department water quality standards or criteria. Therefore, CH2M proposes groundwater monitoring be

removed and groundwater wells abandoned as part of the Certification of Completion of Long-Term Care for the Stock Island Landfill.

In closing, the request for Certification of Completion of Long-Term Care for the Stock Island Landfill (WACS #79636), as well as release from Consent Order 89-0466 – Amendment No. 3 (included as Appendix I) has been prepared in accordance with Chapter 62-701.620, FAC. Upon Department acceptance of the City's request to certify discontinuation of the Long-Term Care requirements of Chapter 62-701.620, FAC, for the Stock Island Landfill, the City will maintain the property throughout a period herein referred to as "perpetual." City perpetual maintenance will continue to include the following:

- Management of the property in accordance with the South Florida Water Management District Permit 44-00076-S (Appendix II, Exhibit 4).
- Mowing / Clearing of vegetation over the capped area six times per year, or on an as-needed basis. Vegetation clearing would include clearing areas surrounding stormwater structures in accordance with the stormwater permit.
- Iguana control services are utilized on an as-needed basis. The City will continue to proactively protect the geomembrane from iguana activity on the capped landfill area with the ongoing assistance of a professional iguana management and removal contractor.
- In the event subsidence occurs, the City will repair area(s) in such a manner as to return the area(s) to their original permitted closure condition.
- The City will continue to address sparse and / or distressed vegetation over the entire Stock Island Landfill by replanting on an as-needed basis.

APPENDICES

APPENDIX I – FDEP CONSENT ORDER AMENDMENT NO. 3 (OGC FILE NO. 89-0466)

BEFORE THE STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION	)	IN THE OFFICE OF THE SOUTH DISTRICT
vs.	)	OGC FILE NO. 89-0466
CITY OF KEY WEST	)	

CONSENT ORDER AMENDMENT NO. 3

This Consent Order Amendment No. 3 ("Order") is entered into between the State of Florida Department of Environmental Protection ("Department") and the City of Key West ("Respondent") to modify certain terms and conditions of a Consent Order previously entered into between the parties.

The Department and the Respondent agree:

1. The Department and Respondent previously entered into a Consent Order to allow the continued operation of the Stock Island Landfill, to include the Long-term Care Period which is scheduled to end on April 24, 2016. The Consent Order ("1989 Order"), with the same caption and OGC number as is set forth above, was filed with the Clerk of the Department on July 27, 1989 and amended on August 1, 1991, entitled "Consent Order Amendment 1" and on July 10, 1992, entitled "Consent Order Amendment 2" (collectively referred to as "Amendments"). The 1989 Order and its subsequent Amendments are attached as Exhibit I and incorporated herein.

2. The Department is the administrative agency of the State of Florida having the power and duty to administer and enforce the provisions of the Florida Resource Recovery and Management Act, Sections 403.702, et seq., Florida Statutes ("F.S."), and the rules promulgated and authorized in Title 62, Florida Administrative Code ("F.A.C."). The Department has jurisdiction over the matters addressed in this Order.

3. Respondent is a "person" within the meaning of Sections 403.031(5) and 403.703(22), F.S.

3. Respondent is responsible for the long-term care, monitoring, and maintenance of a Class I Sanitary Landfill, known as the Stock Island Landfill ("Landfill"), located at 5701 West Junior College Road, Stock Island, in Monroe County, Florida ("Facility"). The Facility's Facility ID Number is WACS #79636.

4. Respondent operates the long-term care plan for the Facility under Permit No. 89-0466 which expires on April 24, 2016.

5. The Department and Respondent agree to repair the closed landfill, due to subsidence of waste and erosion of cover, in accordance with the CH2MHILL Repair Submittal ("Submittal") of March 5, 2009. A copy of the Submittal is attached as Exhibit II.

Having reached a resolution of the matter Respondent and the Department mutually agree and it is

ORDERED:

7. Respondent shall comply with the following corrective actions within the stated time periods:

a) By June 1, 2010, Respondent shall complete all repairs to the landfill cap addressed in the Submittal to the Department's satisfaction.

b) Respondent shall notify the Department's Marathon Branch Office one week prior to starting the repairs.

c) Respondent shall submit weekly reports to the Department's Marathon Branch Office each Friday, by fax to (305) 289-2314, or by email to Barbara.Nevins@dep.state.fl.us summarizing all repair work done, all repair work anticipated to be done for the following week, and completion of the project.

d) By June 30, 2010, Respondent shall submit a certification of completion of construction signed and sealed by a Professional Engineer, licensed in the state of Florida. The form for this submittal is attached in Exhibit I. The completed form shall be sent to the Department of Environmental Protection, Post Office Box 2549, Fort Myers, Florida 33902.

8. Within 20 days of the effective date of this Order, Respondent shall pay the Department $ 500.00 for costs and expenses incurred by the Department during the investigation of this matter and the preparation and tracking of this Order.

9. Respondent agrees to pay the Department stipulated penalties in the amount of $ 100.00 per day for each and every day Respondent fails to timely comply with any of the requirements of paragraph(s) 7 of this Order. The Department may demand stipulated penalties at any time after violations occur. Respondent shall pay stipulated penalties owed within 30 days of the Department's issuance of written demand for payment, and shall do so as further described in paragraphs 10 and 11, below. Nothing in this paragraph shall prevent the Department from filing suit to specifically enforce any terms of this Order.

10. Respondent shall make all payments required by this Order by cashier's check or money order. Payment instruments shall be made payable to the "Department of Environmental Protection" and shall include both the OGC number assigned to this Order and the notation "Ecosystem Management and Restoration Trust Fund."

11. Except as otherwise provided, all submittals and payments required by this Order shall be sent to Department of Environmental Protection, Post Office Box 2549, Fort Myers, Florida 33902**.**

12. Respondent shall allow all authorized representatives of the Department access to the Facility and the Property at reasonable times for the purpose of determining compliance with the terms of this Order and the rules and statutes administered by the Department.

13. In the event of a sale or conveyance of the Facility or of the Property upon which the Facility is located, if all of the requirements of this Order have not been fully satisfied, Respondent shall, at least 30 days prior to the sale or conveyance of the Facility or Property, (a) notify the Department of such sale or conveyance, (b) provide the name and address of the purchaser, operator, or person(s) in control of the Facility, and (c) provide a copy of this Order with all attachments to the purchaser, operator, or person(s) in control of the Facility. The sale or conveyance of the Facility or the Property does not relieve Respondent of the obligations imposed in this Order.

14. If any event, including administrative or judicial challenges by third parties unrelated to Respondent, occurs which causes delay or the reasonable likelihood of delay in complying with the requirements of this Order, Respondent shall have the burden of proving the delay was or will be caused by circumstances beyond the reasonable control of Respondent and could not have been or cannot be overcome by Respondent's due diligence. Neither economic circumstances nor the failure of a contractor, subcontractor, materialman, or other agent (collectively referred to as "contractor") to whom responsibility for performance is delegated to meet contractually imposed deadlines shall be considered circumstances beyond the control of Respondent (unless the cause of the contractor's late performance was also beyond the contractor's control). Upon occurrence of an event causing delay, or upon becoming aware of a potential for delay, Respondent shall notify the Department by the next working day and shall, within seven calendar days notify the Department in writing of (a) the anticipated length and cause of the delay, (b) the measures taken or to be taken to prevent or minimize the delay, and (c) the timetable by which Respondent intends to implement these measures. If the parties can agree that the delay or anticipated delay has been or will be caused by circumstances beyond the reasonable control of Respondent, the time for performance hereunder shall be extended. The agreement to extend compliance must identify the provision or provisions extended, the new compliance date or dates, and the additional measures Respondent must take to avoid or minimize the delay, if any. Failure of Respondent to comply with the notice requirements of this paragraph in a timely manner constitutes a waiver of Respondent's right to request an extension of time for compliance for those circumstances.

15. The Department, for and in consideration of the complete and timely performance by Respondent of the obligations agreed to in this Order, hereby conditionally waives its right to seek judicial imposition of damages or civil penalties for violations outlined in this Order. This waiver is conditioned upon (a) Respondent's complete compliance with all of the terms of this Order, and (b) the remediation of contaminated areas to the applicable site rehabilitation levels. The Department's cause of action for damages accrues when the

Department concludes that remediation of contaminated areas to the applicable site rehabilitation levels is not feasible or that the Respondent failed to completely implement the Department-approved remedial or corrective action plan (however designated). If the Department and Respondent fail to reach agreement on the payment of the damages, the Department may initiate appropriate legal action to recover the damages as provided by law.

16. This Order is a settlement of the Department's civil and administrative authority arising under Florida law to resolve the matters addressed herein. This Order is not a settlement of any criminal liabilities which may arise under Florida law, nor is it a settlement of any violation which may be prosecuted criminally or civilly under federal law. Entry of this Order does not relieve Respondent of the need to comply with applicable federal, state, or local laws, rules, or ordinances.

17. The Department hereby expressly reserves the right to initiate appropriate legal action to address any violations of statutes or rules administered by the Department that are not specifically resolved by this Order.

18. Respondent is fully aware that a violation of the terms of this Order may subject Respondent to judicial imposition of damages, civil penalties up to $10,000.00 per day per violation, and criminal penalties.

19. Respondent acknowledges and waives its right to an administrative hearing pursuant to sections 120.569 and 120.57, F.S., on the terms of this Order. Respondent also acknowledges and waives its right to appeal the terms of this Order pursuant to section 120.68, F.S.

20. No modifications of the terms of this Order will be effective until reduced to writing, executed by both Respondent and the Department, and filed with the clerk of the Department.

21. The terms and conditions set forth in this Order may be enforced in a court of competent jurisdiction pursuant to sections 120.69 and 403.121, F.S. Failure to comply with the terms of this Order constitutes a violation of section 403.161(1)(b), F.S.

22. This Consent Order is a final order of the Department pursuant to section 120.52(7), F.S., and it is final and effective on the date filed with the Clerk of the Department unless a Petition for Administrative Hearing is filed in accordance with Chapter 120, F.S. Upon the timely filing of a petition, this Consent Order will not be effective until further order of the Department.

23. Persons who are not parties to this Consent Order, but whose substantial interests are affected by it, have a right to petition for an administrative hearing under sections 120.569 and 120.57, Florida Statutes. Because the administrative hearing process is designed to formulate final agency action, the filing of a petition concerning this Consent Order means that the Department's final action may be different from the position it has taken in the Consent Order.

The petition for administrative hearing must contain all of the following information:

a) The OGC Number assigned to this Consent Order;

b) The name, address, and telephone number of each petitioner; the name, address, and telephone number of the petitioner's representative, if any, which shall be the address for service purposes during the course of the proceeding;

c) An explanation of how the petitioner's substantial interests will be affected by the Consent Order;

d) A statement of when and how the petitioner received notice of the Consent Order;

e) Either a statement of all material facts disputed by the petitioner or a statement that the petitioner does not dispute any material facts;

f) A statement of the specific facts the petitioner contends warrant reversal or modification of the Consent Order;

g) A statement of the rules or statutes the petitioner contends require reversal or modification of the Consent Order; and

h) A statement of the relief sought by the petitioner, stating precisely the action petitioner wishes the Department to take with respect to the Consent Order.

The petition must be filed (received) at the Department's Office of General Counsel, 3900 Commonwealth Boulevard, MS# 35, Tallahassee, Florida 32399-3000 within 21 days of receipt of this notice. A copy of the petition must also be mailed at the time of filing to the District Office at Department of Environmental Protection, Post Office Box 2549, Fort Myers, Florida 33902. Failure to file a petition within the 21-day period constitutes a person's waiver of the right to request an administrative hearing and to participate as a party to this proceeding under sections 120.569 and 120.57, Florida Statutes. Before the deadline for filing a petition, a person whose substantial interests are affected by this Consent Order may choose to pursue mediation as an alternative remedy under section 120.573, Florida Statutes. Choosing mediation will not adversely affect such person's right to request an administrative hearing if mediation does not result in a settlement. Additional information about mediation is provided in section 120.573, Florida Statutes and Rule 62-110.106(12), Florida Administrative Code.

24. Rules referenced in this Order are available at http://www.dep.state.fl.us/legal/Rules/rulelistnum.htm.

25. Except as expressly provided in this Order, all terms of the original 1989 Order and Amendments described in Paragraph 1 of this Order shall remain in full force and effect.

26. The date of filing this Order remains July 27, 1989.

FOR THE RESPONDENT:

_____ _____

Craig Cates, Mayor Date
City of Key West

DONE AND ORDERED this ____ day of _____, 2010, in Lee County, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

_____
Jon M. Iglehart
District Director
South District

Filed, on this date, pursuant to section 120.52, F.S., with the designated Department Clerk, receipt of which is hereby acknowledged.

_____ _____
Clerk Date

Copies furnished to:

Lea Crandall, Agency Clerk
Mail Station 35

SW_CO (REV. 06/09)

EXHIBIT I

BEFORE THE STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

IN THE OFFICE OF THE
SOUTH FLORIDA DISTRICT

STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION Complainant, vs. CITY OF KEY WEST Respondent	OGC Case No. 89-0466

CONSENT ORDER

This Consent Order is entered into between the State of Florida, Department of Environmental Regulation (hereinafter "Department") and the City of Key West (hereinafter "Respondent").

The Department finds and Respondent admits the following:

1. The Department of Environmental Regulation is the administrative agency of the State of Florida charged with the authority to administer and enforce Chapter 403, Florida Statutes (F.S.), and the rules promulgated thereunder in Florida Administrative Code Chapters 17-3, 17-4, 17-6, and 17.701.

2. Respondent, is a municipal corporation of the State of Florida and is a person within the meaning of Section 403.031(5), Florida Statutes.

3. Respondent, owns and operates a Class I Sanitary Landfill, known as the Stock Island Landfill (herein after Landfill) located on 5701 West Junior College Road, Stock Island in Monroe County, Latitude 24° 34'42" N, Longitude 81° 44'49" W, Section 27, Township 67S, Range 35E.

4. On May 28, 1985, the Department issued to Respondent a permit (S044-085293) to operate the Landfill. The permit was due to expire initially on May 28, 1987, however the Department granted extensions through February 1, 1989.

5. On February 8, 1988, Respondent timely submitted a permit application (S044-145007) in accordance with FAC rule 17-4.090 to vertically expand the existing Landfill. A topographic survey was performed in June, 1987 and showed the elevation height of the landfill to be approximately eighty-six feet. As of February 8, 1988, the elevation height is over 90 feet. The submitted permit application (SO44-145007) includes revisions to the originally proposed closure plan to provide a vertical landfill expansion to one hundred ten feet elevation height. Another proposed revision included the relocation of the perimeter road which in part would encroach on jurisdictional wetlands. As such, Respondent submitted a wetland resource regulation (WRR) permit application (441534639) for Department review. As the final landfill design is dependent on the Department's final action on the WRR permit application and the final action on the Corps of Engineers' permit application (88IPG-21015), the Department suggested to Respondent that the final engineering drawings and other pertinent information, to support solid waste permit application S044-145007, be submitted after the Department's final action on the WRR permit application and the Corps of Engineers' final action.

6. In order to continue operating, the Landfill must meet current requirements of the Florida Administrative Code (FAC) Rules. The Landfill must have a liner and leachate collection

system as specified in F.A.C. Rules 17-701.050(3) through 17-701.050(4). Based upon the submitted plans, the Respondent may not be able to satisfy these requirements. In accordance with F.A.C. Rule 17-701.050(1) and current Department policy, a landfill may not be issued a construction or operation permit for lateral or vertical expansion after January 1, 1987 without meeting the current requirements of Chapter 17-701, F.A.C.

7. Respondent presently has a technical consulting engineering firm on contract for the purpose of investigating, advising, proposing, planning and engineering solutions for the waste management functions of the Respondent.

8. The Landfill is the principal facility utilized at present by the City of Key West for solid waste disposal.

9. In view of the imminent closure of the Landfill and the scarcity of land available to site another sanitary landfill it is imperative that the city immediately initiate steps which will result in the availability of facilities for solid waste disposal and resource recovery which comply with the provisions and requirements of Chapter 403, Florida Statutes, and Rules of the Department, including Florida Administrative Rules 17-2, 17-3, 17-4 and 17-701.

10. The Department and the Respondent have discussed this matter and have agreed upon a mutually acceptable course of action.

THEREFORE, having reached a resolution of the matter pursuant to Florida Administrative Code Rule 17-103.110(3), the Department and the Respondent mutually agree and it is

ORDERED:

11. Respondent shall publish the following notice in a

newspaper of general circulation in Monroe County, Florida. The notice shall be published one time only within 14 days after execution of the Consent Order by the Department. Respondent shall submit an affidavit to the Department as proof of publication.

State of Florida Department of Environmental Regulation

Notice of Proposed Agency Action

The Department of Environmental Regulation gives notice of agency action of entering into a Consent Order with City of Key West pursuant to Rule 17-103.110(3), Florida Administrative Code. The Consent Order addresses the continued operation of the Stock Island Landfill while the process of selecting, acquiring, permitting and constructing a new landfill site is finalized. The Consent Order is available for public inspection during normal business hours, 8:00 a.m. to 5:00 p.m., Monday through Friday, except legal holidays, at the South Florida District Office, Department of Environmental Regulation, 2269 Bay Street, Fort Myers, Florida 33901, and the South Florida District Branch Office located at 11400 Overseas Highway, Suite 123, Marathon, Florida 33050.

Persons whose substantial interests are affected by the Department's proposed Consent Order decision may petition for an administrative determination (hearing) in accordance with Section 120.57, Florida Statutes (F.S.). The petition must conform to the requirements of Chapters 17-103 and 28-5, Florida Administrative Code (F.A.C.), and must be filed (received) in the Department's Office of General Counsel, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400, within twenty-one (21) days of publication of this notice. Failure to file a petition within the twenty-one (21) days constitutes a waiver of any right such person has to an

administrative determination (hearing) pursuant to Section 120.57, F.S.

If a petition is filed, the administrative hearing process is designed to formulate agency action. Accordingly, the Department's final action may be different from the proposed agency action. Therefore, persons who may not wish to file a petition may wish to intervene in the proceeding. A petition for intervention must be filed pursuant to Rule 28-5.207, F.A.C., at least five (5) days before the final hearing and be filed with the hearing officer if one has been assigned at the Division of Administrative Hearings, Department of Administration, 2009 Apalachee Parkway, Tallahassee, Florida 32301. If no hearing officer has been assigned, the petition is to be filed with the Department's Office of General Counsel, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400. Failure to petition to intervene with the allowed time frame constitutes a waiver of any right such person has to request a hearing under Section 120.57, F.S.

12. Respondent shall submit completed engineering plans (plot plans and cross-sectional views) with associated supportive information describing the proposed revisions to permit S044-085293 within ninety days of receiving final agency action on the WRR permit application No. 441534639 and final agency action by the COE on permit application No. 88IPG-21015.

13. Respondent shall complete phase I closure of the Landfill within eighteen (18) months of the effective date of this Order.

14. Respondent, by official action of its City Commission, shall within eighteen (18) months of the effective

date of this order hear presentations on the method or methods by which it proposes to replace the functions provided by the landfill.

15. A selection of the method to be used will be made within twenty-four (24) months after the effective date of this order. The method or methods selected shall comply with Department standards, as set forth in Chapter 403, Florida Statutes and Florida Administrative Rules 17-2, 17-3, 17-4 and 17-701. In the event that the method selected does not require construction of a waste disposal facility by the Respondent, paragraph Nos. 16, 17, 18, and 19 shall not remain in effect.

16. Within twenty-four months of the effective date of this Order Respondent shall have purchased land or have an option to purchase property sufficient to accommodate the methods selected in paragraph No. 15. Land condemnation procedures outside the control of Respondent may necessitate additional time to satisfy the requirements of this order upon approval by the Department. If this occurs, the conditions of this Order shall be amended accordingly.

17. The Respondent shall submit necessary applications for the construction of the facility identified in Paragraph No. 15 above, within twenty-six (26) months from the effective date of this Order.

18. Respondent and its engineer shall attend technical advisory committee meetings (TAC) with the Department as necessary to discuss the proposed plan.

19. Respondent shall advertise for bids for construction of the facilities referred to in paragraph No. 16

above within six (6) weeks of receipt of all necessary permits, licenses, and authorizations from local, State, and Federal agencies. Bid openings shall be 6 weeks after the bid advertisement. The construction contract shall be executed within three (3) months of the bid opening.

20. Respondent shall complete phase II closure within fifteen (15) months after the execution of contracts specified in paragraph 19 above, or within fifteen (15) months of the implementation of an alternative procedure for solid waste disposal, if such alternative does not require construction of a facility by the Respondent.

21. Respondent shall submit progress reports to the Department quarterly. These reports shall outline the occurrence of events in compliance with this Consent Order.

22. The Department authorizes the Respondent to operate the Landfill subject to the following thirteen (13) general conditions and twenty nine (29) specific conditions. The Landfill shall be authorized to serve its current functions which include the codisposal of Class I solid waste, Class III solid waste, construction/demolition debris, and combustor ash.

I. GENERAL CONDITIONS:

A. The terms, conditions, requirements, limitations, and restrictions set forth herein are binding upon the Respondent and enforceable pursuant to the authority of Section 403.161, 403.727, or 403.859 through 403.861, Florida Statutes (F.S.). The Respondent is hereby placed on notice that the

Department will review this authorization periodically and may initiate enforcement action for any violation of the conditions by the Respondent, its agent, employees, servants or representatives.

B. This order is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this Order may constitute grounds for revocation and enforcement action by the Department.

C. As provided in Subsections 403.087(6) and 403.722(5) F.S., the issuance of this Order does not convey any vested rights or any exclusive privileges. Nor does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This Order does not constitute a waiver of or approval of any other department permit that may be required for other aspects of the total project which are not addressed in the permit.

D. This Order conveys no title to land or water, does not constitute state recognition or acknowledgement of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the state. Only the Trustees of the Internal Improvement Trust Fund may express state

opinion as to title.

E. This Order does not relieve the permittee from liability for harm or injury to human health or welfare, animal, plant or aquatic life or property and penalties therefore caused by the construction or operation of this permitted source, nor does it allow the Respondent to cause pollution in contravention of Florida Statutes and Department rules, unless specifically authorized by any order from the Department.

F. The Respondent shall at all times properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the Respondent to achieve compliance with the conditions of this Order, as required by Department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the Order and when required by Department rules.

G. The Respondent, by accepting this Order, specifically agrees to allow authorized department personnel, upon presentation of credentials or other documents as may be required by law, access to the premises, at reasonable times, where the described activity is located or conducted for the purpose of:

1. Having access to and copying any records that must be kept under the conditions of the Order;
2. Inspecting the facility, equipment, practices,

or operations regulated or required under this Order; and

3. Sampling or monitoring any substances or parameters at any location reasonably necessary to assure compliance with this Order or Department rules. Reasonable time may depend on the nature of the concern being investigated.

H. If, for any reason, the Respondent does not comply with or will be unable to comply with any condition or limitation specified in this Order, the Respondent shall immediately notify and provide the Department with the following information:

1. a description of and cause of non-compliance; and
2. the period of non-compliance, including exact dates and times; or, if not corrected, the anticipated time the non-compliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the non-compliance.

The Respondent shall be responsible for any and all damages which may result and may be subject to enforcement action by the Department for penalties or revocation of this Order.

I. In accepting this Order, the Respondent understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this facility, which are

submitted to the Department, may be used by the Department as evidence in any enforcement case arising under the Florida Statutes or Department rules, except where such use is prescribed by Section 403.73 and 403.111, F.S.

J. The Respondent agrees to comply with changes in Department rules and Florida Statutes after a reasonable time for compliance, provided however, the Respondent does not waive any other rights granted by Florida Statutes or Department rules.

K. This Order is required to be kept at the work site of the facility during the entire period of construction or operation.

L. The Respondent shall comply with the following monitoring and record keeping requirements:

1. Upon request, the Respondent shall furnish all records and plans required under Department rules. The retention period for all records will be extended automatically, unless otherwise stipulated by the Department, during the course of any unresolved enforcement action.
2. The Respondent shall retain at the facility or other location designated by this Order records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation), copies of all reports required by this Order, and records of

all data used to complete the application for this Order. The time period of retention shall be at least three years from the date of the sample, measurement, report or application unless otherwise specified by Department rule.

3. Records of monitoring information shall include:

- the date, exact place, and time of sampling or measurement;
- the person responsible for performing the sampling or measurements;
- the date(s) analyses were performed;
- the person responsible for performing the analyses;
- the analytical techniques or methods used; and
- the results of such analyses.

M. When requested by the Department, the Respondent shall within a reasonable time furnish any information required by law which is needed to determine compliance with the Order. If the Respondent becomes aware that relevant facts were not submitted or were incorrect in this Order or in any report to the Department, such facts or information shall be submitted or corrected promptly.

II. SPECIFIC CONDITIONS:

A. The Respondent shall provide for the collection, control and treatment of surface runoff from the site as necessary to meet the water quality

standards of Chapters 17-3 and 17-4, Florida Administrative Code (F.A.C.), for the receiving waters at the boundary of the "site". The "site" is defined as the waste disposal area and not the total property area.

B. All solid waste other than combustor ash, white goods, tire stock piles, and Class III wastes, 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.

C. All compacted solid waste shall be formed into cells with working face and side grades at a slope no steeper than three (3) feet horizontal to one (1) foot vertical.

D. 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.

E. Fugitive dust shall be controlled.

F. All waste other than combustor ash, white goods, tire stockpiles and Class III waste shall receive initial cover at the end of each working day. If the application of water is ineffective in controlling fugitive dust, initial cover shall be applied to the combustor ash.

G. Pesticides used to control rodents, flies, and other insects shall be as specified by the Florida Department of Agriculture and Consumer Services (Chapter 5E-2, Florida Administrative Code), and be available on site for use as necessary.

H. Uncontrolled and unauthorized scavenging shall not be permitted at the sanitary landfill site. Controlled salvaging may be permitted by the local authority responsible for the facility.

I. All records and data relating to the operation of the solid waste control facility shall be made available for inspection by the DER's staff in the offices of the Respondent. The landfill site shall be open for inspection by Department employees during normal hours of operation.

J. No open burning is permitted at this site.

K. No waste shall be disposed of in the water.

L. Signs indicating operating agent, hours of operation, traffic flow, user charges and other pertinent information shall be posted at the entrance to the landfill. A sign indicating that the facility does not accept hazardous and bio-hazardous wastes shall also be posted at the landfill entrance.

M. The solid waste control facility and the immediate area thereof shall be maintained in a clean condition.

N. The site of operations shall be easily accessible by trucks and cars, with all-weather access roads maintained in a dust free condition.

O. Gas generation from waste decomposition shall be controlled.

P. Operation and maintenance of the site shall be

under the direction of a qualified person. After January 1, 1990, landfill operator(s) must satisfactorily complete an operator training course approved by the Department.

Q. Portable litter fences shall be installed as needed downwind of the working face to help control blowing papers and litter.

R. Ground litter shall be collected periodically and transferred to the working face for proper disposal.

S. Respondent shall contact the DER District Office in Fort Myers or the local office in Marathon prior to accepting asbestos wastes.

T. White goods shall be stockpiled at a designated area of the landfill for monthly collection by a contracted hauler. Respondent shall by the fifteenth of each month submit a receipt to the DER District Office in Fort Myers acknowledging the quantity of white goods removed by the hauler for the preceding month.

U. Respondent shall submit a report quarterly to the Department's office in Fort Myers indicating the quantity of waste disposed of at the Landfill each month during that period. If possible the waste should be categorized as combustor ash, construction/demolition debris, Class I waste or Class III waste.

V. Respondent shall maintain at least two (2) water pumps and hoses "operation-ready" on site at all times. These pumps must be of suitable size and design to extinguish landfill fires.

W. Respondent shall maintain a berm on the waterward side of the perimeter access road to prevent direct surface stormwater discharge to State waters.

X. Respondent shall maintain the mangrove fringe along the waterward side of the perimeter berm along the canal and gulf sides in the following manner: Mangroves shall be maintained viable on two (2) foot centers. Two rows, two feet apart, shall be maintained. All areas requiring additional plantings shall be performed timely as needed. Respondent shall thereafter inspect the fringe monthly and perform any required maintenance.

Y. Monitoring Requirements: All three ground water monitoring wells shall be sampled and analyzed quarterly for the following parameters:

1. Total Dissolved Solids
2. Lead
3. Mercury
4. Chromium
5. Cadmium
6. Zinc

A copy of the monitoring report shall be sent to the Marathon and Fort Myers D.E.R. offices within fifteen (15) days after it is received by the Respondent.

Z. Respondent shall submit evidence of financial responsibility in accordance with FAC rule 17-701.076 within thirty (30) days of the effective date of this Order.

AA. Closure Schedule: The Respondent shall at least one year prior to the projected date when wastes will no longer be accepted at the site under this Order, provide written notice to the Department District office with a

schedule for cessation of waste acceptance and landfill closure in accordance with guidelines set forth in Chapter 17-701 Florida Administrative Code.

BB. Closure Plan Submittal: At least 90 days prior to the date when wastes will not longer be accepted at the site under this Order, the Respondent shall submit a closure plan in accordance with the requirements of Florida Administrative Code Rule 17-701.073. Upon approval by the Department., the Closure Plan shall become an addendum to this Consent Order.

CC. These conditions do not exempt the Respondent from complying with requirements of other state, municipal, county or regional pollution control rules, regulations, ordinances or codes.

23. Respondent shall submit a written request withdrawing solid waste permit application number S044-145007 within fourteen (14) days of the effective date of this Order.

24. The Department, for and in consideration of the complete and timely performance by Respondent of the duties and obligations set forth in paragraphs 1 through 20 of this Consent Order, hereby waives its right to seek judicial imposition of damages, penalties or other relief for the alleged violations outlined in this Consent Order. The aforementioned waiver shall become null and void in the event the Respondent fails to comply with the time periods specified herein, absent written authorization from the Department except for circumstances beyond the control of the Respondent as set forth in Paragraphs 16

and 30.

25. Respondent has the right to petition for a variance to the closure rules of F.A.C. 17-701.070 as it applies to the Stock Island Landfill.

26. Except as provided below in paragraph No. 27, the Respondent waives its right to an administrative hearing on the terms of this Consent Order under Section 120.57, Florida Statutes, and its right to appeal this Consent Order pursuant to Section 120.68, Florida Statutes.

27. If the Respondent objects to any determination made by the Department regarding the Respondent's responses to this Order or compliance with the terms of this Order, the Respondent may file a Petition for Formal or Informal Administrative Hearing Proceedings. The burden of proof is on the Respondent herein to prove that the Department's determination is unreasonable. The Petition must conform with the requirements of Florida Administrative Code Rule 28-5.201, and must be received by the Department Office of General Counsel, 2600 Blair Stone Road, Tallahassee, Florida 32301, within fourteen (14) days after receipt of notice from the Department of any determination the Respondent wishes to challenge. Failure to file a Petition within this time period shall constitute a waiver by Respondent of its right ot request an administrative proceeding under Section 120.57, Florida Statutes.

28. Entry of this Consent Order does not exempt Respondent from complying with other federal, state or local laws, regulations, or ordinances.

29. The terms and conditions set forth in this

Consent Order may be enforced in a court of competent jurisdiction pursuant to Sections 120.69 and 403.121, Florida Statutes. Failure to comply with the terms of this Consent Order shall constitute a violation of Section 403.161(1)(b), Florida Statutes.

30. In the event the Respondent is temporarily unable to comply with any of the conditions of this Order, he shall notify the District Office of the DER immediately. Notification shall include pertinent information as to cause of problem and what corrective measures are being taken to prevent its reoccurrence. If the problem is due to circumstances beyond the control of the Respondent, the conditions of this Order shall be amended accordingly.

31. Respondent shall pay $250.00 for each day of each violation of the requirements of paragraphs 13, 15, 17 and 20.

32. Respondent is fully aware that a violation of the terms of this Consent Order may subject Respondent to judicial imposition of damages, civil penalties up to $10,000. per offense and criminal penalties.

33. Respondent shall allow all authorized representatives of the Department access to the property at reasonable times for the purpose of determining compliance with the terms of this Consent Order and the rules of the Department.

34. The Department hereby expressly reserves the right to initiate appropriate legal action to prevent or prohibit future violations of applicable statutes or the rules promulgated thereunder not covered by the terms of this Consent Order.

35. No modification of the terms of this Consent Order shall be effective until reduced to writing and executed by

both the Respondent and the Department.

36. This Consent Order is final agency action of the Department pursuant to Section 120.69, Florida Statutes, and Florida Administrative Code Rule 17-103.110(3), and it is final and effective on the date filed with the Clerk of the Department unless a Petition for Administrative Hearing is filed in accordance with Chapter 120, Florida Statutes. Upon the timely filing of a petition this Consent Order will not be effective until further order of the Department.

For the Respondent:

July 20, 1989
Date

Richard H. Witker
City Manager

DONE AND ORDERED THIS 27Th day of July, 1989, in Fort Myers, Florida.

STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION

Philip R. Edwards
Deputy Assistant Secretary
South Florida District
2269 Bay Street
Fort Myers, Florida 33901
Telephone: (813) 332-2667

FILING AND ACKNOWLEDGEMENT
FILED, on this date, pursuant to S 120.52 Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

Vanessa Olivieo
CLERK

7-27-89
DATE

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a true and correct copy of the following was furnished by U.S. Mail to Richard H. Witker this 27th day of July, 1989.

Ronald D. Blackburn
Environmental Administrator

6/9

BEFORE THE STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

IN THE OFFICE OF THE
SOUTH FLORIDA DISTRICT

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION

Complainant

vs.

CITY OF KEY WEST

Respondent

OGC Case No. 89-0466

CONSENT ORDER AMENDMENT NO. 1

This first amendment to Consent Order is entered into, between the State of Florida, Department of Environmental Regulation (hereinafter "Department") and the City of Key West (hereinafter "Respondent).

WITNESSETH:

WHEREAS, the parties hereto previously entered into a Consent Order (OGC Case No. 89-0466) dated July 27, 1989, and the parties wish to amend said Consent Order;

NOW, THEREFORE, in consideration of the findings and orders contained herein and in the original Consent Order dated July 27, 1989, the parties agree as follows:

1. Paragraph No. 17 of the original Consent Order between the parties is amended in its entirety to read as follows:

17. The Respondent shall submit necessary applications for the construction of the facility identified in Paragraph No. 15 above, within twenty-six (26) months from the effective date of this order. "Facility" as referenced in the previous sentence shall be limited to a replacement landfill or other disposal option for the ultimate disposal of ash and/or solid waste. Applications for transfer stations and other storage and handling facilities for ash and/or solid waste are not included.

2. Paragraph No. 20 of the original Consent Order between the parties is amended in its entirety to read as follows:

20. Respondent shall complete Phase II closure within fifteen (15) months after the execution of contracts specified in Paragraph No. 19 above, or by November 30, 1993, if the disposal alternative selected under Paragraph No. 15 above does not require construction of a solid waste disposal facility by the Respondent.

3. Add a new Paragraph No. 20A to the original Consent Order between the parties, which paragraph shall read as follows:

20A. The Respondent shall submit necessary applications for construction of a solid waste transfer station at least eighteen (18) months prior to the completion date for Phase II closure.

4. Add a new Paragraph No. 20B to the original Consent Order between the parties, which paragraph shall read as follows:

20B. The Respondent shall establish a closure/post-closure escrow account pursuant to FAC 17-701.076. The account shall be established and funded as follows:

- The estimated cost of Phase II closure shall be deposited to the account in equal monthly increments between October 1990 and November 1993.
- The estimated post-closure cost shall be deposited to the account in equal monthly increments between October 1990 and September 1996.

7/9

5. Add a new Paragraph No. 37 to the original Consent Order between the parties, which paragraph shall read as follows:

37. This Consent Order Amendment No. 1 is final agency action of the Department pursuant to Section 120.69, Florida Statutes, and Florida Administrative Code Rule 17-103.110(3), and it is final and effective on the date filed with the Clerk of the Department unless a Petition for Administrative Hearing is filed in accordance with Chapter 120, Florida Statutes. Upon the timely filing of a petition this Consent Order Amendment No. 1 will not be effective until further order of the Department.

For the Respondent:

May 8, 1991
Date

G. Felix Cooper
City Manager
City of Key West

DONE AND ORDERED THIS 1st day of August, 1991, in Fort Myers, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION

FILING AND ACKNOWLEDGEMENT
FILED, on this date, pursuant to S 120.52 Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

Vanessa Olivera 8-1-91
CLERK DATE

Phillip R. Edwards
Deputy Assistant Secretary
South Florida District
2269 Bay Street
Fort Myers, Florida 33901
Telephone: (813) 332-2667

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a true and correct copy of the following was furnished by U.S. Mail to G. Felix Cooper this 1st day of August, 1991.

Ronald D. Blackburn
Environmental Administrator

RESOLUTION NO. 92-280

A RESOLUTION APPROVING AND AUTHORIZING EXECUTION OF ATTACHED CONSENT ORDER AMENDMENT NO. 2 BETWEEN THE CITY OF KEY WEST AND STATE OF FLORIDA, DEPARTMENT OF ENVIRONMENTAL REGULATION; PROVIDING AN EFFECTIVE DATE.

BE IT RESOLVED by the City Commission of the City of Key West, Florida as follows that the attached Consent Order Amendment No. 2 between the City of Key West and State of Florida, Department of Environmental Regulation is hereby approved. The City Manager is hereby authorized to execute said Consent Order Amendment No. 2 on behalf of the City of Key West, and the City Clerk is hereby authorized to attest to his signature and affix the Seal of the City thereto.

This Resolution shall go into effect immediately upon its passage and adoption and authentication by the signatures of the presiding officer and the Clerk of the Commission.

Passed and adopted by the City Commission at a meeting held this 7th day of July, 1992.

DENNIS J. WARDLOW, MAYOR

ATTEST:

THE CITY OF KEY WEST
POST OFFICE BOX 1409
KEY WEST, FLORIDA 33041

July 10, 1992

Mr. Philip R. Edwards
Florida Department of Environmental Reg.
2295 Victoria Avenue, Suite 364
Fort Myers, Fl., 33901

Dear Mr. Edwards:

Enclosed is a certified copy of Resolution No. 92-280 approving and authorizing execution of Consent Order Amendment No. 2 between the City of Key West and State of Florida, Department of Environmental Regulation. Also enclosed is Consent Order Amendment No. 2 executed by the City of Key West. Please send this office a fully executed copy for our files.

This Resolution was passed and adopted by the City Commission of the City of Key West at a meeting held July 7, 1992.

Sincerely,

Josephine Parker
City Clerk

jp

Enclosures

BEFORE THE STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

IN THE OFFICE OF THE
SOUTH FLORIDA DISTRICT

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION

Complainant

vs.

CITY OF KEY WEST

Respondent

OGC Case No. 89-0466

CONSENT ORDER AMENDMENT NO. 2

This second amendment to Consent Order is entered into, between the State of Florida, Department of Environmental Regulation (hereinafter "Department") and the City of Key West (hereinafter "Respondent).

WITNESSETH:

WHEREAS, the parties hereto previously entered into a Consent Order (OGC Case No. 89-0466) dated July 27, 1989 amended August 1, 1991, and the parties wish to amend said Consent Order;

NOW, THEREFORE, in consideration of the findings and orders contained herein and in the amended Consent Order dated August 1, 1991, the parties agree as follows:

1. Paragraph No. 20B of the amended Consent Order between the parties is amended in its entirety to read as follows:

20B. The Respondent shall establish a closure escrow account pursuant to FAC 17-701.076. The estimated cost of Phase II closure shall be deposited to the account in equal monthly increments between October 1990 and November 1993.

2. Add a new Paragraph No. 20C to the amended Consent Order between the parties, which paragraph shall read as follows:

20C. At the time of closing, and each year thereafter, the Respondent shall deposit into a long-term care escrow account sufficient funds to cover the following year's long-term care costs. The long-term care costs of the landfill shall be paid from the solid waste enterprise fund.

3. Add a new Paragraph No. 38 to the amended Consent Order between the parties, which paragraph shall read as follows:

38. This Consent Order Amendment No. 2 is final agency action of the Department pursuant to Section 120.69, Florida Statutes, and Florida Administrative Code Rule 17-103.110(3), and it is final and effective on the date filed with the Clerk of the Department unless a Petition for Administrative Hearing is filed in accordance with Chapter 120, Florida Statutes. Upon the timely filing of a petition this Consent Order Amendment No. 2 will not be effective until further order of the Department.

For the Respondent:

July 10, 1992
Date

G. Felix Cooper
City Manager
City of Key West

Attest:

Josephine Parker, City Clerk.

10012E8B.GNV-1

DONE AND ORDERED THIS ____ day of _____, 1992, in Fort Myers, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION

_____

Philip R. Edwards
Director of District Management
South Florida District
2295 Victoria Avenue
Suite 364
Fort Myers, Florida 33901
Telephone: (813) 332-6975

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a true and correct copy of the following was furnished by U.S. Mail to G. Felix Cooper this ____ day of _____, 1992.

_____

Ronald D. Blackburn
Environmental Administrator

APPENDIX II – STABILIZATION REPORT

Stock Island Landfill Stabilization Report

Prepared for the

Florida Department of Environmental Protection

South District Office
2295 Victoria Avenue, Suite 364
Fort Myers, FL 33901

Marathon Branch Office
2796 Overseas Highway, Suite 221
Marathon, FL 33050

On behalf of the

City of Key West
P.O. Box 1409
Key West, Florida 33041

May 2016

3011 S.W. Williston Road
Gainesville, FL 32608-3928

R. J. (Bo) Brunner III, P.E.
Florida P.E. No. 35951

TABLE OF CONTENTS

EXHIBITS

1 INTRODUCTION

On behalf of the City of Key West ("City"), CH2M HILL Engineers, Inc. ("Engineer") has prepared the following Stabilization Report for the Stock Island Landfill (WACS #79636) in accordance with the requirements of Chapter 62-701.620(6), Florida Administrative Code (F.A.C.) for the Florida Department of Environmental Protection ("FDEP"/"Department") review. This technical report addresses subsidence, barrier layer effectiveness, stormwater management, and landfill gas production.

As the Stock Island Landfill was constructed without a bottom liner or leachate collection system, removal system effectiveness and leachate quantity is not addressed.

The landfill gas "management" system was constructed approximately twenty years ago to effectively vent landfill gases into the atmosphere. Additional discussion regarding landfill gas production follows in Section 5 – Landfill Gas Production.

In addition, in accordance with the requirements of Chapter 62-701.620(6), the technical report required in Paragraph 62-701.510(8)(b), F.A.C. is included as a separate technical report submitted to FDEP concurrent with this report. Please see Appendix B for the *Stock Island Landfill Water Quality Monitoring Technical Report (June 2011- December 2015)*.

2 SUBSIDENCE

2.1 Site Inspection

On February 24, 2016 at approximately 10:00 AM, the Engineer performed a site inspection of the Stock Island Landfill. The facility was collocated next to a bus terminal under construction at the time of the inspection. Weather conditions were clear and sunny with minimal breeze.

Entrance to the facility was properly secured by fencing and waterfrontage. The perimeter road was well maintained, and vegetation outside the perimeter road and throughout the lower landfill sideslope sections showed signs of healthy growth. No distressed vegetation was observed outside the perimeter road.

The certifying engineer from Phases I and II closure noted the thickened growth of mangrove along the shoreline. The only gap in growth occurs where an outfall structure drains stormwater, thus scouring the shoreline clear for a few feet on either side of discharge. The shoreline mangrove stand, a common environmental risk assessment indictor, showed signs of healthy growth throughout.

Following inspection of the landfill perimeter, the Engineer inspected sideslopes and the top shelf for subsidence, distressed vegetation, landfill gas vent production, and general signs of erosion. Photos were taken of both healthy stands of variegated vegetation, as well as sparse areas undergoing City replacement and repair of areas with sparse or limited vegetation. Please see Exhibit 1 for photographs from the site inspection and subsequent ongoing City vegetation maintenance / replacement.

The variegated vegetation comprises species native to Florida, drought tolerant, and able to withstand the saltwater environment. The Engineer initially designed the variegated cover system to best withstand the difficult growing environment, as a traditional Bahia grass cover system could not survive the harsh environment. Unfortunately, the variegated vegetation does not produce the same level of coverage. Regardless, the Engineer estimated adequate coverage over more than 90-percent of the landfill cap, with the remaining areas mostly sparse and/or distressed, but not entirely without vegetation.

The Engineer noted no signs of subsidence anywhere on the landfill. Slopes and the top shelf were relatively smooth, easily navigable by a mower. In addition, there were no signs of erosion extensive enough to have exposed the polyvinyl chloride (PVC) geomembrane cap. The cover system appeared intact and fully operational.

Section 3.4 describes the City perpetual maintenance plans and Section 5 describes gas production, including recent sampling results.

2.2 Previous Subsidence Repairs

In February 2008, two areas of subsidence were observed. The general areas of subsidence are described below:

Southwest Face
The area of subsidence on the southwest face of the landfill began in the first terrace swale (approximately elevation 40) and extended up the slope approximately 50 feet. The area extended approximately 80 feet northwest to southeast along the face of the slope and approximately 3 feet deep at its deepest point. There was no evidence of soft spots or hollow areas beneath the geomembrane. The slopes from the edge of the subsidence to the center were relatively flat, and there was no evidence of surface cracking or slope failure. The recommended remediation for this area was backfilling with clean fill material and grading to approximately the original design slope. Following the completion of the grading, the area was sodded with drought tolerant ground cover.

North Face
The area of subsidence on the north face of the landfill began approximately 1/3 of the way up the lower slope below the first terrace swale and extended up the slope approximately 25 feet. The area extended approximately 30 to 35 feet west to east along the face of the slope and was approximately 3 to 4 feet deep at it deepest point. There was no evidence of soft spots or hollow areas beneath the geomembrane. The slopes from the edge of the subsidence to the center were relatively steep and there was evidence of surface cracking at the top of the area of subsidence. The recommended remediation for this area was to expose and replace the geomembrane in the area of subsidence, backfill the area with clean fill material and grade to approximately the original design slope. The geomembrane repair extended approximately 5 feet in all directions beyond the area of subsidence or areas of visible geomembrane damage. Clean bedding sand was placed beneath the new geomembrane. Following the completion of the geomembrane repair and grading, the area was sodded with drought tolerant ground cover.

The importance of this documented subsidence repair is that it coincided (approximately) with a LiDAR (Light Detection and Ranging) survey for Monroe County in late 2007, creating 1-ft contour maps based on a 2-foot vertical mapping standard (NAVD88) of the County for the Florida Division of Emergency Management (FDEM). Details regarding the aforementioned subsidence repairs are included in Exhibit 2.

The following Section on Comparison Topography describes the use of the 2007 FDEM survey for comparison with a current survey produced for analysis and presentation in this report.

2.3 Comparison Topography

Exhibit 3 includes recent topography of the Stock Island Landfill obtained from a licensed surveyor in the State of Florida. The survey depicts smooth contours, with no obvious signs of subsidence.

To further analyze topography for subsidence, comparison topography was obtained from a LiDAR (Light Detection and Ranging) survey for Monroe County in late 2007, creating 1-ft contour maps (NAVD88) performed on behalf of the Florida Division of Emergency Management (FDEM).

In addition to recent topography, Exhibit 3 includes a comparison of recent topography and the 2007 FDEM LiDAR survey within the landfill footprint. Comparison of topography dating back approximately nine (9) years and what was obtained recently indicates the only areas of subsidence were either repaired as part of the subsidence repair work described in Section 2.2, or likely low areas around stormwater drainage inlets where the 2007 LiDAR failed to obtain the same level of accuracy as recent topographic mapping. Sideslopes and the top shelf exhibited no significant subsidence in the comparison.

It is the Engineer's conclusion that the comparison between recent topography and the 2007 FDEM LiDAR survey indicates significant subsidence of the waste has ceased in accordance with Chapter 62-701.620(1)(c), F.A.C.

3 BARRIER LAYER EFFECTIVENESS

3.1 Barrier Components

The Stock Island landfill was closed in two phases; Phase I was closed in 1990 and Phase II was closed in 1992. The landfill was closed by placing 18 inches of screening sand over one layer of 30-mil polyvinyl chloride (PVC) geomembrane which, in turn, overlies 6 inches of bedding sand.

3.2 Barrier Layer Condition

Upon recent inspection, there were no signs of erosion extensive enough to have exposed the PVC geomembrane cap. The cover system appeared intact and operational. Areas of sparse and/or distressed vegetation are scheduled to be addressed by the City.

3.3 Barrier Layer Recent Repairs

Subsequent to the Engineer's inspection, the City made repairs of areas on the Stock Island Landfill where sparse and/or distressed vegetation required maintenance. Future City maintenance is discussed in Section 3.4

3.4 Barrier Layer Perpetual Care

Upon Department acceptance of the City's request to certify discontinuation of Long-Term Care requirements for the Stock Island Landfill, the City will maintain the property through a period herein referred to as "perpetual." The City's perpetual maintenance includes the following:

- Management of the property in accordance with the South Florida Water Management District Permit 44-00076-S (included as Exhibit 4).
- Mowing / Clearing of vegetation over the capped area six times per year, or on an as-needed basis. Vegetation clearing would include clearing areas surrounding stormwater structures in accordance with the stormwater permit.
- Iguana control services are utilized on an as-needed basis. Please note that Exhibit 1 includes photographs of an iguana hole and a subsequently filled iguana hole, marked with flagging. The City will continue to proactively protect the geomembrane from iguana activity on the capped landfill area with the ongoing assistance of a professional iguana management and removal contractor.
- In the event subsidence occurs, the City will repair area(s) in such a manner as to return the area(s) to original permitted closure condition.
- The City will continue to address sparse and / or distressed vegetation over the Stock Island Landfill by replanting on an as-needed basis.

4 STORMWATER MANAGEMENT

4.1 Stormwater Management System Background

Stormwater management of the Stock Island Landfill is in accordance with the South Florida Water Management District Permit 44-00076-S (included as Exhibit 4). The City proposes no changes at this time to the existing stormwater permit conditions.

4.2 Stormwater Management System Requirements

The City will continue to manage stormwater at the Stock Island Landfill in accordance with South Florida Water Management District Permit 44-00076-S (included as Exhibit 4). Please note that the stormwater drainage structures were recently serviced by a third party contractor, and all components are reported to be in working condition. Engineer's inspection indicated nothing to the contrary.

5 LANDFILL GAS PRODUCTION

5.1 Landfill Gas Vents

Exhibit 5 includes results of the methane and hydrogen sulfide gas monitoring conducted on May 4, 2016 and May 11-13, 2016 at the Key West Stock Island Landfill. A site plan is also provided showing locations of gas vents sampled.

Testing for the site was conducted by CH2M, using a MultiRAE gas analyzer. The MultiRAE unit was last tested for accuracy and cleared for use by CH2M equipment technicians on 4/22/2016 and was field-calibrated using calibration gases prior to gas monitoring. Landfill Gas Vents GV-1 through GV-7, all located on the landfill peak, showed methane readings of > 100% LEL (% of the lower explosive limit for methane), when sampled directly from the vent. GV-1 through GV-7 were also the only vents to produce hydrogen sulfide readings, ranging from 1.3 to 6.9 ppm. GV-22, GV-26, and GV-29 yielded % LEL readings 30%, 4%, and 25% respectively. LEL for methane and hydrogen sulfide were not detectable at the other gas vents. The LEL of methane in air is accepted as 5% methane by volume while the upper explosive limit (UEL) is 15% methane by volume. % LEL readings of greater than 100% LEL, as seen in Gas Vents 1 through 7, indicate the potential for explosive concentrations.

Initial sampling began at approximately 11:00 a. m. on May 5, 2016 on gas vents 1-7 (highest point of landfill). Venting at these locations could be physically felt and produced odors along the top of the landfill. Prior to completing gas monitoring at approximately 14:30 pm, field personnel observed a decrease in odor along the top of the landfill and noticed venting could no longer be felt under the gas vent screens. Gas Vents 1 through 7 were then sampled a second time, yielding results of between 0 and 5 % LEL, significantly lower than initial sampling results.

It was hypothesized that the apparent decrease in venting could be associated with local tidal fluctuations, as the site is bordered by seawater on two sides and in close proximity on a third side. Initial comparisons of field measurements with NOAA tidal charts (Exhibit 5) supported this hypothesis and prompted development of a secondary testing plan. Follow-up gas monitoring was completed from 14:43 p. m. on May 11, 2016 through 1:06 a. m. on May 13, 2016. The MultiRAE unit was installed at one of the more productive gas vents, GV-3, and was set for data logging, with a sampling interval of 120 seconds.

Results from data logging indicate minor correlations between gas venting and tidal fluctuation as gas vent off-gassing concentrations fluctuate throughout the day. However, tidal influence does not appear to be the sole source of off-gas fluctuations. Rate of off-gassing and gas concentrations are likely influenced by a variety of factors such as tidal and atmospheric pressure fluctuation.

Although LFG production is still occurring, it is occurring at a slow rate and only detectable in the deepest portion of the landfill; therefore, LFG production in and of itself should not prevent the termination of long-term care of the landfill.

Please note that GV-20 was damaged at the time of sampling, hence the “not available” / “N/A” on the provided table in Exhibit 5.

5.2 Landfill Gas Perimeter Probes

Two LFG monitoring probes were installed during Phase I closure construction and one additional LFG monitoring probes was installed as part of Phase II closure construction. No data or records for gas monitoring results were found from a thorough review of electronic files. Paper copies of records stored at the Southernmost Waste to Energy (SWTE) facility were determined to be past record storage retention dates and subsequently destroyed. A search conducted by the City and Engineer of OCULUS does not show gas monitoring data for the vents or the perimeter probes for the Stock Island Landfill. R. J. Bruner III, Engineer of Record for this document, remembers discussing the LFG monitoring probes with a City official during operation of the SWTE facility as a solid waste transfer facility. At that time,

Mr. Bruner was informed that the probes had been monitored for several years, that all reading were non-detectable and that the probes had been properly abandoned by filling with cement grout.

6 SUMMARY AND CONCLUSIONS

Following inspection of the landfill perimeter, the Engineer inspected sideslopes and the top shelf for subsidence, distressed vegetation, landfill gas vent production, and general signs of erosion. Photos were taken of both healthy stands of variegated vegetation, as well as areas undergoing City replacement and repair due to sparse or limited vegetation. Please see Exhibit 1 for photographs from the site inspection and subsequent ongoing City vegetation maintenance / replacement.

The Engineer noted no signs of subsidence anywhere on the landfill. Slopes and the top shelf were relatively smooth, easily navigable by a mower. In addition, there were no signs of extensive erosion and no signs of the exposed polyvinyl chloride (PVC) geomembrane cap. The cover system appeared intact and fully operational.

In addition to analysis of recent topography, Exhibit 3 includes a comparison of recent topography and the 2007 FDEM LiDAR survey within the landfill footprint. Comparison of topography dating back approximately nine (9) years and what was obtained recently indicates the only areas of subsidence were either repaired as part of the subsidence repair work described in Section 2.2, or low areas located at stormwater drainage inlets where the 2007 LiDAR failed to obtain the same level of accuracy as recent topographic mapping. Sideslopes and the top shelf exhibited no significant subsidence in the comparison.

It is the Engineer's conclusion that the comparison between recent topography and the 2007 FDEM LiDAR survey indicates significant subsidence of the waste has ceased in accordance with Chapter 62-701.620(1)(c), F.A.C.

Upon recent inspection of the barrier layer, there were no signs of erosion extensive enough to have exposed the polyvinyl chloride (PVC) geomembrane cap. The cover system appeared intact and fully operational. Areas of sparse and/or distressed vegetation were already on the City's schedule to be addressed as soon as resources could be made available.

Stormwater management is performed in accordance with the South Florida Water Management District Permit 44-00076-S. Stormwater structures, berms, and terraces appeared undamaged and functional with minimal or no signs of erosion. The inspection was conducted during a dry period; therefore, the functionality of the system was not observed. The system will continue to be managed in accordance with the aforementioned permit.

Sampling of the landfill gas vents indicated the presence of methane and hydrogen sulfide in seven (7) of the vents on the top shelf of the landfill with trace amounts of methane in a few additional wells. Sampling of the remaining vents indicated no measurable methane or hydrogen sulfide. Landfill gas measurements indicated the intermittent presence of landfill gas at the deeper vents (i.e. those on the top shelf), with no indication the vents on the sideslope are producing gas in consistently measureable amounts. Although LFG production is still occurring, it is occurring at a slow rate and only detectable in the deepest portion of the landfill; therefore, LFG production in and of itself should not prevent the termination of long-term care of the landfill.

EXHIBITS

Exhibit 1 - PHOTOGRAPHS

Figure 1 - Variegated Vegetation Barrier Layer

Figure 2 - Northwest Landfill Panorama

Figure 3 - Southeast Landfill Panorama

Figure 4 - North Sideslope, Perimeter Road, and Mangrove Stand

Figure 5 – Top Shelf and Landfill Maintenance Road (East-Northeast)

Figure 6 – Example Stormwater Structure (Clean Inside & Well-Maintained Outside)

Figure 7 - Sparse / Distressed Vegetation

Figure 8 – Example Iguana Burrow

Figure 9 – Covered and Flagged Iguana Burrow

Figure 10 - Ongoing City Barrier Layer Maintenance / Repairs (March 2016)

Exhibit 2 - Subsidence Repair Certification and Operations Plan - OGC No 89-0466 (2008-2010)

CH2M HILL
3011 SW Williston Road
Gainsville, FL 32608-3928
P.O. Box 147009
Gainesville, FL 32614-7009
Tel 352.335.7991
Fax 352.335.2959

CH2MHILL

June 29, 2010

Mr. Charles Emery, III
Environmental Administrator
Solid Waste Section
Florida Department of Environmental Protection
Southwest District
2295 Victoria Ave., Suite 364
Fort Myers, FL 33901

Subject: Monroe County - SW
Stock Island Landfill
OGC Case No. 89-0466
Long-Term Care Period
Erosion of Cover and Subsidence of Waste

Dear Mr. Emery:

Attached in accordance with Paragraph 7.d of Consent Order Amendment No. 3, OGC File No. 89-0466 is the Certification of Construction Completion for long-term care erosion and subsidence repair activities at the subject landfill.

If you have any questions regarding the repair activities, please give me a call at 352/384-7023 or 352/213-3466.

Sincerely,

CH2M HILL

R. J. Bruner III, P.E.
Sr. Project Manager

Enclosures

cc: Andy Smyth/KWF
Jay Gewin/City of Key West
Barbara Nevins/FDEP Marathon

Florida Department of Environmental Protection
Twin Towers Office Bldg. • 2600 Blair Stone Road • Tallahassee, FL 32399-2400

DEP Form # 62-701.900(2)
Form Title Certification of Construction Completion
Effective Date May 19, 1994

DEP Application No. _____
(Filled by DEP)

Certification of Construction Completion of a Solid Waste Management Facility

DEP Construction Permit No: OGC No. 89-0466 CO Amend 3 County: Monroe

Name of Project: Stock Island Landfill, Repair Operations Plan

Name of Owner: City of Key West FL

Name of Engineer: CH2M HILL

Type of Project: Long-term care, erosion and subsidence repairs

Cost: Estimate $ 100,000.00 Actual $ Approx - $100,000.00

Site Design: Quantity: N/A ton/day Site Acreage: 21 Acres

Deviations from Plans and Application Approved by DEP: None.

Address and Telephone No. of Site: 5701 W. College Rd, Key West, FL 33040
Phone 305.809.3902

Name(s) of Site Supervisor: _____

Date Site inspection is requested: Within 2 weeks-Please notify Jay Gewin at above phone number

This is to certify that, with the exception of any deviation noted above, the construction of the project has been completed in substantial accordance with the plans authorized by Construction

Permit No. OGC No. 89-0466 CO Amend No. 3 :Dated: March 17, 2010

Date: June 29, 2010

Signature of Professional Engineer
R.J. Bruner III, P.E. 6/29/10
PE No. 35951

Northwest District
160 Governmental Center
Pensacola, FL 32501-5794
850-595-8360

Northeast District
7825 Baymeadows Way, Ste. B200
Jacksonville, FL 32256-7590
904-448-4300

Central District
3319 Maguire Blvd., Ste. 232
Orlando, FL 32803-3767
407-894-7555

Southwest District
3804 Coconut Palm Dr.
Tampa, FL 33619
813-744-6100

South District
2295 Victoria Ave., Ste. 364
Fort Myers, FL 33901-3881
941-332-6975

Southeast District
400 North Congress Ave.
West Palm Beach, FL 33401
561-681-6600

CH2MHILL TRANSMITTAL

To: Barbara Nevins/FDEP Marathon
2796 Overseas Highway
Marathon, FL 33050
305-289-2310

From: Bo Bruner
CH2M HILL
3011 S. W. Williston Rd.
Gainesville, Fl 32608

Attn: Barbara

Date: April 6, 2009

Re: Key West Repair Operations Plan Figures 1 thru 5

We Are Sending You:

Method of shipment: FedEx

☑ Attached

Under separate cover via

Drawings ☑ Documents Tracings

Prints Specifications Catalogs

Copy of letter Other:

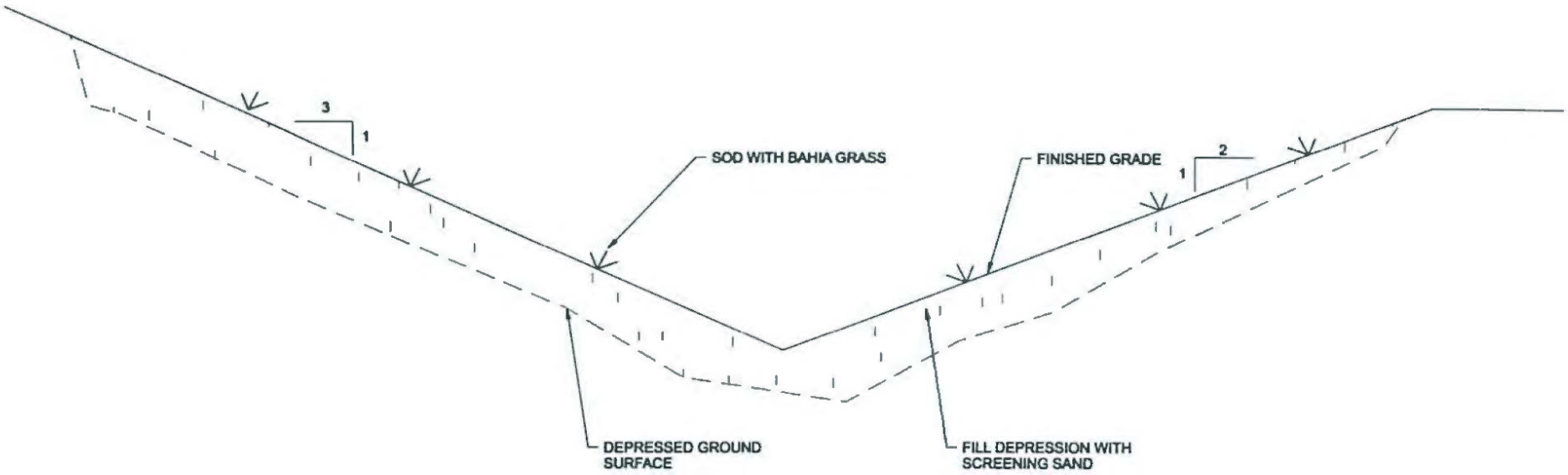
Quantity	Description
1 set	Landfill Repair Operations Plan Figures 1 thru 5

If the material received is not as listed, please notify us at once.

Remarks: Enclosed is Figures 1 thru 5, which were inadvertently left out of the Landfill Repair Operations Plan when it was mailed out last week. If you have questions regarding the plan, please contact Bo Bruner, 352-384-7023.

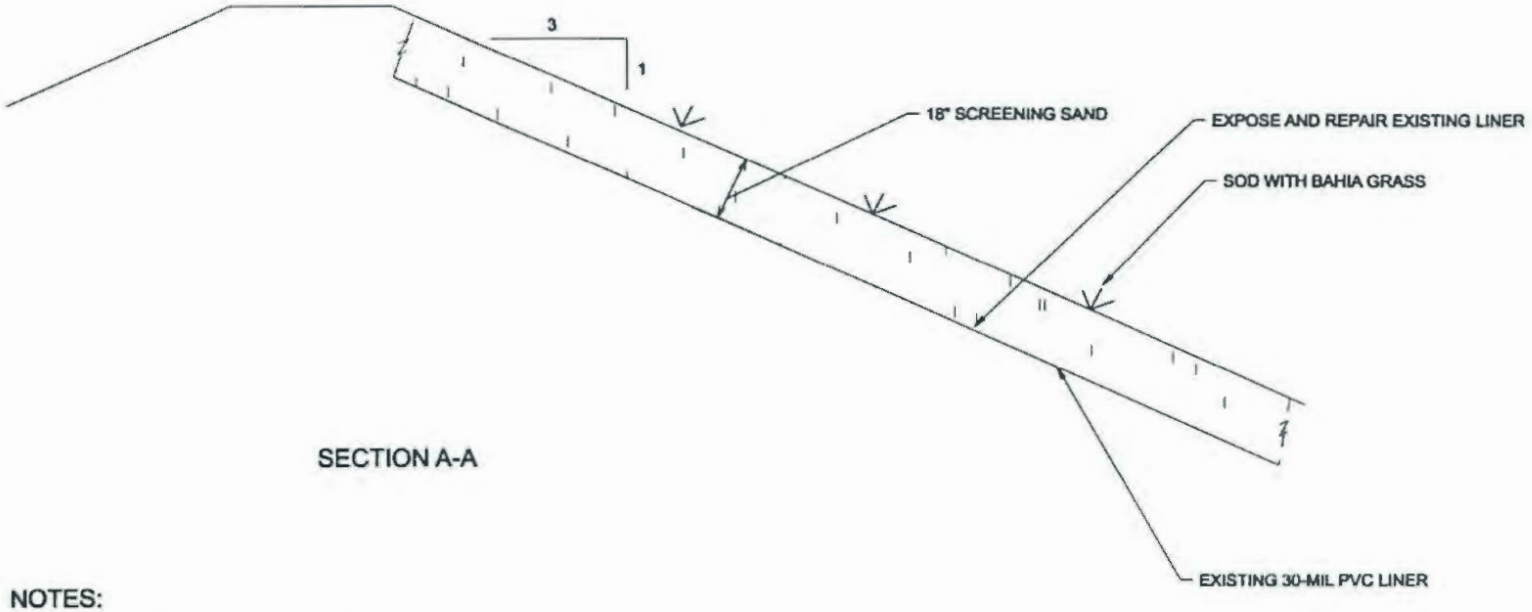
Copy To: FILE
Andy Smith/KWF

RECEIVED
APR 07 2009
D.E.P. Marathon



SECTION B-B

FIGURE 5 DETAIL FOR FILLING DEPRESSION WITH SCREENING SAND



SECTION A-A

NOTES:

1. CONTRACTOR SHALL EXPOSE THE EXISTING PVC LINER USING LIGHT WEIGHT TRACK MOUNTED EQUIPTMENT AND SHOVELS. SEAM THE PVC AS SPECIFIED AND DIRECTOR BY ENGINEER.
2. COVER THE REPAIRED PVC LINER WITH 18" OF SCREENING SAND.
3. SOD THE DISTURBED AREA WITH BAHIA GRASS.

FIGURE 4 DETAIL FOR EXPOSING AND REPAIRING THE PVC LINER

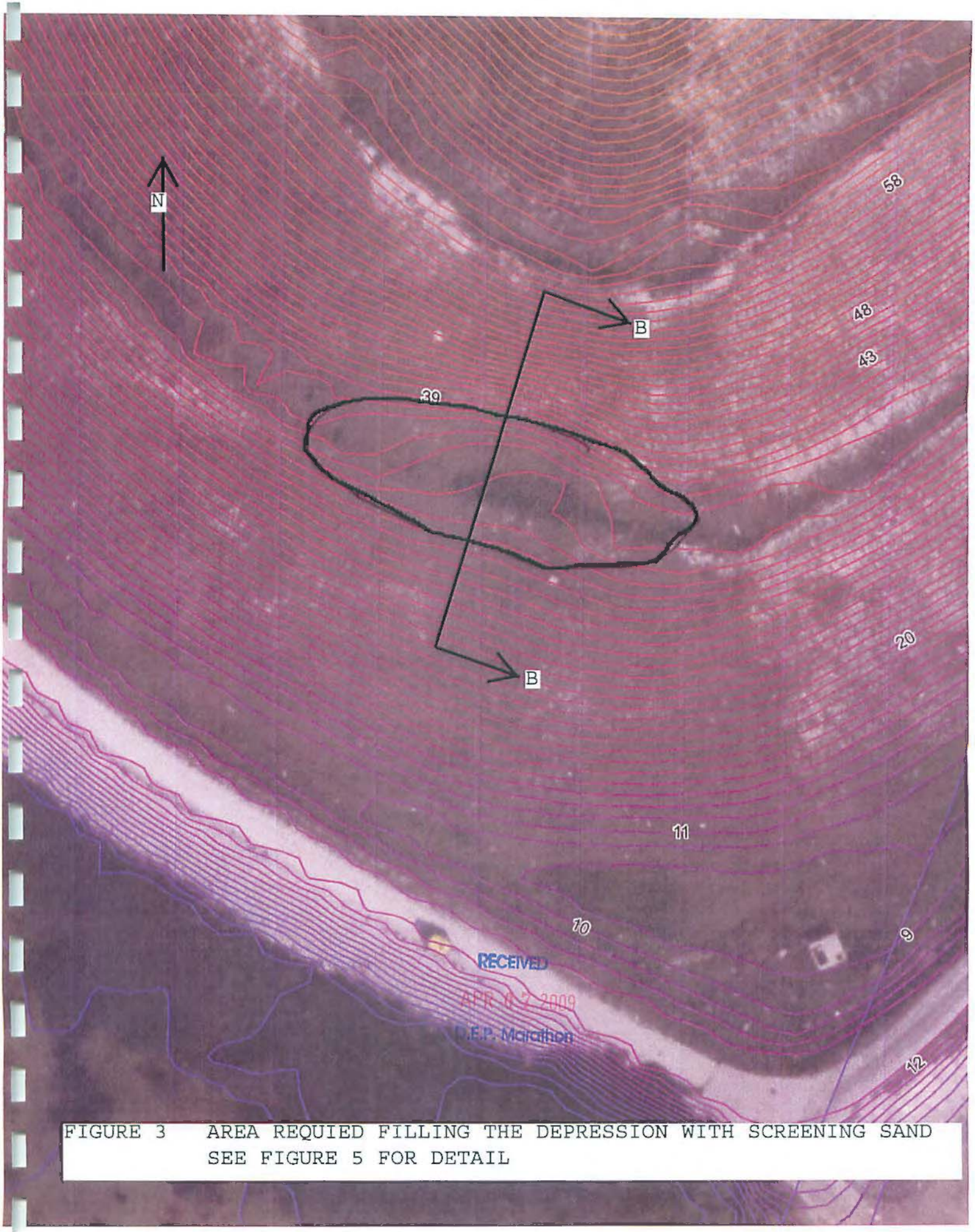


FIGURE 3 AREA REQUIED FILLING THE DEPRESSION WITH SCREENING SAND SEE FIGURE 5 FOR DETAIL

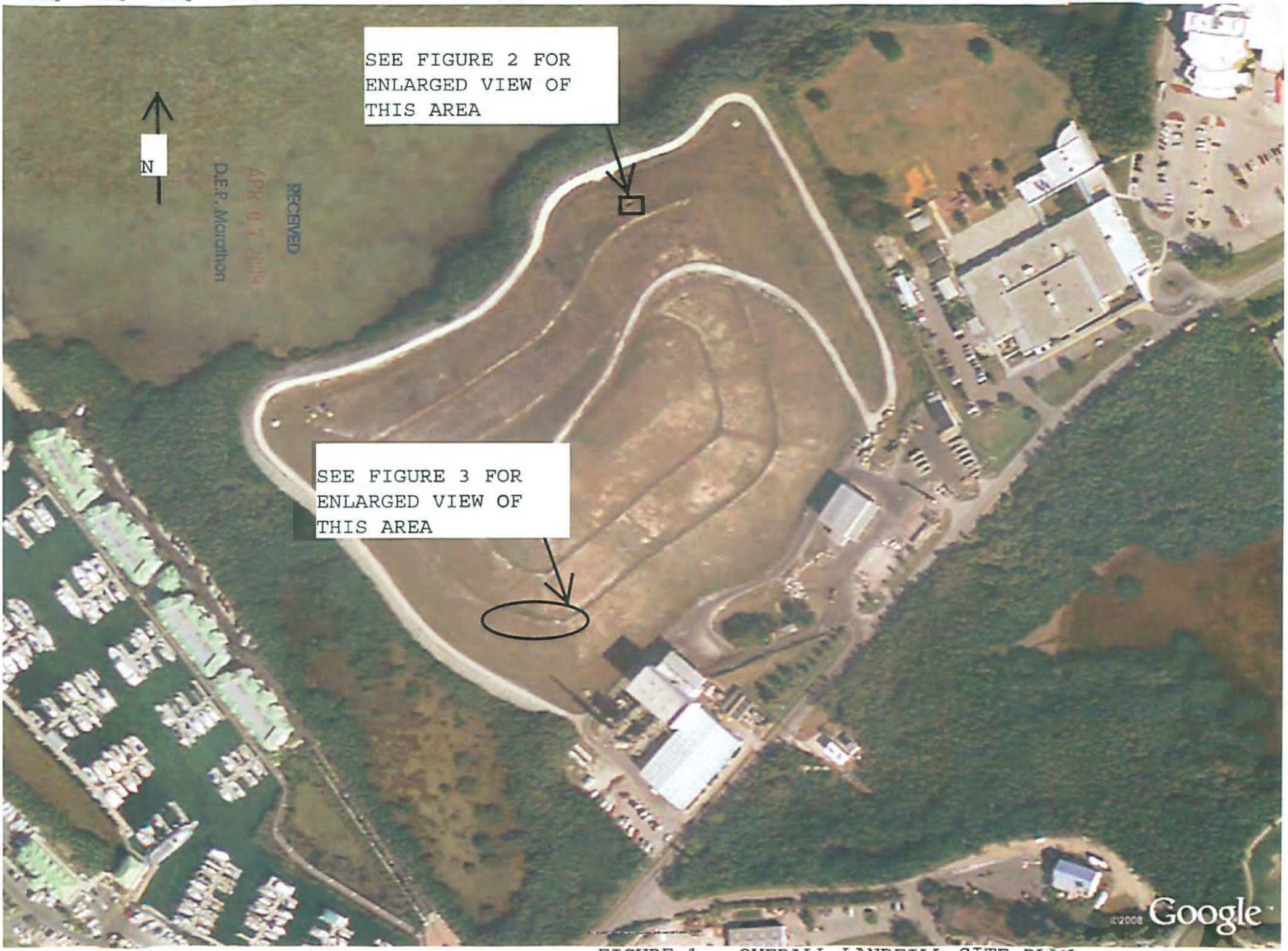
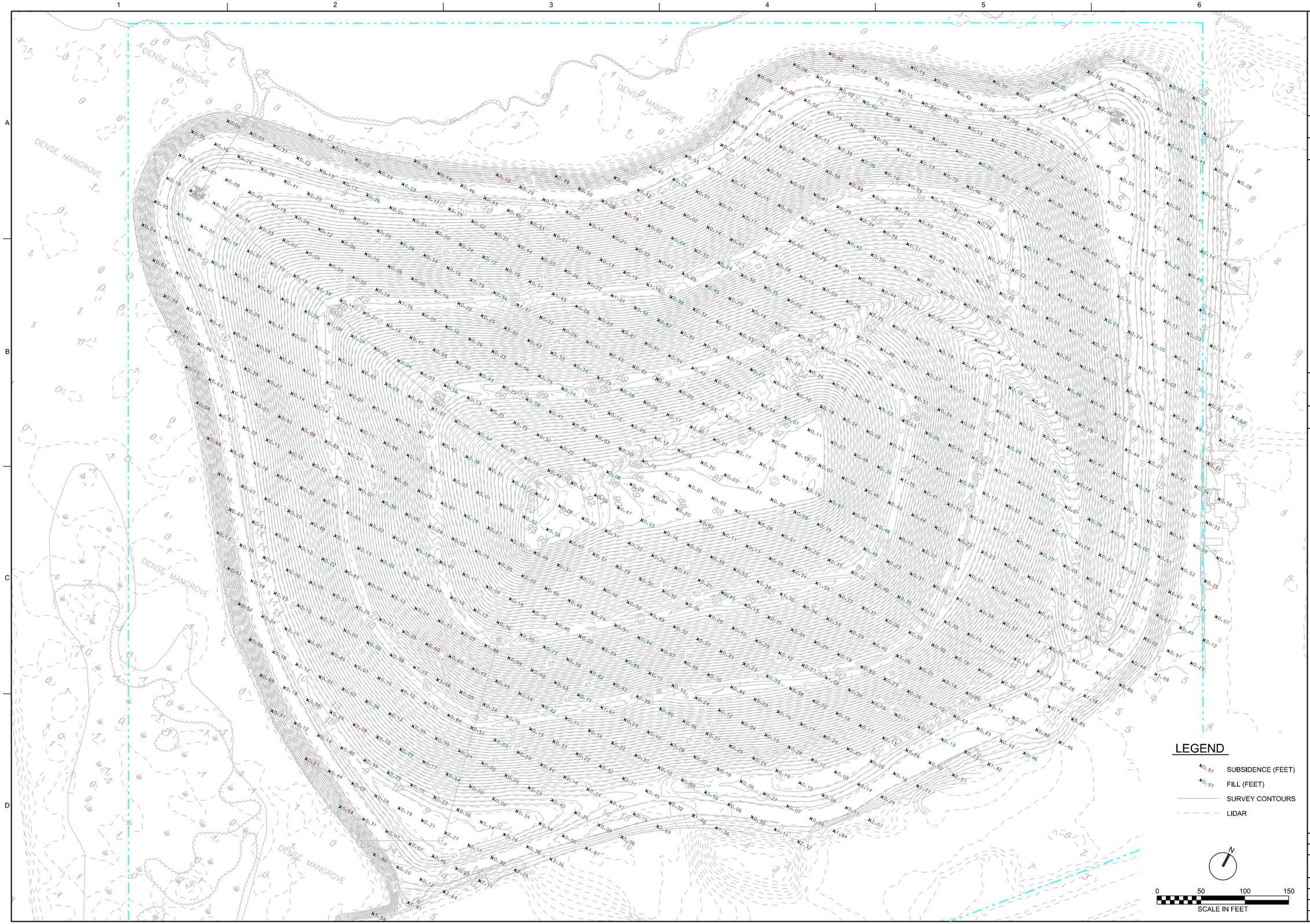


FIGURE 1 OVERALL LANDFILL SITE PLAN

FIGURE 2 AREA REQUIRES EXPOSING, REPAIRING, AND COVERING THE LINER WITH SCREENING SAND SEE FIGURE 4 FOR DETAIL

Exhibit 3 – Topographic Information



NO.	DATE	REVISION	BY	APVD
DSGN	B HIGERD	DR C CHILDRESS	CHK B HIGERD	APVD B BRUNER

KEY WEST STOCK ISLAND
LANDFILL
CITY OF KEY WEST, FLORIDA

CIVIL
SITE PLAN

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	MAY 2016
PROJ	671926
DWG	C-01
SHEET	of

Exhibit 4 - South Florida Water Management District Permit (with Drainage Map)

Form #0150
Rev. 10-89

****

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

MODIFICATION OF SURFACE WATER MANAGEMENT PERMIT NO. 44-00076-S

CERTIFICATION FOR STORMWATER DISCHARGE

****

DATE ISSUED: MARCH 11, 1993

ISSUED TO: CITY OF KEY WEST
(STOCK ISLAND LANDFILL & ASH TRANSFER FACILITY)
525 ANGELA STREET
KEY WEST, FL 33040

LOCATION: MONROE COUNTY, SECTION 26,27 TWP. 67S RGE. 25E

ORIGINAL PERMIT AUTHORIZATION: CONSTRUCTION AND OPERATION OF A WATER MANAGEMENT SYSTEM SERVING 32.5 ACRES OF INDUSTRIAL LANDS (SANITARY LANDFILL) DISCHARGING INTO THE GULF OF MEXICO.

APPROVED MODIFICATION: MODIFICATION OF THE SURFACE WATER MANAGEMENT SYSTEM SERVING 21.37 ACRES OF LANDFILL AREA AND THE ASH TRANSFER STATION DISCHARGING INTO THE GULF OF MEXICO.

(921027-8)

This Permit Modification is approved pursuant to a request dated Sept. 28, 1992. Permittee agrees to hold and save the South Florida Water Management District and its successors harmless from any and all damages, claims or liabilities which may arise by reason of the construction, operation, maintenance or use of any work or structure involved in the Permit. The original Permit, including all plans and specifications attached thereto, as addressed by the staff report and those addressed by the Modification Staff Report are by reference made a part hereof.

All specifications and special and Limiting Conditions attendant to the original Permit, unless specifically recinded by this or previous Modifications, remain in effect.

SPECIAL CONDITIONS: SEE SHEETS 2,3,4 & 5 OF 7 - 13 SPECIAL CONDITIONS.
SEE SHEETS 6 & 7 - 12 LIMITING CONDITIONS.

ORIGINAL PERMIT ISSUED: FEBRUARY 9, 1989

PERMIT MODIFICATION APPROVED BY THE GOVERNING BOARD OF THE SOUTH FLORIDA WATER MANAGEMENT DISTRICT

FILED WITH THE CLERK OF THE SOUTH FLORIDA WATER MANAGEMENT DISTRICT

ON 3-11-93

BY _____ DEPUTY CLERK

ANTHONY M. WATERHOUSE, P.E.,
DEPUTY DIRECTOR
WATER MANAGEMENT DIVISION
RESOURCE CONTROL DEPARTMENT

SPECIAL CONDITIONS

1 . DISCHARGE FACILITIES:

BASIN: LANDFILL, STRUCTURE NO. 1:

1-6.5' WIDE SHARP CRESTED WEIR WITH CREST AT ELEV. 14' NGVD.
1-7.67' W X 1' H RECTANGULAR ORIFICE WITH INVERT AT ELEV. 12.48' NGVD.
90 LF OF 3' DIA. RCP CULVERT.
1-7.67' WIDE X 1' HIGH SLIDE GATE WITH INVERT AT ELEV. 11.48' NGVD AND WITH CREST AT ELEV. 12.48' NGVD.

RECEIVING BODY : GULF OF MEXICO

CONTROL ELEV : 12.48 FEET NGVD.

BASIN: LANDFILL, STRUCTURE NO. 2:

1-6.5' WIDE SHARP CRESTED WEIR WITH CREST AT ELEV. 14' NGVD.
1-7.67' W X .66' H RECTANGULAR ORIFICE WITH INVERT AT ELEV. 12.5' NGVD.
95 LF OF 3' DIA. RCP CULVERT.
1-7.67' WIDE X 1' HIGH SLIDE GATE WITH INVERT AT ELEV. 11.5' NGVD AND WITH CREST AT ELEV. 12.5' NGVD.

RECEIVING BODY : GULF OF MEXICO

CONTROL ELEV : 12.48 FEET NGVD.

BASIN: LANDFILL, STRUCTURE NO. 3:

1-6.5' WIDE SHARP CRESTED WEIR WITH CREST AT ELEV. 14' NGVD.
1-7.67' W X .5' H RECTANGULAR ORIFICE WITH INVERT AT ELEV. 12.5' NGVD.
80 LF OF 3' DIA. RCP CULVERT.
1-7.67' WIDE X 1' HIGH SLIDE GATE WITH INVERT AT ELEV. 11.5' NGVD AND WITH CREST AT ELEV. 12.5' NGVD.

RECEIVING BODY : GULF OF MEXICO

CONTROL ELEV : 12.48 FEET NGVD.

BASIN: ASH TRANSFER FAC.:

1-6.5' WIDE SHARP CRESTED WEIR WITH CREST AT ELEV. 5' NGVD.
1-.5' DIA. CIRCULAR ORIFICE WITH INVERT AT ELEV. 2.7' NGVD.
22 LF OF 1.5' DIA. RCP CULVERT.

RECEIVING BODY : GULF OF MEXICO

CONTROL ELEV : ~~2.7~~ 2.55' FEET NGVD.

2 . THE PERMITTEE SHALL BE RESPONSIBLE FOR THE CORRECTION OF ANY EROSION, SHOALING OR WATER QUALITY PROBLEMS THAT RESULT FROM THE CONSTRUCTION OR OPERATION OF THE SURFACE WATER MANAGEMENT SYSTEM.

3 . MEASURES SHALL BE TAKEN DURING CONSTRUCTION TO INSURE THAT SEDIMENTATION AND/OR TURBIDITY PROBLEMS ARE NOT CREATED IN THE RECEIVING WATER.

4 . THE DISTRICT RESERVES THE RIGHT TO REQUIRE THAT ADDITIONAL WATER QUALITY TREATMENT METHODS BE INCORPORATED INTO THE DRAINAGE SYSTEM IF SUCH MEASURES ARE SHOWN TO BE NECESSARY.

5 . PRIOR TO THE INITIATION OF ANY WITHDRAWAL OF WATER (IRRIGATION, DEWATERING, PUBLIC WATER SUPPLY, ETC.), IT WILL BE NECESSARY TO APPLY FOR A WATER USE PERMIT. THE PERMITTEE IS CAUTIONED THAT A MINIMUM OF 90 DAYS IS REQUIRED FOR CONSIDERATION OF THE WATER USE PERMIT APPLICATION. THE PERMITTEE IS CAUTIONED THAT THE ISSUANCE OF A SURFACE WATER MANAGEMENT PERMIT SHALL NOT BE CONSTRUED TO BE A GUARANTEE THAT WATER WILL BE AVAILABLE.

6 . FACILITIES OTHER THAN THOSE STATED HEREIN SHALL NOT BE CONSTRUCTED WITHOUT AN APPROVED MODIFICATION OF THIS PERMIT.

7 . A BENCHMARK SHALL BE PROVIDED IN THE VICINITY OF THE CONTROL STRUCTURE AND A DESCRIPTION PROVIDED TO THE DISTRICT WHEN CERTIFYING CONSTRUCTION COMPLETION OF THE DRAINAGE FACILITIES.

8 . PRIOR TO MAY 15, 1993, THE SOUTH FLORIDA WATER MANAGEMENT DISTRICT SHALL BE NOTIFIED BY THE PERMITTEE OR AUTHORIZED AGENT (VIA THE SUPPLIED CONSTRUCTION COMMENCEMENT NOTICE OR EQUIVALENT) OF THE ACTUAL OR ANTICIPATED CONSTRUCTION START DATE AND THE EXPECTED COMPLETION DATE/ DURATION.

9 . WHEN THE DURATION OF CONSTRUCTION EXCEEDS ONE YEAR, CONSTRUCTION STATUS REPORTS SHALL BE SUBMITTED TO THE SOUTH FLORIDA WATER MANAGEMENT DISTRICT ON AN ANNUAL BASIS (VIA THE SUPPLIED ANNUAL STATUS REPORT OR EQUIVALENT) BEGINNING ONE YEAR AFTER THE INITIAL COMMENCEMENT OF CONSTRUCTION DATE.

10. WITHIN 30 DAYS AFTER COMPLETION OF CONSTRUCTION OF THE SURFACE WATER MANAGEMENT SYSTEM, THE PERMITTEE OR AUTHORIZED AGENT SHALL NOTIFY THE SOUTH FLORIDA WATER MANAGEMENT DISTRICT OF THAT COMPLETION DATE AND SUBMIT CERTIFICATION BY A FLORIDA REGISTERED PROFESSIONAL ENGINEER THAT ALL FACILITIES HAVE BEEN CONSTRUCTED IN ACCORDANCE WITH THE DESIGN APPROVED BY THE DISTRICT (VIA THE SUPPLIED CONSTRUCTION COMPLETION/CONSTRUCTION CERTIFICATION OR EQUIVALENT). SUCH CERTIFICATION MAY CONSIST OF WORDING IN PARAGRAPH 3.1.7 "CONSTRUCTION COMPLETION CERTIFICATION" OF THE CURRENT BASIS OF REVIEW FOR SURFACE WATER MANAGEMENT PERMIT APPLICATIONS WITHIN THE SOUTH FLORIDA WATER MANAGEMENT DISTRICT. IF THE CERTIFICATION LANGUAGE USED IS DIFFERENT FROM THE SUGGESTED LANGUAGE, A SET OF RECORD DRAWINGS CONSISTING OF ELEVATIONS, LOCATIONS AND DIMENSIONS OF COMPONENTS OF THE SURFACE WATER MANAGEMENT SYSTEM SHALL ALSO BE SUBMITTED.

11. OPERATION OF THE SURFACE WATER MANAGEMENT SYSTEM SHALL BE THE RESPONSIBILITY OF THE PERMITTEE. PRIOR TO TRANSFER OF TITLE FOR ANY PORTION OF THE PROJECT TO A THIRD PARTY, MODIFICATION OF THE PERMIT WILL BE REQUIRED TO VERIFY CONTINUED COMPLIANCE WITH LIMITING CONDITION NO. 8.

12. WATER QUALITY SAMPLES SHALL BE TAKEN AT THE DISCHARGE LOCATION(S) OF THE WATER MANAGEMENT SYSTEM DURING PERIODS OF DISCHARGE, OR IF NO DISCHARGE OCCURS DURING THE SCHEDULED MONITORING PERIOD, WATER QUALITY SAMPLES SHALL BE TAKEN IMMEDIATELY UPSTREAM OF THE DISCHARGE STRUCTURE (SEE EXHIBIT NO. 2). A LABORATORY CERTIFIED BY FLORIDA DER AND/OR HRS SHALL BE RESPONSIBLE FOR ALL WATER QUALITY SAMPLING AND ANALYSES. REPORTS, INCLUDING THE DER/HRS CERTIFIED LAB NUMBER, SFWMD PERMIT NUMBER, SAMPLE LOCATION, AND FLOW/NO-FLOW OCCURENCE SHALL BE SUBMITTED TO THIS DISTRICT SEMI-ANNUALLY UNLESS REQUESTED ON A MORE FREQUENT BASIS. INITIAL SAMPLING RESULTS SHALL BE REPORTED TO THIS DISTRICT NO LATER THAN 30 DAYS FOLLOWING THE SUBMITTAL OF THE CONSTRUCTION COMPLETION/CONSTRUCTION CERTIFICATION OF THE SURFACE WATER MANAGEMENT SYSTEM BY A FLORIDA REGISTERED PROFESSIONAL ENGINEER. THE DISTRICT WILL EVALUATE MONITORING REQUIREMENTS FOLLOWING TWO YEARS OF DATA COLLECTION AND MAKE A DETERMINATION AS TO WHETHER THE DISCHARGE CONFORMS TO STATE WATER QUALITY STANDARDS AS DEFINED IN CHAPTER 17-302 F.A.C. IF THE WATER QUALITY ANALYSES SHOW LITTLE OR NO CHANGE AND IT IS DETERMINED THAT THERE IS MINIMAL CONTAMINANT POTENTIAL, THE MONITORING PROGRAM MAY BE MODIFIED TO REDUCE THE SAMPLING SCHEDULE AND/OR PARAMETERS. IF WATER QUALITY PROBLEMS DEVELOP, THE DISTRICT RESERVES THE RIGHT TO REQUIRE MORE FREQUENT SAMPLING AND MORE THOROUGH ANALYSES. THE SAMPLES SHALL BE ANALYZED ON A BIMONTHLY BASE FOR THE FOLLOWING PARAMETERS:

PARAMETERS	UNITS
Temperature	deg. C
Conductivity, field	umho/cm
Dissolved Oxygen (DO)	mg/L
Chemical Oxygen Demand (COD)	mg/L
pH (Range > 6.0 & < 8.5)	Standard Unit
Alkalinity	mg/L
Total Suspended Solids (TSS)	mg/L
Oil and Greases	mg/L
Total Organic Carbon (TOC)	mg/L
Lead	mg/L
Mercury	ug/L
Turbidity, NTU	NTU
Zinc	mg/L

13. PRIOR TO THE COMMENCEMENT OF CONSTRUCTION, A FENCE SHALL BE INSTALLED ADJACENT TO THE STAGING AREA IN ACCORDANCE WITH EXHIBIT 10 TO PREVENT ENCROACHMENT INTO THE MANGROVE WETLAND AREAS. THE PERMITTEE SHALL NOTIFY THE SFWMD'S COMPLIANCE STAFF IN WRITING UPON COMPLETION OF FENCING AND SCHEDULE AN INSPECTION OF THIS WORK. THE PERMITTEE SHALL MODIFY THE FENCING IF SFWMD STAFF DETERMINES IT IS INSUFFICIENT OR IS NOT IN CONFORMANCE WITH THE INTENT OF THIS PERMIT. FENCING SHALL REMAIN IN PLACE

UNITL ALL ADJACENT CONSTRUCTION ACTIVITIES ARE COMPLETE.

LIMITING CONDITIONS

1. THE PERMITTEE SHALL PROSECUTE THE WORK AUTHORIZED IN A MANNER SO AS TO MINIMIZE ANY ADVERSE IMPACT OF THE WORKS ON FISH, WILDLIFE, NATURAL ENVIRONMENTAL VALUES, AND WATER QUALITY. THE PERMITTEE SHALL INSTITUTE NECESSARY MEASURES DURING THE CONSTRUCTION PERIOD, INCLUDING FULL COMPACTION OF ANY FILL MATERIAL PLACED AROUND NEWLY INSTALLED STRUCTURES, TO REDUCE EROSION, TURBIDITY, NUTRIENT LOADING AND SEDIMENTATION IN THE RECEIVING WATERS.

2. WATER QUALITY DATA FOR THE WATER DISCHARGED FROM THE PERMITTEE'S PROPERTY OR INTO SURFACE WATERS OF THE STATE SHALL BE SUBMITTED TO THE DISTRICT AS REQUIRED. PARAMETERS TO BE MONITORED MAY INCLUDE THOSE LISTED IN CHAPTER 17-302. IF WATER QUALITY DATA IS REQUIRED, THE PERMITTEE SHALL PROVIDE DATA AS REQUIRED, ON VOLUMES OF WATER DISCHARGED INCLUDING TOTAL VOLUME DISCHARGED, DURING THE DAYS OF SAMPLING AND TOTAL MONTHLY DISCHARGES FROM THE PROPERTY OR INTO SURFACE WATERS OF THE STATE.

3. THE PERMITTEE SHALL COMPLY WITH ALL APPLICABLE LOCAL SUBDIVISION REGULATIONS AND OTHER LOCAL REQUIREMENTS. IN ADDITION, THE PERMITTEE SHALL OBTAIN ALL NECESSARY FEDERAL, STATE, LOCAL AND SPECIAL DISTRICT AUTHORIZATIONS PRIOR TO THE START OF ANY CONSTRUCTION OR ALTERATION OF WORKS AUTHORIZED BY THIS PERMIT.

4. THE OPERATION PHASE OF THIS PERMIT SHALL NOT BECOME EFFECTIVE UNTIL A FLORIDA REGISTERED PROFESSIONAL ENGINEER CERTIFIES THAT ALL FACILITIES HAVE BEEN CONSTRUCTED IN ACCORDANCE WITH THE DESIGN APPROVED BY THE DISTRICT. WITHIN 30 DAYS AFTER COMPLETION OF CONSTRUCTION OF THE SURFACE WATER MANAGEMENT SYSTEM, THE PERMITTEE SHALL SUBMIT THE CERTIFICATION AND NOTIFY THE DISTRICT THAT THE FACILITIES ARE READY FOR INSPECTION AND APPROVAL. UPON APPROVAL OF THE COMPLETED SURFACE WATER MANAGEMENT SYSTEM, THE PERMITTEE SHALL REQUEST TRANSFER OF THE PERMIT TO THE RESPONSIBLE ENTITY APPROVED BY THE DISTRICT.

5. ALL ROADS SHALL BE SET AT OR ABOVE ELEVATIONS REQUIRED BY THE APPLICABLE LOCAL GOVERNMENT FLOOD CRITERIA.

6. ALL BUILDING FLOORS SHALL BE SET AT OR ABOVE ELEVATIONS ACCEPTABLE TO THE APPLICABLE LOCAL GOVERNMENT.

7. OFF-SITE DISCHARGES DURING CONSTRUCTION AND DEVELOPMENT SHALL BE MADE ONLY THROUGH THE FACILITIES AUTHORIZED BY THIS PERMIT. NO ROADWAY OR BUILDING CONSTRUCTION SHALL COMMENCE ON-SITE UNTIL COMPLETION OF THE PERMITTED DISCHARGE STRUCTURE AND DETENTION AREAS. WATER DISCHARGED FROM THE PROJECT SHALL BE THROUGH STRUCTURES HAVING A MECHANISM SUITABLE FOR REGULATING UPSTREAM WATER STAGES. STAGES MAY BE SUBJECT TO OPERATING SCHEDULES SATISFACTORY TO THE DISTRICT.

8. NO CONSTRUCTION AUTHORIZED HEREIN SHALL COMMENCE UNTIL A RESPONSIBLE ENTITY ACCEPTABLE TO THE DISTRICT HAS BEEN ESTABLISHED AND HAS AGREED TO

OPERATE AND MAINTAIN THE SYSTEM. THE ENTITY MUST BE PROVIDED WITH SUFFICIENT OWNERSHIP SO THAT IT HAS CONTROL OVER ALL WATER MANAGEMENT FACILITIES AUTHORIZED HEREIN. UPON RECEIPT OF WRITTEN EVIDENCE OF THE SATISFACTION OF THIS CONDITION, THE DISTRICT WILL ISSUE AN AUTHORIZATION TO COMMENCE CONSTRUCTION.

9 . THE PERMIT DOES NOT CONVEY TO THE PERMITTEE ANY PROPERTY RIGHT NOR ANY RIGHTS OR PRIVILEGES OTHER THAN THOSE SPECIFIED IN THE PERMIT AND CHAPTER 40E-4, FAC.

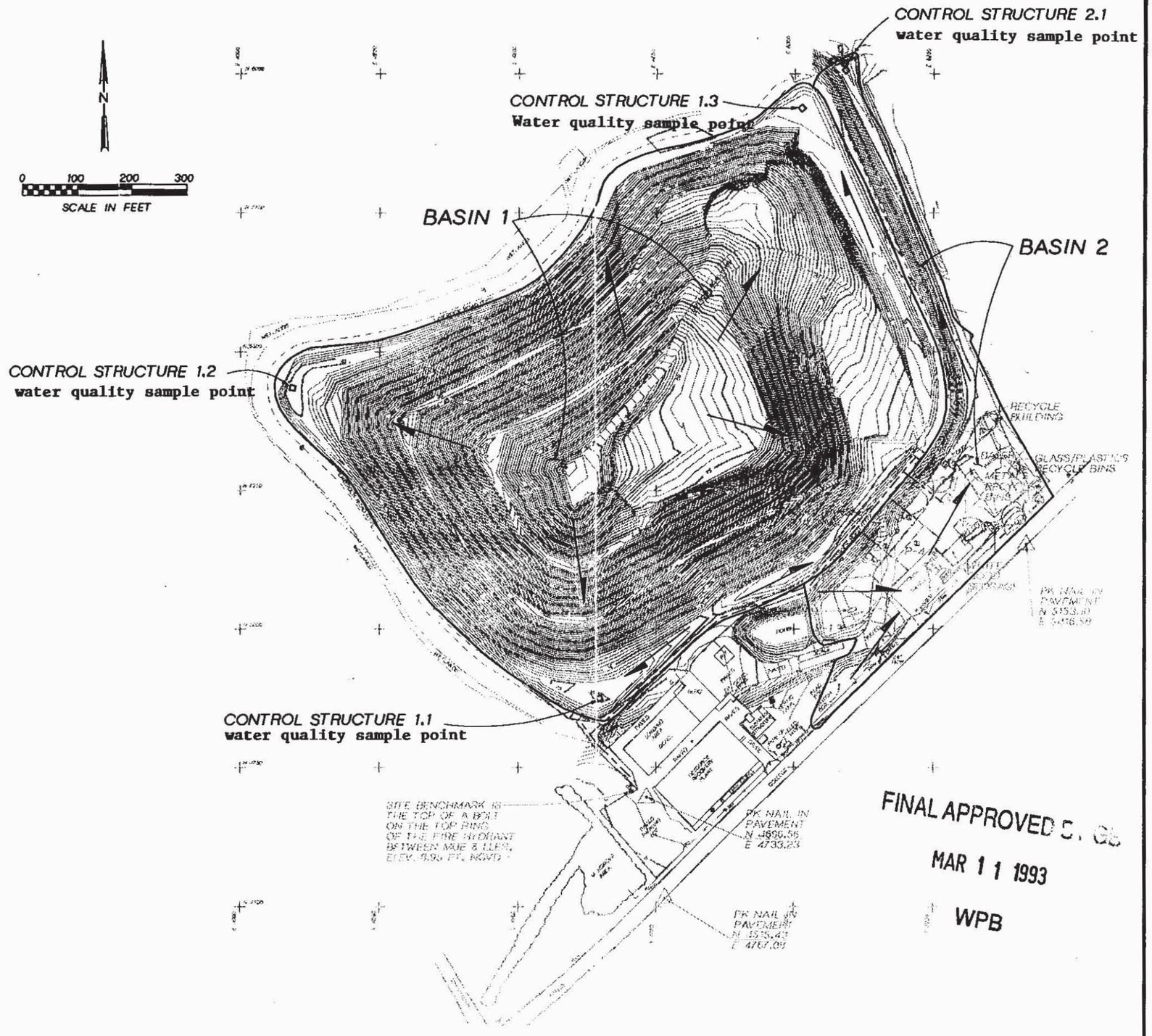
10. THE PERMITTEE SHALL HOLD AND SAVE THE DISTRICT HARMLESS FROM ANY AND ALL DAMAGES, CLAIMS, OR LIABILITIES WHICH MAY ARISE BY REASON OF THE CONSTRUCTION, OPERATION, MAINTENANCE OR USE OF ANY FACILITY AUTHORIZED BY THE PERMIT.

11. THIS PERMIT IS ISSUED BASED ON THE APPLICANT'S SUBMITTED INFORMATION WHICH REASONABLY DEMONSTRATES THAT ADVERSE OFF-SITE WATER RESOURCE RELATED IMPACTS WILL NOT BE CAUSED BY THE COMPLETED PERMIT ACTIVITY. IT IS ALSO THE REPONSIBILITY OF THE PERMITTEE TO INSURE THAT ADVERSE OFF-SITE WATER RESOURCE IMPACTS DO NOT OCCUR DURING CONSTRUCTION.

12. PRIOR TO DEWATERING, PLANS SHALL BE SUBMITTED TO THE DISTRICT FOR APPROVAL. INFORMATION SHALL INCLUDE AS A MINIMUM: PUMP SIZES, LOCATIONS AND HOURS OF OPERATION FOR EACH PUMP. IF OFF-SITE DISCHARGE IS PROPOSED, OR OFF-SITE ADVERSE IMPACTS ARE EVIDENT, AN INDIVIDUAL WATER USE PERMIT MAY BE REQUIRED. THE PERMITTEE IS CAUTIONED THAT SEVERAL MONTHS MAY BE REQUIRED FOR CONSIDERATION OF THE WATER USE PERMIT APPLICATION.

LEGEND

- MONITOR WELL
- PPØ POWER OR SERVICE POLE
- FIRE HYDRANT
- WATER VALVE
- SANITARY SEWER MANHOLE
- FENCE LINES
- EXIST. MAINTENANCE RD.
- SPOT ELEVATION
- PROPERTY LINE
- NEW PIPING
- ℄ OF SWALE
- A-1 SOIL BORING LOCATION
- DIRECTION OF SLOPE
- 6 CONTOURS
- DIRECTION OF FLOW
- BASIN BOUNDARY



FINAL APPROVED
MAR 11 1993
WPB

EXHIBIT 2

ITEM II-3
DRAINAGE MAP

CH2MHILL

Exhibit 5 - Landfill Gas Vent Sampling Results

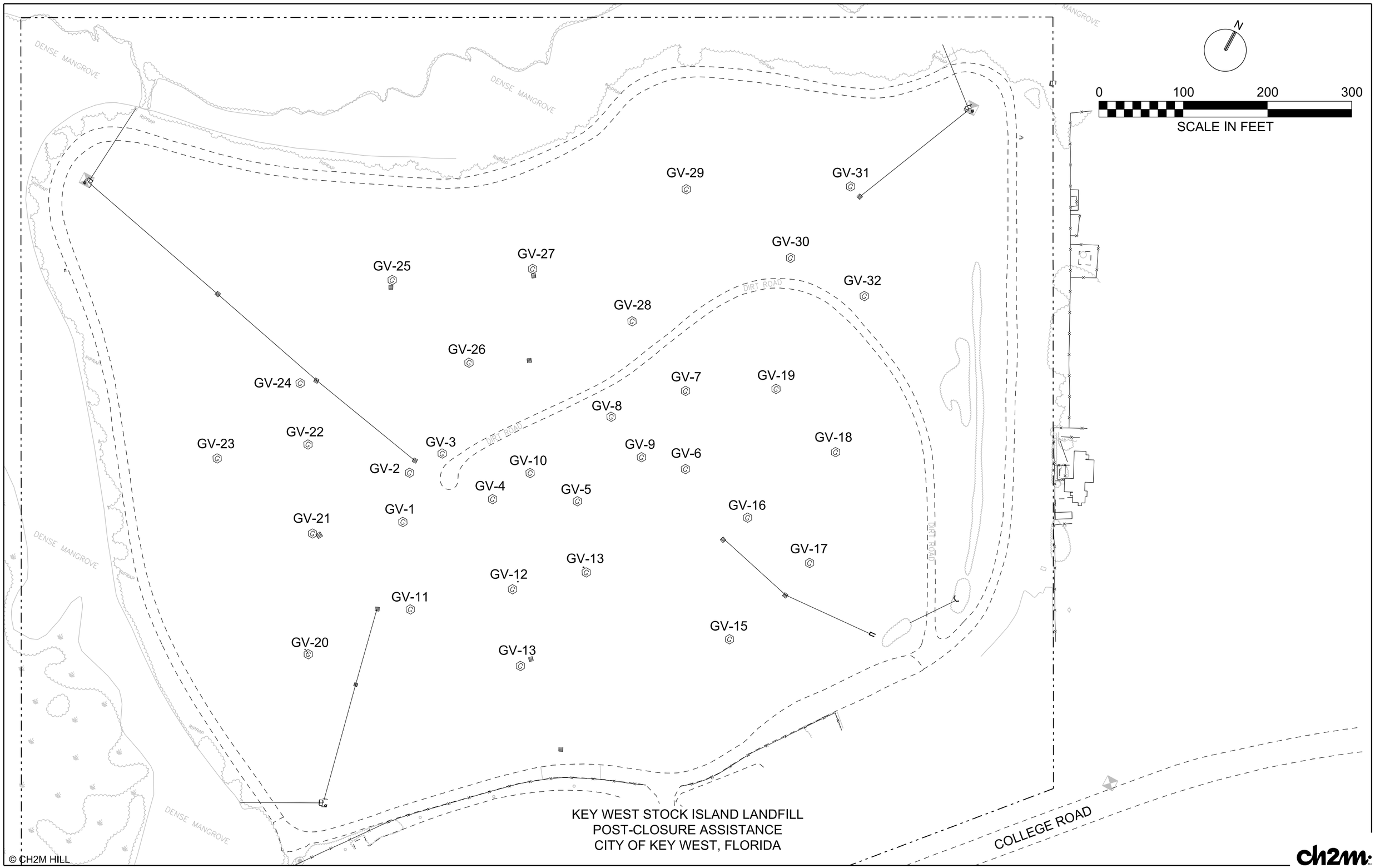


Fig-01_671926.dgn

SITE:	Stock Island Landfill	DATE:	5/4/2016
PERSONNEL:	Harrison Barron	INSTRUMENT:	MultiRAE Gas Monitor
TEMPERATURE:	80 °F	WEATHER:	Overcast, 12 mph Winds

Maximum Gas Readings
Stock Island Landfill

Date	Gas Vent No.	% LEL		H_2S (ppm)	
		In Vent	1 foot downwind	In Vent	1 foot downwind
5/4/2016	GV-1	> 100%	0.0	6.9	0.0
5/4/2016	GV-2	> 100%	0.0	2.0	0.0
5/4/2016	GV-3	> 100%	0.0	1.4	0.0
5/4/2016	GV-4	> 100%	0.0	1.3	0.0
5/4/2016	GV-5	> 100%	0.0	4.7	0.0
5/4/2016	GV-6	> 100%	0.0	2.3	0.0
5/4/2016	GV-7	> 100%	0.0	2.2	0.0
5/4/2016	GV-8	0.0	0.0	0.0	0.0
5/4/2016	GV-9	0.0	0.0	0.0	0.0
5/4/2016	GV-10	0.0	0.0	0.0	0.0
5/4/2016	GV-11	0.0	0.0	0.0	0.0
5/4/2016	GV-12	0.0	0.0	0.0	0.0
5/4/2016	GV-13	0.0	0.0	0.0	0.0
5/4/2016	GV-14	0.0	0.0	0.0	0.0
5/4/2016	GV-15	0.0	0.0	0.0	0.0
5/4/2016	GV-16	0.0	0.0	0.0	0.0
5/4/2016	GV-17	0.0	0.0	0.0	0.0
5/4/2016	GV-18	0.0	0.0	0.0	0.0
5/4/2016	GV-19	0.0	0.0	0.0	0.0
5/4/2016	GV-20	N/A	N/A	N/A	N/A
5/4/2016	GV-21	0.0	0.0	0.0	0.0
5/4/2016	GV-22	30.0	0.0	0.0	0.0
5/4/2016	GV-23	0.0	0.0	0.0	0.0
5/4/2016	GV-24	0.0	0.0	0.0	0.0
5/4/2016	GV-25	0.0	0.0	0.0	0.0
5/4/2016	GV-26	4.0	0.0	0.0	0.0
5/4/2016	GV-27	0.0	0.0	0.0	0.0
5/4/2016	GV-28	0.0	0.0	0.0	0.0
5/4/2016	GV-29	25.0	0.0	0.0	0.0
5/4/2016	GV-30	0.0	0.0	0.0	0.0
5/4/2016	GV-31	0.0	0.0	0.0	0.0
5/4/2016	GV-32	0.0	0.0	0.0	0.0

Gas Vent-3 Real-Time Datalog Stock Island Landfill 5/11/2016-5/13/2016		
Date/Time	% LEL	H2S (ppm)
5/11/2016 14:43	0	0
5/11/2016 14:45	0	0
5/11/2016 14:47	73	0.7
5/11/2016 14:49	60	0
5/11/2016 14:51	73	0.5
5/11/2016 14:53	69	1
5/11/2016 14:55	85	1.2
5/11/2016 14:57	69	0.7
5/11/2016 14:59	72	2.2
5/11/2016 15:01	59	3.1
5/11/2016 15:03	83	2.7
5/11/2016 15:05	77	3.1
5/11/2016 15:07	71	1.5
5/11/2016 15:09	76	3.2
5/11/2016 15:11	73	2.9
5/11/2016 15:13	72	3.1
5/11/2016 15:15	76	2.4
5/11/2016 15:17	67	2.6
5/11/2016 15:19	73	2.3
5/11/2016 15:21	70	2.9
5/11/2016 15:23	76	1
5/11/2016 15:25	64	3.7
5/11/2016 15:27	80	2.8
5/11/2016 15:29	67	3.1
5/11/2016 15:31	63	3.5
5/11/2016 15:33	64	0.7
5/11/2016 15:35	75	0.7
5/11/2016 15:37	57	1.7
5/11/2016 15:39	76	1.9
5/11/2016 15:41	52	1.8
5/11/2016 15:43	74	0.7
5/11/2016 15:45	61	0
5/11/2016 15:47	51	0
5/11/2016 15:49	69	0.8
5/11/2016 15:51	64	0.6
5/11/2016 15:53	80	0
5/11/2016 15:55	72	0.7
5/11/2016 15:57	66	2.6
5/11/2016 15:59	71	2.2
5/11/2016 16:01	74	3.1
5/11/2016 16:03	7	0.4
5/11/2016 16:05	44	0

5/11/2016 16:07	86	0.7
5/11/2016 16:09	89	0.5
5/11/2016 16:11	65	0.7
5/11/2016 16:13	60	0.7
5/11/2016 16:15	81	0.8
5/11/2016 16:17	69	0.7
5/11/2016 16:19	79	0.8
5/11/2016 16:21	70	0.9
5/11/2016 16:23	61	0.9
5/11/2016 16:25	72	0.6
5/11/2016 16:27	72	0.8
5/11/2016 16:29	76	1.7
5/11/2016 16:31	87	1.2
5/11/2016 16:33	68	0.6
5/11/2016 16:35	3	0
5/11/2016 16:37	52	0
5/11/2016 16:39	59	0
5/11/2016 16:41	57	0
5/11/2016 16:43	76	0
5/11/2016 16:45	84	0.6
5/11/2016 16:47	69	0.5
5/11/2016 16:49	57	0.5
5/11/2016 16:51	29	0
5/11/2016 16:53	83	0
5/11/2016 16:55	22	0
5/11/2016 16:57	72	0
5/11/2016 16:59	81	0.6
5/11/2016 17:01	76	0
5/11/2016 17:03	69	0.4
5/11/2016 17:05	80	0.6
5/11/2016 17:07	91	0.5
5/11/2016 17:09	75	0.7
5/11/2016 17:11	63	0.7
5/11/2016 17:13	77	0.8
5/11/2016 17:15	87	0.7
5/11/2016 17:17	64	0.7
5/11/2016 17:19	82	0.7
5/11/2016 17:21	86	0.7
5/11/2016 17:23	72	0.7
5/11/2016 17:25	77	0.6
5/11/2016 17:27	83	0.8
5/11/2016 17:29	80	0.7
5/11/2016 17:31	71	0.6
5/11/2016 17:33	75	0.6
5/11/2016 17:35	73	0.6
5/11/2016 17:37	79	0.7
5/11/2016 17:39	82	0.6
5/11/2016 17:41	73	0.5

5/11/2016 17:43	79	0.4
5/11/2016 17:45	78	0.6
5/11/2016 17:47	79	0.5
5/11/2016 17:49	62	0.7
5/11/2016 17:51	73	0.6
5/11/2016 17:53	77	0.7
5/11/2016 17:55	72	0.7
5/11/2016 17:57	90	0.6
5/11/2016 17:59	84	0.5
5/11/2016 18:01	77	0.6
5/11/2016 18:03	67	1
5/11/2016 18:05	68	0.7
5/11/2016 18:07	76	0.7
5/11/2016 18:09	86	0.6
5/11/2016 18:11	82	0.6
5/11/2016 18:13	55	0.6
5/11/2016 18:15	72	0.6
5/11/2016 18:17	66	0.8
5/11/2016 18:19	82	0.7
5/11/2016 18:21	74	0.6
5/11/2016 18:23	71	0.7
5/11/2016 18:25	68	0.5
5/11/2016 18:27	92	0.5
5/11/2016 18:29	74	0.6
5/11/2016 18:31	78	0.9
5/11/2016 18:33	70	0.7
5/11/2016 18:35	73	0.6
5/11/2016 18:37	65	0.7
5/11/2016 18:39	75	0.6
5/11/2016 18:41	67	0.7
5/11/2016 18:43	64	0.7
5/11/2016 18:45	57	0.7
5/11/2016 18:47	79	0.7
5/11/2016 18:49	82	0.6
5/11/2016 18:51	81	0.6
5/11/2016 18:53	75	0.6
5/11/2016 18:55	70	0.4
5/11/2016 18:57	78	0.6
5/11/2016 18:59	80	0.6
5/11/2016 19:01	75	0.5
5/11/2016 19:03	78	0.7
5/11/2016 19:05	77	0.7
5/11/2016 19:07	81	0.7
5/11/2016 19:09	76	0.7
5/11/2016 19:11	59	0.8
5/11/2016 19:13	65	1.4
5/11/2016 19:15	77	1.1
5/11/2016 19:17	90	1.9

5/11/2016 19:19	70	0.7
5/11/2016 19:21	75	1.1
5/11/2016 19:23	80	1.1
5/11/2016 19:25	84	0.9
5/11/2016 19:27	68	0.6
5/11/2016 19:29	78	0.7
5/11/2016 19:31	68	0.5
5/11/2016 19:33	48	0
5/11/2016 19:35	81	0.5
5/11/2016 19:37	74	0.7
5/11/2016 19:39	83	0.7
5/11/2016 19:41	85	0.6
5/11/2016 19:43	26	0
5/11/2016 19:45	18	0
5/11/2016 19:47	16	0
5/11/2016 19:49	15	0
5/11/2016 19:51	14	0
5/11/2016 19:53	13	0
5/11/2016 19:55	12	0
5/11/2016 19:57	12	0
5/11/2016 19:59	11	0
5/11/2016 20:01	11	0
5/11/2016 20:03	11	0
5/11/2016 20:05	10	0
5/11/2016 20:07	10	0
5/11/2016 20:09	10	0
5/11/2016 20:11	10	0
5/11/2016 20:13	9	0
5/11/2016 20:15	9	0
5/11/2016 20:17	9	0
5/11/2016 20:19	9	0
5/11/2016 20:21	9	0
5/11/2016 20:23	8	0
5/11/2016 20:25	8	0
5/11/2016 20:27	8	0
5/11/2016 20:29	8	0
5/11/2016 20:42	5	0
5/11/2016 20:44	7	0
5/11/2016 20:46	5	0
5/11/2016 20:48	7	0
5/11/2016 20:50	5	0
5/11/2016 20:52	17	0
5/11/2016 20:54	16	0
5/11/2016 20:56	14	0
5/11/2016 20:58	6	0
5/11/2016 21:00	10	0
5/11/2016 21:02	10	0
5/11/2016 21:04	13	0

5/11/2016 21:06	14	0
5/11/2016 21:08	8	0
5/11/2016 21:10	5	0
5/11/2016 21:12	14	0
5/11/2016 21:14	8	0
5/11/2016 21:16	15	0
5/11/2016 21:18	5	0
5/11/2016 21:20	5	0
5/11/2016 21:22	5	0
5/11/2016 21:24	11	0
5/11/2016 21:26	8	0
5/11/2016 21:28	10	0
5/11/2016 21:30	14	0
5/11/2016 21:32	7	0
5/11/2016 21:34	8	0
5/11/2016 21:36	7	0
5/11/2016 21:38	23	0
5/11/2016 21:40	5	0
5/11/2016 21:42	6	0
5/11/2016 21:44	5	0
5/11/2016 21:46	7	0
5/11/2016 21:48	7	0
5/11/2016 21:50	10	0
5/11/2016 21:52	14	0
5/11/2016 21:54	12	0
5/11/2016 21:56	14	0
5/11/2016 21:58	5	0
5/11/2016 22:00	5	0
5/11/2016 22:02	10	0
5/11/2016 22:04	8	0
5/11/2016 22:06	10	0
5/11/2016 22:08	6	0
5/11/2016 22:10	5	0
5/11/2016 22:12	5	0
5/11/2016 22:14	15	0
5/11/2016 22:16	16	0
5/11/2016 22:18	24	0
5/11/2016 22:20	18	0
5/11/2016 22:22	15	0
5/11/2016 22:24	13	0
5/11/2016 22:26	12	0
5/11/2016 22:28	20	0
5/11/2016 22:30	12	0
5/11/2016 22:32	13	0
5/11/2016 22:34	14	0
5/11/2016 22:36	12	0
5/11/2016 22:38	11	0
5/11/2016 22:40	22	0

5/11/2016 22:42	9	0
5/11/2016 22:44	11	0
5/11/2016 22:46	13	0
5/11/2016 22:48	11	0
5/11/2016 22:50	13	0
5/11/2016 22:52	8	0
5/11/2016 22:54	6	0
5/11/2016 22:56	12	0
5/11/2016 22:58	9	0
5/11/2016 23:00	11	0
5/11/2016 23:02	17	0
5/11/2016 23:04	15	0
5/11/2016 23:06	8	0
5/11/2016 23:08	10	0
5/11/2016 23:10	9	0
5/11/2016 23:12	8	0
5/11/2016 23:14	8	0
5/11/2016 23:16	8	0
5/11/2016 23:18	8	0
5/11/2016 23:20	10	0
5/11/2016 23:22	8	0
5/11/2016 23:24	5	0
5/11/2016 23:26	5	0
5/11/2016 23:28	5	0
5/11/2016 23:30	5	0
5/11/2016 23:32	5	0
5/11/2016 23:34	7	0
5/11/2016 23:36	6	0
5/11/2016 23:38	5	0
5/11/2016 23:40	6	0
5/11/2016 23:42	5	0
5/11/2016 23:44	5	0
5/11/2016 23:46	5	0
5/11/2016 23:48	5	0
5/11/2016 23:50	6	0
5/11/2016 23:52	7	0
5/11/2016 23:54	12	0
5/11/2016 23:56	11	0
5/11/2016 23:58	17	0
5/12/2016 0:00	18	0
5/12/2016 0:02	12	0
5/12/2016 0:04	13	0
5/12/2016 0:06	11	0
5/12/2016 0:08	15	0
5/12/2016 0:10	9	0
5/12/2016 0:12	9	0
5/12/2016 0:14	12	0
5/12/2016 0:16	6	0

5/12/2016 0:18	6	0
5/12/2016 0:20	11	0
5/12/2016 0:22	16	0
5/12/2016 0:24	20	0
5/12/2016 0:26	13	0
5/12/2016 0:28	9	0
5/12/2016 0:30	10	0
5/12/2016 0:32	11	0
5/12/2016 0:34	17	0.5
5/12/2016 0:36	10	0
5/12/2016 0:38	12	0
5/12/2016 0:40	13	0
5/12/2016 0:42	11	0
5/12/2016 0:44	20	0.6
5/12/2016 0:46	21	0
5/12/2016 0:48	11	0.5
5/12/2016 0:50	12	0
5/12/2016 0:52	13	0
5/12/2016 0:54	15	0
5/12/2016 0:56	9	0
5/12/2016 0:58	10	0
5/12/2016 1:00	8	0
5/12/2016 1:02	9	0
5/12/2016 1:04	12	0
5/12/2016 1:06	12	0
5/12/2016 1:08	10	0
5/12/2016 1:10	9	0
5/12/2016 1:12	9	0
5/12/2016 1:14	8	0
5/12/2016 1:16	10	0.4
5/12/2016 1:18	10	0
5/12/2016 1:20	9	0
5/12/2016 1:22	8	0
5/12/2016 1:24	8	0
5/12/2016 1:26	11	0
5/12/2016 1:28	10	0
5/12/2016 1:30	7	0
5/12/2016 1:32	10	0
5/12/2016 1:34	14	0
5/12/2016 1:36	10	0
5/12/2016 1:38	8	0
5/12/2016 1:40	9	0
5/12/2016 1:42	10	0
5/12/2016 1:44	9	0
5/12/2016 1:46	18	0
5/12/2016 1:48	10	0
5/12/2016 1:50	10	0
5/12/2016 1:52	9	0

5/12/2016 1:54	13	0
5/12/2016 1:56	19	0.6
5/12/2016 1:58	10	0
5/12/2016 2:00	11	0
5/12/2016 2:02	16	0
5/12/2016 2:04	14	0
5/12/2016 2:06	14	0
5/12/2016 2:08	12	0
5/12/2016 2:10	10	0
5/12/2016 2:12	15	0
5/12/2016 2:14	11	0
5/12/2016 2:16	10	0
5/12/2016 2:18	13	0
5/12/2016 2:20	11	0
5/12/2016 2:22	21	0.7
5/12/2016 2:24	11	0
5/12/2016 2:26	10	0
5/12/2016 2:28	14	0
5/12/2016 2:30	10	0
5/12/2016 2:32	9	0
5/12/2016 2:34	10	0
5/12/2016 2:36	12	0
5/12/2016 2:38	9	0
5/12/2016 2:40	10	0
5/12/2016 2:42	11	0
5/12/2016 2:44	11	0
5/12/2016 2:46	11	0
5/12/2016 2:48	11	0
5/12/2016 2:50	15	0
5/12/2016 2:52	10	0
5/12/2016 2:54	9	0
5/12/2016 2:56	14	0
5/12/2016 2:58	14	0
5/12/2016 3:00	9	0
5/12/2016 3:02	11	0
5/12/2016 3:04	10	0
5/12/2016 3:06	10	0
5/12/2016 3:08	11	0
5/12/2016 3:10	11	0
5/12/2016 3:12	10	0
5/12/2016 3:14	9	0
5/12/2016 3:16	9	0
5/12/2016 3:18	10	0
5/12/2016 3:20	10	0
5/12/2016 3:22	10	0
5/12/2016 3:24	9	0
5/12/2016 3:26	10	0
5/12/2016 3:28	10	0

5/12/2016 3:30	11	0
5/12/2016 3:32	10	0
5/12/2016 3:34	9	0
5/12/2016 3:36	11	0
5/12/2016 3:38	9	0
5/12/2016 3:40	10	0
5/12/2016 3:42	9	0
5/12/2016 3:44	10	0
5/12/2016 3:46	9	0
5/12/2016 3:48	9	0
5/12/2016 3:50	9	0
5/12/2016 3:52	9	0
5/12/2016 3:54	10	0
5/12/2016 3:56	9	0
5/12/2016 3:58	9	0
5/12/2016 4:00	8	0
5/12/2016 4:02	9	0
5/12/2016 4:04	9	0
5/12/2016 4:06	10	0
5/12/2016 4:08	10	0
5/12/2016 4:10	10	0
5/12/2016 4:12	8	0
5/12/2016 4:14	9	0
5/12/2016 4:16	10	0
5/12/2016 4:18	10	0
5/12/2016 4:20	13	0
5/12/2016 4:22	9	0
5/12/2016 4:24	9	0
5/12/2016 4:26	9	0
5/12/2016 4:28	9	0
5/12/2016 4:30	9	0
5/12/2016 4:32	8	0
5/12/2016 4:34	9	0
5/12/2016 4:36	9	0
5/12/2016 4:38	8	0
5/12/2016 4:40	9	0
5/12/2016 4:42	10	0
5/12/2016 4:44	9	0
5/12/2016 4:46	10	0
5/12/2016 4:48	10	0
5/12/2016 4:50	9	0
5/12/2016 4:52	10	0
5/12/2016 4:54	10	0
5/12/2016 4:56	9	0
5/12/2016 4:58	9	0
5/12/2016 5:00	9	0
5/12/2016 5:02	10	0
5/12/2016 5:04	8	0

5/12/2016 5:06	9	0
5/12/2016 5:08	8	0
5/12/2016 5:10	9	0
5/12/2016 5:12	9	0
5/12/2016 5:14	9	0
5/12/2016 5:16	9	0
5/12/2016 5:18	11	0
5/12/2016 5:20	8	0
5/12/2016 5:22	9	0
5/12/2016 5:24	8	0
5/12/2016 5:26	10	0
5/12/2016 5:28	9	0
5/12/2016 5:30	8	0
5/12/2016 5:32	11	0
5/12/2016 5:34	9	0
5/12/2016 5:36	10	0
5/12/2016 5:38	10	0
5/12/2016 5:40	9	0
5/12/2016 5:42	10	0
5/12/2016 5:44	11	0
5/12/2016 5:46	11	0
5/12/2016 5:48	10	0
5/12/2016 5:50	8	0
5/12/2016 5:52	9	0
5/12/2016 5:54	9	0
5/12/2016 5:56	9	0
5/12/2016 5:58	9	0
5/12/2016 6:00	9	0
5/12/2016 6:02	9	0
5/12/2016 6:04	10	0
5/12/2016 6:06	8	0
5/12/2016 6:08	11	0
5/12/2016 6:10	11	0
5/12/2016 6:12	9	0
5/12/2016 6:14	9	0
5/12/2016 6:16	10	0
5/12/2016 6:18	10	0
5/12/2016 6:20	10	0
5/12/2016 6:22	8	0
5/12/2016 6:24	9	0
5/12/2016 6:26	10	0
5/12/2016 6:28	8	0
5/12/2016 6:30	8	0
5/12/2016 6:32	10	0
5/12/2016 6:34	7	0
5/12/2016 6:36	6	0
5/12/2016 6:38	7	0
5/12/2016 6:40	9	0

5/12/2016 6:42	8	0
5/12/2016 6:44	8	0
5/12/2016 6:46	6	0
5/12/2016 6:48	7	0
5/12/2016 6:50	9	0
5/12/2016 6:52	8	0
5/12/2016 6:54	7	0
5/12/2016 6:56	6	0
5/12/2016 6:58	6	0
5/12/2016 7:00	6	0
5/12/2016 7:02	8	0
5/12/2016 7:04	9	0
5/12/2016 7:06	22	0
5/12/2016 7:08	10	0
5/12/2016 7:10	11	0
5/12/2016 7:12	10	0
5/12/2016 7:14	13	0
5/12/2016 7:16	8	0
5/12/2016 7:18	10	0
5/12/2016 7:20	15	0
5/12/2016 7:22	9	0
5/12/2016 7:24	8	0
5/12/2016 7:26	14	0
5/12/2016 8:48	8	0
5/12/2016 8:50	8	0
5/12/2016 8:52	7	0
5/12/2016 8:54	10	0
5/12/2016 8:56	6	0
5/12/2016 8:58	9	0
5/12/2016 9:00	6	0
5/12/2016 9:02	8	0
5/12/2016 9:04	6	0
5/12/2016 9:06	6	0
5/12/2016 9:08	7	0
5/12/2016 9:10	8	0
5/12/2016 9:12	9	0
5/12/2016 9:14	7	0
5/12/2016 9:16	6	0
5/12/2016 9:18	8	0
5/12/2016 9:20	9	0
5/12/2016 9:22	9	0
5/12/2016 9:24	9	0
5/12/2016 9:26	8	0
5/12/2016 9:28	7	0
5/12/2016 9:30	10	0
5/12/2016 9:32	9	0
5/12/2016 9:34	7	0
5/12/2016 9:36	7	0

5/12/2016 9:38	7	0
5/12/2016 9:40	7	0
5/12/2016 9:42	6	0
5/12/2016 9:44	6	0
5/12/2016 9:46	7	0
5/12/2016 9:48	11	0
5/12/2016 9:50	6	0
5/12/2016 9:52	5	0
5/12/2016 9:54	7	0
5/12/2016 9:56	9	0
5/12/2016 9:58	10	0
5/12/2016 10:00	8	0
5/12/2016 10:02	7	0
5/12/2016 10:04	7	0
5/12/2016 10:06	10	0
5/12/2016 10:08	9	0
5/12/2016 10:10	10	0
5/12/2016 10:12	8	0
5/12/2016 10:14	6	0
5/12/2016 10:16	10	0
5/12/2016 10:18	9	0
5/12/2016 10:20	8	0
5/12/2016 10:22	6	0
5/12/2016 10:24	6	0
5/12/2016 10:26	5	0
5/12/2016 10:28	7	0
5/12/2016 10:30	9	0
5/12/2016 10:32	6	0
5/12/2016 10:34	7	0
5/12/2016 10:36	9	0
5/12/2016 10:38	11	0
5/12/2016 10:40	11	0
5/12/2016 10:42	9	0
5/12/2016 10:44	7	0
5/12/2016 10:46	8	0
5/12/2016 10:48	6	0
5/12/2016 10:50	11	0
5/12/2016 10:52	8	0
5/12/2016 10:54	12	0
5/12/2016 10:56	8	0
5/12/2016 10:58	9	0
5/12/2016 11:00	7	0
5/12/2016 11:02	8	0
5/12/2016 11:04	7	0
5/12/2016 11:06	9	0
5/12/2016 11:08	9	0
5/12/2016 11:10	6	0
5/12/2016 11:12	6	0

5/12/2016 11:14	10	0
5/12/2016 11:16	7	0
5/12/2016 11:18	9	0
5/12/2016 11:20	9	0
5/12/2016 11:22	10	0
5/12/2016 11:24	6	0
5/12/2016 11:26	7	0
5/12/2016 11:28	8	0
5/12/2016 11:30	8	0
5/12/2016 11:32	8	0
5/12/2016 11:34	8	0
5/12/2016 11:36	12	0
5/12/2016 11:38	11	0
5/12/2016 11:40	7	0
5/12/2016 11:42	10	0
5/12/2016 11:44	19	0
5/12/2016 11:46	7	0
5/12/2016 11:48	10	0
5/12/2016 11:50	13	0
5/12/2016 11:52	11	0
5/12/2016 11:54	6	0
5/12/2016 11:56	7	0
5/12/2016 11:58	12	0
5/12/2016 12:00	8	0
5/12/2016 12:02	7	0
5/12/2016 12:04	6	0
5/12/2016 12:06	9	0
5/12/2016 12:08	12	0
5/12/2016 12:10	11	0
5/12/2016 12:12	7	0
5/12/2016 12:14	8	0
5/12/2016 12:16	9	0
5/12/2016 12:18	13	0
5/12/2016 12:20	8	0
5/12/2016 12:22	9	0
5/12/2016 12:24	9	0
5/12/2016 12:26	10	0
5/12/2016 12:28	6	0
5/12/2016 12:30	6	0
5/12/2016 12:32	14	0
5/12/2016 12:34	13	0
5/12/2016 12:36	11	0
5/12/2016 12:38	12	0
5/12/2016 12:40	12	0
5/12/2016 12:42	15	0
5/12/2016 12:44	8	0
5/12/2016 12:46	36	0
5/12/2016 14:32	6	0

5/12/2016 14:34	6	0
5/12/2016 14:36	17	0
5/12/2016 14:38	11	0
5/12/2016 14:40	7	0
5/12/2016 14:42	7	0
5/12/2016 14:44	6	0
5/12/2016 14:46	6	0
5/12/2016 14:48	7	0
5/12/2016 14:50	6	0
5/12/2016 14:52	6	0
5/12/2016 14:54	8	0
5/12/2016 14:56	6	0
5/12/2016 14:58	6	0
5/12/2016 15:00	6	0
5/12/2016 15:02	8	0
5/12/2016 15:04	8	0
5/12/2016 15:06	6	0
5/12/2016 15:08	19	0
5/12/2016 15:10	9	0
5/12/2016 15:12	6	0
5/12/2016 15:14	8	0
5/12/2016 15:16	14	0
5/12/2016 15:18	7	0
5/12/2016 15:20	10	0
5/12/2016 15:22	6	0
5/12/2016 15:24	8	0
5/12/2016 15:26	6	0
5/12/2016 15:28	8	0
5/12/2016 15:30	7	0
5/12/2016 15:32	7	0
5/12/2016 15:34	8	0
5/12/2016 15:36	8	0
5/12/2016 15:38	7	0
5/12/2016 15:40	6	0
5/12/2016 15:42	7	0
5/12/2016 15:44	6	0
5/12/2016 15:46	8	0
5/12/2016 15:48	9	0
5/12/2016 15:50	7	0
5/12/2016 15:52	10	0
5/12/2016 15:54	13	0
5/12/2016 15:56	13	0
5/12/2016 15:58	11	0
5/12/2016 16:00	12	0
5/12/2016 16:02	8	0
5/12/2016 16:04	11	0
5/12/2016 16:06	19	0
5/12/2016 16:08	7	0

5/12/2016 16:10	27	0
5/12/2016 16:12	10	0
5/12/2016 16:14	9	0
5/12/2016 16:16	20	0
5/12/2016 16:18	24	0
5/12/2016 16:20	17	0
5/12/2016 16:22	11	0
5/12/2016 16:24	6	0
5/12/2016 16:26	6	0
5/12/2016 16:28	7	0
5/12/2016 16:30	7	0
5/12/2016 16:32	6	0
5/12/2016 16:34	6	0
5/12/2016 16:36	7	0
5/12/2016 16:38	7	0
5/12/2016 16:40	6	0
5/12/2016 16:42	6	0
5/12/2016 16:44	7	0
5/12/2016 16:46	6	0
5/12/2016 16:48	10	0
5/12/2016 16:50	6	0
5/12/2016 16:52	6	0
5/12/2016 16:54	6	0
5/12/2016 16:56	6	0
5/12/2016 16:58	6	0
5/12/2016 17:00	6	0
5/12/2016 17:02	7	0
5/12/2016 17:04	7	0
5/12/2016 17:06	7	0
5/12/2016 17:08	6	0
5/12/2016 17:10	6	0
5/12/2016 17:12	6	0
5/12/2016 17:14	7	0
5/12/2016 17:16	6	0
5/12/2016 17:18	7	0
5/12/2016 17:20	7	0
5/12/2016 17:22	7	0
5/12/2016 17:24	6	0
5/12/2016 17:26	6	0
5/12/2016 17:28	6	0
5/12/2016 17:30	6	0
5/12/2016 17:32	6	0
5/12/2016 17:34	6	0
5/12/2016 17:36	6	0
5/12/2016 17:38	6	0
5/12/2016 17:40	6	0
5/12/2016 17:42	7	0
5/12/2016 17:44	6	0

5/12/2016 17:46	6	0
5/12/2016 17:48	6	0
5/12/2016 17:50	6	0
5/12/2016 17:52	6	0
5/12/2016 17:54	6	0
5/12/2016 17:56	6	0
5/12/2016 17:58	6	0
5/12/2016 18:00	6	0
5/12/2016 18:02	6	0
5/12/2016 18:04	6	0
5/12/2016 18:06	6	0
5/12/2016 18:08	7	0
5/12/2016 18:10	6	0
5/12/2016 18:12	6	0
5/12/2016 18:14	6	0
5/12/2016 18:16	6	0
5/12/2016 18:18	6	0
5/12/2016 18:20	6	0
5/12/2016 18:22	6	0
5/12/2016 18:24	6	0
5/12/2016 18:26	6	0
5/12/2016 18:28	6	0
5/12/2016 18:30	6	0
5/12/2016 18:32	7	0
5/12/2016 18:34	7	0
5/12/2016 18:36	6	0
5/12/2016 18:38	6	0
5/12/2016 18:40	6	0
5/12/2016 18:42	6	0
5/12/2016 18:44	6	0
5/12/2016 18:46	7	0
5/12/2016 18:48	6	0
5/12/2016 18:50	6	0
5/12/2016 18:52	6	0
5/12/2016 18:54	6	0
5/12/2016 18:56	6	0
5/12/2016 18:58	6	0
5/12/2016 19:00	6	0
5/12/2016 19:02	6	0
5/12/2016 19:04	6	0
5/12/2016 19:06	6	0
5/12/2016 19:08	6	0
5/12/2016 19:10	6	0
5/12/2016 19:12	6	0
5/12/2016 19:14	6	0
5/12/2016 19:16	6	0
5/12/2016 19:18	6	0
5/12/2016 19:20	6	0

5/12/2016 19:22	6	0
5/12/2016 19:24	6	0
5/12/2016 19:26	6	0
5/12/2016 19:28	6	0
5/12/2016 19:30	7	0
5/12/2016 19:32	6	0
5/12/2016 19:34	18	0
5/12/2016 19:36	6	0
5/12/2016 19:38	13	0
5/12/2016 19:40	6	0
5/12/2016 19:42	8	0
5/12/2016 19:44	21	0
5/12/2016 19:46	12	0
5/12/2016 19:48	14	0
5/12/2016 19:50	15	0
5/12/2016 19:52	9	0
5/12/2016 19:54	6	0
5/12/2016 19:56	6	0
5/12/2016 19:58	7	0
5/12/2016 20:00	6	0
5/12/2016 20:02	8	0
5/12/2016 20:04	13	0
5/12/2016 20:06	14	0
5/12/2016 20:08	17	0
5/12/2016 20:10	20	0
5/12/2016 20:12	15	0
5/12/2016 20:14	22	0
5/12/2016 20:16	22	0
5/12/2016 20:18	16	0
5/12/2016 20:20	18	0
5/12/2016 20:22	20	0
5/12/2016 20:24	21	0
5/12/2016 20:26	17	0
5/12/2016 20:28	20	0
5/12/2016 20:30	24	0
5/12/2016 20:32	24	0
5/12/2016 20:34	23	0
5/12/2016 20:36	22	0
5/12/2016 20:38	20	0
5/12/2016 20:40	24	0
5/12/2016 20:42	19	0
5/12/2016 20:44	17	0
5/12/2016 20:46	20	0
5/12/2016 20:48	19	0
5/12/2016 20:50	19	0
5/12/2016 20:52	14	0
5/12/2016 20:54	15	0
5/12/2016 20:56	16	0

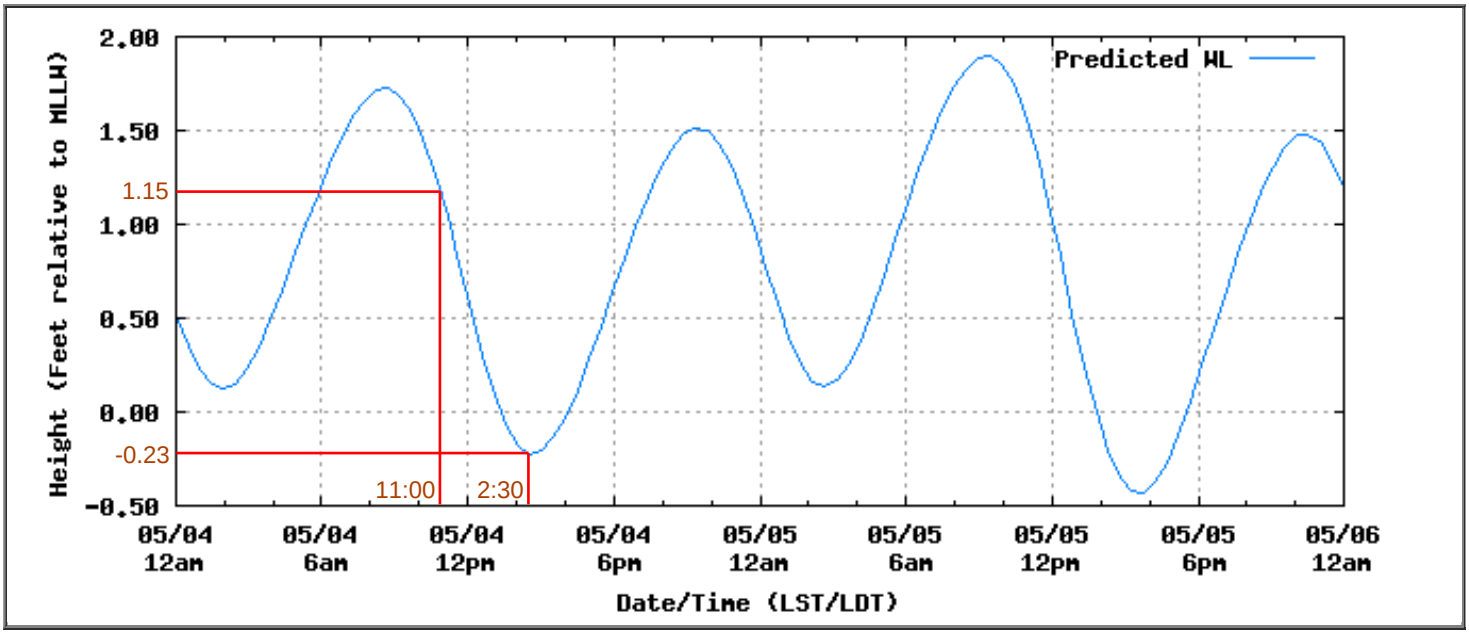
5/12/2016 20:58	16	0
5/12/2016 21:00	23	0
5/12/2016 21:02	17	0
5/12/2016 21:04	18	0
5/12/2016 21:06	15	0
5/12/2016 21:08	14	0
5/12/2016 21:10	16	0
5/12/2016 21:12	13	0
5/12/2016 21:14	21	0
5/12/2016 21:16	19	0
5/12/2016 21:18	16	0
5/12/2016 21:20	21	0
5/12/2016 21:22	19	0
5/12/2016 21:24	20	0
5/12/2016 21:26	21	0
5/12/2016 21:28	21	0
5/12/2016 21:30	18	0
5/12/2016 21:32	12	0
5/12/2016 21:34	13	0
5/12/2016 21:36	15	0
5/12/2016 21:38	21	0
5/12/2016 21:40	22	0
5/12/2016 21:42	20	0
5/12/2016 21:44	18	0
5/12/2016 21:46	19	0
5/12/2016 21:48	17	0
5/12/2016 21:50	18	0
5/12/2016 21:52	16	0
5/12/2016 21:54	19	0
5/12/2016 21:56	21	0
5/12/2016 21:58	19	0
5/12/2016 22:00	18	0
5/12/2016 22:02	19	0
5/12/2016 22:04	20	0
5/12/2016 22:06	20	0
5/12/2016 22:08	20	0
5/12/2016 22:10	15	0
5/12/2016 22:12	18	0
5/12/2016 22:14	18	0
5/12/2016 22:16	18	0
5/12/2016 22:18	15	0
5/12/2016 22:20	21	0
5/12/2016 22:22	21	0
5/12/2016 22:24	16	0
5/12/2016 22:26	17	0
5/12/2016 22:28	18	0
5/12/2016 22:30	18	0
5/12/2016 22:32	19	0

5/12/2016 22:34	14	0
5/12/2016 22:36	10	0
5/12/2016 22:38	14	0
5/12/2016 22:40	12	0
5/12/2016 22:42	17	0
5/12/2016 22:44	20	0
5/12/2016 22:46	19	0
5/12/2016 22:48	18	0
5/12/2016 22:50	22	0
5/12/2016 22:52	20	0
5/12/2016 22:54	18	0
5/12/2016 22:56	20	0
5/12/2016 22:58	22	0
5/12/2016 23:00	20	0
5/12/2016 23:02	19	0
5/12/2016 23:04	18	0
5/12/2016 23:06	18	0
5/12/2016 23:08	19	0
5/12/2016 23:10	17	0
5/12/2016 23:12	17	0
5/12/2016 23:14	17	0
5/12/2016 23:16	18	0
5/12/2016 23:18	18	0
5/12/2016 23:20	22	0
5/12/2016 23:22	20	0
5/12/2016 23:24	20	0
5/12/2016 23:26	19	0
5/12/2016 23:28	19	0
5/12/2016 23:30	16	0
5/12/2016 23:32	18	0
5/12/2016 23:34	19	0
5/12/2016 23:36	20	0
5/12/2016 23:38	19	0
5/12/2016 23:40	20	0
5/12/2016 23:42	17	0
5/12/2016 23:44	18	0
5/12/2016 23:46	20	0
5/12/2016 23:48	17	0
5/12/2016 23:50	18	0
5/12/2016 23:52	17	0
5/12/2016 23:54	15	0
5/12/2016 23:56	18	0
5/12/2016 23:58	16	0
5/13/2016 0:00	19	0
5/13/2016 0:02	16	0
5/13/2016 0:04	18	0
5/13/2016 0:06	18	0
5/13/2016 0:08	19	0

5/13/2016 0:10	19	0
5/13/2016 0:12	18	0
5/13/2016 0:14	20	0
5/13/2016 0:16	17	0
5/13/2016 0:18	19	0
5/13/2016 0:20	17	0
5/13/2016 0:22	17	0
5/13/2016 0:24	15	0
5/13/2016 0:26	12	0
5/13/2016 0:28	14	0
5/13/2016 0:30	14	0
5/13/2016 0:32	15	0
5/13/2016 0:34	13	0
5/13/2016 0:36	12	0
5/13/2016 0:38	12	0
5/13/2016 0:40	18	0
5/13/2016 0:42	21	0
5/13/2016 0:44	18	0
5/13/2016 0:46	17	0
5/13/2016 0:48	18	0
5/13/2016 0:50	19	0
5/13/2016 0:52	19	0
5/13/2016 0:54	18	0
5/13/2016 0:56	20	0
5/13/2016 0:58	20	0
5/13/2016 1:00	19	0
5/13/2016 1:02	20	0
5/13/2016 1:04	20	0
5/13/2016 1:06	19	0

Help Print

NOAA/NOS/CO-OPS
Daily Tide Prediction for KEY WEST,FL
StationId 8724580
From: 2016/05/04 - 2016/05/05
Units: Feet Time Zone: LST/LDT Datum: MLLW



Disclaimer: These data are based upon the latest information available as of the date of your request, and may differ from the published tide tables.

High/Low Tide Predictions

Station Name: KEY WEST,FL
Parameter: Daily
Product: Tide Prediction
Start Date & Time: 2016/05/04 12:00AM
End Date & Time: 2016/05/05 11:59PM

Source: NOAA/NOS/CO-OPS
Prediction Type: Harmonic
Datum: MLLW
Height Units: Feet
Time Zone: LST/LDT

Date	Day	Time	Hgt	Time	Hgt	Time	Hgt	Time	Hgt
2016/05/04	Wed	01:57 AM	0.12 L	08:36 AM	1.72 H	02:40 PM	-0.23 L	09:28 PM	1.51 H
2016/05/05	Thu	02:40 AM	0.14 L	09:17 AM	1.9 H	03:33 PM	-0.44 L	10:23 PM	1.48 H

APPENDIX III – WATER QUALITY MONITORING TECHNICAL REPORT (JUNE 2011- DECEMBER 2015)

Stock Island Landfill Water Quality Monitoring Technical Report (June 2011- December 2015)

Prepared for the

Florida Department of Environmental Protection

South District Office
2295 Victoria Avenue, Suite 364
Fort Myers, FL 33901

Marathon Branch Office
2796 Overseas Highway, Suite 221
Marathon, FL 33050

On behalf of the

City of Key West
P.O. Box 1409
Key West, Florida 33041

May 2016

3011 S.W. Williston Road
Gainesville, FL 32608-3928

R. J. (Bo) Bruner III, P.E.
Florida P.E. No. 35951

TABLE OF CONTENTS

Exhibits

Photographs

1 INTRODUCTION

On behalf of the City of Key West ("City"), CH2M Hill Engineers Inc. ("Engineer") has prepared the following Water Quality Report for the Stock Island Landfill (WACS #79636) in accordance with the requirements of Chapter 62-701.510(8)(b), Florida Administrative Code ("FAC") for the Florida Department of Environmental Protection ("FDEP"). This technical report summarizes and interprets groundwater quality and water level data and trends at the Stock Island Landfill.

The report analyzes data from the ten (10) semi-annual sampling events at the Stock Island Landfill during June 2011 through December 2015. Previously, the sampling events happened quarterly, however in April 2011, the sampling events were reduced to semi-annual samplings but increased the number of parameters to be sampled (Exhibit 1). In 2014, the number of parameters were reduced for the semi-annual sampling events (Exhibit 2). Information presented includes:

- Tabular and graphical data of the groundwater monitoring parameters, including water level hydrographs for each monitoring well;
- Analysis of trends of detected parameters;
- Comparisons between monitoring wells based upon proximity to the coastline;
- Correlation between related parameters;
- Discussion of poorly-correlated data;
- Interpretation of groundwater elevation contour maps and groundwater movement, and;
- Evaluation of the adequacy of water quality monitoring frequency and sampling location based upon site condition.

2 DETECTION MONITORING NETWORK

2.1 Groundwater Monitoring Wells

The groundwater monitoring network at the Stock Island Landfill consists of five (5) active monitoring wells. The locations of monitoring wells around the landfill are shown on Figure 1.

The five monitoring wells are distributed around the northern and southern borders of the landfill. Two wells, MW-1 and MW-5 are up-gradient of the landfill and are located on the South – Southeastern side of the landfill. MW-2 and MW-3 (Photograph I) are down-gradient wells located between the Gulf of Mexico and the landfill. MW-4 (Photograph II) is also a down-gradient well near the Gulf of Mexico, but it is located between the landfill and another parcel. There are no other water supply wells or monitoring wells located within a 1-mile radius of the landfill.

2.2 Surface Water Stations

There are no surface water stations at the Stock Island Landfill as there is no surface water present onsite. The surface water generated by rainfall runoff is collected in retention ponds and outfalls to the Gulf of Mexico. Standing water in the retention ponds was not present at the time of groundwater monitoring. Therefore, the accumulated rainwater was not tested.

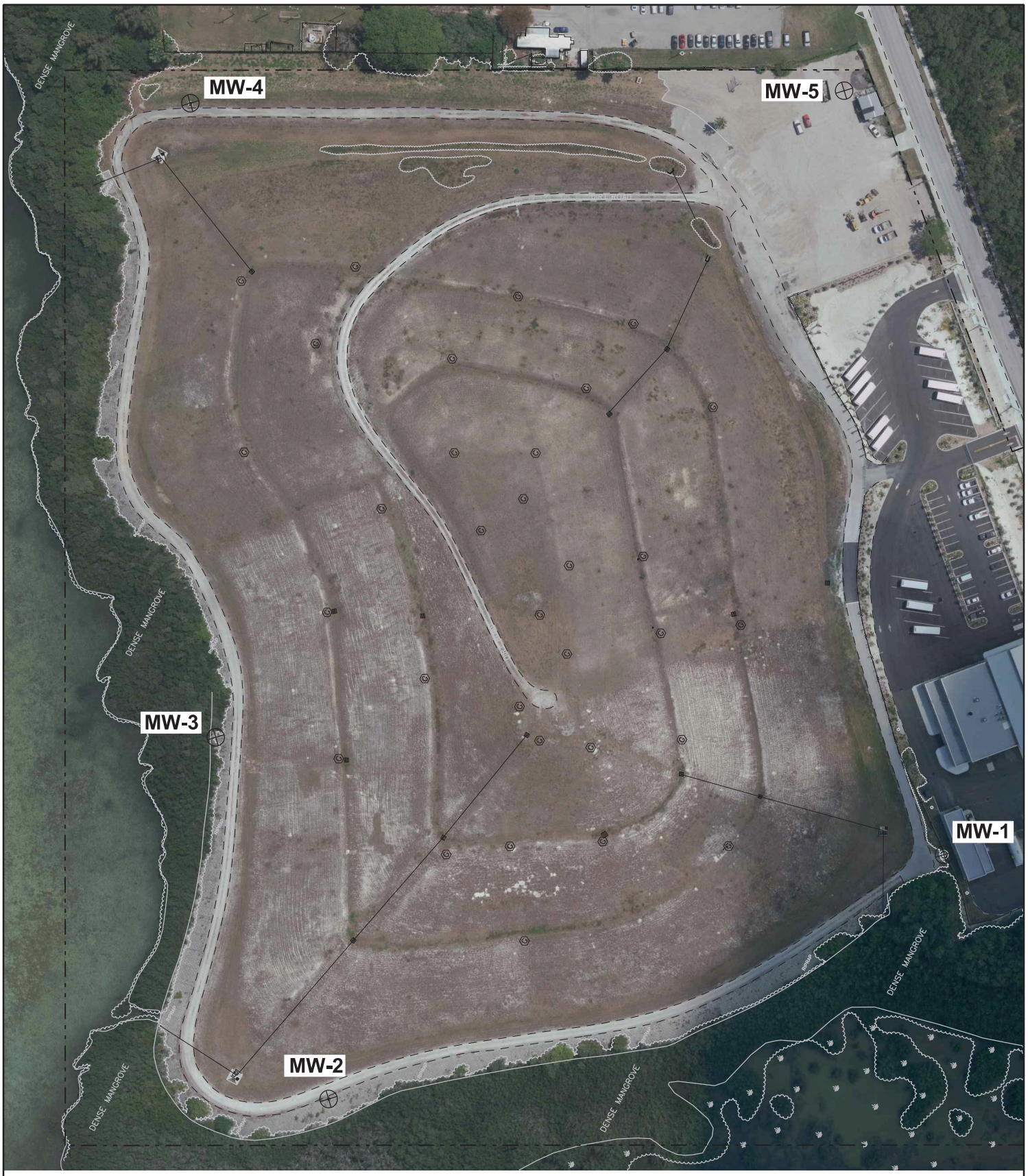


Figure 10: Groundwater Contours December 2015

N

0 150 300

SCALE IN FEET

KEY WEST STOCK ISLAND LANDFILL
POST-CLOSURE ASSISTANCE
CITY OF KEY WEST, FLORIDA

ch2m

Fig-02_671926.dgn

2.3 Site Hydrogeologic Framework

The lower keys are underlain by three formations. In descending depth order the formations are Miami Oolite, Tamiami, and Hawthorn formations. The Hawthorn formation is about 60 ft. below mean sea level. The Miami Oolite and Tamiami formations are highly permeable layers. The Miami Oolite has a higher vertical permeability than horizontal permeability. Due to the proximity of the site to the Gulf of Mexico and the high permeability of the ground formations, tidal fluctuations influence groundwater levels and groundwater flow direction at the site; as well as, groundwater quality (Exhibit 3).

3 SUMMARY OF MONITORING RESULTS

3.1 Summary of Exceedances: Groundwater

Concentrations of parameters in groundwater from each of the five (5) monitoring wells detected during the semi-annual sampling events from June 2011 – December 2015 are presented in Table 1 of Exhibit 4. The data received from the sampling events were compared to the GCTLs for Groundwater of Low Yield/Poor Quality Criteria. The data is compared to the G3 water standard due to the saline background conditions of the groundwater and the residents of the island do not drink the groundwater. The groundwater is only used on the island as part of the fire protection system.

Graphic plots of groundwater constituent trends at each monitoring well are presented in Exhibit 5.

pH

The pH of groundwater samples collected during the past five years was typically in the range of pH values from the Florida secondary drinking water standards (6.5-8.5 pH units). The background conditions are the seawater from the Gulf of Mexico which typically ranges from 7.5 to 8.4 pH units. The first sampling event for this reporting period (June 2011) had higher than average pH ranging from 8.98 to 8.24. Another outlier, from MW-5 on May 2015, was recorded at 9.89 pH units. The remaining sampling data showed close to neutral pH.

Total Dissolved Solids

Total Dissolved Solids (TDS) exceeded GCTL during eight of the ten different sampling events. These exceedances occurred at Well #2 and Well #3, which are between the landfill and the Gulf of Mexico. Well #2 exceeded TDS standard 5 times and Well #3 exceeded TDS standard 7 times. However, TDS may be exceeded if no other maximum contaminant level (MCL) is exceeded (FDEP, 2004). Therefore, the TDS exceedance should not be seen as an issue for the groundwater as it is known that the underlying conditions are saline from the Gulf of Mexico tidal influence.

3.2 Field Parameters: Groundwater

Field parameters measured by personnel in field include: pH, dissolved oxygen, water temperature, turbidity, and specific conductivity. These data can be useful to indicate variances in general groundwater quality as well as variance around the site. Field measurements of parameters for groundwater samples collected over the reporting period are included in Table 2 in Exhibit 4.

pH
The average pH of all sampling events, excluding the outlier data denoted in Section 3.2, is 7.26 pH units. This is a bit below background conditions of the saline water of the Gulf of Mexico.

Dissolved Oxygen
The Dissolved Oxygen (DO) was lower than typical groundwater conditions, possibly due to the nearby mangroves next to the landfill and the tidally influenced groundwater movement.

Water Temperature
Groundwater temperatures appeared consistent between monitoring wells and sampling event data sets. There was small change (about 1°C) in the average recorded temperature between seasons.

Fluid Turbidity
Fluid turbidity did not exceed 20 NTUs in any of the samples collected during the monitoring period.

Specific Conductivity
Conductivity varied relative to TDS. The higher conductivity was typically tested from MW-2 and MW-3 as these wells were located between the landfill and the Gulf of Mexico.

3.3 Indicator Parameters: Groundwater

In August 2014, several parameters for groundwater monitoring were removed (Exhibit 2). Due to background conditions of saline water and some parameters not exceeding the GCTL, CH2M (2012) recommended parameters to be removed from testing. These include the need to test for ammonium (NH_4), arsenic, bicarbonate, chlorides, iron, nitrate, sodium, and total organic carbon (TOC). Specifically sodium and iron were not good indicators as these are naturally occurring elements and no background data was available for comparison.

3.4 Trace Metals: Groundwater

Table 1 in Exhibit 4 presents a summary of trace metals (Cadmium, Chromium, Lead, Mercury, and Zinc) detected in the groundwater samples over the monitoring period. During the past five years, there were no exceedances for any of the trace metals for the G3 GCTL standards.

Cadmium

The GCTL for Cadmium is 50 ug/L. The analyzed groundwater samples ranged from 0.28 – 1.1 ug/L.

Chromium

The GCTL for Chromium is 1,000 ug/L. The analyzed groundwater samples ranged from 0.27 – 63 ug/L.

Lead

The GCTL for Lead is 150 ug/L. The analyzed groundwater samples ranged from 0.12 – 2.6 ug/L.

Mercury
The GCTL for Mercury is 20 ug/L. The analyzed groundwater samples ranged from 0.00025 – 0.73 ug/L.

Zinc
The GCTL for Zinc is 50,000 ug/L. The analyzed groundwater samples ranged from 0.28 – 130 ug/L.

3.5 Volatile Organic Compounds: Groundwater

In July 2014, the groundwater parameters to be tested were reduced for the Stock Island Landfill to not include VOCs (Exhibit 2). Before the reduction in parameters, CH2M (2012) analyzed the groundwater data and found seven VOCs have been detected in groundwater from at least one monitoring well: 1,4-dichlorobenzene, carbon disulfide, chloromethane, dichlorodifluoromethane, methylene chloride, methyl tert-butyl ether (MTBE), and toluene.

None of the VOCs were detected at concentrations above the respective GCTLs, and several were flagged by the laboratory. Methylene chloride was the most frequently detected VOC, but all of the detections were flagged as between the MDL and PQL or present in the associated blank. Methylene chloride is used as an extraction solvent in organic chemistry laboratories and is a common laboratory contaminant.

4 CORRELATION OF RELATED PARAMETERS

4.1 TDS vs Specific Conductance

The relationship between TDS and specific conductance concentrations at each groundwater monitoring well over the reporting period is shown graphically in Exhibit 6. Typically, specific conductance and total dissolved solids correlated well. There were only two sampling dates that the correlation did not seem similar to the other data. These dates were November 2012 and May 2013. During these dates, there were no GCTL exceedances besides for TDS.

4.2 VOCs

There is no correlation between the related VOCs, as any VOC that was tested for was below the respective GCTL and testing for VOCs ended in July 2014 (Exhibit 2).

5 GROUNDWATER FLOW

Groundwater at the site was found to generally flow northwesterly toward the Gulf of Mexico (Exhibit 7). The Miami Oolite and Tamiami formations, underlying the lower keys, are highly permeable layers. The Miami Oolite has a higher vertical permeability than horizontal permeability. Due to this formation, the groundwater had chemical characteristics of brackish water, but did not change much with the tide elevation. Water levels collected before groundwater sampling events, during the reporting period are shown in Exhibit 8. The water levels tend to stay relatively consistent between sampling events.

6 EVALUATION OF MONITORING REQUIREMENTS

The monitoring requirements specified in the Closure Plan FDEP Monitoring Plan Implementation for the closed Stock Island Landfill required quarterly sampling. In April 2011, the sampling was reduced to semi-annual monitoring (Exhibit 1). In July 2014, the parameters to be monitored were further reduced (Exhibit 2). Upon analyzing the collected data for the past 2 years, all parameters are under GCTL except the TDS. The TDS is above GCTL due to the background saline conditions of the Gulf of Mexico. However, TDS may be exceeded if no other maximum contaminant level (MCL) is exceeded (FDEP, 2004). Therefore, the TDS exceedance should not be seen as an issue for the groundwater.

7 SUMMARY AND CONCLUSIONS

Semi-annual water quality sampling events for groundwater monitoring wells at the Stock Island Landfill over the 5-year-period, June 2011 - December 2015, were reviewed and evaluated. Only one groundwater parameter was found to occasionally exceed the Groundwater Cleanup Target Levels (GCTLs) set forth in Chapter 62-777, F.A.C. This parameter was TDS at Well #2 and Well #3. Both of these wells are between the landfill and the Gulf of Mexico. The background water condition is the Gulf of Mexico due to the tidal influence the groundwater incurs through the highly permeable formations. Therefore, the TDS GCTL exceedance should not be seen as a potential concern for leachate leaks. The other parameters that have been monitored have not shown any GCTL exceedance or concerning data trends.

The data analyzed during the reporting period indicated the landfill does not impact groundwater at concentrations that may be expected to result in violations of Department water quality standards or criteria. Therefore, CH2M proposes groundwater monitoring be removed and groundwater wells abandoned as part of the Certification of Completion of Long-Term Care for the Stock Island Landfill.

WORKS CITED

CH2M. 2012. “Data Analysis for the Closed Stock Island Landfill, Key West, Florida”.

Florida Department of Environment Protection (FDEP). 2004. “Ground Water Standards and Guidance Concentrations used in Watershed Assessments”. Division of Waters Resource Management. Bureau of Watershed Management.

Exhibit 1: Groundwater Sampling Schedule Reduced from Quarterly to Semi-Annually Samplings

Florida Department of Environmental Protection
South District
P.O. Box 2549
Fort Myers, FL 33902-2549

April 12, 2011

Jay Gewin, Utilities Manager
Via Electronic Mail: jgewin@keywestcity.com
Collier County Solid Waste Management
3301 East Tamiami Trail, Building H
Naples, Florida 34112

Re: Monroe County – SW
Stock Island Landfill (Class I)
WACS ID No. 00079636
OGC Consent Order 89-0466

Dear Mr. Gewin:

In an effort to update our water quality monitoring requirements, and to facilitate electronic review of Water Quality Monitoring reports pursuant to Rule 6-701.510(8), Florida Administrative Code (F.A.C.), we are writing to notify you and acquire your permission for the Department to modify **condition no. 5a** that references water quality monitoring in the attached **Closure Plan dated July 13, 1993** with the pertinent requirements in the aforementioned rule. The net effect of this modification is that the groundwater sampling schedule will be decreased from quarterly (see condition no. 5f) to semi-annually and the number of parameters to be analyzed will increase. The collected samples shall be analyzed for the parameters found in 62-701.510(8), F.A.C. (see attached).

There will be no fee for this administrative change to your Consent Order.

Whenever possible, please submit your written response(s) electronically to Bill.Krumbholz@dep.state.fl.us. If you have any questions or concerns, please contact myself or Mark A. Sautter at (239) 344-5690 or **Mark.Sautter@dep.state.fl.us.**

Sincerely,

Bill Krumbholz
Environmental Manager

BK/MAS/se

Attachments: Water Quality Parameter List [62-701.510(8)]
July 13, 1993 Closure Plan

Exhibits

WATER QUALITY MONITORING PARAMETERS – LONG TERM CARE
62-701.510(8), FLORIDA ADMINISTRATIVE CODE

GROUNDWATER

Field Parameters:

- Static water level in wells before purging
- Specific Conductivity
- pH
- Dissolved Oxygen
- Turbidity
- Temperature
- Colors and Sheens (by observation)

Laboratory Parameters:

- Total Ammonia – N
- Chlorides
- Iron
- Mercury
- Nitrate
- Sodium
- Total Dissolved Solids (TDS)
- Those Parameters listed in 40 CFR Part 258 Appendix I:

SURFACE WATER (storm water when applicable)

Field Parameters:

- Specific Conductivity
- pH
- Dissolved Oxygen
- Turbidity
- Temperature
- Colors and Sheens (by observation)

Laboratory Parameters:

- Unionized Ammonia
- Total Hardness (as mg/L CaCO3)
- Biochemical Oxygen Demand (BOD)
- Iron
- Mercury
- Nitrate
- Total Dissolved Solids (TDS)
- Total Organic Carbon (TOC)
- Fecal Coliform
- Total Phosphorus (as mg/L P)
- Chlorophyll A
- Total Nitrogen
- Chemical Oxygen Demand (COD)
- Total Suspended Solids (TSS)
- Those Parameters listed in 40 CFR Part 258 Appendix I:

Florida Department of
Environmental Protection

Lawton Chiles
Governor

South District
2295 Victoria Avenue
Fort Myers, Florida 33901

Virginia B. Wetherell
Secretary

July 13, 1993

Paul Cates
Director Technical Services
City of Key West
P.O. Box 1409
Key West, Florida 33041-1409

Re: Monroe County - SW
Stock Island Landfill Phase II
Closure Plan
OGC Consent Order 89-0466

Dear Mr. Cates:

The Department has reviewed the additional information submitted by your consultant CH_2M Hill and found it to be satisfactory to complete the Closure Plan for Phase II of the subject landfill. The Closure Plan is hereby approved for closure construction and post closure long-term care with the following conditions:

1. The closure construction shall be carried out in compliance with the Consent Order OGC No. 89-0466 and its amendments 1 and 2. However, any circumstances beyond the control of the City shall be made aware to the Department as the ones noted in the City's letter of May 25, 1993.

2. The closure construction shall be in accordance with the submitted and approved Closure Plan, additional information and Construction Quality Assurance Plan. The synthetic liner shall not be left exposed (i.e., without the protective soil layer) for a prolonged period to prevent any risk of damage due to extreme weather conditions.

3. A Certificate of Construction Completion [Form 17-701-900(2), attached] signed, dated and sealed by a Professional Engineer registered in the State of Florida, shall be submitted to the Department within thirty (30) days of construction completion.

Continued . . .

4. Post closure long-term care shall be in accordance with the approved Closure Plan and the consent order including amendments 1 and 2.

5. The following approved water quality monitoring program that has been planned to comply with the criteria of F.A.C. Rule 17-701.510 (Effective 1-6-93) shall be subject to the provisions of F.A.C. Rules 17-160, 17-520, 17-522, 17-302, 17-550, and the following specific conditions:

   a. Monitoring wells identified as MW-1, MW-2, MW-3, MW-4, and MW-5, and stormwater retention ponds identified as No. 1, No. 2, and No. 3 as shown on Figure 2 of the permit application shall be sampled and analyzed quarterly for the following parameters:

      Field Parameters

      Static water level (wells only prior to purging)
      Specific conductivity
      pH
      Dissolved oxygen
      Turbidity
      Temperature
      Colors and sheens

      Laboratory Parameters

Ammonium (NH_4)	Lead
Arsenic	Mercury
Bicarbonate	Nitrate
Cadmium	Sodium
Chlorides	Total dissolved solids (TDS)
Chromium	Total organic carbon (TOC)
Iron	EPA 601/602 Analytes

   b. Compliance with ground water standards shall be determined by analysis of unfiltered ground water samples, unless a filtered sample is as or more representative of the particular ground water quality.

   c. The City shall ensure that the minimum criteria for Class G-III ground water specified in F.A.C. Rules 17-520.430 and 17-520.400 shall not be violated.

Continued.....

d. The City shall ensure discharges from the retention ponds for stormwater meet surface water quality standards specified in F.A.C. Rule 17-302 at the point of discharge to waters of the state or from the property, whichever is closer to the retention pond.

e. If at any time the minimum criteria for Class G-III ground water specified in F.A.C. Rules 17-520.430 and 17-520.400 is violated, the City has fifteen (15) days in which to resample the monitor well(s) to verify the original analysis. Should the City choose not to resample, the Department will consider the water quality analysis as representative of current ground water conditions at the facility.

f. Quarterly monitoring reports shall be submitted within the first fifteen (15) days of each month following the three month sampling and analysis periods.

g. Quarterly monitoring reports shall be submitted on DER Form 17-1.216(2).

h. Abandonment of existing wells and construction of new wells at the landfill shall be approved by the Department.

i. If a monitoring well becomes damaged or inoperable, the City shall notify the Department immediately, and a detailed written report shall be submitted within seven (7) days thereafter. The report shall describe the nature of the problem and the remedial measures which have been taken to prevent a recurrence. All monitoring well design and replacement shall be approved by the Department prior to installation.

j. The field testing, sample collection and preservation, and laboratory testing, including quality control procedures, shall be in accordance with methods approved by the Department as specified in F.A.C. Rules 17-160, 17-4.246 and 17-520.300.

Continued.....

k. If any existing monitoring well detects significant contamination, the Department may require additional wells to be installed to determine the extent and degree of contamination.

6. Surface water and storm water shall be managed in compliance with the permit issued by the South Florida Water Management District.

7. This letter shall be attached to the OGC Consent Order No. 89-0466 as the approved Closure Plan becomes an addendum to that consent order.

Should you have any questions, please call Ghaus Minhaj at (813) 332-6975.

Note: In the event of an emergency the City shall contact the Department by calling (904) 488-1320. During normal business hours. The City shall call (813) 332-6975.

Sincerely,

Philip R. Edwards
Director of
District Management

PRE/GM/klm

Attachment

cc: K.R. Chang Ph.D., P.E. (w/attachment)
R.J. Bruner III, P.E.
Jeff Gould - Fort Myers
Bill Krumbholz - Fort Myers
Lisa Gordon - Marathon
David Schwartz - OGC Tallahassee
Mary Jean Yon - Tallahassee

Exhibit 2: Groundwater Parameters Reduced

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
Marathon Branch Office
2796 Overseas Hwy, Suite 221
Marathon, FL 33050

RICK SCOTT
GOVERNOR

CARLOS LOPEZ-CANTERA
LT. GOVERNOR

HERSCHEL T. VINYARD JR.
SECRETARY

August 12, 2014

William Thompson
Solid Waste Coordinator
City of Key West
3140 Flagler Ave
Key West, FL 33040
wthompson@keywestcity.com

Re: Monroe County – SW
Stock Island Landfill (Class I)
WACS ID No. 79636
OGC Consent Order 89-0466

Dear Mr. Thompson:

In response to a request by the City of Key West through Jay Gewin, we are writing to notify you of the Department's approval of the request for a modification of the above referenced facility's groundwater monitoring plan. The net effect of this modification is that the groundwater sampling schedule which was previously decreased from quarterly to semi-annually, will remain semi-annual and the number of parameters to be analyzed will decrease. Please see the attached list of parameters to be analyzed. There will be no fee for this administrative change to your closure plan.

If you have any questions or concerns, please contact Barbara Nevins at (305) 289-7073 or Barbara.nevins@dep.state.fl.us or Mark A. Sautter at (239) 344-5690 or Mark.Sautter@dep.state.fl.us.

Sincerely,

Jennifer L. Carpenter
Assistant District Director
South District Office

JC/GR/BK/BN

Attachments: New Semi-annual monitoring Parameter List
July 13, 1993 Closure Plan, OGC Case 89-0466

ec: Bill Krumbholz, FDEP Ft. Myers, bill.krumbholz@dep.state.fl.us
Mark Sautter, FDEP Ft. Myers, mark.sautter@dep.state.fl.us

SEMI-ANNUAL WATER QUALITY MONITORING PARAMETERS – LONG TERM CARE

Field Parameters:
• Static water level in wells before purging
• Specific Conductivity
• pH
• Dissolved Oxygen
• Turbidity
• Temperature
• Colors and Sheens (by observation)

Laboratory Parameters:
- Lead (Pb)
- Mercury (Hg)
- Chromium (Cr)
- Cadmium (Cd)
- Zinc (Zn)
- Total Dissolved Solids (TDS)

SURFACE WATER (storm water when applicable)

Field Parameters:
• Specific Conductivity
• pH
• Dissolved Oxygen
• Turbidity
• Temperature
• Colors and Sheens (by observation)

Laboratory Parameters:
- Lead (Pb)
- Mercury (Hg)
- Chromium (Cr)
- Cadmium (Cd)
- Zinc (Zn)
- Total Dissolved Solids (TDS)

Florida Department of
Environmental Protection

Lawton Chiles
Governor

South District
2295 Victoria Avenue
Fort Myers, Florida 33901

Virginia B. Wetherell
Secretary

July 13, 1993

Paul Cates
Director Technical Services
City of Key West
P.O. Box 1409
Key West, Florida 33041-1409

Re: Monroe County - SW
Stock Island Landfill Phase II
Closure Plan
OGC Consent Order 89-0466

Dear Mr. Cates:

The Department has reviewed the additional information submitted by your consultant CH_2M Hill and found it to be satisfactory to complete the Closure Plan for Phase II of the subject landfill. The Closure Plan is hereby approved for closure construction and post closure long-term care with the following conditions:

1. The closure construction shall be carried out in compliance with the Consent Order OGC No. 89-0466 and its amendments 1 and 2. However, any circumstances beyond the control of the City shall be made aware to the Department as the ones noted in the City's letter of May 25, 1993.

2. The closure construction shall be in accordance with the submitted and approved Closure Plan, additional information and Construction Quality Assurance Plan. The synthetic liner shall not be left exposed (i.e., without the protective soil layer) for a prolonged period to prevent any risk of damage due to extreme weather conditions.

3. A Certificate of Construction Completion [Form 17-701-900(2), attached] signed, dated and sealed by a Professional Engineer registered in the State of Florida, shall be submitted to the Department within thirty (30) days of construction completion.

Continued . . .

4. Post closure long-term care shall be in accordance with the approved Closure Plan and the consent order including amendments 1 and 2.

5. The following approved water quality monitoring program that has been planned to comply with the criteria of F.A.C. Rule 17-701.510 (Effective 1-6-93) shall be subject to the provisions of F.A.C. Rules 17-160, 17-520, 17-522, 17-302, 17-550, and the following specific conditions:

   a. Monitoring wells identified as MW-1, MW-2, MW-3, MW-4, and MW-5, and stormwater retention ponds identified as No. 1, No. 2, and No. 3 as shown on Figure 2 of the permit application shall be sampled and analyzed quarterly for the following parameters:

      Field Parameters

      Static water level (wells only prior to purging)
      Specific conductivity
      pH
      Dissolved oxygen
      Turbidity
      Temperature
      Colors and sheens

      Laboratory Parameters

Ammonium (NH_4)	Lead
Arsenic	Mercury
Bicarbonate	Nitrate
Cadmium	Sodium
Chlorides	Total dissolved solids (TDS)
Chromium	Total organic carbon (TOC)
Iron	EPA 601/602 Analytes

   b. Compliance with ground water standards shall be determined by analysis of unfiltered ground water samples, unless a filtered sample is as or more representative of the particular ground water quality.

   c. The City shall ensure that the minimum criteria for Class G-III ground water specified in F.A.C. Rules 17-520.430 and 17-520.400 shall not be violated.

Continued.....

d. The City shall ensure discharges from the retention ponds for stormwater meet surface water quality standards specified in F.A.C. Rule 17-302 at the point of discharge to waters of the state or from the property, whichever is closer to the retention pond.

e. If at any time the minimum criteria for Class G-III ground water specified in F.A.C. Rules 17-520.430 and 17-520.400 is violated, the City has fifteen (15) days in which to resample the monitor well(s) to verify the original analysis. Should the City choose not to resample, the Department will consider the water quality analysis as representative of current ground water conditions at the facility.

f. Quarterly monitoring reports shall be submitted within the first fifteen (15) days of each month following the three month sampling and analysis periods.

g. Quarterly monitoring reports shall be submitted on DER Form 17-1.216(2).

h. Abandonment of existing wells and construction of new wells at the landfill shall be approved by the Department.

i. If a monitoring well becomes damaged or inoperable, the City shall notify the Department immediately, and a detailed written report shall be submitted within seven (7) days thereafter. The report shall describe the nature of the problem and the remedial measures which have been taken to prevent a recurrence. All monitoring well design and replacement shall be approved by the Department prior to installation.

j. The field testing, sample collection and preservation, and laboratory testing, including quality control procedures, shall be in accordance with methods approved by the Department as specified in F.A.C. Rules 17-160, 17-4.246 and 17-520.300.

Continued.....

k. If any existing monitoring well detects significant contamination, the Department may require additional wells to be installed to determine the extent and degree of contamination.

6. Surface water and storm water shall be managed in compliance with the permit issued by the South Florida Water Management District.

7. This letter shall be attached to the OGC Consent Order No. 89-0466 as the approved Closure Plan becomes an addendum to that consent order.

Should you have any questions, please call Ghaus Minhaj at (813) 332-6975.

Note: In the event of an emergency the City shall contact the Department by calling (904) 488-1320. During normal business hours. The City shall call (813) 332-6975.

Sincerely,

Philip R. Edwards
Director of
District Management

PRE/GM/klm

Attachment

cc: K.R. Chang Ph.D., P.E. (w/attachment)
R.J. Bruner III, P.E.
Jeff Gould - Fort Myers
Bill Krumbholz - Fort Myers
Lisa Gordon - Marathon
David Schwartz - OGC Tallahassee
Mary Jean Yon - Tallahassee

Exhibit 3: Application for Permit to Close City of Key West Stock Island Landfill

CH2M HILL
Engineers
Planners
Economists
Scientists

November 4, 1992

SEF20064.CD

Mr. Phil Barbaccia
Florida Department of Environmental
Regulation
2295 Victoria Avenue
Fort Myers, Florida 33901

Dear Mr. Barbaccia:

Subject: Application for Permit to Close City of Key West Stock Island Landfill

Submitted in accordance with Item 17 of the Consent Order (OGC Case No. 89-0466) between the City of Key West and the Florida Department of Environmental Regulation are seven signed and sealed copies of the subject permit application.

Please call me if you have any questions regarding this permit application.

Sincerely,

CH2M HILL

Kou-Roung Chang

Kou-Roung Chang, Ph.D., P.E.
Project Manager

10013B56.GNV
cc: Paul Cates/City of Key West
Ken Williams/CH2M HILL/KWF
Bo Bruner/CH2M HILL/GNV

CH2M HILL Gainesville Office 7201 N.W. 11th Place, Gainesville, FL 32605-3158 P.O. Box 147009, Gainesville, FL 32614-7009 904.331.2442 FAX. 904.331.5320

LANDFILL CLOSURE PLAN
CITY OF KEY WEST
STOCK ISLAND LANDFILL

Prepared for

CITY OF KEY WEST
P.O. Box 1409
Key West, Florida 33041

Prepared by

CH2M HILL
7201 NW 11th Place
P.O. Box 147009
Gainesville, Florida 32614-7009

SEF20064.CD
November 1992

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

APPLICATION FOR PERMIT TO CLOSE
A SOLID WASTE RESOURCE RECOVERY AND MANAGEMENT FACILITY

GENERAL REQUIREMENTS

Solid Waste Resource Recovery and Management Facilities must be permitted pursuant to Section 403.707, Florida Statutes. Separate permit applications for each type of facility, six copies each, should be submitted to the District office of the Department of Environmental Regulation. Complete appropriate sections of the application for the type of facility involved.

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 submit the application through appropriate local planning agencies. Comments from any the these agencies shall be forwarded with the application to the Department.

The permit application shall include all information necessary to evaluate the proposed closure plan to insure the landfill will pose no significant threat to public health or the environment. All entries should be typed or printed in ink. If additional space is needed, separate, properly identified sheets of paper may be attached. All blanks shall be filled or marked as not applicable.

Facility Type:

Sanitary Landfill:
- [X] Class I, more than 50 cy or 20 tons waste/day
- [ ] Class II, less than 50 cy or 20 tons waste/day
- [ ] Class III:
  - [ ] trash/yard trash

Volume Reduction:
- [ ] Composting
- [X] Transfer Station
- [ ] Shredder
- [ ] Incinerator/Trench Burner
- [ ] Resource Recovery: __Energy __Materials

Sludge Landspreading:
- [ ] Grade II

FACILITY NAME: City of Key West Stock Island Landfill GMA #5244M05353 OGC Case #89-0466
(ID number)

FACILITY LOCATION (main entrance): Junior College Road

S 26&27 (section), T 67S (township), R 25E (range) / Latitude 24° 34' 42" Longitude 31° 44' 49"

Applicant Name (operating authority): City of Key West

Street Address (include P. O. Box): 525 Angela Street PO Box 1409 Key West (city) Monroe (county) 33041 (zip)

Contact Person: Paul Cates/Director of Technical Services (305)292-8176
(Name) (phone number)

Authorized Agent/Consultant: CH2M HILL (904)331-2442
(Name) (phone number)

Mailing Address: 7201 NW 11th Place (PO Box 147009)

Gainesville (city) Alachua (county) 32614-7009 (zip)

Contact Person: K. R. Chang
(name) (phone number)

Landowner (if different than applicant): Same as applicant

Address of Landowner: _____
(street, P. O. Box) (city) (state) (zip)

REQUIRED ATTACHEMENTS FOR CLOSURE OF A RESOURCE RECOVERY AND MANAGEMENT FACILITY

LANDFILL:
Permit applications and supporting information shall include the following (17-7.077(2), F.A.C.):

Completeness Check

1. A letter of transmittal to the Department; (17-7.077(2)(a), F.A.C.) ___

2. A table of contents listing the main sections of the application: (17-7.077(2)(b), F.A.C.) ___

3. The permit fee specified in Florida Aministrative Code Rule 17-4.05 in check or money order payable to the Department: (17-7.077(2)(c), F.A.C.) ___

4. Seven copies, at minimum, of the completed application form, all supporting data, and reports; (17-7.077(2)(d), F.A.C.) ___

5. Engineer certification; (17-7.077(2)(e), and 17-7.073(8), F.A.C.) ___

6. Engineer's letter of appointment if applicable; (17-7.077(2)(f), F.A.C. and 17-7.074(8), F.A.C.) ___

7. Closure plan as required in Florida Administrative Code Rule 17-7.073. A copy of a Department letter of approval of the landfill groundwater monitoring plan, or a copy of the letter of transmittal of the groundwater monitoring plan to the Department may be included in the closure plan in lieu of the groundwater monitoring plan document. ___

8. Copy of any lease agreement, transfer of property agreement with right of entry for long-term care, or any other agreement between operator and property owner by which the closing and long-term care of the facility may be affected; (17-7.077(4)(h) and 17-7.075(3), F.A.C.) ___

ATTACHMENT ITEMS

The following information items must be included in the application or an explanation given if they are not applicable.
CLOSURE PLAN REQUIREMENTS (17-7.073), F.A.C.)

1. General Landfill Information Report (17-7.073(1), Florida Administrative Code)

   a. Identification of the landfill(17-7.073(1)(a), F.A.C.) ___

   b. Name, address, and phone number of primary contact person. (17-7.073(1)(b), F.A.C.) ___

   c. Name of persons or consultants preparing closure plan (17-7.073(1)(c), F.A.C.) ___

   d. Name of landfill property owners and landfill operator (17-7.073(1)(d), F.A.C.) ___

   e. Locations of main entrance or operators office of the landfill by: township, range, and section and latitude and longitude. (17-7.073(1)(e), F.A.C.) ___

   f. Total acreage: of waste disposal area and landfill property (17-7.073(1)(f), F.A.C.) ___

   g. Legal Description of landfill property (17-7.073(1)(g), F.A.C.) ___

   h. History of landfill construction and operations (17-7.073(1)(h), F.A.C.) ___

   i. Identity of types of waste disposal of in completed landfill (17-7.073(1)(i), F.A.C.) ___

2. Area Information Report
(17-7.073(2), F.A.C.)

Completeness Check

a. Topogrpahy (17-7.073(2)(a), F.A.C.) ___

b. Hydrology (17-7.073(2)(b), F.A.C.) ___

c. Geology (17-7.073(2)(c), F.A.C.) ___

d. Hydrogeology (17-7.073(2)(d), F.A.C.) ___

e. Ground and surface water quality (17-7.073(2)(e), F.A.C.) ___

f. Land use information (17-7.073(2)(f), F.A.C.) ___

3. Groundwater Monitoring Plan Containing Site Specific Information
(17-7.073(3) and 17-4.245(6)(d), F.A.C.) ___

4. Gas Migration Investigation
(17-7.073(4), F.A.C.) ___

5. Assessment of the Effectiveness of Existing Landfill Design and Operation
(17-7.073(5), F.A.C.)

a. Effectiveness and results of groundwater investigation (17-7.073(5)(a), F.A.C.) ___

b. Effects of surface water runoff, drainage patterns and existing storm water controls (17-7.073(5)(b), F.A.C.) ___

c. Extent and effects of methane gas migration(17-7.073(5)(c), F.A.C.) ___

d. Type and condition of existing cover and effectiveness as leachate control mechanism. (17-7.073(5)(d), F.A.C.) ___

e. Nature and characteristics of wastes disposed of at the landfill. (17-7.073(5)(e), F.A.C.) ___

6. Closure Design Plan
(17-7.073(6), F.A.C.)

a. Phasing of site closing. (17-7.073(6)(a), F.A.C) ___

b. Existing topography and proposed final grades. (17-7.073(6)(b), F.A.C.) ___

c. Final cover installation plans. (17-7.073(6)(c), F.A.C.) ___

d. Proposed method of leachate control. (17-7.073(6)(c), F.A.C.) ___

e. Compliance with groundwater protection requirements of 17-4.245 and 17-4.246, F.A.C. (17-7.073(6)(e), F.A.C.) ___

f. Proposed method of gas and odor control. (17-7.073(6)(f), F.A.C.) ___

g. Proposed method of stormwater control. (17-7.073(6)(g), F.A.C.) ___

h. Proposed method of access control. (17-7.073(6)(h), F.A.C.) ___

i. Proposed final use of landfill property. (17-7.073(6)(i), F.A.C.) ___

7. Closure Operation Plan
(17-7.073(7), F.A.C.)

Completeness Check

a. Describe actions which will be taken to close the landfill. (17-7.073(7)(a), F.A.C.) ___

b. Time schedule for completion of closure and long term care. (17-7.073(7)(b), F.A.C.) ___

c. Proposed method of demonstrating financial responsibility for long term monitoring and maintenance. (17-7.073(7)(d), and 17-7.077(2)(i), F.A.C.) ___

d. Equipment and personnel needs to complete closure. (17-7.073(7)(e), F.A.C.) ___

REQUIREMENTS FOR LONG TERM CARE (17-7.075, F.A.C.)

1. Establish Long Term Care Period From Date of Closing.
(17-7.075(1) and 17-7.074(5), F.A.C.) ___

2. Acquire Right of Access Agreement Between Operator and Property Owner for Closing and Long-Term Care.
(17-7.075(3) and 17-7.077(2)(h), F.A.C.) ___

REQUIREMENTS FOR PROOF OF FINANCIAL RESPONSIBILITY (17-7.076, F.A.C)

1. Closure Cost Estimates
(17-7.076(1), F.A.C.) ___

CERTIFICATION BY APPLICANT AND ENGINEER OR PUBLIC OFFICER

A. Applicant

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

Paul K. Calos
Signature of Applicant or Agent

Director of Technical Services
Name and Title

Date: 10/5/92

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

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

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 principals applicable to such facilities. In my professional judgement, this facility, when properly maintained and operated, will comply with all applicable statutes of the State of Florida and rules of the Department. It is agreed that the undersigned will provide the applicant with a set of instructions of proper maintenance and operation of the facility.

Kou-Roung Chang
Signature

Sr. Geotechnical Engineer
Name and title (please type)

28438
Florida Registration Number
(please affix seal)

7201 N.W. 11th Place
Mailing Address

Gainesville FL. 32605
City, State, Zip Code

904-331-2442
Telephone Number

Date: _____

Construction Cost Estimate: $ 5,800,000

Permit Number: _____ Issue Date: _____

Review Date: _____ Expiration Date: _____

WACS # 79636
Entered into
OCULUS
South District

Kou-Roung Chang
11/6/92

CONTENTS

Appendixes

Kou-Roung Chang
Florida P.E.
License No. 28438

This closure plan has been prepared under the direction of a professional engineer registered in the State of Florida.

Introduction

In accordance with Section 17-701.070 of the Florida Administrative Code (FAC), this report was prepared to provide engineering design and construction documentation demonstrating that the closure of the City of Key West Stock Island landfill meets the minimum permit application requirements to close a landfill and monitor and maintain the closed facility.

The City of Key West and the Florida Department of Environmental Regulation (FDER) entered into a Consent Order (OGC Case No. 89-0466) on July 27, 1989, that requires the City to close Stock Island landfill in two phases by November 30, 1993. Phase I of the closure, which involves about one-half of the landfill, was completed in January 1991. Engineering design for the Phase II closure was completed in August 1992 and construction will begin in May 1993.

The Stock Island landfill began operation in early 1920. Residential and commercial wastes, including construction and demolition debris and white goods from the City of Key West and adjacent naval air station, were placed in the landfill until 1987, when a 150-ton-per-day waste-to-energy facility began operation. Since 1987, wet ash/residue at about 1,500 to 2,000 tons per month from the waste-to-energy facility has been hauled to the top of the landfill where it has been spread and compacted by a bulldozer. Materials that cannot be burned in the waste-to-energy facility are sent directly to the landfill. When the construction for the Phase II closure system begins in May 1993, the ash/residue will be hauled to a landfill in Dade County.

Closure Plan

The closure plan for the Stock Island landfill is discussed in the following seven sections.

1. General Landfill Information

a. Identification: The City of Key West landfill is located on Stock Island, east of Key West, Florida, as shown in Figure 1. The landfill is a Class I disposal facility.

b. Primary Contact Person: The primary person to contact about the landfill is Mr. Paul Cates, Director of Technical Services, City of Key West, P.O. Box 1409, Key West, Florida 33041, Telephone (305) 292-8150.

c. Consultants: The initial permit application was prepared by Malcolm Pirnie, Inc. of White Plains, New York. The additional information requested by FDER was prepared by CH2M HILL of Key West, Florida. The persons to contact are Mr. Paul Cates of the City of Key West, Florida, and Mr. K.R. Chang, P.E., of CH2M HILL.

d. Owner and Operator: The landfill is owned and operated under the jurisdiction of the City of Key West, Key West, Florida.

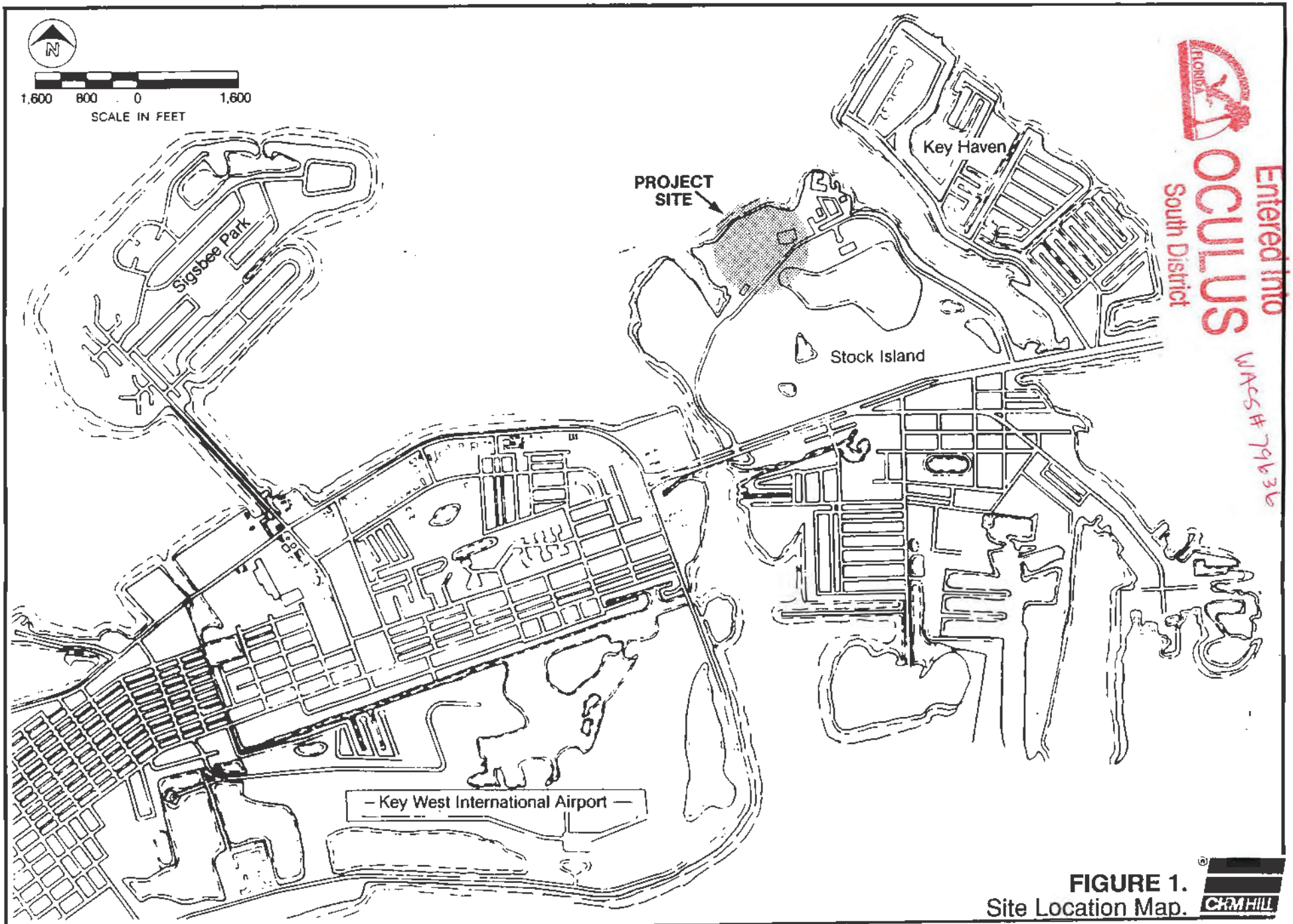
e. Location: The main entrance to the landfill is located in Sections 26 and 27, Township 67 South, Range 25 East, and latitude 24 degrees, 34 minutes, 42 seconds north and longitude 81 degrees, 44 minutes, 49 seconds west.

f. Total Area: The landfill property covers a total land area of about 32.5 acres. The total land area of the disposal site is about 19 acres.

g. Legal Description: A legal description of the landfill property is included in Appendix A.

h. History: The Key West landfill, located on Stock Island, has been in operation since the 1920's. The site has been used by the City of Key West as a solid waste landfill since the 1960's. The site is presently operating under a Consent Order between the City of Key West and FDER which was signed in July 1989. This consent order outlines guidelines for the operation of the landfill, requires the City to pursue a permanent solution to their waste disposal needs, and close the landfill in two phases before November 1993.

SEF20064.LD



Entered into OCULUS South District WACS # 79636

FIGURE 1.
Site Location Map.

CH2MHILL

On February 27, 1984, the City selected the firm of Montenay International to build and operate a waste to energy plant consisting of three 75-ton-per-day incinerator units. On January, 1987, a 150-ton-per-day facility began operations. The remaining 75-ton-per-day incinerator unit may be constructed in the future. Ash/residue and non-processable waste from the facility is presently being disposed of at the landfill on Stock Island under the Consent Order issued by the State.

The sequence at the site has been to fill a single lift over the entire footprint of the landfill. The initial lifts were spread over the entire 19 acres of the landfilled area and additional lifts gradually brought the landfill to its current grade. Before the resource recovery operation was begun, there was no separation of waste types and all wastes were disposed of together in the landfill.

Since the closing of the Phase I, western half, of the landfill in January 1991, wet ash/residue taken from the resource recovery facility is trucked to the top of the eastern half of the landfill where it is spread and compacted by a bulldozer. Nonprocessable construction and demolition debris is also placed with the ash. Cover material is not presently being used at the landfill. The ash/residue is used to cover the demolition debris and areas where previously placed putrescible waste may have become exposed. Dust on the access roads is controlled by a water truck as necessary.

In order to increase the amount of processable demolition debris, truck loads containing large amounts of tree stumps and wood are spread and crushed next to the tipping floor of the resource recovery facility. This process will be replaced by a shredder to be installed concurrently with the construction of the ash transfer facility. The processable wood waste is then disposed of in the incinerator. White goods and other metals are baled onsite and transported offsite to a scrap dealer.

i. Waste Types: The landfill has been the exclusive waste disposal area for the City of Key West and the Naval Air Station at Key West and has accepted residential and commercial waste, including construction/demolition debris and white goods. No information is available on materials disposed of during the early years of the landfill.

Current materials disposed of at the landfill were determined from a review of the scale data from the resource recovery facility. It is estimated that of the 156 tons per day (TPD) of incoming waste (140 TPD from Key West and 16 TPD from Monroe County), an average of about 136 TPD is processable. After processing, about 57 TPD of wet ash/residue remains for disposal at the landfill.

The remaining 20 TPD of nonprocessable waste is about 20 percent white goods and metals and 80 percent demolition debris and non-processable materials. The white goods and metals are presently baled and transported offsite for sale to scrap dealers. The demolition debris and non-processable materials are landfilled with the ash/residue.

2. Area Information

Information for the area surrounding the landfill property is presented below.

a. Topography: A topographic survey of the site was performed in June 1992 and shown in Figures 2 and 3. As shown, elevations within the landfilled area ranged from about 10 feet in the stormwater retention ponds to about 100 feet at the top of the Phase I cover. A 20-foot-wide perimeter earthen dike surrounds the entire landfill. The top of the dike is at elevation 15 feet. The surrounding area is flat with most elevations varying between 0 and 10 feet mean sea level (msl).

b. Hydrology: Surface water run-off in areas around the landfill generally move by sheet flow to adjacent low areas or the Gulf of Mexico. No creeks, streams or rivers exist within or around the site. Because of the relatively high permeability of the coral limestone underlying the entire site, most rainfall percolates into the ground upon contact. Any surface runoff is contained onsite by a system of perimeter berms and the Junior College Road right-of-way.

Stormwater from the landfill is contained by the 20-foot-wide perimeter berm. Because the Phase I landfill area is covered with a 30-mil PVC geomembrane that prevents the vertical infiltration of stormwater, stormwater in the area is retained in two retention ponds, then filter through an underdrain system to two outlet structures, and eventually to the Gulf of Mexico.

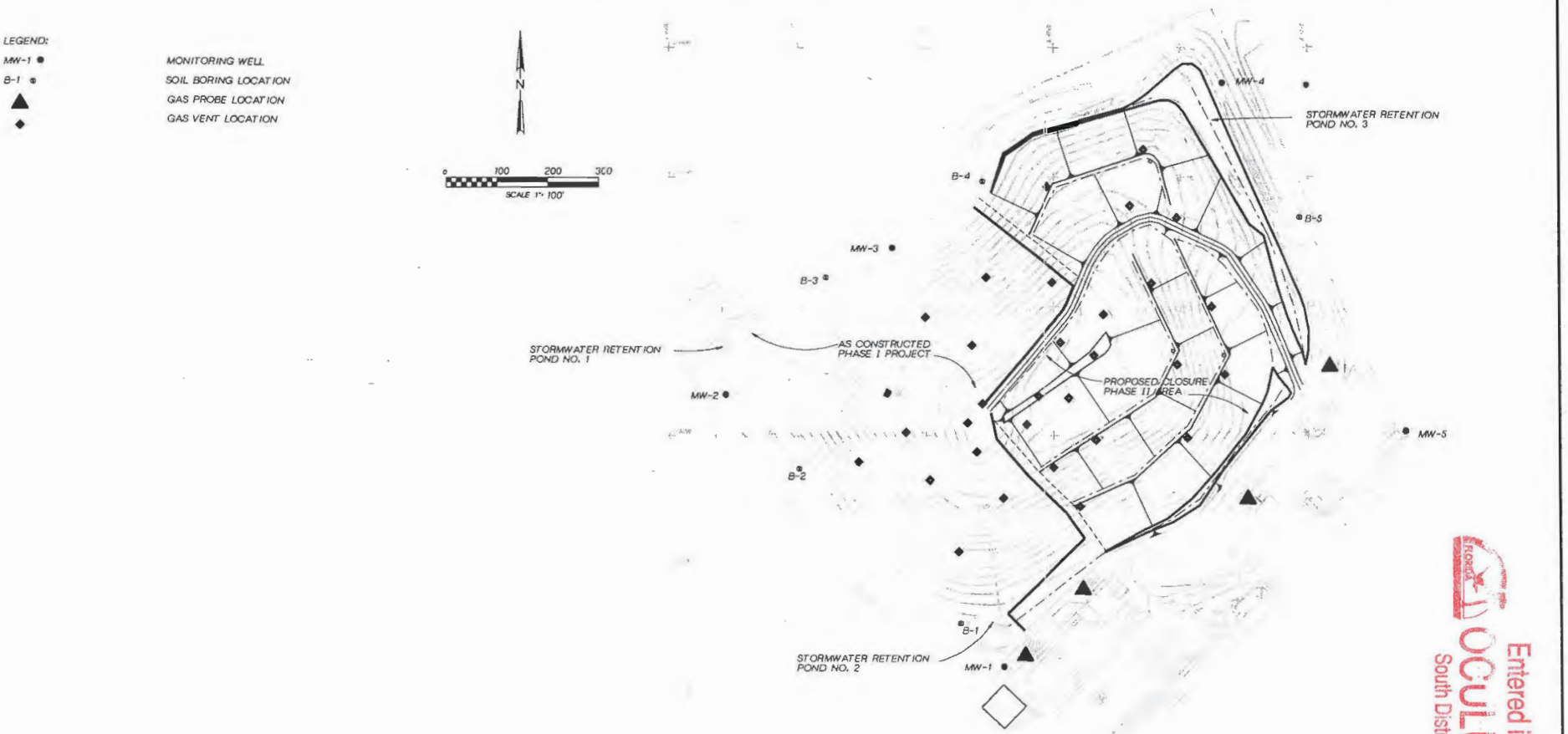
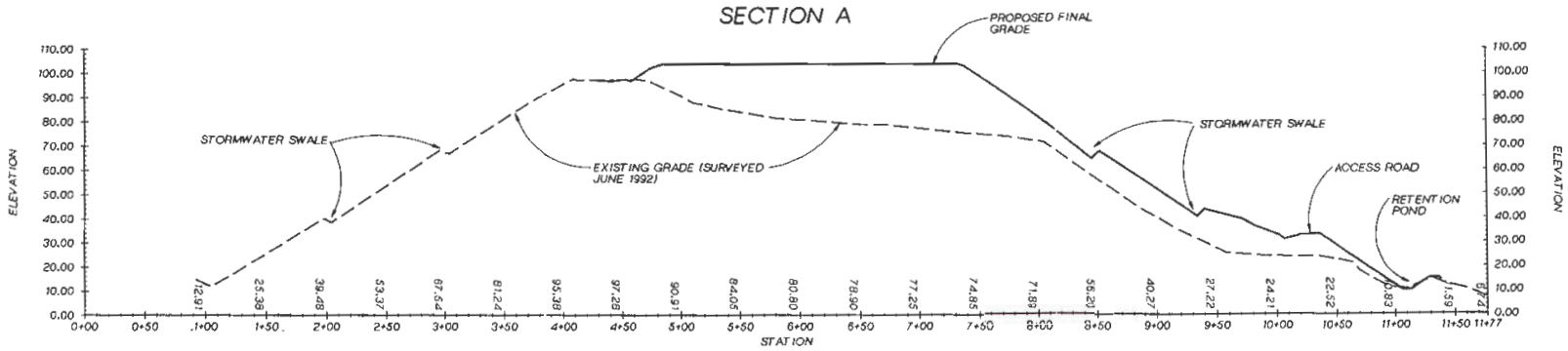


FIGURE 2
SOIL BORINGS, GROUNDWATER MONITORING WELLS, GAS VENTS AND GAS PROBE LOCATIONS

SEF2004.CD PERPLAN.DLV 11/03/92



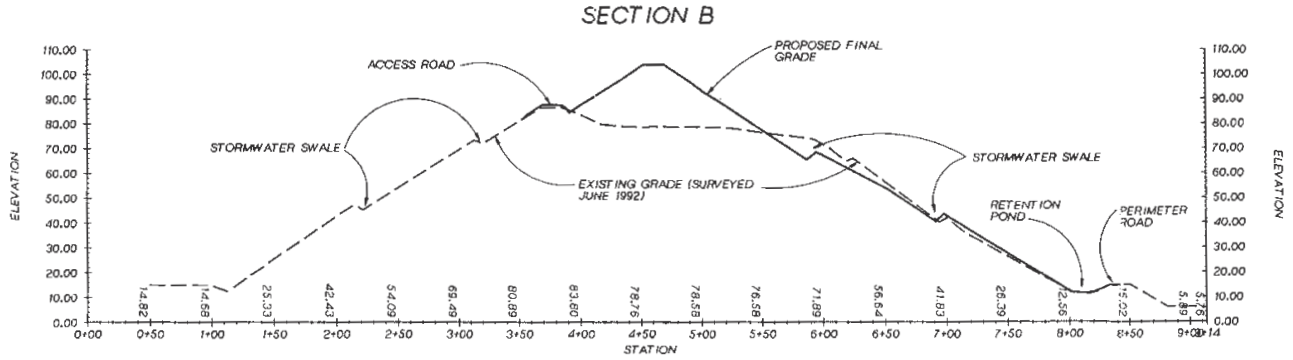


FIGURE 3 LANDFILL SECTIONS
(SEE FIGURE 2 FOR SECTION LOCATIONS)

Currently, the stormwater infiltrates through ash and refuse to the groundwater in the Phase II area. After the closure of the Phase II area, stormwater will be retained, filtered through, and eventually discharged to the Gulf of Mexico like the process in the Phase I area.

c. Geology and Hydrogeology: The geology of Key West consists primarily of Miami oolite. Miami oolite is typically a soft, white oolitic limestone containing up to 95 percent calcium carbonate. The surface of this oolitic layer forms a nearly level plain that ranges in elevation on the mainland from between +15 feet to -15 feet NGVD. The Miami oolite underlies the Atlantic coastal range from a transition zone near Boca Raton to Florida City. It covers the floor of the Bay of Florida and reappears above water level again in the Lower Keys from Big Pine Key to beyond Key West.

Five borings were made at the landfill in March and April of 1985 by KBC Consultants, Inc. of Miami, Florida. These borings were made from 20 to 30 feet below the ground surface. The boring locations are shown in Figure 2 and the logs for these borings are included in Appendix B. The source of these logs is entitled *Report of Geotechnical Exploration and Consultation, Resource Recovery Plant, Stock Island, Key West, Florida*, prepared for Morse Boulger, Inc. by KBC Consultants, Inc., April 1985.

The borings generally encountered 5 to 6 feet of silty sand with limestone fragments and trash overlying slightly porous chalky oolite limestone to a maximum depth of 30 feet.

The Miami oolite at the site is underlain in descending order by the Tamiami, Hawthorn, Tampa, Suwannee, and Ocala formations. The Tamiami formation is relatively thin, about 15 to 25 feet thick. The Hawthorn formation extends below this layer to a depth of almost 600 feet below sea level.

Groundwater at the site is entirely saline. The proximity of the site to the Gulf of Mexico and the porous nature of the Miami oolite prevents the formation of a freshwater aquifer. The most shallow known artesian aquifer under the site is

reported by the Florida East Coast Railroad to be a brackish aquifer at a depth of 1,100 to 1,500 feet.

d. Ground and Surface Water Quality: The groundwater at the site is saline. The City conducts periodic monitoring of five wells at the site and this information is submitted to FDER. Results of the groundwater analyses are presented in Appendix C. No surface water is present onsite; however, the surface water next to the site is the Gulf of Mexico and is saline water.

e. Land Use Information: Land use surrounding the landfill site within 1 mile is predominantly residential with some commercial areas and some areas where commercial establishments and residential housing are intermixed. Zoning for the landfill and surrounding area within 1 mile of the site includes multi-family and hotels, mixed use, residential and some commercial. Figure 4 illustrates the land use and zoning for the area within 1 mile of the landfill.

Adjacent property owners are Gerald Adams Elementary School to the northeast, the Murray Marina on the southwest, and Junior College Road on the southeast.

3. Groundwater Monitoring Plan

Discharge of leachate from the Stock Island landfill to groundwater requires that a groundwater monitoring plan be implemented. This groundwater monitoring plan was prepared according to the requirements of FAC 17-28.700.

Monitoring Plan

As shown in Figure 1, the Stock Island landfill is located next to the Gulf of Mexico. Tidal fluctuations influence groundwater levels and groundwater flow direction at the site. From the topography of the site, the groundwater appears to be flowing northwesterly toward the Gulf of Mexico. Natural background groundwater quality at the site is equivalent to the quality of water in the Gulf of Mexico. The groundwater is saline and is not used for any potable or irrigation use.

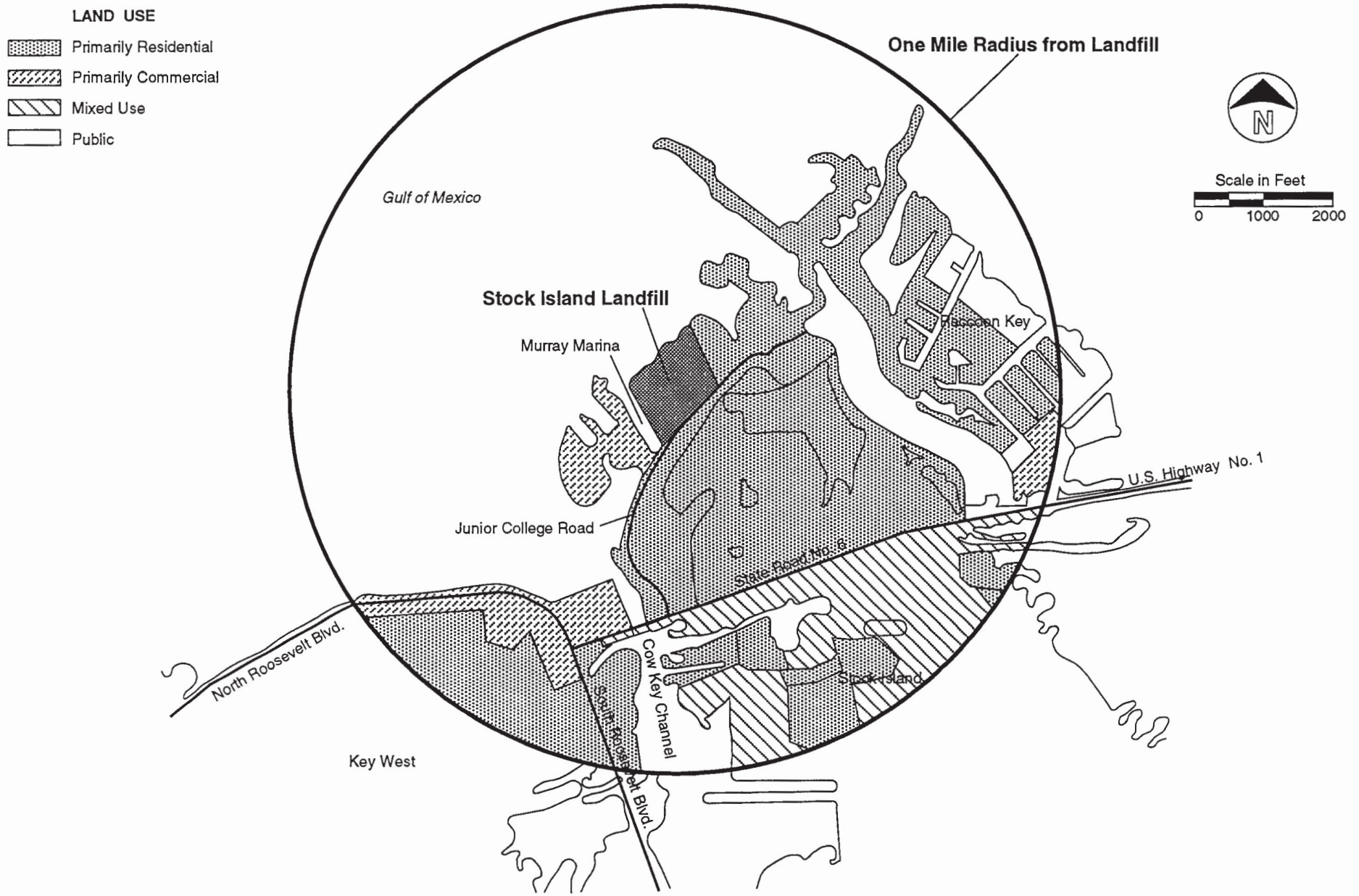


FIGURE 4.
Key West, Florida, Stock Island Landfill, Land Use and Zoning Plan.

Five wells were installed around the site to monitor the quality of offsite migration of groundwater. Monitoring wells No. 1 and No. 5 are the upgradient wells and wells No. 2, No. 3, and No. 4 are downgradient wells. The monitor well locations are shown in Figure 2 and the well construction details and specifications are shown in Appendix D.

Quarterly groundwater sampling and analyses have been conducted at the landfill since September 1987. The results of these analyses are provided in Appendix C. These same parameters, including total dissolved solids, cadmium, chromium, leads, mercury, zinc nitrate, nickel, copper and pH, will continue to be monitored quarterly.

Site Hydrogeology

The lower keys are underlain in descending order by the Miami Oolite, Tamiami, and Hawthorn formations. The Miami Oolite is characterized as a highly permeable formation with higher vertical permeability than horizontal permeability. The Tamiami formation is also a highly permeable formation. The top of the Hawthorn formation is estimated to be at about 60 feet below mean sea level (msl) (Parker & Cooke, 1944). The Hawthorn formation is generally less permeable than the overlying formations and may be considered the confining layer at the site.

Topography around the landfill is relatively flat, ranging from mean sea level to elevation about 7 feet msl. The top of the Phase I landfill cover is at elevation 100 feet msl. The top of the Phase II landfill cover will be at elevation 104 feet msl.

The surficial Miami Oolite is highly permeable with permeability of more than 1×10^{-2} centimeters per second (cm/sec). The groundwater at the site is generally flowing northwesterly toward the Gulf of Mexico.

Surface water drainage around the landfill is non-distinct. Most surface water infiltrates into the ground. Overland discharge may flow directly to the Gulf of Mexico. A stormwater retention/detention system has been constructed in the Phase I landfill closure area and will be constructed in the Phase II area to control stormwater runoff from the landfill.

Landfill Leachate Data

Because the Stock Island landfill has no liner and leachate collection system, leachate from the landfill is discharged to the groundwater. The quantity and quality of the leachate is not known. The quarterly groundwater analysis results presented in Appendix C provide an indication of the leachate constituents.

Hydrologic modeling of the existing landfill was performed to predict leachate volume using the Hydrologic Evaluation of Landfill Performance (HELP) computer model developed by the United States Environmental Protection Agency (EPA). The model performs a water balance of the landfill system that considers rainfall amounts, evapotranspiration, runoff, refuse thickness, cover system, and infiltration. The HELP model predicts that before capping the landfill with 30-mil PVC, about 708,000 cubic feet of leachate per year would be discharged from the landfill to the groundwater. After capping the landfill, the leachate volume would be reduced to about 7,000 cubic feet per year.

Local Groundwater Use

Groundwater in the lower keys is saline and is used only for fire protection. The most shallow artesian aquifer in the lower keys reported by the Florida East Coast Railroad is a brackish aquifer at elevation -1,100 to -1,500 feet msl.

No water supply wells or monitor wells are located within a 1-mile radius of the landfill. Data on water quality from the monitor wells are presented in Appendix C.

4. Gas Migration Investigation

The conditions existing around the Stock Island landfill site tend to promote confinement of methane gas within the site boundaries and release by venting to the atmosphere. Methane gas is insoluble in water for the most part; therefore, any potential migration to adjacent property is contained within a narrow 3- to 5-feet band of soil between the existing ground surface and the groundwater table (about 3 feet above mean sea level). From a review of available reports and construction

documents of the facilities around the landfill, there are no underground structures, such as sanitary sewer lines, existing on the site that might provide a means of offsite migration for methane gas.

A total of 12 gas vents were installed in Phase I construction. Seventeen additional gas vents will be installed during Phase II construction. The gas vents are generally spaced at about 200 feet from each other and are laterally connected with a 4-inch-diameter polylethylene perforated pipe. The boreholes for the gas vents generally extend from ground surface to the groundwater table. The gas vent locations are shown in Figure 2. The detailed construction of the gas vents is presented in Appendix E. Because of the age of the existing waste and the volume of ash/residue to be placed at the site, gas generated is expected to be of low quantity and quality.

To further protect the surrounding areas from gas migration, two gas monitoring probes were installed in Phase I construction and two additional gas monitoring probes will be installed in Phase II coustruction on the east and south boundaries of the site as shown in Figure 2. The north and west boundaries of the site are the Gulf of Mexico; therefore, landfill gas will vent naturally to the atmosphere in these areas. These probes will be monitored on a quarterly basis to determine if gas is migrating offsite. A detail showing the construction of the gas monitoring probes is presented in Appendix E. If gas concentrations reach the levels indicated in FAC Section 17-701.073(4), active gas venting will be evaluated to address the problem.

5. Effectiveness of Existing Landfill Design and Operation

a. Groundwater: The FDER consent order requires ongoing quarterly monitoring of the groundwater from the existing monitoring wells. Samples from the wells are analyzed for pH, total dissolved solids, nitrates, lead, mercury, zinc, nickel, chromium, and copper. These results are submitted to FDER quarterly and indicate little contamination above background levels. The groundwater quality is expected to improve significantly after the entire landfill is capped with a 30-mil PVC.

b. Surface Water: Currently, the entire landfill is confined by a perimeter dike. The crest width of the dike is 20 feet and the top of the dike is at elevation 15 feet (about 8 to 12 feet above the surrounding ground surface). After the completion of Phase II

construction, stormwater within the landfill will sheet flow to three retention ponds, then filter through an underdrain system to three concrete outlet structures and eventually flow to the Gulf of Mexico. The stormwater retention and filtration system has been permitted by the South Florida Water Management District. A permit modification covering the Phase II construction and construction of the ash transfer facility has been submitted.

c. Gas Migration: After the entire landfill is capped with a 30-mil PVC geomembrane, the majority of the gas will vent to the atmosphere through the gas venting system installed at the landfill. The groundwater table at the site is at 3 to 5 feet below the ground surface. The thin layer of soil between the groundwater table and the ground surface could potentially provide the path for offsite migration of gas. Two gas probes have been installed during Phase I construction and two additional gas probes will be installed during Phase II construction to monitor if there is any offsite migration of gas.

d. Cover System: The entire landfill will be capped with 6 inches of sand, 30-mil PVC, and 18 inches of protective sand (see Figure 5). Native vegetation will be planted on the surficial sand layer for erosion protection. In addition, a 4-inch-diameter underdrain pipe will be installed at about 100-foot spacings perpendicular to the slope to lower the groundwater table in the protective sand.

e. Characteristics of the Wastes: The landfill has been the exclusive waste disposal area for the City of Key West and the Naval Air Station in Key West and has accepted residential and commercial waste including construction/demolition debris and white goods. No information is available on materials disposed of during the early years of the landfill.

Current materials disposed of at the landfill were determined from a review of the scale data from the resource recovery facility. It is estimated that of the 156 TPD of incoming waste (140 TPD from Key West and 16 TPD from Monroe County), an average of about 136 TPD is processable. After processing, about 57 TPD of wet ash/residue remains for disposal at the landfill.

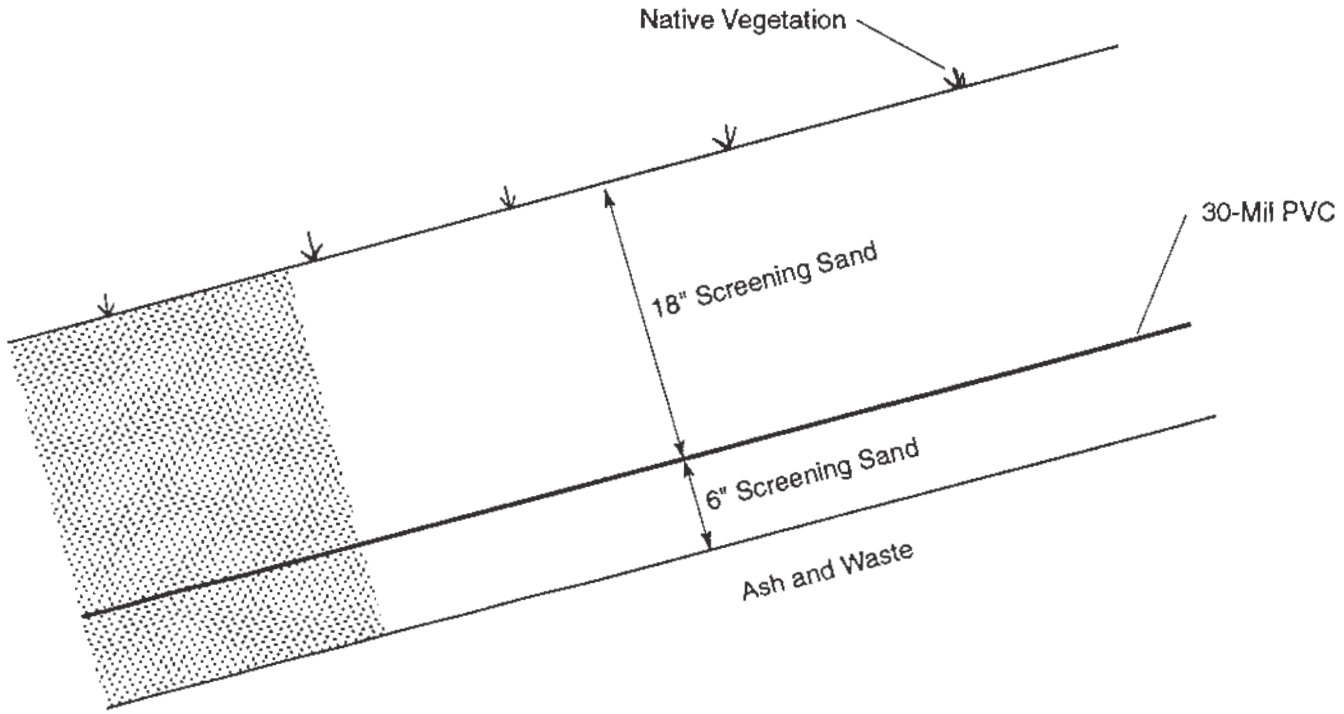


FIGURE 5.
Typical Cross Section of Landfill Cover.

The remaining 20 TPD of nonprocessable waste is about 20 percent white goods and metals and 80 percent demolition debris and non-processable materials. The white goods and metals are presently baled and transported offsite for sale to scrap dealers. The demolition debris and non-processable materials are landfilled with the ash/residue.

6. Closure Design Plan

a. Phasing of Site Closing: The landfill will be closed in two phases. Phase I closing covering the western half of the landfill was completed in January 1991. The design for Phase II closing covering the eastern half of the landfill was completed in August 1992. The construction will begin in May 1993 and be completed by November 1993. Figure 2 shows the phasing of landfill closing.

b. Topography: Existing topography is shown in Figure 2. Proposed final grades and cross-sections at final landfill closure are presented in Figure 3.

c. Final Cover Installation: The final cover system for the landfill has been designed to reduce infiltration of precipitation into the landfill after closure. It has been designed to collect and control stormwater runoff and limit erosion of the side slopes. FAC Chapter 17-701.073 requires that the cover system should consist of 2 feet of cover material, the cover material should be seeded or planted with grass, and the side slopes of the completed landfill should be no steeper than 3 horizontal to 1 vertical to reduce erosion. Exceeding the FAC requirements, the landfill cover system will consist of (in descending order) a grass cover, an 18-inch drainage layer, a limiting layer, and 6 inches of intermediate cover above the refuse (see Figure 5).

The limiting layer is intended to control the infiltration of rainwater into the refuse. To accomplish this purpose, the limiting layer will be a low permeability, 30-mil PVC membrane material. The membrane will be protected from above by 18 inches of drainage sand and from below by 6 inches of sand.

The drainage layer will have a permeability of about 1×10^{-3} cm/sec so that water will flow freely in the lateral direction and thereby reduce the hydraulic head on the PVC membrane or infiltration through the PVC membrane. Saturation of the drainage

layer would otherwise reduce the stability of the cover sand. The drainage sand has a tendency to slide down the slope along the surface of the PVC membrane, particularly immediately after a heavy rainstorm when the sand layer is saturated. The stability of the landfill cover depends on the friction angle between the drainage sand and the PVC membrane, the permeability of the drainage sand, and the head on the PVC membrane. Laboratory tests were conducted to determine these parameters and stability analyses were conducted to estimate the factor of safety against sliding failure.

By using the infinite slope theory (Duncan and Buchignani), the safety factor of the cover slope was calculated to be 1.3. Because the sloughing conditions are short-term and occur only following heavy rainfall events, this safety factor is acceptable.

The vegetative layer will be native grasses and ground covers, which have a much higher probability of long-term success without irrigation and would have lower annual maintenance costs than lawn grasses. The native grasses will be supplemented with erosion-control fabric to protect the slopes before the grasses are fully grown. Planted areas will be irrigated during the maintenance and establishment period (about 6 months) if rainfall is insufficient to ensure the survival of the plants.

The closure of the landfill will require large amounts of imported materials. The estimated quantities of cover material required for complete closure of the landfill are presented below:

- 6-inch bedding sand, 16,200 cubic yards
- 30-mil PVC geomembrane, 870,000 square feet
- 18-inch protective sand, 48,400 cubic yards

The landfill will require maintenance over its lifetime, including control of erosion damage, repair of subsidence areas, and maintenance of the exterior berm. The most effective erosion control measure will be maintaining a healthy vegetative cover. The landfill surface will be planted with native vegetation, including seashore paspalum, virginia dropseed, saltmeadow cord, dune sunflower and railroad vine. These native species require less maintenance and are considerably more drought- and salt-tolerant than other cultivated grasses. If areas of the landfill are void of vegetation, they will

be replanted to produce satisfactory growth. The vegetation will be maintained regularly to promote healthy vegetation. Fertilizer, weed killer, or pesticide will be selectively applied as needed to maintain the vegetation and control erosion for the post-closure care period of the landfill.

It is likely that isolated subsidences may occur on the landfill surface that will produce areas of standing water on top of the cap. These areas will be filled with topsoil to eliminate the ponding of water and to restore the runoff pattern of stormwater. Currently, the majority of the refuse disposed of at the landfill is ash from the incinerator. The ash will subside much less than a landfill composed of putrescible wastes; therefore, it is believed that repairing the subsidences will not be a long-term maintenance problem.

The exterior dike that surrounds the landfill will be visually inspected at least once a year to identify deficiencies and maintenance requirements. Regular maintenance, such as filling erosion gullies with top soil and replanting bare spots with native vegetation will be implemented immediately after they are observed.

d. Leachate Control: The leachate control at the landfill will consist of capping the landfill with relatively impervious PVC geomembrane to reduce infiltration of stormwater through the wastes and subsequent generation of leachate and installing a stormwater management system to drain stormwater from the landfill and reduce potential ponding and infiltration through the waste. A computer analyses using the HELP model predicts that by capping the landfill with 30-mil PVC geomembrane and installing the stormwater management system, the leachate volume would be reduced to less than 1 percent of the leachate volume generated when the landfill is not capped.

e. Groundwater Protection: The groundwater at the landfill will be protected by capping the landfill with relatively impervious PVC geomembrane, installing a stormwater control system and monitoring the groundwater quality regularly. The groundwater monitoring system will verify if the preventive measures are performing as designed. The groundwater monitoring wells will be sampled quarterly for pH, total dissolved solids, nitrates, lead, mercury, zinc, nickel, chromium, cadmium, and copper. The results of these analyses will be submitted to FDER on a quarterly

basis. The stormwater detention areas will be sampled on a quarterly basis for the same parameters as the groundwater monitoring wells. During the first 6 months of operation, the detention areas will be sampled individually. After the first 6 months of operation, a composite sample will be obtained from all the detention areas.

f. Gas and Odor Control: The shallow groundwater table, compacted earthen dike around the landfill, and the PVC cover system provide ideal conditions for confining methane gas within the landfill boundary and releasing the gas by venting it to the atmosphere. Methane gas is generally insoluble in water; therefore, any potential migration to adjacent properties will occur through the earthen berm along the northeast and southeast boundaries between the groundwater table and the PVC cover.

To monitor lateral gas migration, two gas monitoring probes were installed in Phase I construction and two additional gas probes will be installed in Phase II construction at about 200-foot spacings along the toe of the southwest and southeast portion of the perimeter earthen dike around the landfill.

The landfill has been receiving refuse since 1920. Because of the age of the refuse and the large volume of ash/residue that will be placed on the refuse, the gas produced is expected to be of low quantity and quality. Therefore, 12 passive ventilation wells were installed in Phase I construction and an additional 19 wells will be installed in Phase II construction at about 200-foot spacings along the two benches of the landfill cover. The wells will be installed to the groundwater level. An expansion fitting will be installed in the wells to accommodate settlement of refuse. In addition, a 4-inch-diameter slotted polyethylene pipe will connect the wells.

g. Stormwater Control: Stormwater will be routed off the landfill through a series of drainage swales to three detention basins. Drainage facilities and detention basins are designed for the 25-year storm. The landfill will be configured with a flat area (about 0.5 acre) at the top elevation of 104 feet and 3 horizontal to 1 vertical side slopes down to elevation 10 feet NGVD at the bottom of the three stormwater retention ponds. The entire landfill will be surrounded by a perimeter earthen dike/service road at an elevation of 15 feet. Grass-lined interceptor swales will be placed at the approximate elevations of 67 feet and 41 feet. Runoff will be collected by the swales

and intercepted by headwall inlets or grate inlets placed on the four corners of the landfill. The headwalls and inlets will be connected to lightweight, polyethylene, corrugated pipe, which carries the stormwater to dissipation structures in the three retention ponds.

As shown in Figure 2, Pond No. 1 will mainly collect stormwater from the northern and part of the western portion of the landfill, Pond No. 2 will collect stormwater from the southwestern portion of the landfill, and Pond No. 3 will collect stormwater from the eastern and part of the northern portion of the landfill.

An outlet structure will be connected to each dissipation structure at the three retention ponds. The control elevation on the rectangular opening will be placed so that 0.5 inches of retention storage will be provided. No untreated runoff will be discharged below the control elevation of 12.0 feet. A sliding gate will be attached to the inlet so that the orifice can be closed to provide additional retention storage. The outlet structures will be designed to handle the runoff from a 100-year rainfall event without overtopping the service road, even with the orifice slot completely closed.

The three outlet structures will be identical in dimension, elevation, and discharge capabilities. Ground surface will be at an elevation of 10.0 feet, the control elevation of the rectangular opening will be at 12.5 feet, and the top of grate elevation will be at 14.0 feet. Each structure will discharge to the Gulf through a 36-inch, reinforced concrete pipe (RCP) with an upstream invert elevation of 5.5 feet.

Filter underdrains will be placed on each side of the outlet structures at an elevation of 10 feet. Each of the six filter drains will be 2-feet-wide by 15-feet-long to treat the one-half inch of runoff in less than 72 hours.

Measures to prevent clogging of the filter underdrains by soil and debris during the phased closure of the landfill will be implemented. The top 6 inches of the underdrain system will be checked regularly and, if necessary, removed and replaced with fresh sand. The dissipation basins and sump inlets will also be maintained regularly to protect against sediment clogging.

h. Access Control: The landfill property is surrounded by a chain-link fence on the south and east. The landfill is surrounded on the north and west by the Gulf of Mexico. Access is limited to a gate at the property entrance. After closure of the landfill, the gate will be locked to prevent unauthorized persons from entering the facility.

i. Final Use: After the landfill closure has been completed, the site may be available for other uses. The final use will be consistent with the safety and maintenance requirements of the site.

7. Closure Operation Plan

The landfill will be closed in two phases. Phase I closing covering the western half of the landfill was completed in January 1991. The design for Phase II closing covering the eastern half of the landfill was completed in August 1992. The construction will begin in May 1993 and be completed in November 1993. A copy of the Phase II closure contract documents are attached. The final cover will consist of 6 inches of bedding sand, a 30-mil PVC geomembrane, 18 inches of drainage sand, and native vegetation cover. Gas and odor control features will consist of passive gas vents throughout the landfill and gas monitoring probes in the areas south and east of the landfill. The projected schedule for timing of these activities is included in Figure 6. Phase I drainage and stormwater control features and an exterior berm were installed in January 1991.

The City of Key West forwarded a letter to FDER that described the funding approach and financial responsibilities for this work on June 22, 1989. A copy is included in Appendix F.

Closure Procedures

After approval of the closure plan and the issuance of a closure permit by FDER, the City of Key West will close the landfill in accordance with the approved plans.

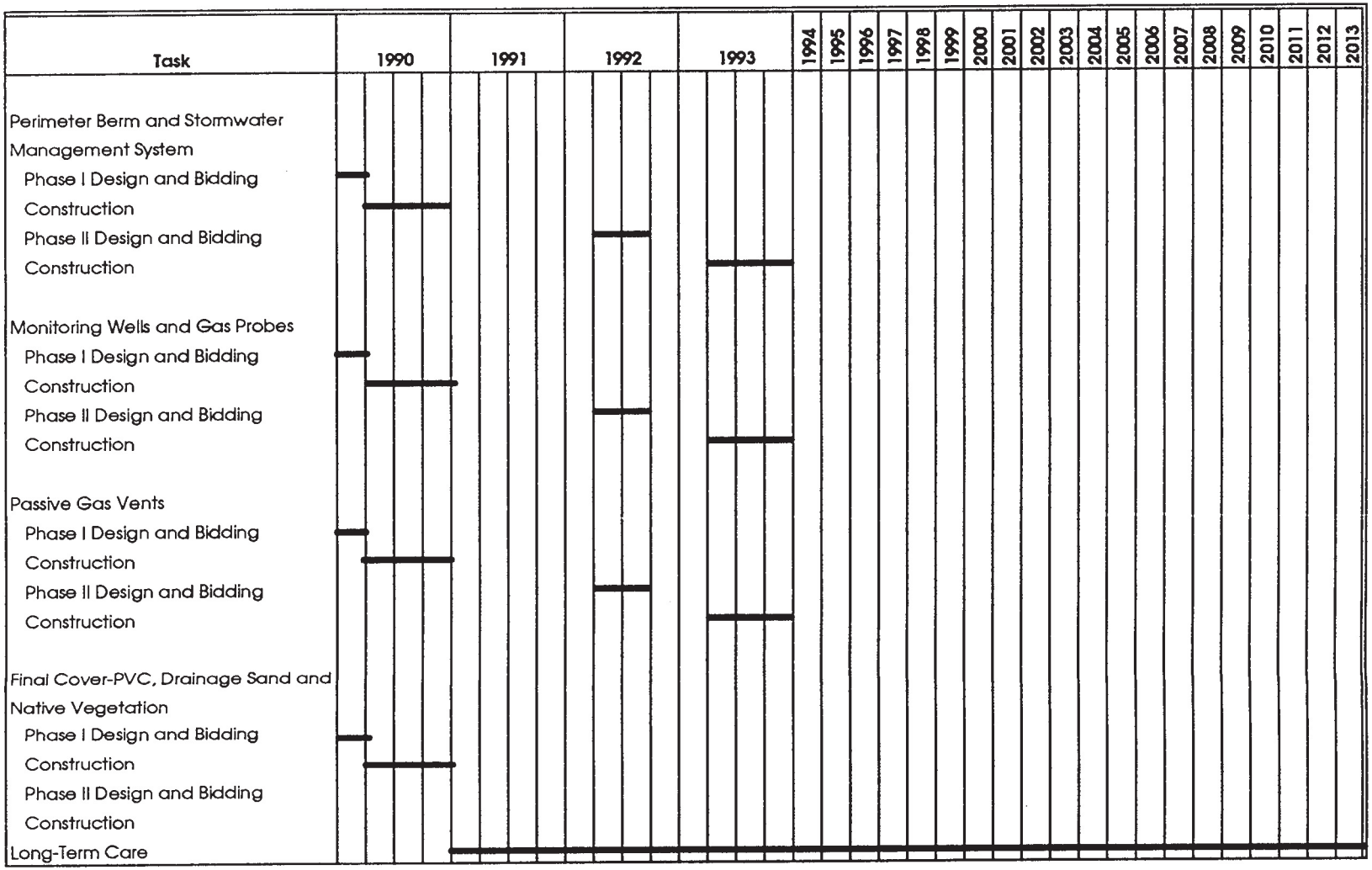


Figure 6
Proposed Closure Implementation Schedule

1. Survey Monuments

The City will install concrete monuments to mark the boundaries of the landfill property and other permanent markers to outline the waste-filled areas. These markers will be tied to one or more of the boundary markers by a survey performed by a registered land surveyor. The location and elevation of all markers will be shown on the site plan filed with the Declaration to the Public described below.

2. Final Survey and As-Built Report

The City will have a final survey performed by a registered land surveyor to verify that final contours and elevations of the facility are in accordance with the plans as approved in the permit. Contours will be shown at no greater than 5-foot intervals. The City will include this information in an "as-built" report and submit this report to FDER in accordance with the closing schedule.

3. Declaration to the Public

After closing operations are inspected and approved by FDER, the City will file a declaration to the public in the deed records in the Monroe County Clerk's office. This declaration will include a legal description of the property and a site plan specifying the area actually filled with solid waste with reference to the monuments referred to earlier. The declaration will also include a notice that any future owner or user of the site should consult with FDER before to planning or initiating any activity involving the disturbance of the landfill cover system, monitoring system, or other control structures. A certified copy of the declaration will be filed with FDER.

4. Official Closing Date

Upon receipt of the documents required under Final Survey and Declaration to the Public above, FDER will acknowledge by letter to the County within 30 days that notice of termination of operations and closing of the facility has been received. The date of this letter will be the official date of landfill closing for the purposes of determining the long-term care period.

5. Use of Closed Areas and Construction on Closed Landfill

Closed landfill areas, if disturbed, are a potential hazard to public health, groundwater, and the environment. FDER will be consulted before conducting any activities at the closed landfill site.

Long-Term Care

Following closure of the landfill, long-term care will be implemented to ensure that the closed landfill poses no threat to human health or the environment. The landfill and its facilities will be inspected periodically during the post-closure period to prevent abuse or misuse of the landfill property and to repair decay or damage to the design features discussed in this report.

The City of Key West will be responsible for ensuring that the landfill will not pose a threat to human health, safety, or the environment. The long-term care period will last for a minimum of 20 years following the official closing date of the landfill.

The following is a list of items to be inspected and maintained during the long-term care period.

Fencing and Security: The security fence and gates will be secure to prevent unauthorized entry into the landfill. Any damage to the security fence and gates will be noted and repaired as soon as practical. The landfill grounds will be inspected at the same time for signs of unauthorized use.

Vegetation: Vegetative cover will be inspected to ensure its viability as an erosion control measure. Watering, fertilizing, herbicide, and pesticide application will be performed, as necessary, to maintain the grass. No large vegetation such as trees, bushes, or other vegetation with a deep root system will be allowed to grow as the roots can penetrate and damage the synthetic membrane cover.

Cover: The cover will be inspected for signs of stormwater ponding or damage that may be caused by burrowing animals, erosion, or settlement. Repairs will be undertaken to maintain the integrity of the final cover and drainage system.

Exterior Berm: The perimeter earthen dike will be inspected for signs of sloughing or erosion. Such conditions will be repaired as soon as practical. Repairs will include restoring any vegetation lost as a result of the damage.

Drainage System: The drainage system will be maintained free of debris that might block or inhibit drainage. Damage to any pipes or underdrain systems will be repaired as soon as practical.

Monitor Wells: Monitor wells will be inspected and sampled according to the schedule outlined previously. If any of these wells have been damaged or fail to operate for any reason, repairs will be performed or the well will be replaced within 60 days of the inspection.

Financial Responsibility

As part of the permit application, Section 17-701.076 of the regulations requires proof of financial responsibility for the total cost of closure and long-term care costs. These costs shall be based on estimates for final cover, topsoil, seeding, fertilizing, mulching, labor, and long-term care. Cost estimates for the long-term care costs and closure costs are presented in Appendix F along with a copy of the financial responsibility from the City of Key West.

Appendix A
Legal Description

A parcel of land on and adjacent to Stock Island, Monroe County, Florida; said parcel being a part of the lands described in TIIF Deed No. 19699 (Deed Book G-52 at Page 32 of the Public Records of the said county), TIIF Deed No. 23257 (Official Record Book 269 at Page 516 of the said Public Records) and TIIF Deed No. 24067 (Official Record Book 355 at PAge 32 of the said Public Records); the said parcel of land lying entirely within the composite of the said TIIF Deeds referred to above; the said parcel lying within Sections 26 and 27, T67 South, R25 East; and the said parcel of land being described by metes and bounds as follows: COMMENCE at the intersection of the easterly right-of-way line of Junior College Road with the northerly right-of-way line of U.S. Highway #1 (State Road #5); thence along said easterly right-of-way line of said Junior College Road for the following seven (7) courses: (1) thence N 18°41'18" W for 36.16 feet to a point of curvature of a circular curve concave to the Southwest; (2) thence northwesterly along the arc of said curve having a radius of 265.00 feet and a central angle of 35°06'00" for 162.34 feet to the point of tangency; (3) thence N 53°47'18" W for 272.56 feet to the point of curvature of a circular curve concave to the Northeast; (4) thence northwesterly along the arc of said curve having a radius of 361.02 feet and a central angle of 14°25'40" for 90.91 feet to the point of tangency; (5) thence N 39°21'38" W for 273.51 feet to the point of curvature of a circular curve concave to the Northeast; (6) thence northwesterly along and northeasterly along the arc of said curve having a radius of 446.85 feet and a central angle of 62°35'30" for 488.15 feet to a point of tangency; (7) thence N 23°13'52" E for 1122.43 feet; thence N 45°30'07" E for 108.37 feet to the POINT OF BEGINNING of the hereinafter described parcel; thence North 27°37' West for a distance of 1372.29 feet; thence North 62°23' East for a distance of 1225.00 feet; thence South 27°37' East for a distance of 915.62 feet to the Southeasterly boundary line of the lands described in Official Record Book 867 at Page 1449 of the Public Records of Monroe County, Florida; thence South 41°46'36" West along the Southeasterly boundary line of the lands described in the said Official Record Book 867 for a distance of 26.65 feet to the Northwesterly boundary lines of the lands described in Official Book 880 at Page 1964 of the said Public Records; thence along the Northwesterly boundary line of the lands described in the said Official Record Book 880 along the following five (5) courses: (1) continue South 41°46'36" West for a distance of 438.20 feet; (2) thence South 48°13'24" East for a distance of 15.00 feet; (3) thence South 41°46'36" West for a distance of 435.66 feet to the beginning of a curve said curve being concave to the Northwest and having a radius of 3686.55 feet; (4) thence Southwesterly along the said curve for an arc distance of 239.69 feet; (5) thence South 45°30'07" West for a distance of 167.67 feet back to the point of beginning.

PHILLIPS & TRACE SURVEYING, INC.

May 1, 1986
Key West, Florida

Jack M. Phillips, P. S.
Fla. Reg. Cert. No. 1410

Appendix B
Test Boring Logs

RECORD OF TEST BORING
KBC PROJECT NO. 8519

PROJECT NAME: Resource Recovery Plant

PROJECT LOCATION: Stock Island, Key West, Florida

BORING START/FINISH: 3-30-85/3-30-85

BORING NUMBER: B-1 (Refer to Test Location Drawing)

GROUND SURFACE ELEVATION: Estimated at +7 feet MSL

STANDARD PENETRATION
SAMPLER ADVANCED BY: 140-pound hammer falling 30 inches

SAMPLER DESCRIPTION: 1.4-inch I.D., 2.0-inch O.D., 36-inch overall length

DEPTH TO GROUNDWATER: 3.5 feet

DRILL DESCRIPTION: Mobile drill with rotary capability; drilling mud was used.

DRILLING SUBCONTRACTOR: Warren George, Inc.; Neil Jain, Driller

BORING TERMINATION DEPTH, FEET: 31.0

SAMPLE NO.	DEPTH, FT.	N, BL/FT. OR ROCK CORING	DESCRIPTION
1	0 - 6	-	Tan and black calcareous silty SAND with limestone fragments and trash (wash sample).
2	6 - 11	REC = 95% RQD = 82%	Soft white slightly porous chalky oolitic LIMESTONE.
3	11 - 16	REC = 100% RQD = 85%	Soft white slightly porous chalky oolitic LIMESTONE.
4	16 - 21	REC = 100% RQD = 93%	Soft white porous chalky oolitic LIMESTONE.
5	21 - 26	REC = 100% RQD = 70%	Soft white porous to very porous chalky oolitic LIMEST
6	26 - 31	REC = 95% RQD = 65%	Soft white porous to very porous chalky oolitic LIMESTONE.

RECORD OF TEST BORING
KBC PROJECT NO. 8519

PROJECT NAME: Resource Recovery Plant

PROJECT LOCATION: Stock Island, Key West, Florida

BORING START/FINISH: 3-29-85/3-29-85

BORING NUMBER: B-2 (Refer to Test Location Drawing)

GROUND SURFACE ELEVATION: Estimated at +9 feet MSL

STANDARD PENETRATION
SAMPLER ADVANCED BY: 140-pound hammer falling 30 inches

SAMPLER DESCRIPTION: 1.4-inch I.D., 2.0-inch O.D., 36-inch overall length

DEPTH TO GROUNDWATER: 2.2 feet

DRILL DESCRIPTION: Mobile drill with rotary capability; drilling mud was used.

DRILLING SUBCONTRACTOR: Warren George, Inc.; Neil Jain, Driller

BORING TERMINATION DEPTH, FEET: 21.0

SAMPLE NO.	DEPTH, FT.	N, BL/FT. OR ROCK CORING	DESCRIPTION
1	0 - 6	-	Tan to black calcareous silty SAND with limestone fragments and trash (wash samples).
2	6 - 11	REC = 80% RQD = 75%	Soft white slightly porous to porous chalky oolitic LIMESTONE.
3	11 - 16	REC = 100% RQD = 92%	Soft white slightly porous to porous chalky oolitic LIMESTONE.
4	16 - 21	REC = 100% RQD = 88%	Soft white slightly porous to porous chalky oolitic LIMESTONE.

RECORD OF TEST BORING
KBC PROJECT NO. 8519

PROJECT NAME: Resource Recovery Plant

PROJECT LOCATION: Stock Island, Key West, Florida

BORING START/FINISH: 3-29-85/3-29-85

BORING NUMBER: B-3 (Refer to Test Location Drawing)

GROUND SURFACE ELEVATION: Estimated at +8 feet MSL

STANDARD PENETRATION
SAMPLER ADVANCED BY: 140-pound hammer falling 30 inches

SAMPLER DESCRIPTION: 1.4-inch I.D., 2.0-inch O.D., 36-inch overall length

DEPTH TO GROUNDWATER: 3.0 feet

DRILL DESCRIPTION: Mobile drill with rotary capability; drilling mud was used.

DRILLING SUBCONTRACTOR: Warren George, Inc.; Neil Jain, Driller

BORING TERMINATION DEPTH, FEET: 30.0

SAMPLE NO.	DEPTH, FT.	N,BL/FT. OR ROCK CORING	DESCRIPTION
1	0 - 2	-	Tan calcareous SAND with limestone fragments and trash (wash sample).
2	2 - 4	11	Tan and brown calcareous silty SAND with trash.
3	4 - 6	25	Tan and black silty SAND wi trash and limestone fragmen
4	5.5 - 10	REC = 59% RQD = 54%	Soft white slightly porous chalky oolitic LIMESTONE.
5	10 - 15	REC = 100% RQD = 85%	Soft white slightly porous chalky oolitic LIMESTONE.
6	15 - 20	REC = 100% RQD = 70%	Soft white porous chalky oolitic LIMESTONE.
7	20 - 25	REC = 85% RQD = 31%	Soft white very porous chal oolitic LIMESTONE.
8	25 - 30	REC = 55% RQD = 35%	Soft white very porous chal oolitic LIMESTONE.

RECORD OF TEST BORING
KBC PROJECT NO. 8519

PROJECT NAME: Resource Recovery Plant

PROJECT LOCATION: Stock Island, Key West, Florida

BORING START/FINISH: 4-1-85/4-1-85

BORING NUMBER: B-4 (Refer to Test Location Drawing)

GROUND SURFACE ELEVATION: Estimated at +9 feet MSL

STANDARD PENETRATION
SAMPLER ADVANCED BY: 140-pound hammer falling 30 inches

SAMPLER DESCRIPTION: 1.4-inch I.D., 2.0-inch O.D., 36-inch overall length

DEPTH TO GROUNDWATER: 5.0 feet

DRILL DESCRIPTION: Mobile drill with rotary capability; drilling mud was used.

DRILLING SUBCONTRACTOR: Warren George, Inc.; Neil Jain, Driller

BORING TERMINATION DEPTH, FEET: 32.0

SAMPLE NO.	DEPTH, FT.	N,BL/FT. OR ROCK CORING	DESCRIPTION
1	0 - 6.5	-	Tan and black calcareous silty SAND with limestone fragments and trash (wash sample).
2	6.5 - 11.5	REC = 72% RQD = 40%	Soft white slightly porous chalky oolitic LIMESTONE.
3	11.5 - 16.5	REC = 98% RQD = 87%	Soft white slightly porous chalky oolitic LIMESTONE.
4	16.5 - 21.5	REC = 100% RQD = 85%	Soft white porous chalky oolitic LIMESTONE.
5	21.5 - 26.5	REC = 87% RQD = 53%	Soft white porous to very porous chalky oolitic LIMES
6	26.5 - 32.0	REC = 100% RQD = 53%	Soft white porous to very porous chalky oolitic LIMESTONE.

RECORD OF TEST BORING
KBC PROJECT NO. 8519

PROJECT NAME: Resource Recovery Plant

PROJECT LOCATION: Stock Island, Key West, Florida

BORING START/FINISH: 3-29-85/3-29-85

BORING NUMBER: B-5 (Refer to Test Location Drawing)

GROUND SURFACE ELEVATION: Estimated at +8 feet MSL

STANDARD PENETRATION
SAMPLER ADVANCED BY: 140-pound hammer falling 30 inches

SAMPLER DESCRIPTION: 1.4-inch I.D., 2.0-inch O.D., 36-inch overall length

DEPTH TO GROUNDWATER: 2.3 feet

DRILL DESCRIPTION: Mobile drill with rotary capability; drilling mud was used.

DRILLING SUBCONTRACTOR: Warren George, Inc.; Neil Jain, Driller

BORING TERMINATION DEPTH, FEET: 21.0

SAMPLE NO.	DEPTH, FT.	N,BL/FT. OR ROCK CORING	DESCRIPTION
1	0 - 6	-	Tan to black calcareous silty SAND with limestone fragments and trash (wash sample).
2	6 - 11	REC = 85% RQD = 73%	Soft white slightly porous to porous chalky oolitic LIMESTONE.
3	11 - 16	REC = 100% RQD = 98%	Soft white slightly porous to porous chalky oolitic LIMESTONE.
4	16 - 21	REC = 100% RQD = 72%	Soft white slightly porous to porous chalky oolitic LIMESTONE.

Appendix C
Groundwater Monitoring Data

ENVIROPACT

KEY_00012242
Attn: PAUL CATES

KEY WEST, CITY OF
SOLID WASTE DEPARTMENT
P.O. BOX 1550
KEY WEST, FL. 33040

14 Aug 1992
Report M2-08-012-01
LAB ID. 86119,83141,84271,800001156

Site Description / Work I.D.
STOCK ISLAND LANDFILL, KEY WEST

SAMPLE ID.: MW-1
COLLECTED: 07/31/92 14:30
RECEIVED: 08/03/92
COLLECTED BY: GARY BEVINS

Parameter	Result	Units	Method	Det. Limit	Extracted	Analyzed	Analyst
Cadmium, Total	0.03	mg/L	213.2	0.005	08/04/92	08/07/92	MAS
Chromium, Total	0.096	mg/L	218.2	0.005	08/04/92	08/07/92	MAS
Copper, Total	0.89	mg/L	220.1	0.01	08/04/92	08/06/92	MAS
Lead, Dissolved	0.009	mg/L	239.2	0.005	08/04/92	08/12/92	MAS
Lead, Total	1.21	mg/L	239.1	0.1	08/04/92	08/13/92	CP
Mercury, Total	BDL	mg/L	245.1	0.0002	08/04/92	08/06/92	MAS
Nickel, Total	BDL	mg/L	249.2	0.01	08/04/92	08/13/92	MAS
Nitrate as N	BDL (E)	mg/L	353.2	0.01		08/05/92	JAX
Solids, Total Dissolved	5120	mg/L	160.1	2.0		08/04/92	JLM
Zinc, Total	7.61	mg/L	289.1	0.01	08/04/92	08/11/92	CP
pH (field)	6.9		150.1	0.1		07/31/92	GB

**** BDL INDICATES ANALYTE IS BELOW DETECTABLE LEVELS
ALL ANALYSIS PERFORMED BY EPA, ASTM, OR STANDARD METHODS
**** UNLESS OTHERWISE NOTED, mg/Kg DENOTES WET WEIGHT.
PERCENT SOLIDS ARE GIVEN FOR THOSE WHO NEED DRY WEIGHT RESULTS

Sarah M. Serrano, Laboratory Manager

ENVIROPACT, INC
MIAMI DIVISION
4790 N.W. 157th STREET
MIAMI, FL 33014-6421
305-620-1700

KEY_00012242
Attn: PAUL CATES

KEY WEST, CITY OF
SOLID WASTE DEPARTMENT
P.O. BOX 1550
KEY WEST, FL. 33040

14 Aug 1992
Report M2-08-012-02
LAB ID. 86119,83141,84271,800001156

Site Description / Work I.D.
STOCK ISLAND LANDFILL, KEY WEST

SAMPLE ID.: MW-2
COLLECTED: 07/31/92 15:20
RECEIVED: 08/03/92
COLLECTED BY: GARY BEVINS

Parameter	Result	Units	Method	Det. Limit	Extracted	Analyzed	Analyst
Cadmium, Total	BDL	mg/L	213.2	0.005	08/04/92	08/07/92	MAS
Chromium, Total	0.100	mg/L	218.2	0.005	08/04/92	08/07/92	MAS
Copper, Total	0.28	mg/L	220.1	0.01	08/04/92	08/06/92	MAS
Lead, Dissolved	0.023	mg/L	239.2	0.005	08/04/92	08/12/92	MAS
Lead, Total	0.109	mg/L	239.2	0.005	08/04/92	08/12/92	MAS
Mercury, Total	BDL	mg/L	245.1	0.0002	08/04/92	08/06/92	MAS
Nickel, Total	BDL	mg/L	249.2	0.01	08/04/92	08/13/92	MAS
Nitrate as N	0.078	mg/L	353.2	0.01		08/05/92	JAX
Solids, Total Dissolved	140	mg/L	160.1	2.0		08/04/92	JLM
Zinc, Total	0.82	mg/L	289.1	0.01	08/04/92	08/11/92	CP
pH (field)	6.9		150.1	0.1		07/31/92	GB

**** BDL INDICATES ANALYTE IS BELOW DETECTABLE LEVELS
ALL ANALYSIS PERFORMED BY EPA, ASTM, OR STANDARD METHODS
**** UNLESS OTHERWISE NOTED, mg/Kg DENOTES WET WEIGHT.
PERCENT SOLIDS ARE GIVEN FOR THOSE WHO NEED DRY WEIGHT RESULTS

Sarah M. Serrano, Laboratory Manager

KEY_00012242
Attn: PAUL CATES

KEY WEST, CITY OF
SOLID WASTE DEPARTMENT
P.O. BOX 1550
KEY WEST, FL. 33040

14 Aug 1992
Report M2-08-012-03
LAB ID. 86119,83141,84271,800001156

Site Description / Work I.D.
STOCK ISLAND LANDFILL, KEY WEST

SAMPLE ID.: MW-3
COLLECTED: 07/31/92 16:00
RECEIVED: 08/03/92
COLLECTED BY: GARY BEVINS

Parameter	Result	Units	Method	Det. Limit	Extracted	Analyzed	Analyst
Cadmium, Total	BDL	mg/L	213.2	0.005	08/04/92	08/07/92	MAS
Chromium, Total	0.037	mg/L	218.2	0.005	08/04/92	08/07/92	MAS
Copper, Total	0.12	mg/L	220.1	0.01	08/04/92	08/06/92	MAS
Lead, Dissolved	0.011	mg/L	239.2	0.005	08/04/92	08/12/92	MAS
Lead, Total	0.058	mg/L	239.2	0.005	08/04/92	08/12/92	MAS
Mercury, Total	BDL	mg/L	245.1	0.0002	08/04/92	08/06/92	MAS
Nickel, Total	BDL	mg/L	249.2	0.01	08/04/92	08/13/92	MAS
Nitrate as N	0.027	mg/L	353.2	0.01		08/05/92	JAX
Solids, Total Dissolved	58414	mg/L	160.1	2.0		08/04/92	JLM
Zinc, Total	0.22	mg/L	289.1	0.01	08/04/92	08/11/92	CP
pH (field)	7.1		150.1	0.1		07/31/92	GB

**** BDL INDICATES ANALYTE IS BELOW DETECTABLE LEVELS
ALL ANALYSIS PERFORMED BY EPA, ASTM, OR STANDARD METHODS
**** UNLESS OTHERWISE NOTED, mg/Kg DENOTES WET WEIGHT.
PERCENT SOLIDS ARE GIVEN FOR THOSE WHO NEED DRY WEIGHT RESULTS

Sarah M. Serrano, Laboratory Manager

KEY_00012242
Attn: PAUL CATES

KEY WEST, CITY OF
SOLID WASTE DEPARTMENT
P.O. BOX 1550
KEY WEST, FL. 33040

14 Aug 1992
Report M2-08-012-04
LAB ID. 86119,83141,84271,800001156

Site Description / Work I.D.
STOCK ISLAND LANDFILL, KEY WEST

SAMPLE ID.: MW-4
COLLECTED: 07/31/92 16:55
RECEIVED: 08/03/92
COLLECTED BY: GARY BEVINS

Parameter	Result	Units	Method	Det. Limit	Extracted	Analyzed	Analyst
Cadmium, Total	0.009	mg/L	213.2	0.005	08/04/92	08/07/92	MAS
Chromium, Total	0.032	mg/L	218.2	0.005	08/04/92	08/07/92	MAS
Copper, Total	0.43	mg/L	220.1	0.01	08/04/92	08/06/92	MAS
Lead, Dissolved	0.005	mg/L	239.2	0.005	08/04/92	08/12/92	MAS
Lead, Total	0.43	mg/L	239.1	0.1	08/04/92	08/13/92	CP
Mercury, Total	BDL	mg/L	245.1	0.0002	08/04/92	08/06/92	MAS
Nickel, Total	BDL	mg/L	249.2	0.01	08/04/92	08/13/92	MAS
Nitrate as N	0.529	mg/L	353.2	0.01		08/05/92	JAX
Solids, Total Dissolved	29052	mg/L	160.1	2.0		08/04/92	JLM
Zinc, Total	1.49	mg/L	289.1	0.01	08/04/92	08/11/92	CP
pH (field)	7.1		150.1	0.1		07/31/92	GB

**** BDL INDICATES ANALYTE IS BELOW DETECTABLE LEVELS
ALL ANALYSIS PERFORMED BY EPA, ASTM, OR STANDARD METHODS
**** UNLESS OTHERWISE NOTED, mg/Kg DENOTES WET WEIGHT.
PERCENT SOLIDS ARE GIVEN FOR THOSE WHO NEED DRY WEIGHT RESULTS

Sarah M. Serrano, Laboratory Manager

KEY_00012242
Attn: PAUL CATES

KEY WEST, CITY OF
SOLID WASTE DEPARTMENT
P.O. BOX 1550
KEY WEST, FL. 33040

14 Aug 1992
Report M2-08-012-05
LAB ID. 86119,83141,84271,800001156

Site Description / Work I.D.
STOCK ISLAND LANDFILL, KEY WEST

SAMPLE ID.: MW-5
COLLECTED: 07/31/92 17:40
RECEIVED: 08/03/92
COLLECTED BY: GARY BEVINS

Parameter	Result	Units	Method	Det. Limit	Extracted	Analyzed	Analyst
Cadmium, Total	BDL	mg/L	213.2	0.005	08/04/92	08/07/92	MAS
Chromium, Total	0.016	mg/L	218.2	0.005	08/04/92	08/07/92	MAS
Copper, Total	0.09	mg/L	220.1	0.01	08/04/92	08/06/92	MAS
Lead, Dissolved	BDL	mg/L	239.2	0.005	08/04/92	08/12/92	MAS
Lead, Total	0.071	mg/L	239.2	0.005	08/04/92	08/12/92	MAS
Mercury, Total	BDL	mg/L	245.1	0.0002	08/04/92	08/06/92	MAS
Nickel, Total	BDL	mg/L	249.2	0.01	08/04/92	08/13/92	MAS
Nitrate as N	0.046	mg/L	353.2	0.01		08/05/92	JAX
Solids, Total Dissolved	4068	mg/L	160.1	2.0		08/04/92	JLM
Zinc, Total	0.12	mg/L	289.1	0.01	08/04/92	08/11/92	CP
pH (field)	6.9		150.1	0.1		07/31/92	GB

**** BDL INDICATES ANALYTE IS BELOW DETECTABLE LEVELS
ALL ANALYSIS PERFORMED BY EPA, ASTM, OR STANDARD METHODS
**** UNLESS OTHERWISE NOTED, mg/Kg DENOTES WET WEIGHT.
PERCENT SOLIDS ARE GIVEN FOR THOSE WHO NEED DRY WEIGHT RESULTS

Sarah M. Serrano, Laboratory Manager

ENVIROPACT

KEY_00012242
Attn: PAUL CATES

KEY WEST, CITY OF
SOLID WASTE DEPARTMENT
P.O. BOX 1550
KEY WEST, FL. 33040

29 Apr 1992
Report M2-04-210-01
LAB ID. 86119,83141,84271,800001156

Site Description / Work I.D.
STOCK ISLAND
KEY WEST, FL.

SAMPLE ID.: MW-1
COLLECTED: 04/16/92 14:30
RECEIVED: 04/17/92
COLLECTED BY: GARY BEVINS

Parameter	Result	Units	Method	Det. Limit	Extracted	Analyzed	Analyst
Cadmium, Total	BDL	mg/L	213.1	0.1	04/20/92	04/23/92	DWH
Chromium, Total	BDL	mg/L	218.1	0.1	04/20/92	04/23/92	DWH
Copper, Total	0.21	mg/L	220.1	0.01	04/20/92	04/24/92	DWH
Lead, Dissolved	0.096	mg/L	239.2	0.005	04/20/92	04/21/92	DWH
Lead, Total	0.484	mg/L	239.2	0.005	04/20/92	04/21/92	DWH
Mercury, Total	0.0004	mg/L	245.1	0.0002	04/20/92	04/21/92	DWH
Nickel, Total	BDL	mg/L	249.1	0.10	04/20/92	04/20/92	DWH
Nitrate/Nitrite as N	0.08	mg/l	353.2	0.02		04/24/92	WBK
Solids, Total Dissolved	5,790	mg/L	160.1	2.0		04/21/92	CP
Zinc, Total	2.72	mg/L	289.1	0.01	04/20/92	04/24/92	DWH
pH (field)	6.9		150.1	0.1		04/16/92	GB

**** BDL INDICATES ANALYTE IS BELOW DETECTABLE LEVELS
ALL ANALYSIS PERFORMED BY EPA, ASTM, OR STANDARD METHODS
**** UNLESS OTHERWISE NOTED, mg/Kg DENOTES WET WEIGHT.
PERCENT SOLIDS ARE GIVEN FOR THOSE WHO NEED DRY WEIGHT RESULTS

Sarah M. Serrano, Laboratory Manager

ENVIROPACT, INC
MIAMI DIVISION
4790 N.W. 157th STREET
MIAMI, FL 33014-6421
305-620-1700

KEY_00012242
Attn: PAUL CATES

KEY WEST, CITY OF
SOLID WASTE DEPARTMENT
P.O. BOX 1550
KEY WEST, FL. 33040

29 Apr 1992
Report M2-04-210-02
LAB ID. 86119,83141,84271,800001156

Site Description / Work I.D.
STOCK ISLAND
KEY WEST, FL.

SAMPLE ID.: MW-2
COLLECTED: 04/16/92 15:45
RECEIVED: 04/17/92
COLLECTED BY: GARY BEVINS

Parameter	Result	Units	Method	Det. Limit	Extracted	Analyzed	Analyst
Cadmium, Total	BDL	mg/L	213.1	0.1	04/20/92	04/23/92	DWH
Chromium, Total	BDL	mg/L	218.1	0.1	04/20/92	04/23/92	DWH
Copper, Total	0.01	mg/L	220.1	0.01	04/20/92	04/24/92	DWH
Lead, Dissolved	0.010	mg/L	239.2	0.005	04/20/92	04/21/92	DWH
Lead, Total	0.144	mg/L	239.2	0.005	04/20/92	04/21/92	DWH
Mercury, Total	BDL	mg/L	245.1	0.0002	04/20/92	04/21/92	DWH
Nickel, Total	BDL	mg/L	249.1	0.10	04/20/92	04/20/92	DWH
Nitrate/Nitrite as N	BDL	mg/l	353.2	0.02		04/24/92	WBK
Solids, Total Dissolved	39,300	mg/L	160.1	2.0		04/21/92	CP
Zinc, Total	1.04	mg/L	289.1	0.01	04/20/92	04/24/92	DWH
pH (field)	7.4		150.1	0.1		04/16/92	GB

**** BDL INDICATES ANALYTE IS BELOW DETECTABLE LEVELS
ALL ANALYSIS PERFORMED BY EPA, ASTM, OR STANDARD METHODS
**** UNLESS OTHERWISE NOTED, mg/Kg DENOTES WET WEIGHT.
PERCENT SOLIDS ARE GIVEN FOR THOSE WHO NEED DRY WEIGHT RESULTS

Sarah M. Serrano, Laboratory Manager

KEY_00012242
Attn: PAUL CATES

KEY WEST, CITY OF
SOLID WASTE DEPARTMENT
P.O. BOX 1550
KEY WEST, FL. 33040

29 Apr 1992
Report M2-04-210-03
LAB ID. 86119,83141,84271,800001156

Site Description / Work I.D.
STOCK ISLAND
KEY WEST, FL.

SAMPLE ID.: MW-3
COLLECTED: 04/16/92 16:30
RECEIVED: 04/17/92
COLLECTED BY: GARY BEVINS

Parameter	Result	Units	Method	Det. Limit	Extracted	Analyzed	Analyst
Cadmium, Total	BDL	mg/L	213.1	0.1	04/20/92	04/23/92	DWH
Chromium, Total	BDL	mg/L	218.1	0.1	04/20/92	04/23/92	DWH
Copper, Total	0.05	mg/L	220.1	0.01	04/20/92	04/24/92	DWH
Lead, Dissolved	BDL	mg/L	239.2	0.005	04/20/92	04/21/92	DWH
Lead, Total	0.067	mg/L	239.2	0.005	04/20/92	04/21/92	DWH
Mercury, Total	BDL	mg/L	245.1	0.0002	04/20/92	04/21/92	DWH
Nickel, Total	BDL	mg/L	249.1	0.10	04/20/92	04/20/92	DWH
Nitrate/Nitrite as N	0.35	mg/l	353.2	0.02		04/24/92	WBK
Solids, Total Dissolved	36,000	mg/L	160.1	2.0		04/21/92	CP
Zinc, Total	0.42	mg/L	289.1	0.01	04/20/92	04/24/92	DWH
pH (field)	7.4		150.1	0.1		04/16/92	GB

**** BDL INDICATES ANALYTE IS BELOW DETECTABLE LEVELS
ALL ANALYSIS PERFORMED BY EPA, ASTM, OR STANDARD METHODS
**** UNLESS OTHERWISE NOTED, mg/Kg DENOTES WET WEIGHT.
PERCENT SOLIDS ARE GIVEN FOR THOSE WHO NEED DRY WEIGHT RESULTS

Sarah M. Serrano, Laboratory Manager

KEY_00012242
Attn: PAUL CATES

KEY WEST, CITY OF
SOLID WASTE DEPARTMENT
P.O. BOX 1550
KEY WEST, FL. 33040

29 Apr 1992
Report M2-04-210-04
LAB ID. 86119,83141,84271,800001156

Site Description / Work I.D.
STOCK ISLAND
KEY WEST, FL.

SAMPLE ID.: MW-4
COLLECTED: 04/16/92 17:25
RECEIVED: 04/17/92
COLLECTED BY: GARY BEVINS

Parameter	Result	Units	Method	Det. Limit	Extracted	Analyzed	Analyst
Cadmium, Total	BDL	mg/L	213.1	0.1	04/20/92	04/23/92	DWH
Chromium, Total	BDL	mg/L	218.1	0.1	04/20/92	04/23/92	DWH
Copper, Total	0.29	mg/L	220.1	0.01	04/20/92	04/24/92	DWH
Lead, Dissolved	0.035	mg/L	239.2	0.005	04/20/92	04/21/92	DWH
Lead, Total	0.355	mg/L	239.2	0.005	04/20/92	04/21/92	DWH
Mercury, Total	0.0006	mg/L	245.1	0.0002	04/20/92	04/21/92	DWH
Nickel, Total	BDL	mg/L	249.1	0.10	04/20/92	04/20/92	DWH
Nitrate/Nitrite as N	BDL	mg/l	353.2	0.02		04/24/92	WBK
Solids, Total Dissolved	4,020	mg/L	160.1	2.0		04/21/92	CP
Zinc, Total	1.15	mg/L	289.1	0.01	04/20/92	04/24/92	DWH
pH (field)	7.3		150.1	0.1		04/16/92	GB

**** BDL INDICATES ANALYTE IS BELOW DETECTABLE LEVELS
ALL ANALYSIS PERFORMED BY EPA, ASTM, OR STANDARD METHODS
**** UNLESS OTHERWISE NOTED, mg/Kg DENOTES WET WEIGHT.
PERCENT SOLIDS ARE GIVEN FOR THOSE WHO NEED DRY WEIGHT RESULTS

Sarah M. Serrano, Laboratory Manager

KEY_00012242
Attn: PAUL CATES

KEY WEST, CITY OF
SOLID WASTE DEPARTMENT
P.O. BOX 1550
KEY WEST, FL. 33040

29 Apr 1992
Report M2-04-210-05
LAB ID. 86119,83141,84271,800001156

Site Description / Work I.D.
STOCK ISLAND
KEY WEST, FL.

SAMPLE ID.: MW-5
COLLECTED: 04/16/92 17:50
RECEIVED: 04/17/92
COLLECTED BY: GARY BEVINS

Parameter	Result	Units	Method	Det. Limit	Extracted	Analyzed	Analyst
Cadmium, Total	BDL	mg/L	213.1	0.1	04/20/92	04/23/92	DWH
Chromium, Total	BDL	mg/L	218.1	0.1	04/20/92	04/23/92	DWH
Copper, Total	BDL	mg/L	220.1	0.01	04/20/92	04/24/92	DWH
Lead, Dissolved	BDL	mg/L	239.2	0.005	04/20/92	04/21/92	DWH
Lead, Total	0.024	mg/L	239.2	0.005	04/20/92	04/21/92	DWH
Mercury, Total	BDL	mg/L	245.1	0.0002	04/20/92	04/21/92	DWH
Nickel, Total	BDL	mg/L	249.1	0.10	04/20/92	04/20/92	DWH
Nitrate/Nitrite as N	BDL	mg/l	353.2	0.02		04/24/92	WBK
Solids, Total Dissolved	2,940	mg/L	160.1	2.0		04/21/92	CP
Zinc, Total	0.18	mg/L	289.1	0.01	04/20/92	04/24/92	DWH
pH (field)	7.0		150.1	0.1		04/16/92	GB

**** BDL INDICATES ANALYTE IS BELOW DETECTABLE LEVELS
ALL ANALYSIS PERFORMED BY EPA, ASTM, OR STANDARD METHODS
**** UNLESS OTHERWISE NOTED, mg/Kg DENOTES WET WEIGHT.
PERCENT SOLIDS ARE GIVEN FOR THOSE WHO NEED DRY WEIGHT RESULTS

Sarah M. Serrano, Laboratory Manager

ENVIROPACT

KEY_00012242
Attn: ACCOUNT PAYABLE

KEY WEST, CITY OF
SOLID WASTE DEPARTMENT
P.O. BOX 1550
KEY WEST, FL. 33040

22 Jan 1992
Report M2-01-083-01
LAB ID. 86119,83141,84271,800001156

Site Description / Work I.D.
KEY WEST LANDFILL
DER #D004485293

SAMPLE ID.: WELL 1
COLLECTED: 01/08/92 12:45
RECEIVED: 01/09/92
COLLECTED BY: FRANK GOMEZ

Parameter	Result	Units	Method	Det. Limit	Extracted	Analyzed	Analyst
Cadmium, Total	BDL	mg/L	213.2	0.005	01/09/92	01/13/92	DWH
Chromium, Total	0.006	mg/L	218.2	0.005	01/09/92	01/14/92	BJM
Copper, Total	0.03	mg/L	220.1	0.01	01/09/92	01/10/92	BJM
Lead, Dissolved	BDL	mg/L	239.2	0.005	01/09/92	01/14/92	BJM
Lead, Total	BDL	mg/L	239.2	0.005	01/09/92	01/14/92	BJM
Mercury, Total	BDL	mg/L	245.1	0.0002	01/09/92	01/17/92	DWH
Nickel, Total	BDL	mg/L	249.2	0.01	01/09/92	01/14/92	BJM
Nitrate as N	BDL	mg/L	353.2	0.01		01/20/92	EMA
Solids, Total Dissolved	5,820	mg/L	160.1	2.0		01/16/92	CP
Zinc, Total	0.06	mg/L	289.1	0.01	01/09/92	01/10/92	DWH
pH (field)	7.1		150.1	0.1		01/08/92	FG

**** BDL INDICATES ANALYTE IS BELOW DETECTABLE LEVELS
ALL ANALYSIS PERFORMED BY EPA, ASTM, OR STANDARD METHODS
**** UNLESS OTHERWISE NOTED, mg/Kg DENOTES WET WEIGHT.
PERCENT SOLIDS ARE GIVEN FOR THOSE WHO NEED DRY WEIGHT RESULTS

Tony Del Buono, Laboratory Manager

KEY_00012242
Attn: ACCOUNT PAYABLE

KEY WEST, CITY OF
SOLID WASTE DEPARTMENT
P.O. BOX 1550
KEY WEST, FL. 33040

22 Jan 1992
Report M2-01-083-02
LAB ID. 86119,83141,84271,800001156

Site Description / Work I.D.
KEY WEST LANDFILL
DER #D004485293

SAMPLE ID.: WELL 2
COLLECTED: 01/08/92 13:30
RECEIVED: 01/09/92
COLLECTED BY: FRANK GOMEZ

Parameter	Result	Units	Method	Det. Limit	Extracted	Analyzed	Analyst
Cadmium, Total	BDL	mg/L	213.2	0.005	01/09/92	01/13/92	DWH
Chromium, Total	0.034	mg/L	218.2	0.005	01/09/92	01/14/92	BJM
Copper, Total	0.07	mg/L	220.1	0.01	01/09/92	01/10/92	BJM
Lead, Dissolved	BDL	mg/L	239.2	0.005	01/09/92	01/14/92	BJM
Lead, Total	BDL	mg/L	239.2	0.005	01/09/92	01/14/92	BJM
Mercury, Total	BDL	mg/L	245.1	0.0002	01/09/92	01/17/92	DWH
Nickel, Total	BDL	mg/L	249.2	0.01	01/09/92	01/14/92	BJM
Nitrate as N	0.05	mg/L	353.2	0.01		01/20/92	EMA
Solids, Total Dissolved	18,300	mg/L	160.1	2.0		01/16/92	CP
Zinc, Total	0.09	mg/L	289.1	0.01	01/09/92	01/10/92	DWH
pH (field)	7.7		150.1	0.1		01/08/92	FG

**** BDL INDICATES ANALYTE IS BELOW DETECTABLE LEVELS
ALL ANALYSIS PERFORMED BY EPA, ASTM, OR STANDARD METHODS
**** UNLESS OTHERWISE NOTED, mg/Kg DENOTES WET WEIGHT.
PERCENT SOLIDS ARE GIVEN FOR THOSE WHO NEED DRY WEIGHT RESULTS

Tony Del Buono, Laboratory Manager

KEY_00012242
Attn: ACCOUNT PAYABLE

KEY WEST, CITY OF
SOLID WASTE DEPARTMENT
P.O. BOX 1550
KEY WEST, FL. 33040

22 Jan 1992
Report M2-01-083-03
LAB ID. 86119,83141,84271,800001156

Site Description / Work I.D.
KEY WEST LANDFILL
DER #D004485293

SAMPLE ID.: WELL 3
COLLECTED: 01/08/92 14:15
RECEIVED: 01/09/92
COLLECTED BY: FRANK GOMEZ

Parameter	Result	Units	Method	Det. Limit	Extracted	Analyzed	Analyst
Cadmium, Total	BDL	mg/L	213.2	0.005	01/09/92	01/13/92	DW
Chromium, Total	0.041	mg/L	218.2	0.005	01/09/92	01/14/92	BJM
Copper, Total	0.13	mg/L	220.1	0.01	01/09/92	01/10/92	BJM
Lead, Dissolved	BDL	mg/L	239.2	0.005	01/09/92	01/14/92	BJM
Lead, Total	BDL	mg/L	239.2	0.005	01/09/92	01/14/92	BJM
Mercury, Total	BDL	mg/L	245.1	0.0002	01/09/92	01/17/92	DWH
Nickel, Total	0.025	mg/L	249.2	0.01	01/09/92	01/20/92	BJM
Nitrate as N	0.86	mg/L	353.2	0.01		01/20/92	EMA
Solids, Total Dissolved	34,000	mg/L	160.1	2.0		01/16/92	CP
Zinc, Total	0.22	mg/L	289.1	0.01	01/09/92	01/10/92	DWH
pH (field)	7.3		150.1	0.1		01/08/92	FG

**** BDL INDICATES ANALYTE IS BELOW DETECTABLE LEVELS
ALL ANALYSIS PERFORMED BY EPA, ASTM, OR STANDARD METHODS
**** UNLESS OTHERWISE NOTED, mg/Kg DENOTES WET WEIGHT.
PERCENT SOLIDS ARE GIVEN FOR THOSE WHO NEED DRY WEIGHT RESULTS

Tony Del Buono, Laboratory Manager

KEY_00012242
Attn: ACCOUNT PAYABLE

KEY WEST, CITY OF
SOLID WASTE DEPARTMENT
P.O. BOX 1550
KEY WEST, FL. 33040

22 Jan 1992
Report M2-01-083-04
LAB ID. 86119,83141,84271,800001156

Site Description / Work I.D.
KEY WEST LANDFILL
DER #D004485293

SAMPLE ID.: WELL 4
COLLECTED: 01/08/92 14:45
RECEIVED: 01/09/92
COLLECTED BY: FRANK GOMEZ

Parameter	Result	Units	Method	Det. Limit	Extracted	Analyzed	Analyst
Cadmium, Total	BDL	mg/L	213.2	0.005	01/09/92	01/13/92	DWH
Chromium, Total	0.009	mg/L	218.2	0.005	01/09/92	01/14/92	BJM
Copper, Total	0.02	mg/L	220.1	0.01	01/09/92	01/10/92	BJM
Lead, Dissolved	BDL	mg/L	239.2	0.005	01/09/92	01/14/92	BJM
Lead, Total	BDL	mg/L	239.2	0.005	01/09/92	01/14/92	BJM
Mercury, Total	BDL	mg/L	245.1	0.0002	01/09/92	01/17/92	DWH
Nickel, Total	BDL	mg/L	249.2	0.01	01/09/92	01/14/92	BJM
Nitrate as N	0.13	mg/L	353.2	0.01		01/20/92	EMA
Solids, Total Dissolved	4,080	mg/L	160.1	2.0		01/16/92	CP
Zinc, Total	0.07	mg/L	289.1	0.01	01/09/92	01/10/92	DWH
pH (field)	7.2		150.1	0.1		01/08/92	FG

**** BDL INDICATES ANALYTE IS BELOW DETECTABLE LEVELS
ALL ANALYSIS PERFORMED BY EPA, ASTM, OR STANDARD METHODS
**** UNLESS OTHERWISE NOTED, mg/Kg DENOTES WET WEIGHT.
PERCENT SOLIDS ARE GIVEN FOR THOSE WHO NEED DRY WEIGHT RESULTS

Tony Del Buono, Laboratory Manager

KEY_00012242
Attn: ACCOUNT PAYABLE

KEY WEST, CITY OF
SOLID WASTE DEPARTMENT
P.O. BOX 1550
KEY WEST, FL. 33040

22 Jan 1992
Report M2-01-083-05
LAB ID. 86119,83141,84271,800001156

Site Description / Work I.D.
KEY WEST LANDFILL
DER #D004485293

SAMPLE ID.: WELL 5
COLLECTED: 01/08/92 15:15
RECEIVED: 01/09/92
COLLECTED BY: FRANK GOMEZ

Parameter	Result	Units	Method	Det. Limit	Extracted	Analyzed	Analyst
Cadmium, Total	BDL	mg/L	213.2	0.005	01/09/92	01/13/92	DWH
Chromium, Total	0.017	mg/L	218.2	0.005	01/09/92	01/14/92	BJM
Copper, Total	0.08	mg/L	220.1	0.01	01/09/92	01/10/92	BJM
Lead, Dissolved	BDL	mg/L	239.2	0.005	01/09/92	01/14/92	BJM
Lead, Total	0.039	mg/L	239.2	0.005	01/09/92	01/14/92	BJM
Mercury, Total	BDL	mg/L	245.1	0.0002	01/09/92	01/17/92	DWH
Nickel, Total	BDL	mg/L	249.2	0.01	01/09/92	01/14/92	BJM
Nitrate as N	BDL	mg/L	353.2	0.01		01/20/92	EMA
Solids, Total Dissolved	2,770	mg/L	160.1	2.0		01/16/92	CP
Zinc, Total	0.19	mg/L	289.1	0.01	01/09/92	01/10/92	DWH
pH (field)	7.1		150.1	0.1		01/08/92	FG

**** BDL INDICATES ANALYTE IS BELOW DETECTABLE LEVELS
ALL ANALYSIS PERFORMED BY EPA, ASTM, OR STANDARD METHODS
**** UNLESS OTHERWISE NOTED, mg/Kg DENOTES WET WEIGHT.
PERCENT SOLIDS ARE GIVEN FOR THOSE WHO NEED DRY WEIGHT RESULTS

Sarah Serrano for TDB
Tony Del Buono, Laboratory Manager

ENVIROPACT

KEY_00012242
Attn: ACCOUNT PAYABLE

KEY WEST, CITY OF
SOLID WASTE DEPARTMENT
P.O. BOX 1550
KEY WEST, FL. 33040

16 Oct 1991
Report M1-10-016-01
LAB ID. 86119

Sample Description:
STOCK ISLAND LANDFILL
D.E.R. # D004485293
CITY OF KEY WEST, FL

SAMPLE ID.: WELL 1
COLLECTED: 10/01/91 10:30
RECEIVED: 10/02/91
COLLECTED BY: FRANK GOMEZ

Parameter	Result	Units	Method	Det. Limit	Extracted	Analyzed	Analyst
Job: QUART COMPLIANCE WELLS							
Cadmium, Total	BDL	mg/L	213.2	0.005	10/02/91	10/03/91	BJM
Chromium, Total	0.016	mg/L	218.2	0.005	10/02/91	10/04/91	BJM
Copper, Total	0.08	mg/L	220.1	0.01	10/02/91	10/04/91	BJM
Lead, Dissolved	BDL	mg/L	239.2	0.005	10/02/91	10/04/91	BJM
Lead, Total	0.152	mg/L	239.2	0.005	10/02/91	10/04/91	BJM
Mercury, Total	BDL	mg/L	245.1	0.0002	10/02/91	10/04/91	DWH
Nickel, Total	0.012	mg/L	249.2	0.01	10/02/91	10/04/91	BJM
Nitrate as N	0.03	mg/L	353.2	0.01		10/11/91	EMA
Solids, Total Dissolved	7,354	mg/L	160.1	2.0		10/03/91	CP
Zinc, Total	0.57	mg/L	289.1	0.01	10/02/91	10/03/91	BJM
pH (field)	7.1		150.1	0.1		10/01/91	FG

**** BDL INDICATES ANALYTE IS BELOW DETECTABLE LEVELS
ALL ANALYSIS PERFORMED BY EPA, ASTM, OR STANDARD METHODS
**** UNLESS OTHERWISE NOTED, mg/Kg DENOTES WET WEIGHT.
PERCENT SOLIDS ARE GIVEN FOR THOSE WHO NEED DRY WEIGHT RESULTS

Michael Spitzer

Michael Spitzer, Laboratory Manager

ENVIROPACT, INC.
MIAMI DIVISION
4790 N.W. 157th STREET
MIAMI, FL 33014-6421

KEY_00012242
Attn: ACCOUNT PAYABLE

KEY WEST, CITY OF
SOLID WASTE DEPARTMENT
P.O. BOX 1550
KEY WEST, FL. 33040

16 Oct 1991
Report M1-10-016-02
LAB ID. 86119

Sample Description:
STOCK ISLAND LANDFILL
D.E.R. # D004485293
CITY OF KEY WEST, FL

SAMPLE ID.: WELL 2
COLLECTED: 10/01/91 11:30
RECEIVED: 10/02/91
COLLECTED BY: FRANK GOMEZ

Parameter	Result	Units	Method	Det. Limit	Extracted	Analyzed	Analyst
Job: QUART COMPLIANCE WELLS							
Cadmium, Total	BDL	mg/L	213.2	0.005	10/02/91	10/03/91	BJM
Chromium, Total	0.058	mg/L	218.2	0.005	10/02/91	10/04/91	BJM
Copper, Total	0.04	mg/L	220.1	0.01	10/02/91	10/04/91	BJM
Lead, Dissolved	BDL	mg/L	239.2	0.005	10/02/91	10/04/91	BJM
Lead, Total	0.164	mg/L	239.2	0.005	10/02/91	10/04/91	BJM
Mercury, Total	BDL	mg/L	245.1	0.0002	10/02/91	10/04/91	DWH
Nickel, Total	0.012	mg/L	249.2	0.01	10/02/91	10/04/91	BJM
Nitrate as N	0.03	mg/L	353.2	0.01		10/11/91	EMA
Solids, Total Dissolved	10,106	mg/L	160.1	2.0		10/03/91	CP
Zinc, Total	0.82	mg/L	289.1	0.01	10/02/91	10/03/91	BJM
pH (field)	8.0		150.1	0.1		10/01/91	FG

**** BDL INDICATES ANALYTE IS BELOW DETECTABLE LEVELS
ALL ANALYSIS PERFORMED BY EPA, ASTM, OR STANDARD METHODS
**** UNLESS OTHERWISE NOTED, mg/Kg DENOTES WET WEIGHT.
PERCENT SOLIDS ARE GIVEN FOR THOSE WHO NEED DRY WEIGHT RESULTS

Michael Spitzer

Michael Spitzer, Laboratory Manager

KEY_00012242
Attn: ACCOUNT PAYABLE

KEY WEST, CITY OF
SOLID WASTE DEPARTMENT
P.O. BOX 1550
KEY WEST, FL. 33040

16 Oct 1991
Report M1-10-016-03
LAB ID. 86119

Sample Description:
STOCK ISLAND LANDFILL
D.E.R. # D004485293
CITY OF KEY WEST, FL

SAMPLE ID.: WELL 3
COLLECTED: 10/01/91 12:00
RECEIVED: 10/02/91
COLLECTED BY: FRANK GOMEZ

Parameter	Result	Units	Method	Det. Limit	Extracted	Analyzed	Analyst
Job: QUART ^ COMPLIANCE WELLS							
Cadmium, Total	BDL	mg/L	213.2	0.005	10/02/91	10/03/91	BJM
Chromium, Total	0.042	mg/L	218.2	0.005	10/02/91	10/04/91	BJM
Copper, Total	0.06	mg/L	220.1	0.01	10/02/91	10/04/91	BJM
Lead, Dissolved	BDL	mg/L	239.2	0.005	10/02/91	10/04/91	BJM
Lead, Total	0.032	mg/L	239.2	0.005	10/02/91	10/04/91	BJM
Mercury, Total	BDL	mg/L	245.1	0.0002	10/03/91	10/04/91	DWH
Nickel, Total	BDL	mg/L	249.2	0.01	10/02/91	10/04/91	BJM
Nitrate as N	1.79	mg/L	353.2	0.01		10/11/91	EMA
Solids, Total Dissolved	25,572	mg/L	160.1	2.0		10/03/91	CP
Zinc, Total	0.12	mg/L	289.1	0.01	10/02/91	10/03/91	BJM
pH (field)	7.2		150.1	0.1		10/01/91	FG

**** BDL INDICATES ANALYTE IS BELOW DETECTABLE LEVELS
ALL ANALYSIS PERFORMED BY EPA, ASTM, OR STANDARD METHODS
**** UNLESS OTHERWISE NOTED, mg/Kg DENOTES WET WEIGHT.
PERCENT SOLIDS ARE GIVEN FOR THOSE WHO NEED DRY WEIGHT RESULTS

Michael Spitzer

Michael Spitzer, Laboratory Manager

KEY_00012242
Attn: ACCOUNT PAYABLE

KEY WEST, CITY OF
SOLID WASTE DEPARTMENT
P.O. BOX 1550
KEY WEST, FL. 33040

16 Oct 1991
Report M1-10-016-04
LAB ID. 86119

Sample Description:
STOCK ISLAND LANDFILL
D.E.R. # D004485293
CITY OF KEY WEST, FL

SAMPLE ID.: WELL 4
COLLECTED: 10/01/91 12:20
RECEIVED: 10/02/91
COLLECTED BY: FRANK GOMEZ

Parameter	Result	Units	Method	Det. Limit	Extracted	Analyzed	Analyst
Job: QUART COMPLIANCE WELLS							
Cadmium, Total	0.006	mg/L	213.2	0.005	10/02/91	10/03/91	BJM
Chromium, Total	0.034	mg/L	218.2	0.005	10/02/91	10/04/91	BJM
Copper, Total	0.47	mg/L	220.1	0.01	10/02/91	10/04/91	BJM
Lead, Dissolved	BDL	mg/L	239.2	0.005	10/02/91	10/04/91	BJM
Lead, Total	5.29	mg/L	239.2	0.005	10/02/91	10/04/91	BJM
Mercury, Total	BDL	mg/L	245.1	0.0002	10/02/91	10/04/91	DWH
Nickel, Total	0.033	mg/L	249.2	0.01	10/02/91	10/04/91	BJM
Nitrate as N	0.11	mg/L	353.2	0.01		10/11/91	EMA
Solids, Total Dissolved	4,062	mg/L	160.1	2.0		10/03/91	CP
Zinc, Total	1.61	mg/L	289.1	0.01	10/02/91	10/03/91	BJM
pH (field)	7.2		150.1	0.1		10/01/91	FG

**** BDL INDICATES ANALYTE IS BELOW DETECTABLE LEVELS
ALL ANALYSIS PERFORMED BY EPA, ASTM, OR STANDARD METHODS
**** UNLESS OTHERWISE NOTED, mg/Kg DENOTES WET WEIGHT.
PERCENT SOLIDS ARE GIVEN FOR THOSE WHO NEED DRY WEIGHT RESULTS

Michael Spitzer

Michael Spitzer, Laboratory Manager

KEY_00012242
Attn: ACCOUNT PAYABLE

KEY WEST, CITY OF
SOLID WASTE DEPARTMENT
P.O. BOX 1550
KEY WEST, FL. 33040

16 Oct 1991
Report M1-10-016-05
LAB ID. 86119

Sample Description:
STOCK ISLAND LANDFILL
D.E.R. # D004485293
CITY OF KEY WEST, FL

SAMPLE ID.: WELL 5
COLLECTED: 10/01/91 13:00
RECEIVED: 10/02/91
COLLECTED BY: FRANK GOMEZ

Parameter	Result	Units	Method	Det. Limit	Extracted	Analyzed	Analyst
Job: QUART COMPLIANCE WELLS							
Cadmium, Total	BDL	mg/L	213.2	0.005	10/02/91	10/03/91	BJM
Chromium, Total	0.037	mg/L	218.2	0.005	10/02/91	10/04/91	BJM
Copper, Total	0.16	mg/L	220.1	0.01	10/02/91	10/04/91	BJM
Lead, Dissolved	BDL	mg/L	239.2	0.005	10/02/91	10/04/91	BJM
Lead, Total	0.179	mg/L	239.2	0.005	10/02/91	10/04/91	BJM
Mercury, Total	BDL	mg/L	245.1	0.0002	10/02/91	10/04/91	DWH
Nickel, Total	BDL	mg/L	249.2	0.01	10/02/91	10/04/91	BJM
Nitrate as N	0.04	mg/L	353.2	0.01		10/11/91	EMA
Solids, Total Dissolved	3,518	mg/L	160.1	2.0		10/03/91	CP
Zinc, Total	0.33	mg/L	289.1	0.01	10/02/91	10/03/91	BJM
pH (field)	6.8		150.1	0.1		10/01/91	FG

**** BDL INDICATES ANALYTE IS BELOW DETECTABLE LEVELS
ALL ANALYSIS PERFORMED BY EPA, ASTM, OR STANDARD METHODS
**** UNLESS OTHERWISE NOTED, mg/Kg DENOTES WET WEIGHT.
PERCENT SOLIDS ARE GIVEN FOR THOSE WHO NEED DRY WEIGHT RESULTS

Michael Spitzer, Laboratory Manager

ENVIROPACT

KEY_00012242
Attn: ACCOUNT PAYABLE

KEY WEST, CITY OF
SOLID WASTE DEPARTMENT
P.O. BOX 1550
KEY WEST, FL. 33040

15 Jul 1991
Report M1-07-002-01
LAB ID. 86119

Sample Description:
KEY WEST LANDFILL, DER #D004485293

SAMPLE ID.: WELL 1
COLLECTED: 06/28/91 09:15
RECEIVED: 07/01/91
COLLECTED BY: FRANK GOMEZ

Parameter	Result	Units	Method	Det. Limit	Extracted	Analyzed	Analyst
Cadmium, Total	BDL	mg/L	213_2	0.005	07/01/91	07/03/91	DWH
Chromium, Total	0.015	mg/L	218_2	0.005	07/01/91	07/05/91	DWH
Copper, Total	0.10	mg/L	220_1	0.01	07/01/91	07/05/91	DWH
Lead, Dissolved	BDL	mg/L	239_2	0.005	07/01/91	07/02/91	DWH
Lead, Total	0.106	mg/L	239_2	0.005	07/01/91	07/02/91	DWH
Mercury, Total	BDL	mg/L	245_1	0.001	07/01/91	07/09/91	JAK
Nickel, Total	0.029	mg/L	249_2	0.01	07/01/91	07/05/91	DWH
Nitrate as N	0.01	mg/L	353_2	0.01		07/08/91	JCB
Solids, Total Dissolved	7,240	mg/L	160_1	2.0		07/11/91	MBL
Zinc, Total	0.50	mg/L	289_1	0.01	07/01/91	07/03/91	DWH
pH (field)	7.3		150_1	0.1		06/28/91	FG

**** BDL INDICATES ANALYTE IS BELOW DETECTABLE LEVELS
ALL ANALYSIS PERFORMED BY EPA, ASTM, OR STANDARD METHODS
**** UNLESS OTHERWISE NOTED, mg/Kg DENOTES WET WEIGHT.
PERCENT SOLIDS ARE GIVEN FOR THOSE WHO NEED DRY WEIGHT RESULTS

Michael Spitzer, Laboratory Manager

KEY_00012242
Attn: ACCOUNT PAYABLE

KEY WEST, CITY OF
SOLID WASTE DEPARTMENT
P.O. BOX 1550
KEY WEST, FL. 33040

15 Jul 1991
Report M1-07-002-02
LAB ID. 86119

Sample Description:
KEY WEST LANDFILL, DER #D004485293

SAMPLE ID.: WELL 2
COLLECTED: 06/28/91 10:00
RECEIVED: 07/01/91
COLLECTED BY: FRANK GOMEZ

Parameter	Result	Units	Method	Det. Limit	Extracted	Analyzed	Analyst
Cadmium, Total	BDL	mg/L	213_2	0.005	07/01/91	07/03/91	DWH
Chromium, Total	0.005	mg/L	218_2	0.005	07/01/91	07/05/91	DWH
Copper, Total	0.02	mg/L	220_1	0.01	07/01/91	07/05/91	DWH
Lead, Dissolved	BDL	mg/L	239_2	0.005	07/01/91	07/02/91	DWH
Lead, Total	0.011	mg/L	239_2	0.005	07/01/91	07/02/91	DWH
Mercury, Total	BDL	mg/L	245_1	0.001	07/01/91	07/09/91	JAK
Nickel, Total	BDL	mg/L	249_2	0.01	07/01/91	07/05/91	DWH
Nitrate as N	BDL	mg/L	353_2	0.01		07/08/91	JCB
Solids, Total Dissolved	7,670	mg/L	160_1	2.0		07/11/91	MBL
Zinc, Total	0.03	mg/L	289_1	0.01	07/01/91	07/03/91	DWH
pH (field)	8.0		150_1	0.1		06/28/91	FG

**** BDL INDICATES ANALYTE IS BELOW DETECTABLE LEVELS
ALL ANALYSIS PERFORMED BY EPA, ASTM, OR STANDARD METHODS
**** UNLESS OTHERWISE NOTED, mg/Kg DENOTES WET WEIGHT.
PERCENT SOLIDS ARE GIVEN FOR THOSE WHO NEED DRY WEIGHT RESULTS

Michael Spitzer

Michael Spitzer, Laboratory Manager

KEY_00012242
Attn: ACCOUNT PAYABLE

KEY WEST, CITY OF
SOLID WASTE DEPARTMENT
P.O. BOX 1550
KEY WEST, FL. 33040

15 Jul 1991
Report M1-07-002-03
LAB ID. 86119

Sample Description:
KEY WEST LANDFILL, DER #D004485293

SAMPLE ID.: WELL 3
COLLECTED: 06/28/91 10:30
RECEIVED: 07/01/91
COLLECTED BY: FRANK GOMEZ

Parameter	Result	Units	Method	Det. Limit	Extracted	Analyzed	Analyst
Cadmium, Total	BDL	mg/L	213_2	0.005	07/01/91	07/03/91	DWH
Chromium, Total	0.012	mg/L	218_2	0.005	07/01/91	07/05/91	DWH
Copper, Total	0.07	mg/L	220_1	0.01	07/01/91	07/05/91	DWH
Lead, Dissolved	0.035	mg/L	239_2	0.005	07/01/91	07/02/91	DWH
Lead, Total	0.038	mg/L	239_2	0.005	07/01/91	07/02/91	DWH
Mercury, Total	BDL	mg/L	245_1	0.001	07/01/91	07/09/91	JAK
Nickel, Total	0.014	mg/L	249_2	0.01	07/01/91	07/05/91	DWH
Nitrate as N	2.11	mg/L	353_2	0.01		07/08/91	JCB
Solids, Total Dissolved	27,800	mg/L	160_1	2.0		07/11/91	MBL
Zinc, Total	0.03	mg/L	289_1	0.01	07/01/91	07/03/91	DWH
pH (field)	7.6		150_1	0.1		06/28/91	FG

**** BDL INDICATES ANALYTE IS BELOW DETECTABLE LEVELS
ALL ANALYSIS PERFORMED BY EPA, ASTM, OR STANDARD METHODS
**** UNLESS OTHERWISE NOTED, mg/Kg DENOTES WET WEIGHT.
PERCENT SOLIDS ARE GIVEN FOR THOSE WHO NEED DRY WEIGHT RESULTS

Michael Spitzer

Michael Spitzer, Laboratory Manager

KEY_00012242
Attn: ACCOUNT PAYABLE

KEY WEST, CITY OF
SOLID WASTE DEPARTMENT
P.O. BOX 1550
KEY WEST, FL. 33040

15 Jul 1991
Report M1-07-002-04
LAB ID. 86119

Sample Description:
KEY WEST LANDFILL, DER #D004485293

SAMPLE ID.: WELL 4
COLLECTED: 06/28/91 11:15
RECEIVED: 07/01/91
COLLECTED BY: FRANK GOMEZ

Parameter	Result	Units	Method	Det. Limit	Extracted	Analyzed	Analyst
Cadmium, Total	BDL	mg/L	213_2	0.005	07/01/91	07/03/91	DWH
Chromium, Total	0.014	mg/L	218_2	0.005	07/01/91	07/05/91	DWH
Copper, Total	0.11	mg/L	220_1	0.01	07/01/91	07/05/91	DWH
Lead, Dissolved	0.010	mg/L	239_2	0.005	07/01/91	07/02/91	DWH
Lead, Total	0.204	mg/L	239_2	0.005	07/01/91	07/02/91	DWH
Mercury, Total	BDL	mg/L	245_1	0.001	07/01/91	07/09/91	JAK
Nickel, Total	0.025	mg/L	249_2	0.01	07/01/91	07/05/91	DWH
Nitrate as N	0.31	mg/L	353_2	0.01		07/08/91	JCB
Solids, Total Dissolved	4,670	mg/L	160_1	2.0		07/11/91	MBL
Zinc, Total	0.53	mg/L	289_1	0.01	07/01/91	07/03/91	DWH
pH (field)	7.6		150_1	0.1		06/28/91	FG

**** BDL INDICATES ANALYTE IS BELOW DETECTABLE LEVELS
ALL ANALYSIS PERFORMED BY EPA, ASTM, OR STANDARD METHODS
**** UNLESS OTHERWISE NOTED, mg/Kg DENOTES WET WEIGHT.
PERCENT SOLIDS ARE GIVEN FOR THOSE WHO NEED DRY WEIGHT RESULTS

Michael Spitzer, Laboratory Manager

KEY_00012242
Attn: ACCOUNT PAYABLE

KEY WEST, CITY OF
SOLID WASTE DEPARTMENT
P.O. BOX 1550
KEY WEST, FL. 33040

15 Jul 1991
Report M1-07-002-05
LAB ID. 86119

Sample Description:
KEY WEST LANDFILL, DER #D004485293

SAMPLE ID.: WELL 5
COLLECTED: 06/28/91 11:45
RECEIVED: 07/01/91
COLLECTED BY: FRANK GOMEZ

Parameter	Result	Units	Method	Det. Limit	Extracted	Analyzed	Analyst
Cadmium, Total	BDL	mg/L	213_2	0.005	07/01/91	07/03/91	DWH
Chromium, Total	0.042	mg/L	218_2	0.005	07/01/91	07/05/91	DWH
Copper, Total	0.11	mg/L	220_1	0.01	07/01/91	07/05/91	DWH
Lead, Dissolved	BDL	mg/L	239_2	0.005	07/01/91	07/02/91	DWH
Lead, Total	0.095	mg/L	239_2	0.005	07/01/91	07/02/91	DWH
Mercury, Total	BDL	mg/L	245_1	0.001	07/01/91	07/09/91	JAK
Nickel, Total	0.020	mg/L	249_2	0.01	07/01/91	07/05/91	DWH
Nitrate as N	0.01	mg/L	353_2	0.01		07/08/91	JCB
Solids, Total Dissolved	4,070	mg/L	160_1	2.0		07/11/91	MBL
Zinc, Total	0.08	mg/L	289_1	0.01	07/01/91	07/03/91	DWH
pH (field)	7.6		150_1	0.1		06/28/91	FG

**** BDL INDICATES ANALYTE IS BELOW DETECTABLE LEVELS
ALL ANALYSIS PERFORMED BY EPA, ASTM, OR STANDARD METHODS
**** UNLESS OTHERWISE NOTED, mg/Kg DENOTES WET WEIGHT.
PERCENT SOLIDS ARE GIVEN FOR THOSE WHO NEED DRY WEIGHT RESULTS

Michael Spitzer, Laboratory Manager

RECEIVED APR 22 1991

ENVIROPACT

KEY_00012242
Attn: ACCOUNT PAYABLE

KEY WEST, CITY OF
SOLID WASTE DEPARTMENT
P.O. BOX 1550
KEY WEST, FL. 33040

Page 1
16 Apr 1991
Report M1-03-381-02
LAB ID. 86119

Sample Description:
KEY WEST LANDFILL, DER #D004485293

SAMPLE ID.: WELL 2
COLLECTED: 03/29/91 10:10
RECEIVED: 03/29/91
COLLECTED BY: FRANK GOMEZ

Parameter	Result	Units	Method	Det. Limit	Extracted	Analyzed	Analyst
Cadmium, Total	BDL	mg/L	213_2	0.005	04/01/91	04/01/91	DWH
Chromium, Total	0.070	mg/L	218_2	0.005	04/01/91	04/01/91	MJS
Copper, Total	0.17	mg/L	220_1	0.01	04/01/91	04/01/91	DWH
Lead, Dissolved	BDL	mg/L	239_2	0.005	04/01/91	04/02/91	MJS
Lead, Total	0.15	mg/L	239_2	0.005	04/01/91	04/01/91	MJS
Mercury, Total	BDL	mg/L	245_1	0.001	04/01/91	04/02/91	JAK
Nickel, Total	0.070	mg/L	249_2	0.01	04/01/91	04/10/91	JAK
Nitrate as N	BDL	mg/L	353_2	0.01		04/02/91	JCB
Solids, Total Dissolved	13,400	mg/L	160_1	2.0		04/02/91	MBL
Zinc, Total	0.50	mg/L	289_1	0.01	04/01/91	04/01/91	DWH
pH (field)	8.0		150_1	0.1		03/29/91	FG

**** BDL INDICATES ANALYTE IS BELOW DETECTABLE LEVELS
ALL ANALYSIS PERFORMED BY EPA, ASTM, OR STANDARD METHODS
**** UNLESS OTHERWISE NOTED, mg/Kg DENOTES WET WEIGHT.
PERCENT SOLIDS ARE GIVEN FOR THOSE WHO NEED DRY WEIGHT RESULTS

Michael Spitzer

Michael Spitzer, Laboratory Manager

ENVIROPACT, INC
MIAMI DIVISION
4790 N.W. 157th STREET
MIAMI, FL 33014-6421
305-620-1700

KEY_00012242
Attn: ACCOUNT PAYABLE

KEY WEST, CITY OF
SOLID WASTE DEPARTMENT
P.O. BOX 1550
KEY WEST, FL. 33040

16 Apr 1991
Report M1-03-381-03
LAB ID. 86119

Sample Description:
KEY WEST LANDFILL, DER #D004485293

SAMPLE ID.: WELL 3
COLLECTED: 03/29/91 11:00
RECEIVED: 03/29/91
COLLECTED BY: FRANK GOMEZ

Parameter	Result	Units	Method	Det. Limit	Extracted	Analyzed	Analyst
Cadmium, Total	BDL	mg/L	213_2	0.005	04/01/91	04/01/91	DWH
Chromium, Total	0.033	mg/L	218_2	0.005	04/01/91	04/01/91	MJS
Copper, Total	0.09	mg/L	220_1	0.01	04/01/91	04/01/91	DWH
Lead, Dissolved	0.015	mg/L	239_2	0.005	04/01/91	04/02/91	MJS
Lead, Total	0.11	mg/L	239_2	0.005	04/01/91	04/01/91	MJS
Mercury, Total	BDL	mg/L	245_1	0.001	04/01/91	04/02/91	JAK
Nickel, Total	0.031	mg/L	249_2	0.01	04/01/91	04/10/91	JAK
Nitrate as N	0.183	mg/L	353_2	0.01		04/02/91	JCB
Solids, Total Dissolved	19,000	mg/L	160_1	2.0		04/02/91	MBL
Zinc, Total	0.18	mg/L	289_1	0.01	04/01/91	04/01/91	DWH
pH (field)	7.6		150_1	0.1		03/29/91	FG

**** BDL INDICATES ANALYTE IS BELOW DETECTABLE LEVELS
ALL ANALYSIS PERFORMED BY EPA, ASTM, OR STANDARD METHODS
**** UNLESS OTHERWISE NOTED, mg/Kg DENOTES WET WEIGHT.
PERCENT SOLIDS ARE GIVEN FOR THOSE WHO NEED DRY WEIGHT RESULTS

Michael Spitzer

Michael Spitzer, Laboratory Manager

16 Apr 1991
Report M1-03-381-04
LAB ID. 86119

00012242
Attn: ACCOUNT PAYABLE

KEY WEST, CITY OF
SOLID WASTE DEPARTMENT
P.O. BOX 1550
KEY WEST, FL. 33040

Sample Description:
KEY WEST LANDFILL, DER #D004485293

SAMPLE ID.: WELL 4
COLLECTED: 03/29/91 11:30
RECEIVED: 03/29/91
COLLECTED BY: FRANK GOMEZ

Parameter	Result	Units	Method	Det. Limit	Extracted	Analyzed	Analyst
Cadmium, Total	BDL	mg/L	213_2	0.005	04/01/91	04/01/91	DWH
Chromium, Total	0.005	mg/L	218_2	0.005	04/01/91	04/01/91	MJS
Copper, Total	0.03	mg/L	220_1	0.01	04/01/91	04/01/91	DWH
Lead, Dissolved	BDL	mg/L	239_2	0.005	04/01/91	04/02/91	MJS
Lead, Total	0.008	mg/L	239_2	0.005	04/01/91	04/02/91	MJS
Mercury, Total	BDL	mg/L	245_1	0.001	04/01/91	04/02/91	JAK
Nickel, Total	BDL	mg/L	249_2	0.01	04/01/91	04/02/91	DWH
Nitrate as N	0.012	mg/L	353_2	0.01		04/02/91	JCB
Solids, Total Dissolved	4,360	mg/L	160_1	2.0		04/02/91	MBL
Zinc, Total	0.04	mg/L	289_1	0.01	04/01/91	04/01/91	DWH
pH (field)	7.8		150_1	0.1		03/29/91	FG

**** BDL INDICATES ANALYTE IS BELOW DETECTABLE LEVELS
ALL ANALYSIS PERFORMED BY EPA, ASTM, OR STANDARD METHODS
**** UNLESS OTHERWISE NOTED, mg/Kg DENOTES WET WEIGHT.
PERCENT SOLIDS ARE GIVEN FOR THOSE WHO NEED DRY WEIGHT RESULTS

Michael Spitzer, Laboratory Manager

KEY 00012242
Attn: ACCOUNT PAYABLE

KEY WEST, CITY OF
SOLID WASTE DEPARTMENT
P.O. BOX 1550
KEY WEST, FL. 33040

16 Apr 1991
Report M1-03-381-05
LAB ID. 86119

Sample Description:
KEY WEST LANDFILL, DER #D004485293

SAMPLE ID.: WELL 5
COLLECTED: 03/29/91 11:45
RECEIVED: 03/29/91
COLLECTED BY: FRANK GOMEZ

Parameter	Result	Units	Method	Det. Limit	Extracted	Analyzed	Analyst
Cadmium, Total	BDL	mg/L	213_2	0.005	04/01/91	04/01/91	DWH
Chromium, Total	0.063	mg/L	218_2	0.005	04/01/91	04/01/91	MJS
Copper, Total	0.21	mg/L	220_1	0.01	04/01/91	04/01/91	DWH
Lead, Dissolved	BDL	mg/L	239_2	0.005	04/01/91	04/02/91	MJS
Lead, Total	0.18	mg/L	239_2	0.005	04/01/91	04/01/91	MJS
Mercury, Total	BDL	mg/L	245_1	0.001	04/01/91	04/02/91	JAK
Nickel, Total	BDL	mg/L	249_2	0.01	04/01/91	04/02/91	DWH
Nitrate as N	0.038	mg/L	353_2	0.01		04/02/91	JCB
Solids, Total Dissolved	3,280	mg/L	160_1	2.0		04/02/91	MBL
Zinc, Total	0.17	mg/L	289_1	0.01	04/01/91	04/01/91	DWH
pH (field)	8.0		150_1	0.1		03/29/91	FG

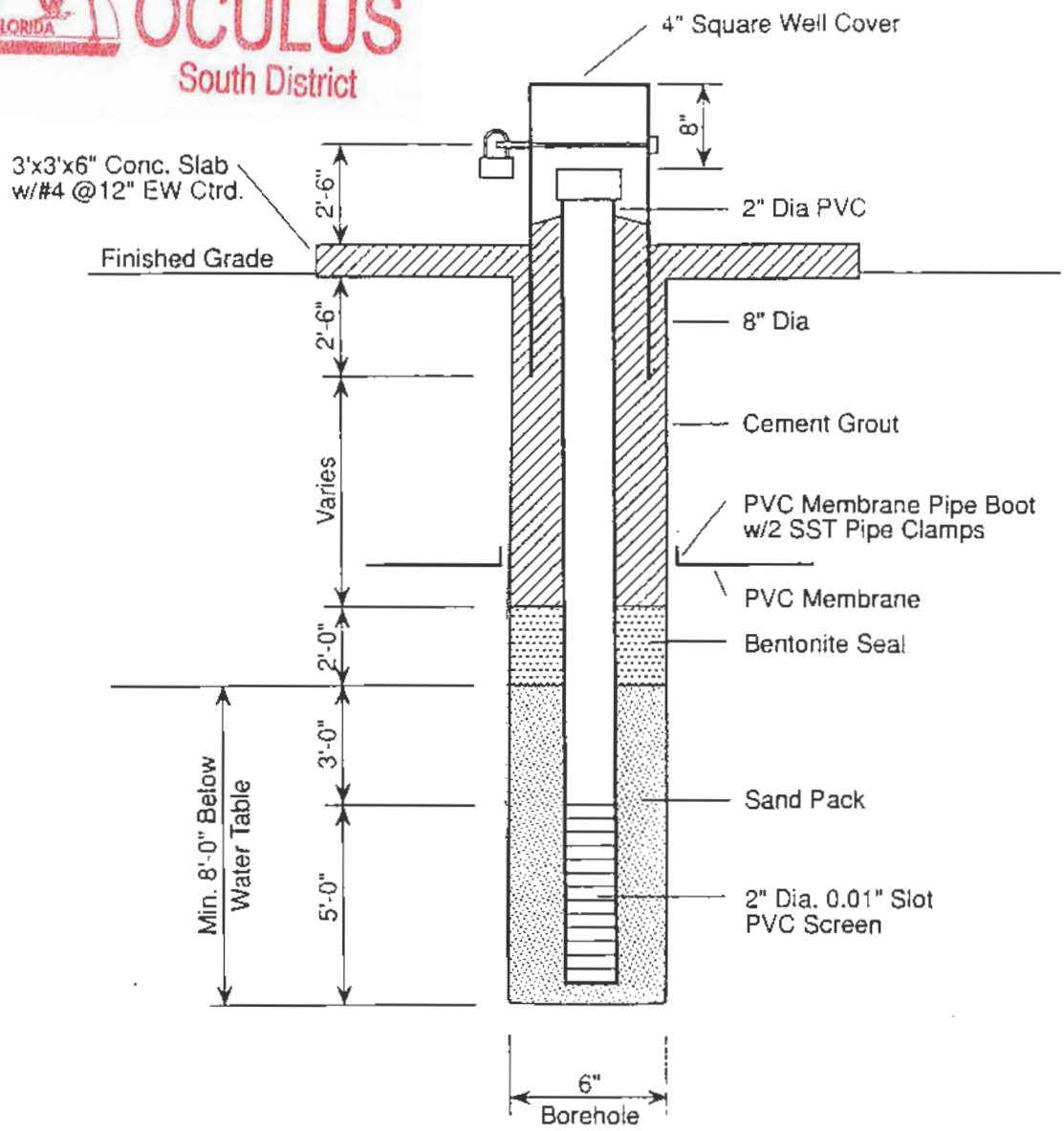
**** BDL INDICATES ANALYTE IS BELOW DETECTABLE LEVELS
ALL ANALYSIS PERFORMED BY EPA, ASTM, OR STANDARD METHODS
**** UNLESS OTHERWISE NOTED, mg/Kg DENOTES WET WEIGHT.
PERCENT SOLIDS ARE GIVEN FOR THOSE WHO NEED DRY WEIGHT RESULTS

Michael Spitzer

Michael Spitzer, Laboratory Manager

Appendix D
Monitor Well Details

SEF20064.Y6.11 4/92



Monitoring Well Data

Well No.	Total Depth (Feet)	Approximate Depth to Water (Feet)	Measuring Point* Elevation Feet NGVD
1	19.0	11.5	13.01
2	25.0	15.6	16.85
3	18.0	9.2	10.87
4	24.6	15.6	17.25
5	16.0	6.0	7.89

* The measuring point is the top of the well casing with well cap removed.

Typical Monitoring Well Detail.

CH2MHill

02671
MONITORING WELLS

1. SCOPE

1.1 WORK INCLUDED:

1.1.1 These Specifications cover the work necessary for construction of new groundwater monitoring wells and extension of existing monitoring wells, complete.

1.1.2 The Contractor shall furnish all labor, materials, tools, and equipment necessary to drill and complete the wells, including drilling, casing, sealing, sand pack, and completion of well head, and all other work required to complete the work as specified herein and as shown on the Drawings.

1.1.3 The wells shall be constructed in compliance with all laws, rules, regulations, and standards related to construction of wells in the State of Florida, the County of Monroe, and the South Florida Water Management District. The Contractor shall be responsible for obtaining all required permits and submitting all records and reports.

1.1.4 The wells shall be constructed before the placement of ABM or PVC membrane.

1.1.5 When complete, this project will provide the Owner with wells to enable the Owner to monitor the groundwater beneath the landfill.

2. MATERIALS

2.1 WELL CASING: Well casing shall be new and unused 2-inch diameter Schedule 40 PVC pipe, with threaded joints and rubber O-ring seals in all joints. The use of bonding agents or joint cements will not be permitted nor will any thread lubrication compound with exception of teflon tape.

2.2 WELL SCREENS: Well Screens shall be 2-inch diameter factory made, high flow, slotted PVC pipe, with threaded joints to match the PVC casing. Slot dimension shall be 0.010 inch. The length of each screen shall be 5 feet. The base of each screen will be sealed by a threaded end cap.

2.3 SAND PACK: Sand pack shall be thoroughly washed, sound, durable, well rounded siliceous material containing, when delivered less than 5 percent silt and clay, and no organic material, anhydrite, gypsum, mica or calcareous material. Specific gravity shall not be less than 2.5. The size and gradation of the sand packing material shall be 20/30 sieve size. A measuring device shall be provided to sound the sand level in the hole during placement to detect bridging.

2.4 BENTONITE SEAL: Bentonite seal shall consist of 1/4-inch or 3/8-inch diameter Volclay Tablets, manufactured by American Colloid Company, or equal.

2.5 GROUT SEAL: Grout seal shall be portland cement conforming to ASTM C 150, Type I or II. Portion one bag of cement to not more than 7.5 gallons of water, and 3 to 4 pounds of bentonite.

2.6 WELLHEAD: Each wellhead shall consist of a PVC slip-on cap, lockable well cover, and a concrete pad. The PVC slip-on cap shall fit firmly over the end of the well casing and have a 1/8-inch diameter hole drilled through the center. The lockable well covers shall be anodized aluminum, 4-inch square by 5-foot length with hinged covers, as manufactured by Brainard-Killman Inc., or equal. The well identification number shall be painted on using a stencil. Color of the paints will be specified by the Engineer at a later date. A brass (or other corrosion-resistant) keyed-alike security lock shall be supplied for each well.

2.7 CONCRETE: Concrete shall be a five-sack mix with maximum aggregate size of 3/4 inch.

3. WORKMANSHIP

3.1 DECONTAMINATION: Upon mobilization to the landfill and prior to beginning drilling, the Contractor shall flush all water storage tanks, pumps, piping, augers, kelly hose, etc., with a trisodium phosphate (TSP) mixture. Water tanks shall become completely filled with this mixture. After thoroughly flushing and scrubbing, all equipment shall be thoroughly flushed with potable water from a source approved by the Engineer, followed by steam cleaning and an isopropanol rinse. The Contractor shall contain all isopropanol used during rinsing for disposal, isopropanol shall not be allowed to contact the soil on site. If paint or excessive corrosion is present on the downhole drilling equipment, the Contractor will be required to replace the equipment.

3.1.1 The Contractor shall provide sawhorses or other racks to hold all drill pipe, hoses, etc., off the ground for decontamination. The equipment shall remain racked and covered when not in use. The Contractor shall also provide a steam jenny, distilled water, isopropanol rinse, and plastic sheeting required during the decontamination process.

3.1.2 After the initial decontamination procedure, and between boreholes, all equipment including the drilling rig shall be thoroughly steam cleaned. Down hole equipment shall receive a distilled water rinse, an isopropanol rinse and then be allowed to air dry.

3.2 WELL DRILLING:

3.2.1 The wells shall be drilled in the location, to the depth and diameter shown on the Drawings, and designated by the Engineer. Wells shall be drilled by the mud rotary method or by alternative method as approved by the Engineer. Wells shall be field located by the Engineer.

3.2.2 All drilling fluids and cuttings from drilling operations shall be retained in a drilling box disposed of in the landfill.

3.2.3 The use of grease, oils, and other lubricants shall not be permitted during the connection of tool joints with the exception of Teflon tape. The Contractor shall not introduce any fluids or foreign materials into the borehole without the consent of the Engineer.

3.3 PVC CASING - SCREEN ASSEMBLY INSTALLATION: Following completion of the borehole to its total depth, the casing-screen assembly, as shown on the Drawings, shall be installed. The casing-screen assembly shall be centered in the borehole. The casing-screen assembly shall be suspended above the bottom of the hole so that it is not supported from the bottom.

3.4 INSTALLATION OF SAND PACKING MATERIAL: Sand packing material shall be placed in the annular space using tremie pipe or in an approved alternate manner to prevent bridging. Sand packing material shall be placed to an elevation 3 feet above the uppermost perforation in the well screen as approved by the Engineer.

3.5 INSTALLATION OF BENTONITE SEAL: The aquifer zone to be monitored shall be hydraulically isolated by placing a minimum 2-foot thickness of bentonite pellets in the annular space between the casing and the borehole wall above the sand pack.

3.6 INSTALLATION OF GROUT SEAL: Grout shall be placed in the annular space from the top of the bentonite seal to land surface using tremie pipe. Pumping rates shall be low enough so as to not disturb the bentonite seal. All grouting operations shall be witnessed by the Engineer.

3.7 WELL DEVELOPMENT: Well development shall be accomplished by surging and bailing the well, using the bailer as a surging device. The use of hand pumps, or other development methods may be permitted after prior approval by the Engineer. The development water shall be disposed of in the immediate vicinity of each well.

3.8 WELLHEAD COMPLETION: Upon completion of the grouting, finish the top of the well at approximately 2.5 feet above land surface. Cap the well with a slip-on PVC cap. Install the well cover and set into the grout before it hardens. Approximately 2.5 feet of the wellhead cover shall be secured into the grout below land surface. A 3- by 3-foot by 4-inch thick concrete pad shall be poured into a form surrounding the well. The top surface of the concrete pad shall be mounded to prevent water accumulation and given a broom finish.

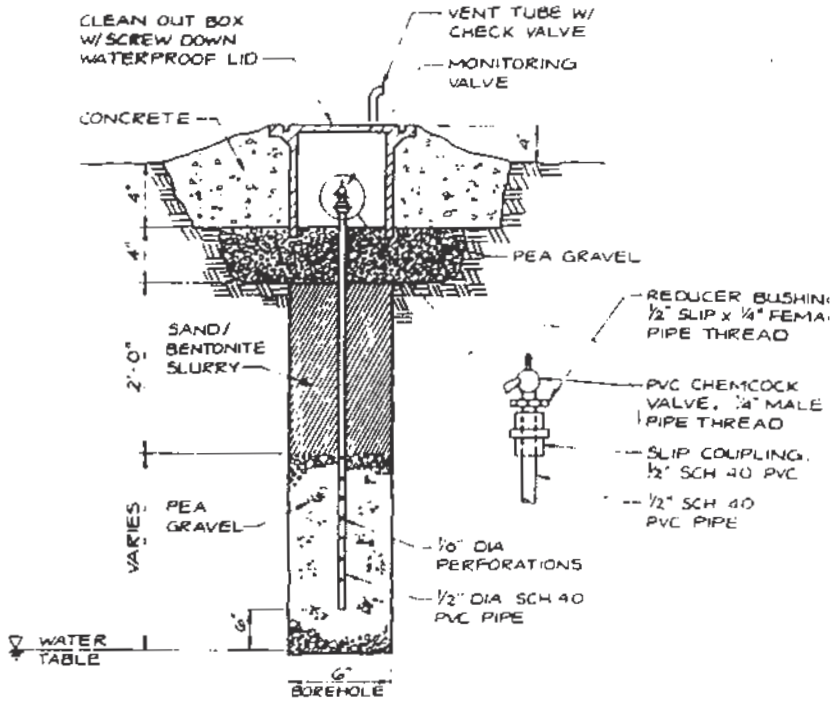
3.9 EXTENSION OF EXISTING MONITORING WELLS: Extend the existing monitoring wells as shown on the Drawings. Provide the wellhead cover as specified above.

4. PAYMENT

4.1 GENERAL: Payment for the work to install the monitoring wells to the depths shown on the Drawings shall be included as part of the lump price stated in the Contractor's Proposal. Payment for the monitoring wells shall constitute full compensation for the work as specified under this section.

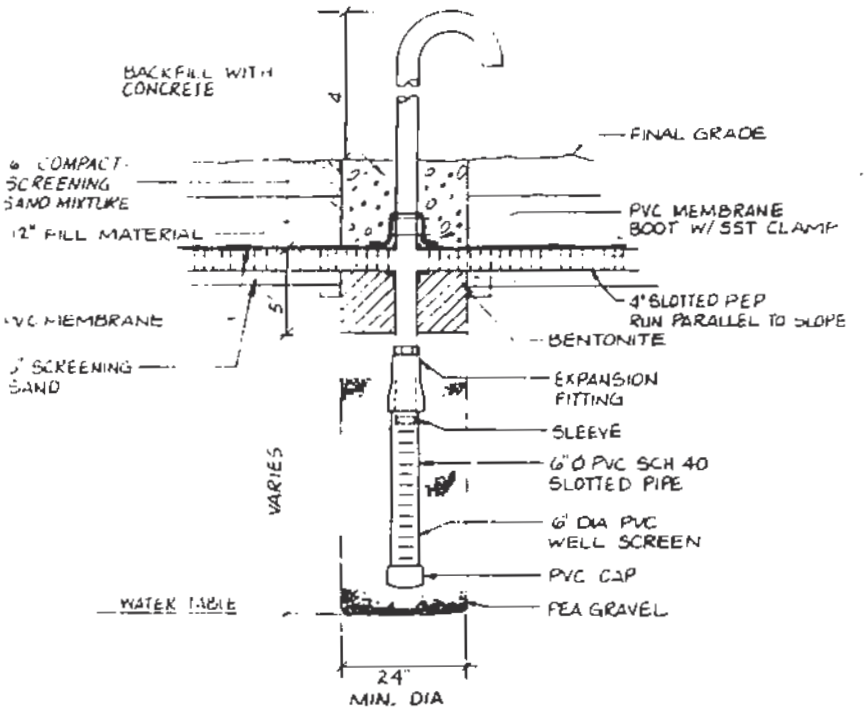
* * * * * *

Appendix E
Detailed Construction of Gas Vents and Gas Probes



TYPICAL GAS MONITORING PROBE DETAIL (2)

NTS



TYPICAL GAS VENTILATION WELL

NOT TO SCALE

Appendix F
Financial Responsibility

Cost Summary

1. The total cost for Phase I construction is 3.4 million dollars in 1990.

2. The estimated cost for Phase II construction is 2.5 million dollars in 1992.

3. Estimated costs for long-term care are summarized as follows.

Landfill Surface Care

Work to be performed on a quarterly basis -

Inspection of stormwater control system, perimeter berm, and slopes - 1 day - one man

Time to fix washouts, regarding, revegetating, etc. - 5 days - 2 men - front-end loader

Fertilizing grass - 1 day - one man

Gas Monitoring

Measuring gas levels in grass problems around site on a quarterly basis - 1 day - one man - one explosimeter.

Stormwater Control

Quarterly inspection of the stormwater system including retention areas, swales, and inlets - 1 day - one man.

Fixing of stormwater control features - 2 days - one man - front-end loader.

Ground Water Monitoring, Collection, and Analysis

Quarterly sampling of monitoring wells and laboratory analysis for specified parameters - $625.00.

Labor

Labor has been included in the above categories.

Equipment Costs

Equipment	1993 ($)	Source
Mower Attachment	12,500	ERB & Roberts Farm Equipment
Front-End Loader - 910	64,500	Ring Power
Tractor	7,300	John Deere Farm Equipment
Explosimeter	1,500	MSA
Fertilizer Spreader	500	John Deere Farm Equipment

Assumptions: Equipment will be purchased in 1993 and be used until 2013. Annual inflation rate of 5 percent.

Factor for converting 1988 $ to 1991 $ is 1.16.

Long-Term Care Cost Summary - 1993 Dollars

Landfill Surface Care - Per Year

Description	Man-Days	Labor Unit Cost	Equipment Cost*	Total Cost
Quarterly Inspection of Landfill	4	$93.00	$ 0.00	$ 372.00
Fixing Washouts, Regarding Revegetating, etc.	24	$93.00	$9,599.89	$11,831.89
Fertilizing Grass, etc.	4	$93.00	$ 72.70	$ 444.70
Subtotal			$9,672.59	$12,648.59

Gas Monitoring

Description	Man-Days	Labor Unit Cost	Equipment Cost*	Total Cost
Measure Gas Levels Quarterly	4	$93.00	$226.71	$598.71
Subtotal				$598.71

Stormwater Control

Description	Man-Days	Labor Unit Cost	Equipment Cost*	Total Cost
Quarterly Inspection of Stormwater Features	4	$93.00	$0.001	$ 372.00
Repairing Stormwater Controls	16	$93.00	Same Equipment as Used for Surface Care	$1,488.00
Subtotal				$1,860.00

*Equipment costs are for buying new equipment amortized over 24 years at an interest rate of 15 percent.

Ground Water Monitoring, Collection, and Analyses

Description	Man-Days	Labor Unit Cost	Equipment Cost*	Total Cost
Quarterly Sampling and Analyses	Subcontracted		$0.00	$5,000.00
Subtotal				$5,000.00
Total Cost Per Year				$20,107.30

Annual Cost for Long-Term Care
5 Percent Annual Escalation of Labor Costs

Year	Labor Costs	Equipment Costs	Total Costs
1993	$10,440	$9,670	$20,110
1994	$10,960	$9,670	$20,630
1995	$11,510	$9,670	$21,180
1996	$12,080	$9,670	$21,750
1997	$12,690	$9,670	$22,360
1998	$13,320	$9,670	$22,990
1999	$13,990	$9,670	$23,660
2000	$14,690	$9,670	$24,360
2001	$15,420	$9,670	$25,090
2002	$16,190	$9,670	$25,860
2003	$17,000	$9,670	$26,670

Year	Labor Costs	Equipment Costs	Total Costs
2004	$17,860	$9,670	$27,530
2005	$18,750	$9,670	$28,420
2006	$19,690	$9,670	$29,360
2007	$20,670	$9,670	$30,340
2008	$21,700	$9,670	$31,370
2009	$22,790	$9,670	$32,460
2010	$23,930	$9,670	$33,600
2011	$25,130	$9,670	$34,800
2012	$26,380	$9,670	$36,050
2013	$27,700	$9,670	$37,370
Totals	$372,890	$203,070	$575,960

CH2M HILL
Engineers
Planners
Economists
Scientists

June 22, 1989

SEF20064.GN

Mr. Phil Barbaccia
Florida Department of Environmental
Regulation
2269 Bay Street
Fort Meyers, Florida 33901-2896

Dear Mr. Barbaccia:

Subject: Financial Responsibility for the Key West Stock Island Landfill

Attached are copies of the Phase I and Phase II Solid Waste System Costs and Finances reports for the Key West solid waste system along with City Ordinances adopting the rates recommended in the reports. These reports include cost estimates for closure of the Stock Island Landfill and post-closure care for the landfill, along with a method for financing the closure. These reports along with the enabling resolutions should meet the requirements of FAC 17-701.076(1) and (2) for government owned landfills.

If you have any questions regarding the reports or the resolutions, please give me a call.

Sincerely,

R. G. Brauner III, P.E.
Project Manager

GNVCR3/039.50
xc: Rick Witker/City of Key West w/o attachments
Paul Cates/City of Key West w/o attachments
Ken Williams/KWF w/o attachments
Bill Hutchinson/SEF w/o attachments
Starr Dehn/FCR w/o attachments

CH2M HILL Gainesville Office 7201 N.W. 11th Place, P.O. Box 1647
Gainesville, FL 32602-1647
904.331.2442
FAX 904.331.5320

Bo Brunner / GNV

73.00 GARBAGE AND TRASH*

Sec. 73.01 Definitions.

For the purposes of sections 73.01 through 73.17, the following words, terms and phrases shall have the meanings respectively ascribed to them below:

Bulky items shall mean any tangible item such as furniture, appliances, bicycles, motor vehicles or similar property not having a useful purpose to the owner or abandoned by the owner and not included within the definitions of garbage, garden trash, or rubbish.

Collector refers to a person authorized by the commission under the provisions of a franchise agreement, to collect and transport solid waste within his respective service area.

Commercial includes all nonresidential and industrial establishments, but not limited to and without regard to whether they are profit or nonprofit organizations or retail and/or wholesale establishments, motels, hotels, stores, schools, churches, hospitals, office buildings, restaurants, service stations, garages, laundries, cleaning establishments, public or private institutions of all types, and all other business required to obtain occupational licenses.

Commission shall refer to the city commission of the City of Key West.

Garbage means materials resulting from the preparation, cooking and serving of food, market wastes, trimmings and other discarded matter from meat or produce, including containers in which packaged and any other matter, of any nature whatsoever, which is subject to decay, putrefaction and the generation of noxious or offensive gases or odors, or which, during or after decay, may serve as breeding or feeding material for flies or other germ carrying insects, or any containers of the material defined herein.

Improved property refers to all residential, commercial or industrial property that generates or is capable of generating solid waste.

Industrial wastes shall mean the waste products of canneries, slaughterhouses or packing plants, condemned food products, agricultural waste products, waste and debris from brick, concrete block, roofing shingle or tile places, debris and wastes accumulated from land clearing, excavating, building, rebuilding, and altering of buildings, structures, roads, streets, sidewalks or parkways and other solid waste products generated from industrial processing or manufacturing.

Litter is hereby defined as including all garbage, rubbish, garden trash and all waste materials including, but not limited to, bottles, glass, cans, scrap metal, junk, paper, disposable packages or containers and all other similar materials, and any substance of any kind or nature whatsoever that creates a public health, safety or fire hazard or a public nuisance.

Manager shall refer to the city manager or his designee.

Multifamily residence refers to a building or structure that is designed for and capable of housing conveniently two (2) or more individuals or families in separate quarters.

Owner refers to the person owning an interest in improved property.

---

*Editor's note—Formerly, provisions pertaining to garbage and trash were derived from the 1958 Code, §§ 16-2, 16-4, 16-5—16-5.2, 16-8, 16-11, 16-13, 16-14, and the following:

Ord. No.	Date	Section	Ord. No.	Date	Section
68-5	2-21-68	1	78-4	3- 6-78	1, 2
68-35	8-21-68	1	80-2	1-21-80	1, 2
70-9	3-16-70	1			

Cross references—Disposal of garbage and refuse from watercraft, § 42.036; health and sanitation, 54.00; distribution of handbills, § 101.20 et seq.

State law reference—Florida litter law, F.S. § 403.413.

Person shall mean any individual, firm, copartnership, corporation, company, association, executor, administrator, trustee, church, religious sect, religious denomination, society, organization or league, or any other legal entity, whether singular or plural, masculine or feminine as the context may require.

Public way is hereby defined as any and all streets, roads, alleys, piers, bulkheads, boardwalks, lanes, trails, waters, or other public ways, and any and all public parks, squares, beaches, parks and any and all recreational facilities operated by the state, county, federal government or special governmental district.

Refuse means all solid wastes including, but not limited to, garbage, rubbish, ashes, street cleaning, dead animals, bulky items, industrial wastes and trash.

Residential property shall mean any structure or shelter, or any part thereof, used, or constructed for use, as a residence for one (1) or more families or individuals and includes the classification "multiple-family residence" as defined herein. Residential units shall be construed to mean a single-family dwelling, each living unit in a duplex or condominium dwelling or apartment house and each mobile home tie-down on a mobile home parcel or on a condominium parcel/site.

Rubbish shall mean refuse accumulations of paper, excelsior, rags or wooden or paper boxes or containers, sweepings, and all other accumulations of a nature other than garbage, which are usual to housekeeping and to operation of stores, offices and other business places, also any bottles, cans or other containers which, due to their ability to retain water, may serve as breeding places for mosquitoes or other water breeding insects.

Solid waste means garbage, rubbish, refuse, bulky items and other discarded solid or liquid materials, including materials resulting from industrial, commercial, agricultural and community activities. The term "waste" shall be synonymous with the term "solid waste."

Solid waste disposal system refers to the total plan of the board for the collection, billing and disposal of solid waste within the city.

Solid waste facility shall mean and include land, equipment and buildings, constructed and maintained by the city to transfer and/or dispose of solid waste within the city.

Transfer station means a site and equipment designated by the city for the purposes of transferring refuse from collection vehicles to long haul transport vehicles.

Trash shall mean and include all horticultural trimmings and all accumulations of grass, weeds, palm fronds, leaves, flowers, shrubs, vines, tree limbs, and other similar accumulations incidental to yard keeping.
(Ord. No. 81-43, § 1, 10-19-81; Ord. No. 82-5, § 1, 3-15-82)

Sec. 73.02 Annual charge.

(a) The commission shall determine, fix and levy upon all improved properties within the city, a solid waste charge for the availability of waste collection, transfer and disposal service as set forth herein.

(b) The fact that any residential or commercial unit located in the city is occupied or is capable of being occupied shall be prima facie evidence that garbage or solid waste is being produced or accumulated upon such premises. Temporary vacancy, regardless of duration, shall not constitute grounds for a refund or excuse the nonpayment of any solid waste charge. A solid waste charge for waste collection and disposal shall be levied against all existing and newly constructed residential or commercial units for which a certificate of occupancy is required.

(c) The annual charges for collection of solid waste shall be for each consecutive city fiscal year, due and payable in advance of the service. Said charges may be paid annually or quarterly at the option of the subscriber. The annual or first quarterly payment shall be due and payable on October 1st. The second quarterly payment shall be due no later than January 1st. The third quarterly payment shall be due no later than April 1st. The fourth quarterly payment shall be due no later than July 1st. Each payment shall become delinquent after the due date. The option of

the property owner to pay quarterly shall be made prior to or on October 1st by written application and payment of one-fourth of the annual charge plus a twenty-five dollar ($25.00) administrative charge; twelve (12) percent interest on the outstanding annual balance shall be due and payable quarterly.

(d) Any solid waste charge which becomes delinquent shall be increased by a twenty-five dollar ($25.00) administrative fee, and by an annual interest fee of eighteen (18) percent of the outstanding balance, compounded quarterly. The outstanding balance shall include the solid waste charge, the administrative fee, and interest incurred.

(e) Any subscriber who is sixty (60) years of age or older by October 1st, or who is totally and permanently disabled, and whose total annual income does not exceed such amount as shall be established by the city manager and approved by resolution of the city commission, shall, upon submission of such proof of age, disability, and income as the city manager may reasonably require, be entitled to a discount in the amount of fifteen (15) percent of the annual charge against the single residential unit in which said subscriber lives.

(f) The dumping fee at the landfill site shall be one hundred seventeen dollars ($117.00) per ton. Charges shall be verified by the weight scales ticket. Weight tickets for commercial hauling accounts will be collected and forwarded to the revenue department for monthly billing and collection.

(g) Residential rates. Commencing upon June 1, 1988, the annual solid waste charge levied upon residential units in the city for solid waste collection, transfer, and disposal service shall be two hundred fifty-two dollars ($252.00) per year. The charge shall be prospectively applied only, and shall take effect June 1, 1988.

(h) Each commercial establishment and/or licensed business shall pay a dumping/tipping fee of one hundred fifty-seven dollars ($157.00) per ton, which fee shall supersede the fee provided at subparagraph 73.02(f) hereof. Additionally, each commercial establishment and/or licensed business shall pay a collection/transfer fee as provided by franchise adopted pursuant to Resolution No. 80-143, as amended. Computation of tonnage shall be calculated on a basis of one hundred fourteen (114) pounds per cubic yard of waste container volume.

(i) All collection and dumping/tipping fees provided or referenced herein, including without limitation those provided at subparagraphs (f), (g), and (h) hereof, shall annually be administratively adjusted by a percentage equal to the change in the Consumer Price Index published by the Bureau of Labor Statistics of the United States Department of Labor for June of the current year of adjustment, compared with said index for June of the preceding year. The annual adjustment shall take effect October 1 of each calendar year, commencing October 1, 1989, and shall be implemented by the city manager.

(Ord. No. 81-43, § 1, 10-19-81; Ord. No. 82-5, § 1, 3-15-82; Ord. No. 85-34, § 1, 9-3-85; Ord. No. 86-43, § 1, 12-15-86; Ord. No. 88-12, §§ 1, 2, 3-21-88; Ord. No. 88-32, § 1, 9-8-88; Ord. No. 88-53, §§ 1—6, 12-7-88)

Sec. 73.03 Past due charges constitute lien.

Any payment which is delinquent as provided in section 73.02 shall continue as a lien if the manager shall cause to be filed, in the office of the clerk of the circuit court of Monroe County, a notice of lien or statement showing a description of the real property against which the lien is claimed. The property location by street and number, the name of the owner as reflected by the records of the county and an accurate statement of the total amount of unpaid and delinquent solid waste charges claimed to be due shall be provided. However, prior to said lien, the manager may first remind the property owner of his delinquency, but such a reminder notice is not mandatory upon the manager. A copy of such notice of lien shall also be mailed to the owner of the property involved as shown by the records of the city. Such notice of lien shall be filed in the official records maintained by the clerk of the circuit court for such purpose, which contain an index listing alphabetically the names of owners against whom such liens have been filed. In the event the city fails to file a notice of lien as aforesaid by July 1st of the subsequent service year for which said delinquent residential charges had occurred, said lien shall cease to exist. Such liens, if filed, may

be discharged and satisfied by payment to the city of the aggregate amount specified in the waste lien docket book, and of administrative fees due, together with interest thereon from the date the waste charge became delinquent to the payment date, together with an additional sum of ten dollars ($10.00) for city clerical costs in handling the lien, and together with an additional sum reimbursing the city's abstracting and recording costs, including costs of recording any notice of lien satisfaction. When such lien has been fully paid or discharged, the city shall promptly cause evidence of the satisfaction or discharge of such lien to be entered in the official records. Any person, firm, corporate or legal entity, other than the present owner of the property involved, who pays any such lien held by the city shall be subrogated to the rights of the city in respect to the enforcement of such lien. Delinquent charges after recordation of the lien may be collected by appropriate civil action for damages; and in addition to the collection of the lien, attorney's fees and collection of same shall be due and collected.
(Ord. No. 81-43, § 1, 10-19-81; Ord. No. 82-5, § 1, 3-15-82; Ord. No. 85-34, § 1, 9-3-85; Ord. No. 88-32, § 2, 9-8-88)

Sec. 73.04 New units.

Prior to the issuance of any certificate of occupancy in the city, the building official shall notify the city manager of the name of the owner of such property and a description of the property and the nature of the improvement; and the manager shall affix the solid waste charge against such improved property in accordance with these provisions; and such property shall be added to city's solid waste records. The solid waste charge shall be prorated to reflect the number of months of actual collection service remaining in the service year that said property became obligated to receive garbage and trash collection service. The property owner shall pay the solid waste charge prior to issuance of the certificate of occupancy.
(Ord. No. 81-43, § 1, 10-19-81; Ord. No. 85-34, § 1, 9-3-85)

Sec. 73.05 Franchisees provide service.

No person, other than persons holding duly authorized franchises issued by the commission, shall engage in or carry on within the limits of the city a private garbage collection service, or enter into a business for the collection and disposal of garbage, nor shall any person other than a duly licensed franchise holder transport or cause to be transported along or over the highways, roads, streets and thoroughfares of the city any garbage, except as provided in sections 73.01 through 73.17 inclusive. No franchise agreement between the city and any person, as defined herein, shall be binding in any way upon the city until such agreement is approved by resolution of the city commission and as provided by the City Charter.
(Ord. No. 81-43, § 1, 10-19-81; Ord. No. 85-34, § 1, 9-3-85)

Sec. 73.06 Trash haulers.

Persons licensed by the City of Key West to transport trash as defined herein may establish monthly billing accounts with the department of revenue of the city. Failure to pay such billings within thirty (30) days shall be grounds for revocation of said license.
(Ord. No. 81-43, § 1, 10-19-81; Ord. No. 85-34, § 1, 9-3-85)

Sec. 73.07 Owner and tenant severally responsible for payment.

(a) It shall be the joint and severable duty of the owner and tenant of each lot, tract, or parcel of land in any area in the city, having a residential unit situate thereon, except as may be otherwise provided herein, to pay or cause to be paid the solid waste charges due for each residential unit.

(b) It shall be the joint and severable duty of the owner and tenant of each improved lot, tract or parcel of land in the city having commercial units situate thereon, to pay or cause to be paid the solid waste collection charges for each such commercial establishment.

(c) Failure on the part of owners and/or tenants to pay or cause to be paid the solid waste collection charges as provided in paragraphs (a) and (b) above shall constitute a violation of the Code of Ordinances, punishable as provided in section 1.13 of the Code of Ordinances.

(Ord. No. 81-43, § 1, 10-19-81; Ord. No. 85-35, § 1, 9-3-85)

Sec. 73.08 Subscription required for occupational license.

No occupational license required by law of the City of Key West shall be issued or renewed until all solid waste fees chargeable to the subject commercial unit are paid.
(Ord. No. 81-43, § 1, 10-19-81; Ord. No. 85-34, § 1, 9-3-85)

Sec. 73.09 Premises to be cleared.

(a) For the purposes of promoting the health, safety, and general welfare of the residents of the city, the manager is hereby authorized and empowered to require that vacant lands and/or improved property within the city be cleared of debris and any noxious material, be the same garbage, litter, rubbish, refuse, solid waste, trash or industrial waste, or high grass or weeds which tend to be a breeding place or haven for snakes, rodents, insects, and vermin, or which tend to create a fire hazard or endanger the lives and property of the residents of the city, or which tend to create a traffic hazard, or which tend to create a nuisance or other unsightly or unsanitary condition.

(b) For the purposes of health, safety and general welfare of the residents of the city, all lots, vacant or occupied, shall be mowed and/or cleared of debris no less than once each three (3) months as follows: Once during the period from January 1st through March 31st; once during the period from April 1st through June 30th; once during the period from July 1st through September 30th; and once during the period from October 1st through December 31st.

(c) Upon a determination by the manager that lands in the city should be cleared in accordance with the provisions of this section, the manager shall make a written demand on such property owner by U.S. certified mail, return receipt requested, directed to his address as shown on the current tax rolls of the county, that his property be cleared in accordance with the provisions of this section and that if such demand is not complied with within thirty (30) days from the date thereof, the land described in such demand will be cleared and/or mowed by the city and the costs thereof will constitute a lien against said land.

(d) Thereafter, if such land be not cleared or mowed within the thirty-day period allotted by such demand, the employees of the city may enter upon such land and clear and/or mow same. After having given written notice to a property owner whose property was so cleared or mowed by the city, the manager shall in writing notify the city commission of the name of the owner of said property, the legal description of same, and of the city's costs of clearing and/or mowing said land; and the commission shall by resolution affix the charge against such property for the cost of such clearing and/or mowing, and such property shall be liened as of the date of said resolution; and a notice of lien shall be filed in the official record books of the county and a copy mailed by certified mail to the property owner, and thereafter said lien shall be collectible in the same manner and shall have the same status as the regular annual charge levied against residential properties by the city for garbage and trash collection and disposal.

(e) Any unauthorized accumulations of refuse and/or failure to keep a parcel mowed on any property as set forth in this section is hereby declared to be illegal and prohibited. In addition to the lien provided for under this section, any owner of property failing to comply with the written demand as provided for hereunder shall be guilty of a violation of this chapter in accordance with the penalty provided for in section 1.13 of the Code of Ordinances.

(f) No person shall cause to be deposited any solid waste or trash as defined herein upon any city street, sidewalk or right-of-way unless the same is bundled or placed in containers as required by sections 73.10 and 73.11 hereof. Persons who violate this provision shall be penalized as provided in section 1.13 of this Code of Ordinances.
(Ord. No. 81-43, § 1, 10-19-81; Ord. No. 85-34, § 1, 9-3-85)

Sec. 73.10 Container and receptacle requirements.

(a) Every premises occupied as a dwelling, store or other place of business in the city shall have and maintain a proper watertight metal garbage container or plastic container for receiving garbage. It shall be provided with a good, tight and closely fitting metal or plastic cover, which cover shall be so constructed as to shed all rain water and to prevent the access of flies to the contents of the can. Such cover shall be kept on at all times except when removed for the purpose of disposing of or removing garbage, or for securing or airing the garbage can immediately after it has been emptied, or before fresh garbage has been deposited in it.

(b) Residential receptacles for storage of refuse may not exceed thirty (30) gallons in capacity and fifty (50) pounds unless it can be mechanically dumped.

(c) Garbage and rubbish may be placed in the same containers. Garden trash will be collected with the garbage if it is placed in containers not exceeding set limits. Containers shall not exceed thirty (30) gallons in capacity.

(d) It shall be unlawful to fail to provide sufficient containers to contain all refuse between collections. Unless special arrangements are made, no refuse will be collected unless placed in proper containers.

(e) Infectious, inflammable and explosive materials, and human or animal wastes shall not be placed in containers for regular collection. Refuse, clothing, bedding, or other refuse from homes or other places where highly infectious or contagious diseases have prevailed should be disposed of under the supervision and direction of the county health officer.
(Ord. No. 81-43, § 1, 10-19-81)

Sec. 73.11 Bundling of brush, etc.

Brush and similar materials must be tied securely in bundles weighing not more than fifty (50) pounds and not more than four (4) feet long unless containerized.
(Ord. No. 81-43, § 1, 10-19-81)

Sec. 73.12 Storage of garbage so as to cause air pollution prohibited.

No person shall permit his garbage to be so stored or kept in an exposed manner as to render the air or soil impure or unwholesome.
(Ord. No. 81-43, § 1, 10-19-81)

Sec. 73.13 Unlawful disposal of solid waste.

(a) No person shall dispose of any garbage, rubbish, offal or industrial waste, except through the franchise collector. Inhabitants of the city may transport to the city dump tree limbs, cuttings, leaves, grass and weeds from their individual premises, provided that such persons using city facilities shall be required to pay the fee established by the city commission.

(b) No person shall case, place, sweep, or deposit anywhere within the city, any refuse in such a manner that the same may be carried or deposited by the elements upon street, sidewalk, alley, sewer, parkway or other public place or into occupied premises or unoccupied property within the city, except this shall not prohibit the placement of clean fill upon any private land.

(c) No person shall throw, place or deposit, or cause to be thrown, placed or deposited, any offal, trash, junk, vehicle, garbage or filth of any kind, into or on any of the public streets, roads, highways, bridges, alleys, lanes, thoroughfares, waters, canals, or vacant lots, or upon the premises of any other person within the limits of the city.
(Ord. No. 81-43, § 1, 10-19-81)

Sec. 73.14 Litter receptacles required for privately owned establishments serving the public.

(a) The proprietors of all privately owned establishments which serve the public including, but not limited to, drive-in restaurants, retail shopping centers, grocery stores, convenience stores, gasoline service stations, commercial parking lots, campgrounds, trailer parks and all other such establishments shall be required to place litter receptacles of a size and nature suitable to the need and bearing in large print thereon the label "trash." The nature of such receptacles, their size, composition, number and place of location shall be determined by the proprietors based on the size, location and circumstances of said establishment. The type and number of such litter receptacles shall be based on the nature and type of business and the customers of such establishments. Failure on the part of proprietors to provide adequate receptacles shall result in action by the city to compel compliance. Such proprietors shall be responsible for the removal of litter from such litter receptacles when necessary.

(b) Such proprietors shall, within thirty (30) days of notification by the city in reference to such litter receptacles, comply with the terms of this section.
(Ord. No. 81-43, § 1, 10-19-81)

Sec. 73.15 Owners of privately owned establishments required to post signs warning against violations of antilitter provisions.

(a) The proprietors of all privately owned establishments which serve the public including, but not limited to, drive-in restaurants, retail shopping centers, grocery stores, convenience stores, gasoline service stations, commercial parking lots, campgrounds, trailer parks and other such establishments, shall be required to prominently place signs warning persons against violation of the antilitter ordinance and its possible criminal sanctions.

(b) The nature, content, number, location, size and composition of said signs shall be determined by the proprietor of each based on the size, location and circumstances, the volume of potential litter generated by such establishments, and the need for such signs caused by the nature and type of business and customers of such establishments.

(c) Failure on the part of the proprietor to provide such signs shall result in action by the city to compel compliance. Such proprietors shall, within thirty (30) days of notification by the board of the required information, comply with the terms of this section. The city may produce such signs and offer them for sale at cost and with no profit to the city to establishments requiring them.
(Ord. No. 81-43, § 1, 10-19-81)

Sec. 73.16 Presumption as to discarded litter.

Any litter discarded or deposited in violation of this chapter which can be established to have been in the possession or ownership of any person, shall be presumed to have been discarded or deposited by such person; this presumption may

be rebutted by competent evidence or testimony establishing that such item of litter had left the ownership or possession of such person prior to being deposited or discarded in violation of this chapter.
(Ord. No. 81-43, § 1, 10-19-81)

Sec. 73.17 Solid waste impact fee.

This section shall be known and may be cited as the "solid waste impact fee ordinance." Each person who shall commence any solid waste generating activity that creates an increased demand for city solid waste disposal services shall pay a solid waste impact fee in the manner and the amount set forth in this section. Such fees shall be collected and used by the city only in such manner as set forth in this section.

(a) Definitions:

Capital improvements include planning, engineering, acquisition and construction, but does not include routine maintenance.

City solid waste disposal system includes all facilities owned and controlled by the City of Key West that are part of the city's collection, distribution, treatment and disposal of solid waste.

Feepayer is a person commencing solid waste generating activity covered by this section.

Solid waste generating activity occurs upon the issuance by the building official of any building permit.

(b) No building permit shall become final and no certificate of occupancy shall be issued until any applicable solid waste impact fee shall be paid according to the provisions of this section and in the amount of forty-three dollars ($43.00) per pound per day estimated solid waste generation for the designated use of the development. The estimated generation rate shall be based on the estimates for the most nearly approximate use listed in Table 5-4, "Estimate Amounts of Solid Waste," Solid Waste, Technical Assistant Manual Florida Department of Environmental Regulation (1976). A copy of such table shall be kept on file for public view in the office of the city clerk.

(c) The feepayer shall pay the solid waste impact fees to the city manager or his designee. The city manager or his designee shall record receipt of the fee in the official public record of the city and, upon full payment of the fee, shall issue to the feepayer a certified copy of such record of receipt, which may be used by the feepayer as evidence of payment.

(d) Solid waste impact fees paid under the provisions of this section shall be used by the city exclusively for the purpose of capital improvements to the city solid waste disposal system to meet the demand on that system which new solid waste generating activity creates. The city shall establish a separate solid waste impact fee trust fund into which all solid waste impact fees shall be paid and from which all disbursements shall be made only in accordance with the purposes of this section.

(e) Any funds collected under this section not expended or encumbered by the end of the calendar year immediately following six (6) years from the date on which the certificate of occupancy for the development was issued may be returned to the feepayer, at his election, with interest at the rate of six (6) percent per annum. Provided, however, that any legal challenge to the payment of fees under this section shall toll the time under this paragraph for repayment of the fees.

(f) A developer who, prior to the effective date of this section, agreed as a condition of development approval to pay a solid waste impact fee shall be responsible for the payment of the fee under the terms of this section.

(g) A violation of this section shall be a misdemeanor punishable according to law; however, in addition to or in lieu of any criminal prosecution or other civil remedy provided by law, the city or any person paying

the solid waste impact fee shall have the power to sue in civil court to enforce the provisions of this section.

(Ord. No. 84-49, § 1, 12-4-84)

~~(h) Waiver of Solid Waste Impact fee added Ord. 88-27~~

(h) Waiver of Solid Waste Impact fee added Ord. 89-14, 4-3-89

[The next page is 2637]

ORDINANCE NO. 88-12

AN ORDINANCE AMENDING SECTION 72.02(F) OF THE KEY WEST CITY CODE TO ADJUST TO $.03 PER POUND THE DUMPING FEE FOR ALL SOLID WASTE RECEIVED AT THE LANDFILL OF THE CITY OF KEY WEST; PROVIDING AN ADJUSTED RATE OF SOLID WASTE CHARGE FOR RESIDENTIAL UNITS IN THE CITY; PROVIDING AN EFFECTIVE DATE.

BE IT ENACTED by the City Commission of the City of Key West, Florida as follows:

Section 1. Commencing upon ~~March~~ June 1, 1988, the annual solid waste charge levied upon residential units in the City of Key West for solid waste collection, transfer, and disposal service shall be $252 per year. The charge shall be prospectively applied only, and shall take effect ~~March~~ June 1, 1988. (City Code Sec. 73.02(a).) Persons qualifying for the City's 15% old age/disability discount may pay said increased fee on a monthly basis.

Section 2. Effective June 1, 1988, Subparagraph (f) of Section 73.02 of the Key West City Code ~~is hereby amended to~~ shall read as follows (deleted portions are ~~struck through~~; added portions are underlined):

"Section 73.02 Annual Charge

* * * *

(f) The dumping fee at the landfill site shall be ~~two and one quarter cents ($0.0225)~~ $.03 per pound; charges shall be verified by the weight scales ticket. Weight tickets for commercial accounts will be collected and forwarded to the revenue department for monthly billing and collection. The fee rate may be adjusted from time to time by resolution of the city commission."

Section 3. All Ordinances or parts of Ordinances of said City in conflict with the provisions of this Ordinance are hereby superseded to the extent of such conflict.

Section 4. This Ordinance shall go into effect immediately upon its passage and adoption and authentication by the signatures of the presiding officer and the Clerk of the Commission; provided, however,

that Section 2 hereof shall take effect as soon after adoption and authentication as the City's contractual obligations permit.

Read and passed on first reading at a regular meeting held this 26 day of February, 1988.

Read and passed on final reading at a regular meeting held this 21 day of March, 1988.

RICHARD A. HEYMAN, MAYOR

ATTEST:

JOSEPHINE PARKER, CITY CLERK

Corrected 9-22-88
after conferring
with City Attorney
Steve Stitt.

Josephine Parker
City Clerk

ORDINANCE NO. 98-32

AN ORDINANCE AMENDING CHAPTER 73, GARBAGE AND TRASH, OF THE KEY WEST CITY CODE OF ORDINANCES; AMENDING SECTION 73.02, DELETING PROVISION FOR SETTING RATES BY RESOLUTION; REPEALING DISCOUNT FOR TIMELY PAYMENTS; PROVIDING FOR IMPOSITION OF ADMINISTRATIVE FEE, AND INTEREST FEE (18%) ON DELINQUENT ACCOUNTS PROVIDING FOR ADMINISTRATIVE FEE ($25) AND INTEREST FEE (12%) ON QUARTERLY ACCOUNTS; PROVIDING THAT DELINQUENT ACCOUNTS BECOME DUE IN FULL AND ARE INELIGIBLE FOR QUARTERLY PAYMENT; AMENDING SECTION 73.03, PROVIDING FOR COLLECTION OF COSTS OF IMPOSING AND COLLECTING LIENS FOR DELINQUENT ACCOUNTS; PROVIDING AN EFFECTIVE DATE.

BE IT ENACTED by the City Commission of the City of Key West, Florida as follows:

Section 1. Section 73.02 of the Key West City Code shall be amended to read as follows (added language is underlined; deleted language is ~~struck through~~):

"Sec. 73.02 Annual Charge.

(a) The commission shall on an annual basis determine, fix and levy upon all improved properties within the city, a solid waste charge for the availability of waste collection, transfer and disposal service as set forth herein. ~~Said charges shall be set by resolution after public hearing.~~

(b) The fact that any residential or commercial unit located in the city is occupied or is capable of being occupied shall be prima facie evidence that garbage or solid waste is being produced or accumulated upon such premises. Temporary vacancy, regardless of duration, shall not constitute grounds for a refund or excuse the nonpayment of any solid waste charge. A solid waste charge for waste collection and disposal shall be levied against all existing and newly constructed residential or commercial units for which a certificate of occupancy is required.

(c) The annual charges for collection of solid waste shall be for each consecutive city fiscal year, due and payable in advance of the service. Said charges may be paid annually or quarterly at the option of the subscriber. The annual or first quarterly payment shall be due and payable on October 1st. The second quarterly payment shall be due no later than January 1st. The third quarterly payment shall be due no later than April 1st. The fourth quarterly payment shall be due no later than July 1st. Each payment shall become delinquent ~~one (1) month~~ after the due date.

The option of the property owner to pay quarterly shall be made prior to or on October 1st by written application and payment of one-fourth of the annual charge plus a ~~reasonable~~ Twenty-Five Dollar ($25) administrative charge; twelve (12) percent interest on the outstanding annual balance shall be due and payable quarterly. ~~to be set by the city commission.~~

(d) ~~Subscribers who submit full annual payment by October 1st shall be entitled to a discount in the amount of five (5) percent of the annual charge.~~ Any solid waste charge which becomes delinquent shall be increased by a Twenty-Five Dollar

($25) administrative fee, and by an annual interest fee of eighteen (18) percent of the outstanding balance, compounded quarterly. The outstanding balance shall include the solid waste charge, the administrative fee, and interest incurred.

(e) Any subscriber who is sixty (60) years of age or older by October 1st, or who is totally and permanently disabled, and whose total annual income does not exceed such amount as shall be established by the city manager and approved by resolution of the city commission, shall, upon submission of such proof of age, disability, and income as the city manager may reasonable require, be entitled to a discount in the amount of fifteen (15) percent of the annual charge against the single residential unit in which said subscriber lives.

(f) The dumping fee at the landfill site shall be three cents ($0.03) per pound; charges shall be verified by the weight scales ticket. Weight tickets for commercial accounts will be collected and forwarded to the revenue department for monthly billing and collection. The fee rate may be adjusted from time to time by resolution of the city commission."

Section 2. Section 73.03 of the Key West City Code is hereby amended to read as follows (added language is underlined; deleted language is ~~struck through~~):

"Sec. 73.03 Past due charges constitute lien.

Any payment which is delinquent as provided in section 73.02 shall continue as a lien if the manager shall cause to be filed, in the office of the clerk of the circuit court of Monroe County, a notice of lien or statement showing a description of the real property against which the lien is claimed. The property location by street and number, the name of the owner as reflected by the records of the county and an accurate statement of the total amouont of unpaid and delinquent solid waste charges claimed to be due shall be provided. However, prior to said lien, the manager may first remind the property owner of his delinquency, but such a reminder notice is not mandatory upon the manager. A copy of such notice of lien shall also be mailed to the owner of the property involved as shown by the records of the city. Such notice of lien shall be filed in the official records maintained by the clerk of the circuit court for such purpose, which contain an index listing alphabetically the names of owners against whom such liens have been filed. In the event the city fails to file a notice of lien as aforesaid by July first of the subsequent service year for which said delinquent residential charges had occurred, said lien shall cease to exist. Such liens, if filed, may be discharged and satisfied by payment to the city of the aggregate amount specified in the waste lien docket book, and of administrative fees due, together with interest thereon from the date the waste charge became delinquent to the payment date, ~~with interest computed at the rate of eighteen (18) percent per annum;~~ together with an additional sum of ten dollars ($10.00) for city clerical costs in handling the lien, and together with an additional sum reimbursing the city's abstracting and recording costs, including costs of recording any notice of lien satisfaction. ~~if any.~~ When such lien has been fully paid or discharged, the city shall promptly cause evidence of the satisfaction or discharge of such lien to be entered in the official records. Any person, firm, corporate or legal entity, other than the present owner of the property involved, who pays any such lien held by the city shall be subrogated to the rights of the city in respect to the enforcement of such lien. Delinquent charges after recordation of the lien may be collected by appropriate civil action for damages; and in addition to the collection of the lien, ~~interest as called for in the ordinance shall be~~

~~collected, together with~~ attorneys' fees and costs for collection of same shall be due and collected."

Section 3. All Ordinances or parts of Ordinances of said City in conflict with the provisions of this Ordinance are hereby superseded to the extent of such conflict.

Section 4. This Ordinance shall go into effect immediately upon its passage and adoption and authentication by the signatures of the presiding officer and the Clerk of the Commission.

Read and passed on first reading at a regular meeting held this 25 day of August, 1988.

Read and passed on final reading at a regular meeting held this 8 day of September, 1988.

RICHARD A. HEYMAN, MAYOR

ATTEST:

JOSEPHINE PARKER, CITY CLERK

ORDINANCE NO. 88-53

AN ORDINANCE AMENDING CERTAIN SOLID WASTE COLLECTION AND DISPOSAL (TIPPING/DUMPING) FEES IN THE CITY OF KEY WEST; AMENDING CERTAIN SOLID WASTE COLLECTION AND DISPOSAL FEES PERTAINING TO IMPROVED PROPERTIES (RESIDENTIAL AND COMMERCIAL) IN THE CITY OF KEY WEST; AMENDING ORDINANCE NO. 88-12; AMENDING CITY CODE SECTION 73.02; DELETING PROVISION FOR CERTAIN MONTHLY PAYMENTS; PROVIDING FOR ANNUAL ADMINISTRATIVE ADJUSTMENT OF COLLECTION AND DISPOSAL FEES ACCORDING TO CHANGES IN U.S. CONSUMER PRICE INDEX; PROVIDING A CONVERSION FORMULA FROM CUBIC YARDS TO TONS OF SOLID WASTE FOR PURPOSES OF CERTAIN COLLECTION AND DISPOSAL FEE CALCULATIONS; PROVIDING AN EFFECTIVE DATE.

WHEREAS, regular collection and proper disposal of solid waste generated by use of improved properties in the City of Key West is a valid public purpose serving the health, safety, and welfare of the citizens of Key West, and benefits improved properties (residential and commercial) in the City; and

WHEREAS, the City of Key West must implement a solid waste rate schedule that will generate revenues sufficient to operate the solid waste system in compliance with all applicable state and federal regulations, and which is equitable to all customer classes; and

WHEREAS, the City of Key West has conducted a study of the solid waste system's forecasted expenses and revenues for the period October 1, 1988, through September 30, 2001, which demonstrates the need for revising the City of Key West's solid waste disposal rate schedule, **NOW THEREFORE,**

BE IT ENACTED by the City Commission of the City of Key West, Florida as follows:

Section 1. Effective January 1, 1989, subparagraph (f) of Section 73.02 of the Key West City Code shall read as follows (deleted portions are ~~struck through~~; added portions are underlined):

Sec. 73.02 Annual Charge.

* * * *

"(f) The dumping fee at the landfill site shall be ~~$.03~~ $117.00 per ton. ~~pound;~~ Charges shall be verified by

the weight scales ticket. Weight tickets for commercial hauling accounts will be collected and forwarded to the revenue department for monthly billing and collection." ~~The fee rate may be adjusted from time to time by resolution of the city commission.~~"

Section 2. Section 73.02(h) of the Key West Code of Ordinances is hereby enacted, and shall take effect January 1, 1989, reading as follows:

"(h) Each commercial establishment and/or licensed business shall pay a dumping/tipping fee of $157 per ton, which fee shall supercede the fee provided at subparagraph 73.02(f) hereof. Additionally, each commercial establishment and/or licensed business shall pay a collection/transfer fee as provided by franchise adopted pursuant to Resolution No. 80-143, as amended. Computation of tonnage shall be calculated on a basis of 114 pounds per cubic yard of waste container volume."

Section 3. Section 73.02(i) of the Key West Code of Ordinances is hereby enacted, and shall take effect January 1, 1989, reading as follows:

"(i) All collection and dumping/tipping fees provided or referenced herein, including without limitation those provided at subparagraphs (f), (g), and (h) hereof, shall annually be administratively adjusted by a percentage equal to the change in the Consumer Price Index published by the Bureau of Labor Statistics of the United States Department of Labor for June of the current year of adjustment, compared with said index for June of the preceding year. The annual adjustment shall take effect October 1 of each calendar year, commencing October 1, 1989, and shall be implemented by the City Manager."

Section 4. Section 73.02(a)(1) of the Key West City Code, as published in Supplement No. 8 (1988) to said code, shall be recodified as Section 73.02(g), and shall read as follows:

"(g) Residential rates. Commencing upon June 1, 1988, the annual solid waste charge levied upon residential units in the City of Key West for solid waste collection, transfer, and disposal service shall be two hundred fifty-two dollars ($252.00) per year. The charge shall be prospectively applied only, and shall take effect June 1, 1988."

Section 5. The final sentence of Section 1 of Ordinance No. 88-12, which sentence is codified in City Code Supplement No. 8 (1988) as the final sentence in City Code Section 73.02(e), is hereby repealed. Accordingly,

(A) Section 1 of Ordinance No. 88-12 shall read as follows (deleted language is ~~struck through~~):

"Section 1. Commencing upon June 1, 1988, the annual solid waste charge levied upon residential units in the City of Key West for solid waste collection, transfer and disposal service shall be $252 per year. The charge shall be prospectively applied only, and shall take effect June 1, 1988." ~~(City Code Sec. 73.02(a).)~~ ~~Persons qualifying for the City's 15% old age/disability discount may pay said increased fee on a monthly basis.~~

(B) City Code Section 73.02(e) shall read as follows (deleted language is ~~struck through~~):

"(e) Any subscriber who is sixty (60) years of age or older by October 1st, or who is totally and permanently disabled, and whose total annual income does not exceed such amount as shall be established by the city manager and approved by resolution of the city commission, shall, upon submission of such proof of age, disability, and income as the city manager may reasonably require, be entitled to a discount in the amount of fifteen (15) percent of the annual charge against the single residential unit in which said subscriber lives." ~~Persons qualifying for the city's fifteen (15) percent old age/disability discount may pay the fee on a monthly basis.~~

Section 6. Section 73.02(a) of the Key West Code of Ordinances is hereby amended to read as follows (deleted language is ~~struck through~~):

"(a) The commission shall ~~on an annual basis,~~ determine, fix and levy upon all improved properties within the city, a solid waste charge for the availability of waste collection, transfer and disposal service as set forth herein."

Section 7. All Ordinances or parts of Ordinances of said City in conflict with the provisions of this Ordinance are hereby superseded to the extent of such conflict.

Section 8. This Ordinance shall go into effect immediately upon its passage and adoption and authentication by the signatures of the presiding officer and the Clerk of the Commission.

Read and passed on first reading at a regular meeting held this 5 day of December, 1988.

Read and passed on final reading at a regular meeting held this 9 day of December, 1988.

RICHARD A. HEYMAN, MAYOR

ATTEST:

JOSEPHINE PARKER, CITY CLERK

Certified

ORDINANCE NO. 89-14

AN ORDINANCE PROVIDING FOR ACCESSORY APARTMENTS; PROVIDING A DEFINITION OF AN ACCESSORY APARTMENT; PROVIDING FOR SPECIAL EXCEPTIONS TO ZONING REGULATIONS IN THE R-2, HP-3, AND HP-2 DISTRICTS; WAIVING TRAFFIC, SOLID WASTE, AND SEWER IMPACT FEES FOR ACCESSORY APARTMENTS; ELIMINATING WAIVER OF TRAFFIC IMPACT FEES FOR CERTAIN OTHER STRUCTURES; AMENDING SECTIONS 34.13, 73.17, 74.44, AND 35.07; REPEALING ALL ORDINANCES IN CONFLICT; PROVIDING AN EFFECTIVE DATE.

WHEREAS, the City of Key West Comprehensive Plan calls for measures to be taken to provide adequate affordable housing for residents; and

WHEREAS, the availability of affordable housing is decreasing; and

WHEREAS, the physical limits to growth in the City of Key West preclude relocation of low and moderate income residents as a solution to increasing housing costs;

WHEREAS, the national experience with the construction and maintenance of affordable housing demonstrates that scattered-site affordable housing provides certain advantages that cannot be achieved through concentrated housing developments; and

WHEREAS, the relatively small number of feasible sites for large housing projects in the City of Key West makes it essential to encourage the construction of scattered-site housing if the City's goals are to be achieved;

NOW, THEREFORE, Be it enacted by the City Commission of the City of Key West, Florida, as follows:

Section I. Title

This ordinance shall be known as the Accessory Apartment Ordinance.

Section 2. Accessory Apartment Defined

Section 35.24(1) of the Key West Code is hereby amended by adding the following paragraph (a):

"(a) Accessory Apartment. A residential dwelling unit as defined in Section 35.24(14) which (1) has cooking facilities, (2) is the first accessory apartment dwelling unit constructed after the effective date of the Accessory Apartment Ordinance on a particular lot as defined in Section 35.24(20), (3) contains no more than 550 square feet of living area as defined in Section 35.24(13), (4) is affordable housing as defined in section 34.132, (5) is one of a maximum of 25 accessory apartments permitted in any year beginning with the effective date of the Accessory Apartment Ordinance, (6) is one of a maximum of a total of 250 accessory apartments permitted subsequent to the effective date of the Accessory Apartment Ordinance, (7) has adequate public utilities and public facilities available concurrent with the permitting of such unit, (8) has adequate off-street parking provided in accordance with Section 35.09, and (9) is not subject to the requirements of a Community Impact Assessment Statement of Section 34.02 through 34.12.

Section 3. Waiver of Traffic Impact Fee

Section 34.13(h) of the Key West Code is hereby amended to read as follows (added terms are underlined; deleted terms are ~~struck through~~):

"(h) This section shall not be applicable to the construction of ~~one-family and two-family structures not subject to the City of Key West Community Impact Assessment Ordinance.~~ an Accessory Apartment as defined in Section 34.24(1)(a)."

Section 4. Waiver of Solid Waste Impact Fee.

Section 73.17 of the Key West Code is hereby amended by adding the following paragraph (h):

"(h) This section shall not be applicable to the construction of an Accessory Apartment as defined in Section 35.24(1)(a)."

Section 5. Waiver of Sewer Impact Fee

Section 74.44 of the Key West Code is hereby amended by adding the following paragraph (j):

"(j) This section shall not be applicable to the construction of an Accessory Apartment as defined in Section 35.24(1)(a)."

Section 6. Special Exceptions for Accessory Apartments

(A) Section 35.07(5)(d) of the Key West Code is hereby amended by adding the following new subparagraph 17:

"17. An Accessory Apartment as defined in Section 35.24(1)(a)."

(B) Section 35.07(8)(d) of the Key West Code is hereby amended by adding the following new subparagraph 4:

"4. An Accessory Apartment as defined in Section 35.24(1)(a)."

(C) Section 35.07(8A)(d) of the Key West Code is hereby amended by adding a new subparagraph 17:

"17. An Accessory Apartment as defined in Section 35.24(1)(a)."

Section 7. All rights conferred by this ordinance shall be subject to all laws of the State of Florida and of the United States and to all judicial orders binding upon the City of Key West.

Section 8. All Ordinances or parts of Ordinances of said City in conflict with the provisions of this Ordinance are hereby superseded to the extent of such conflict.

Section 9. This ordinance shall go into effect immediately upon its passage and adoption and authentication by the signatures of the presiding officer and the Clerk of the Commission.

Read and passed on first reading at a regular meeting held this 20 day of March, 1989.

Read and passed on final reading at a regular meeting held this 3 day of April, 1989.

RICHARD HEYMAN, MAYOR

ATTEST:

JOSEPHINE PARKER, CITY CLERK

WACS #
79638

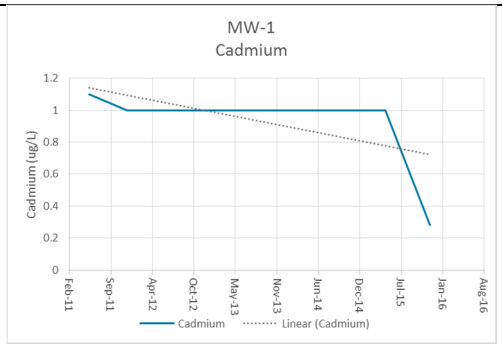
reviewed 4/9d

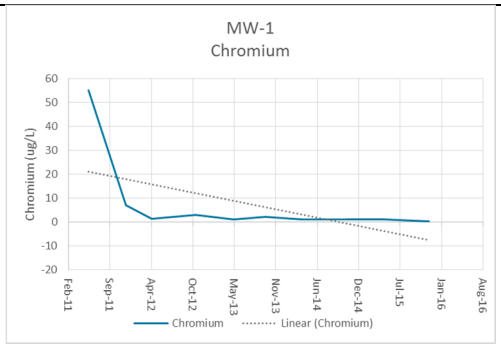
Exhibit 4: Water Quality Results Summary Tables

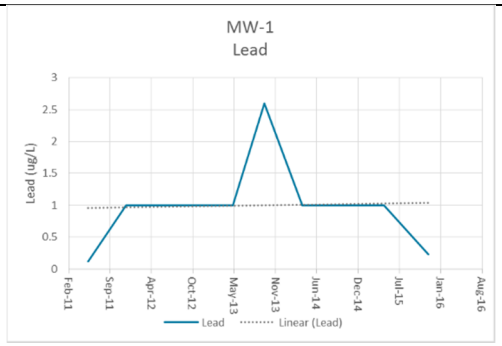
		Lab Data						G3 Levels						Contaminant Exceeds G3 Standards					
		Cadmium	Chromium	Lead	Mercury	Total Dissolved Solids	Zinc	Cadmium	Chromium	Lead	Mercury	Total Dissolved Solids	Zinc	Cadmium	Chromium	Lead	Mercury	Total Dissolved Solids	Zinc
Date	Well Site	ug/L	ug/L	ug/L	ug/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/L	ug/L
Jun-11	WELL #1	1.1	55	0.12	0.00072	610	0.82	50	1,000	150	20	5,000	50,000						
Jun-11	WELL #2	0.28	35	0.42	0.0016	16,000	4.3	50	1,000	150	20	5,000	50,000					Exceeds	
Jun-11	WELL #3	0.28	29	0.2	0.00025	12,000	2.7	50	1,000	150	20	5,000	50,000					Exceeds	
Jun-11	WELL #4	0.28	59	0.27	0.002	2,000	1.8	50	1,000	150	20	5,000	50,000						
Jun-11	WELL #5	0.28	63	0.17	0.00025	1,200	2.1	50	1,000	150	20	5,000	50,000						
Dec-11	WELL #1	1	7.01	1	0.02	1,640	10	50	1,000	150	20	5,000	50,000						
Dec-11	WELL #2	1	2.03	1	0.02	2,870	10	50	1,000	150	20	5,000	50,000						
Dec-11	WELL #3	1	3.4	1	0.02	11,700	10	50	1,000	150	20	5,000	50,000					Exceeds	
Dec-11	WELL #4	1	1.88	1.53	0.02	1,800	17.5	50	1,000	150	20	5,000	50,000						
Dec-11	WELL #5	1	1.6	1	0.036	1,040	10	50	1,000	150	20	5,000	50,000						
Apr-12	WELL #1	1	1.49	1	0.031	1,670	24.7	50	1,000	150	20	5,000	50,000						
Apr-12	WELL #2	1	2.62	1	0.099	11,300	12.5	50	1,000	150	20	5,000	50,000					Exceeds	
Apr-12	WELL #3	1	2.3	1	0.141	7,130	14.9	50	1,000	150	20	5,000	50,000					Exceeds	
Apr-12	WELL #4	1	9.8	1.28	0.069	1,910	10	50	1,000	150	20	5,000	50,000						
Apr-12	WELL #5	1	1.24	1	0.039	888	23.2	50	1,000	150	20	5,000	50,000						
Nov-12	WELL #1	1	2.9	1	0.02	1,120	10	50	1,000	150	20	5,000	50,000						
Nov-12	WELL #2	1	3.04	1	0.02	3,440	10	50	1,000	150	20	5,000	50,000						
Nov-12	WELL #3	1	4	1	0.02	13,200	21.1	50	1,000	150	20	5,000	50,000					Exceeds	
Nov-12	WELL #4	1	2.68	1	0.02	1,440	10	50	1,000	150	20	5,000	50,000						
Nov-12	WELL #5	1	2.52	1	0.02	610	10	50	1,000	150	20	5,000	50,000						
May-13	WELL #1	1	1	1	0.02	1,340	10	50	1,000	150	20	5,000	50,000						
May-13	WELL #2	1	1	1.36	0.02	9,070	10	50	1,000	150	20	5,000	50,000					Exceeds	
May-13	WELL #3	1	1	1	0.02	10,300	10	50	1,000	150	20	5,000	50,000					Exceeds	
May-13	WELL #4	1	1	1	0.02	1,830	10	50	1,000	150	20	5,000	50,000						
May-13	WELL #5	1	1	1	0.02	872	10	50	1,000	150	20	5,000	50,000						
Oct-13	WELL #1	1	2.2	2.6	0.02	1,240	10	50	1,000	150	20	5,000	50,000						
Oct-13	WELL #2	1	2.9	1.93	0.02	3,930	10	50	1,000	150	20	5,000	50,000						
Oct-13	WELL #3	1	3.84	1.96	0.02	10,400	16.7	50	1,000	150	20	5,000	50,000					Exceeds	
Oct-13	WELL #4	1	1.74	1	0.02	1,370	10	50	1,000	150	20	5,000	50,000						
Oct-13	WELL #5	1	1.19	1	0.02	606	10	50	1,000	150	20	5,000	50,000						
Apr-14	WELL #1	1	1	1	0.02	1,640	23.7	50	1,000	150	20	5,000	50,000						
Apr-14	WELL #2	1	1	1	0.0208	3,340	24.9	50	1,000	150	20	5,000	50,000						
Apr-14	WELL #3	1	1	1	0.0505	4,040	31.3	50	1,000	150	20	5,000	50,000						
Apr-14	WELL #4	1	1	1	0.02	1,520	32.1	50	1,000	150	20	5,000	50,000						
Apr-14	WELL #5	1	1	1	0.02	630	26.9	50	1,000	150	20	5,000	50,000						
Nov-14	WELL #1	1	1	1	0.02	2,120	65.7	50	1,000	150	20	5,000	50,000						
Nov-14	WELL #2	1	1	1	0.02	5,350	31.7	50	1,000	150	20	5,000	50,000					Exceeds	
Nov-14	WELL #3	1	1	1	0.02	9,250	45.5	50	1,000	150	20	5,000	50,000					Exceeds	
Nov-14	WELL #4	1	1	1	0.02	1,410	31.1	50	1,000	150	20	5,000	50,000						
Nov-14	WELL #5	1	22.7	1	0.02	550	10	50	1,000	150	20	5,000	50,000						
May-15	WELL #1	1	1	1	0.02	1,750	10	50	1,000	150	20	5,000	50,000						
May-15	WELL #2	1	1	1	0.02	5,630	10	50	1,000	150	20	5,000	50,000					Exceeds	
May-15	WELL #3	1	1	1	0.02	3,600	10	50	1,000	150	20	5,000	50,000						
May-15	WELL #4	1	1	1	0.02	1,800	10	50	1,000	150	20	5,000	50,000						
May-15	WELL #5	1	1	1	0.02	640	10	50	1,000	150	20	5,000	50,000						
Dec-15	WELL #1	0.28	0.27	0.23	0.73	1,900	130	50	1,000	150	20	5,000	50,000						
Dec-15	WELL #2	0.28	0.46	0.12	0.73	4,400	0.28	50	1,000	150	20	5,000	50,000						
Dec-15	WELL #3	0.28	1.1	0.12	0.73	2,500	1.5	50	1,000	150	20	5,000	50,000						
Dec-15	WELL #4	0.28	0.38	0.12	0.73	360	0.28	50	1,000	150	20	5,000	50,000						
Dec-15	WELL #5	0.28	0.27	0.12	0.73	540	18	50	1,000	150	20	5,000	50,000						

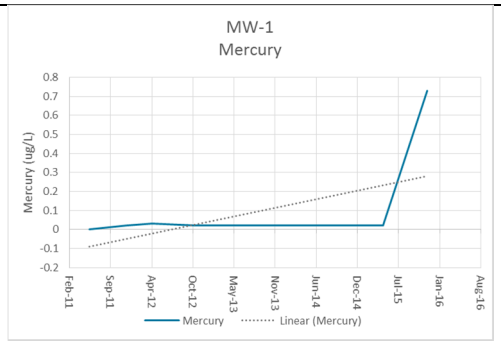
		Dissolved Oxygen	pH	Specific Conductance	Temperature	Turbidity	Water Level
Date	Site	mg/L	S.T.U.	umhos/cm	Degrees Celsius	NTU	Feet (NGVD)
Jun-11	WELL #1	0.71	8.98	3104	28.64	0.79	1.53
Jun-11	WELL #2	0.7	8.24	25185	26.99	1.33	1.3
Jun-11	WELL #3	0.78	8.88	24307	26.93	0.81	1.34
Jun-11	WELL #4	0.42	8.55	3872	28.17	8.27	1.67
Jun-11	WELL #5	0.7	8.77	2239	25.39	1.26	1.93
Dec-11	WELL #1	0.19	7.07	2650	29.6	5.44	1.58
Dec-11	WELL #2	0.4	6.96	4270	29.6	15.1	1.37
Dec-11	WELL #3	0.38	7.12	16600	27.9	9.23	1.3
Dec-11	WELL #4	0.24	7.38	3540	30.5	14.8	1.54
Dec-11	WELL #5	0.26	7.14	1220	27.2	6	1.89
Apr-12	WELL #1	0.34	7.38	3020	27.7	1.62	1.66
Apr-12	WELL #2	0.25	7.11	19100	27.3	4.03	1.15
Apr-12	WELL #3	0.34	7.46	7830	27.2	3.1	1.3
Apr-12	WELL #4	0.31	7.44	3470	29.9	3.68	1.39
Apr-12	WELL #5	0.26	7.14	1530	26.1	2.65	2.16
Nov-12	WELL #1	0.29	7.24	2100	29.7	0.42	1.94
Nov-12	WELL #2	0.33	7.07	981	26.8	0.5	1.53
Nov-12	WELL #3	0.3	7.48	2670	30.9	0.35	1.76
Nov-12	WELL #4	0.26	7.24	21700	28.1	0.1	2.11
Nov-12	WELL #5	0.53	7.23	5930	28.1	0.76	2.6
May-13	WELL #1	0.22	7.12	11700	27.8	8.35	1.76
May-13	WELL #2	0.57	7.38	12400	26.8	4.44	1.4
May-13	WELL #3	0.44	7.47	3340	29.8	4.65	1.36
May-13	WELL #4	0.28	6.86	623	25.7	3.33	1.72
May-13	WELL #5	0.21	7.14	1640	28.2	3.43	2.13
Oct-13	WELL #1	0.46	7.4	2180	29.9	1.34	2.01
Oct-13	WELL #2	0.39	7.33	4850	28.3	4.93	1.75
Oct-13	WELL #3	0.67	7.26	13200	28.3	0.84	1.66
Oct-13	WELL #4	0.24	7.44	1750	30.2	0.93	2.03
Oct-13	WELL #5	0.85	6.96	504	27	0.56	2.43
Apr-14	WELL #1	0.18	7.6	2750	27.4	1.41	1.85
Apr-14	WELL #2	0.5	7.24	4990	28	9.44	1.57
Apr-14	WELL #3	0.57	7.58	5230	27	1.38	1.52
Apr-14	WELL #4	0.31	7.61	2640	29.5	2	1.83
Apr-14	WELL #5	0.344	7.26	1030	25.6	1.57	2.14
Nov-14	WELL #1	3.51	7.24	3060	29.3	2.54	1.89
Nov-14	WELL #2	2.37	7.12	6990	27.8	4.06	1.43
Nov-14	WELL #3	4.14	7.09	10700	27.6	1.92	1.78
Nov-14	WELL #4	4.01	7.37	2140	30.5	2.3	1.97
Nov-14	WELL #5	3.29	7.11	928	26.2	3.66	2.45
May-15	WELL #1	0.16	7.24	2640	26.2	0.72	1.76
May-15	WELL #2	0.1	7.28	8100	27.2	2.15	1.74
May-15	WELL #3	0.27	7.4	4820	26.6	0.54	1.49
May-15	WELL #4	0.21	7.44	2850	28.6	0.81	1.86
May-15	WELL #5	0.25	9.89	1040	24.6	1.53	2.18
Dec-15	WELL #1	0.58	7.04	3433	27	1.31	2.19
Dec-15	WELL #2	0.78	7.37	8380	29	2.53	1.89
Dec-15	WELL #3	0.6	7.38	4531	27.2	2.82	2.1
Dec-15	WELL #4	0.73	7.41	2546	29.8	1.55	2.18
Dec-15	WELL #5	1.28	7.25	982	26.2	0.96	2.69
	Max	4.14	9.89	25185	30.9	15.1	2.69
	Min	0.1	6.86	504	24.6	0.1	1.15

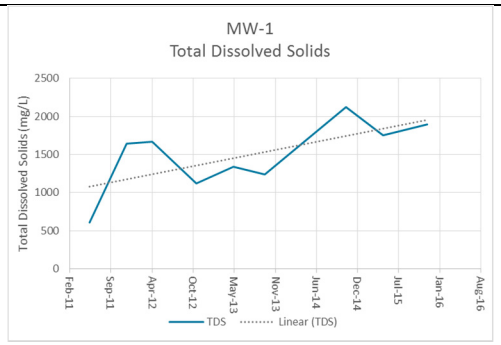
Exhibit 5: Groundwater Constituent Trend Graphs

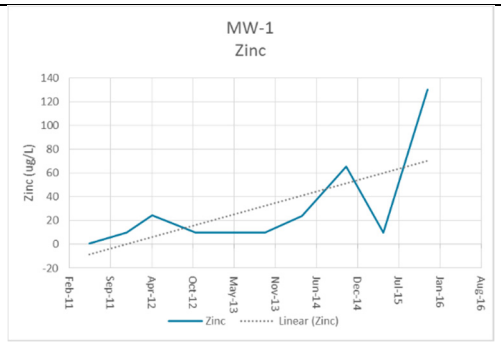






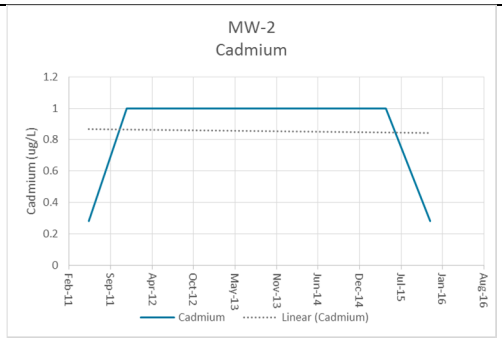


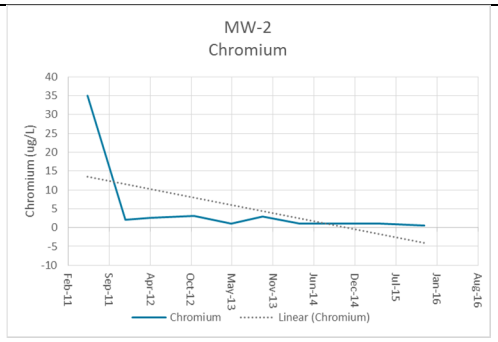


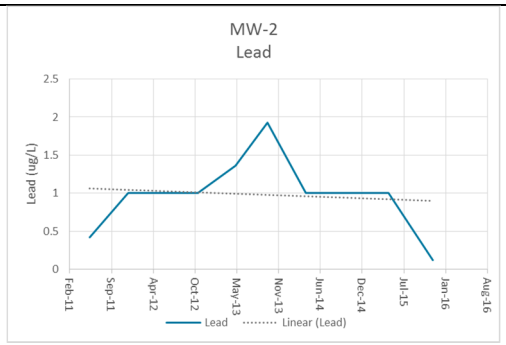


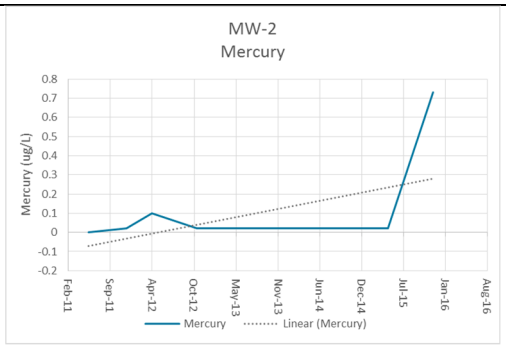
Stock Island Landfill

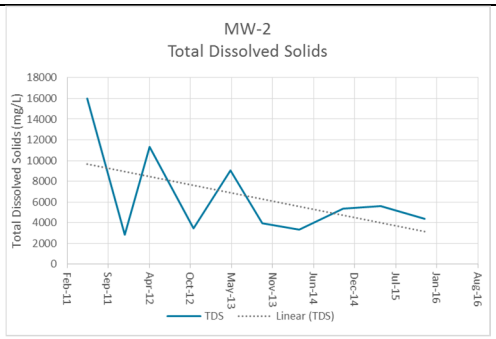
MW-1 Groundwater Constituent Trends

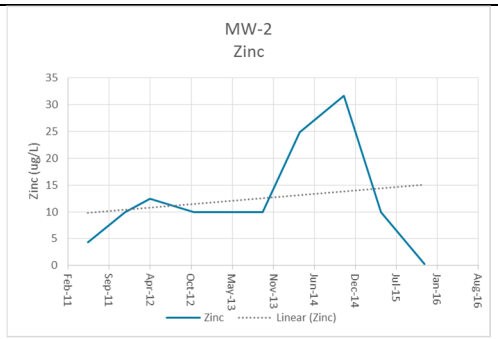




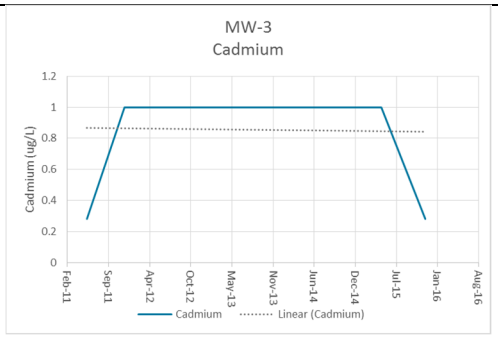


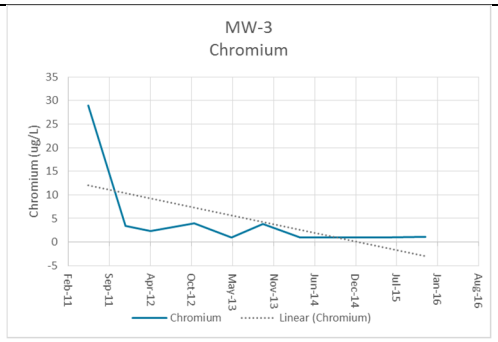


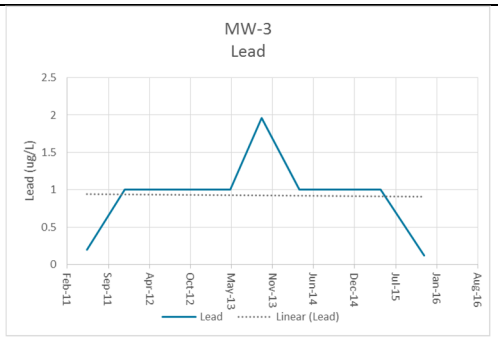


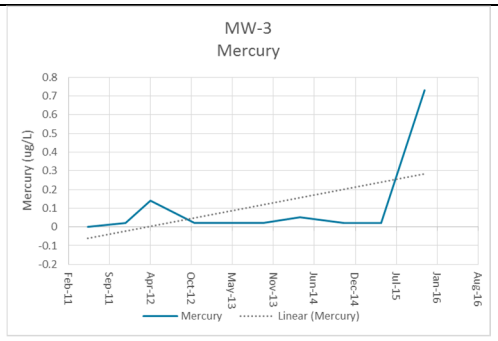


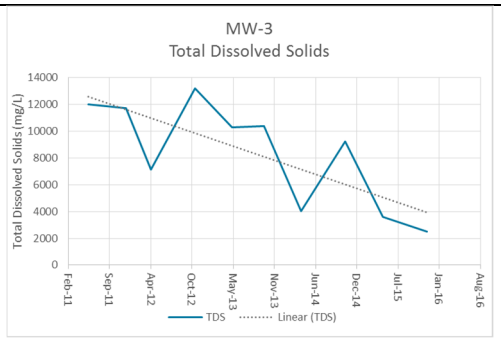
Stock Island Landfill MW-2 Groundwater Constituent Trends

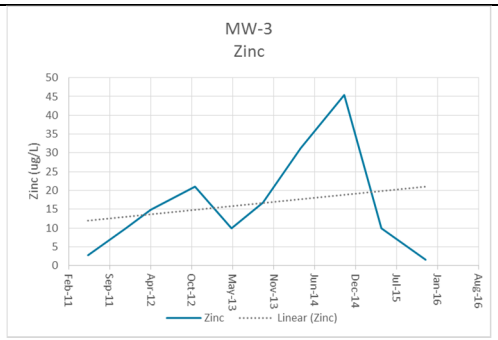




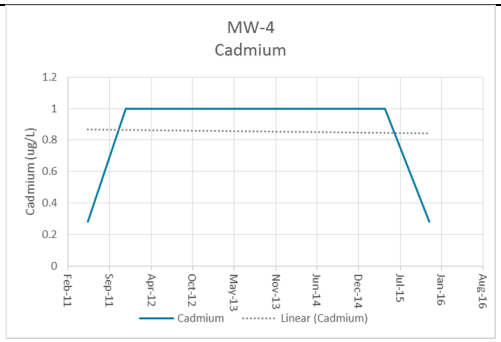


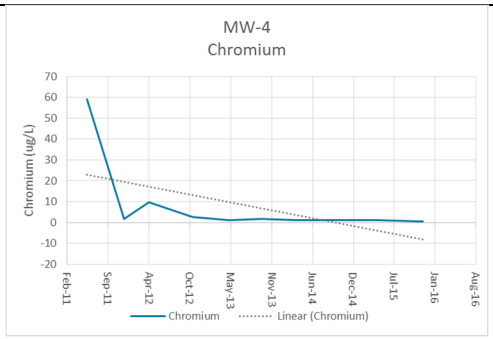


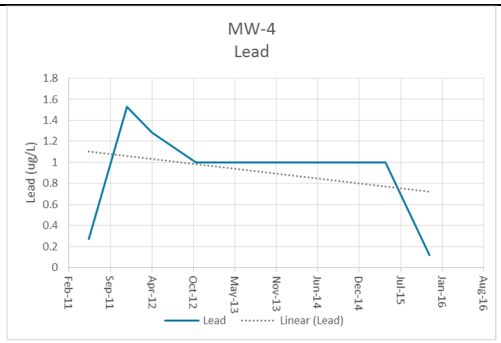


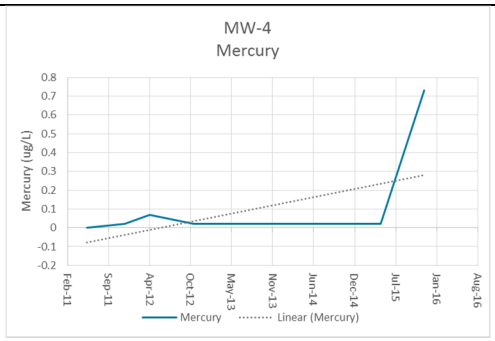


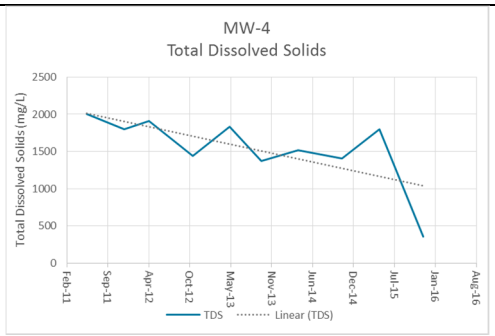
Stock Island Landfill MW-3 Groundwater Constituent Trends

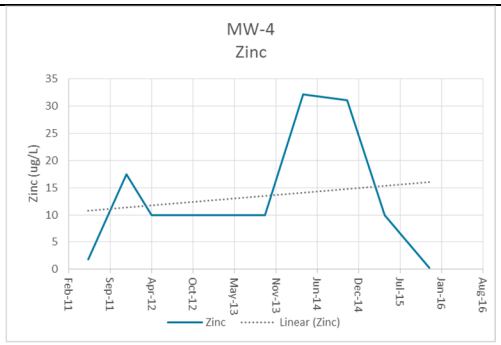




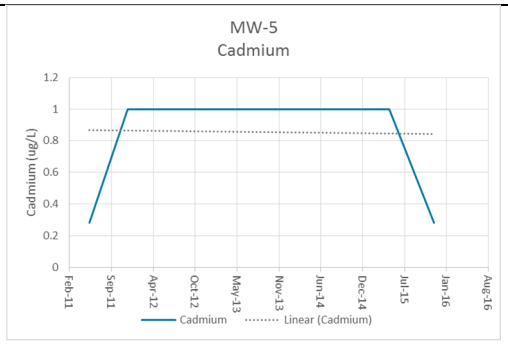


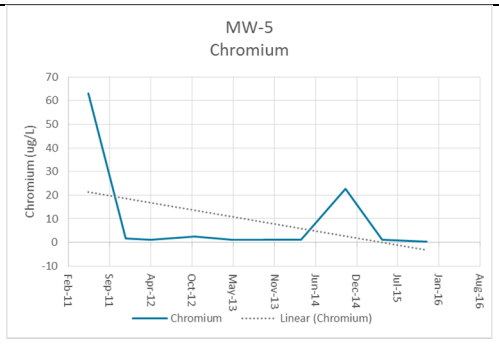


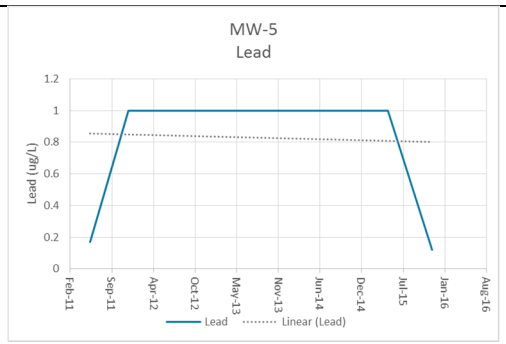


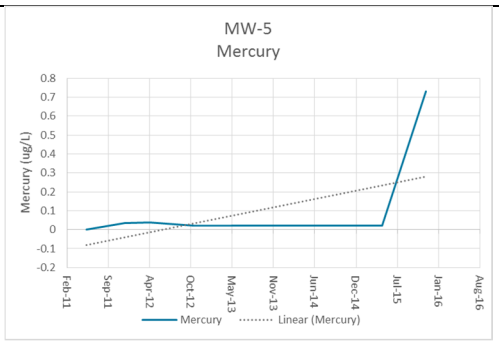


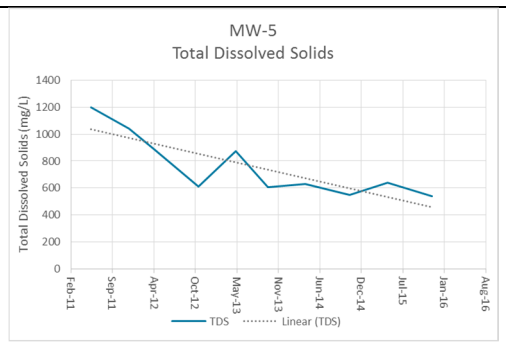
Stock Island Landfill MW-4 Groundwater Constituent Trends

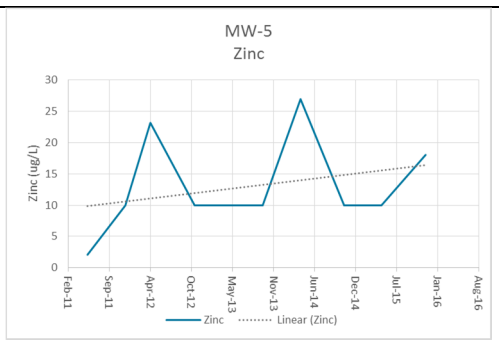








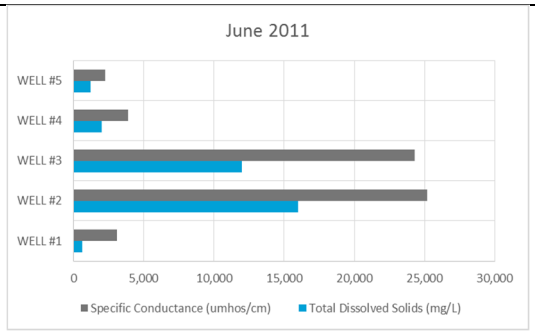


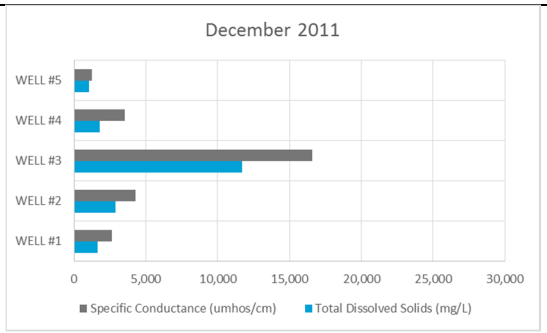


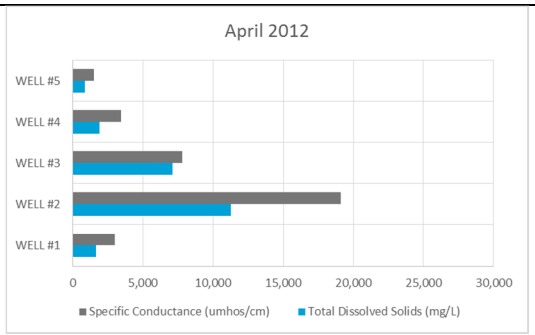
Stock Island Landfill

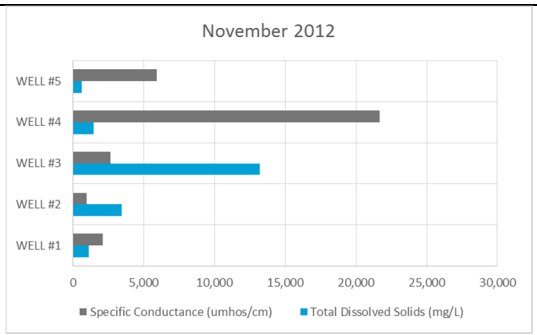
MW-5 Groundwater Constituent Trends

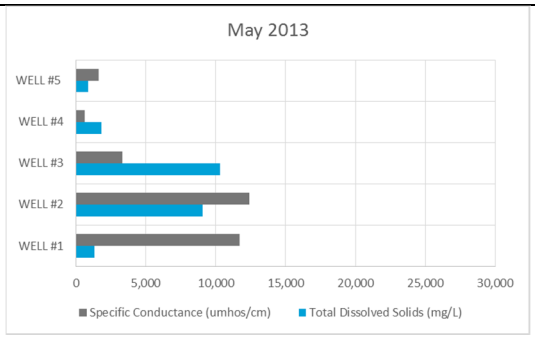
Exhibit 6: Groundwater Correlation of Related Parameters

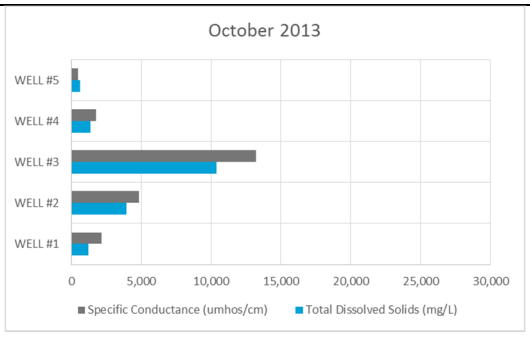


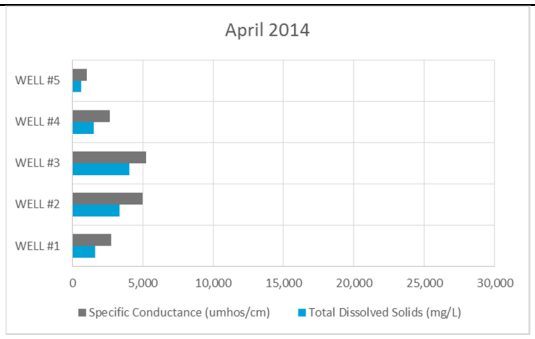


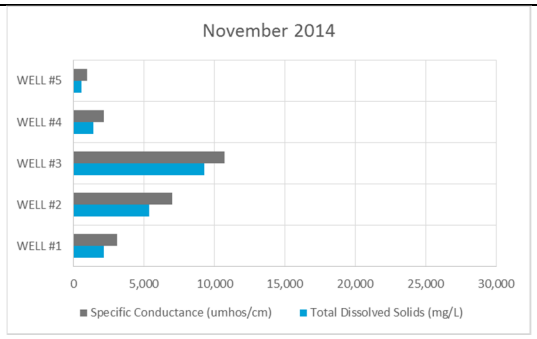


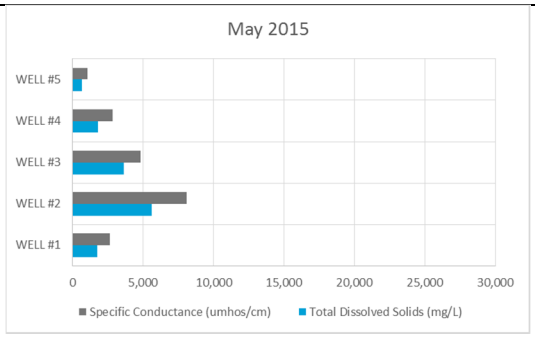


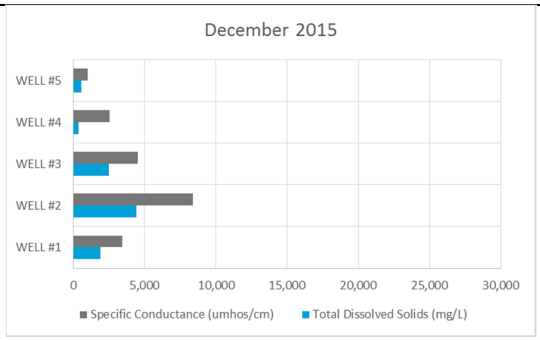












Stock Island Landfill Specific Conductance vs. Total Dissolved Solids

Exhibit 7: Groundwater Contour Maps

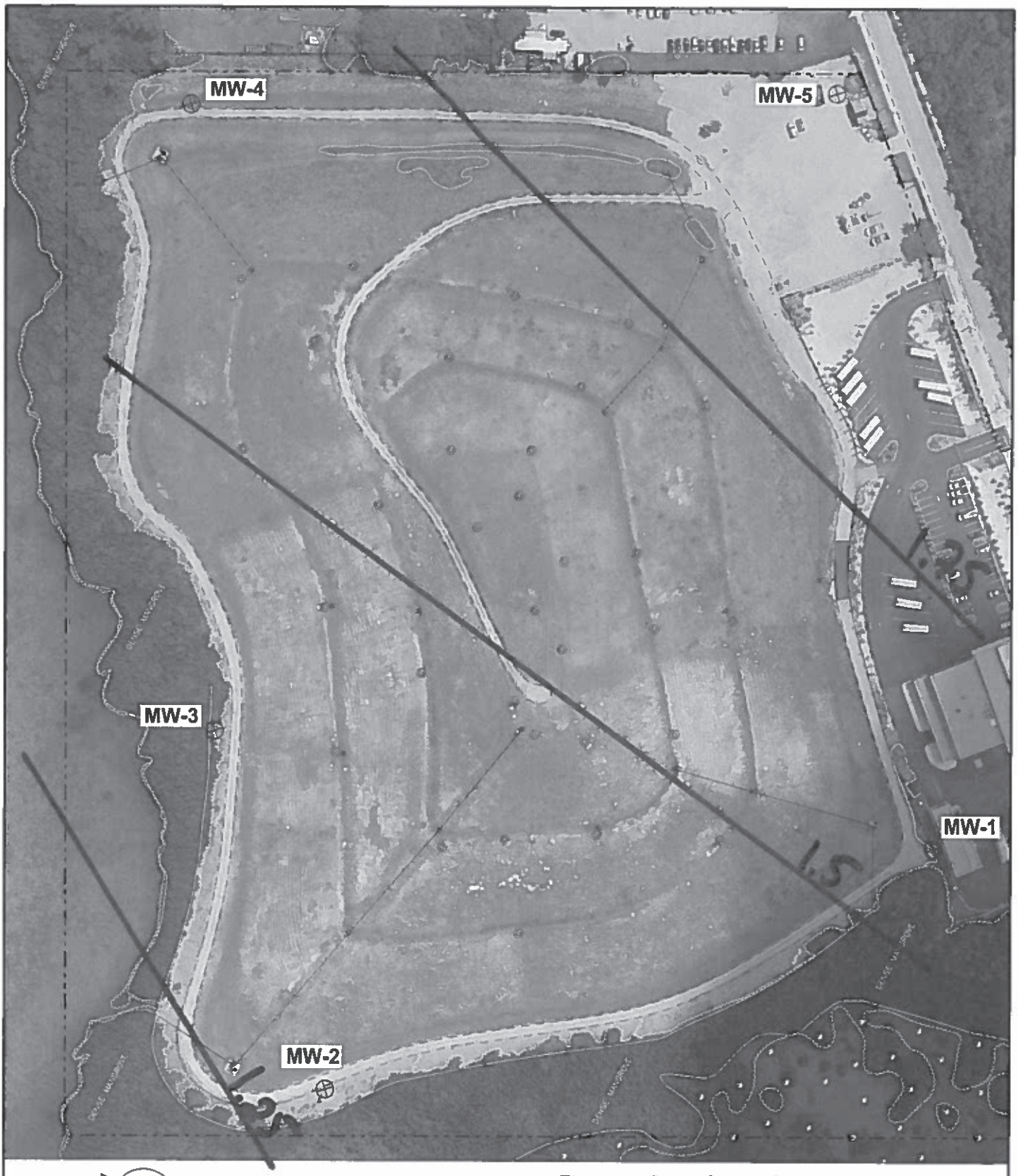


Figure 1: Groundwater Contours June 2011

KEY WEST STOCK ISLAND LANDFILL
POST-CLOSURE ASSISTANCE
CITY OF KEY WEST, FLORIDA

ch2m:

Fig-02_671926.dgn

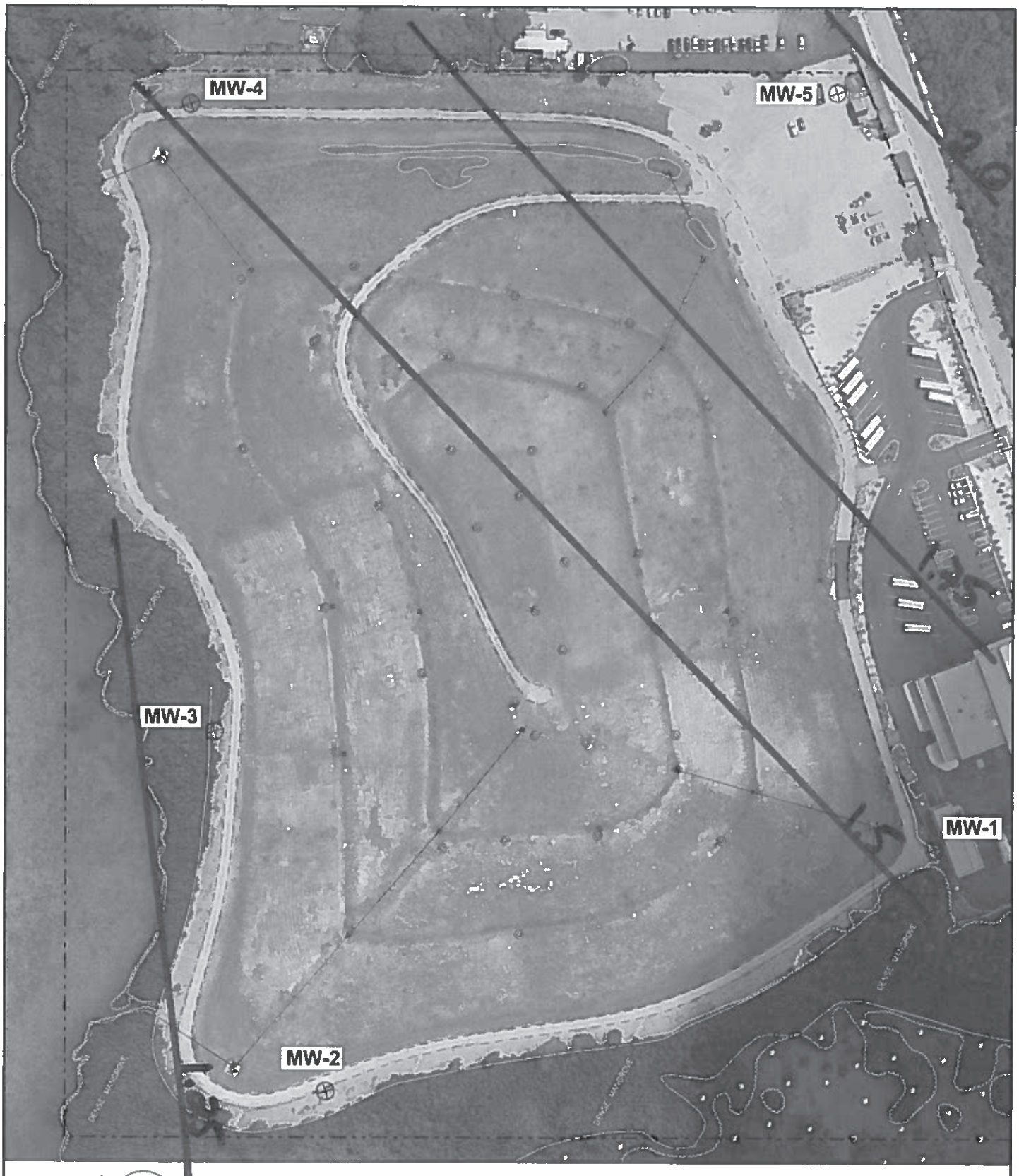


Figure 2: Groundwater Contours November 2011

KEY WEST STOCK ISLAND LANDFILL
POST-CLOSURE ASSISTANCE
CITY OF KEY WEST, FLORIDA

ch2m:

Fig-02_671926.dgn

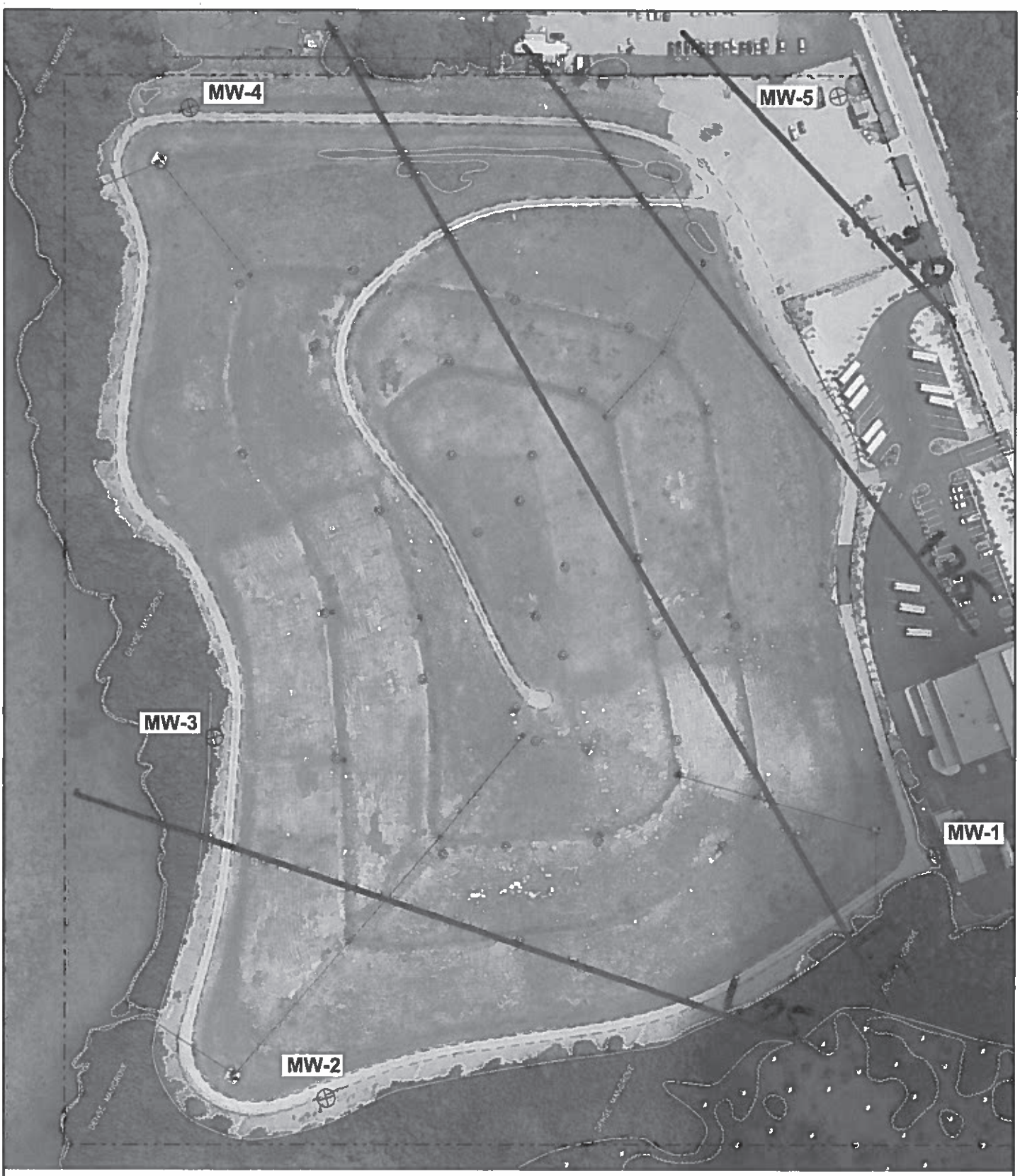


Figure 3: Groundwater Contours April 2012

N

0 150 300

SCALE IN FEET

KEY WEST STOCK ISLAND LANDFILL
POST-CLOSURE ASSISTANCE
CITY OF KEY WEST, FLORIDA

ch2m:

Fig-02_671926.dgn

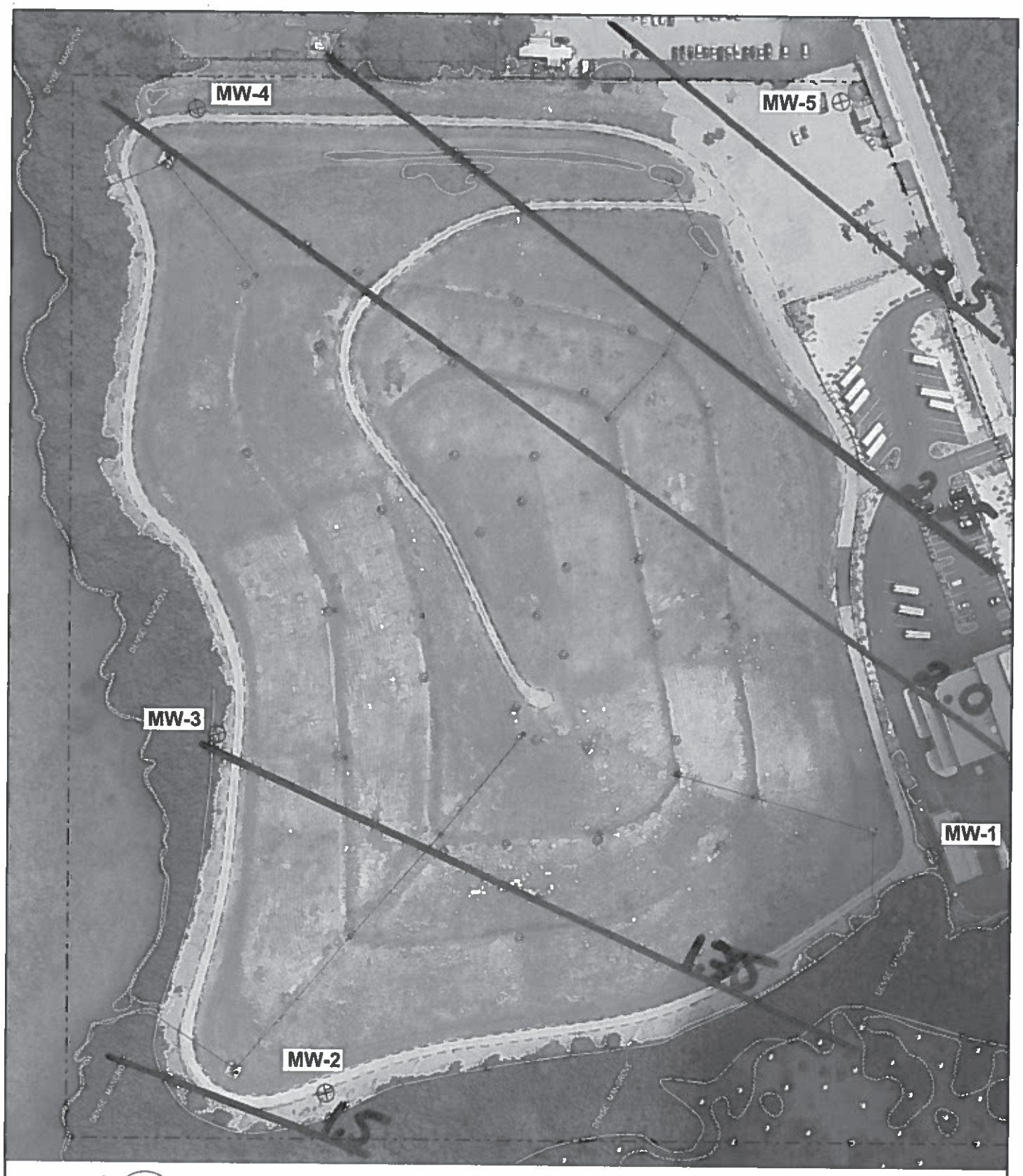


Figure 4: Groundwater Contours November 2012

KEY WEST STOCK ISLAND LANDFILL
POST-CLOSURE ASSISTANCE
CITY OF KEY WEST, FLORIDA

ch2m:

Fig-02_671926.dgn

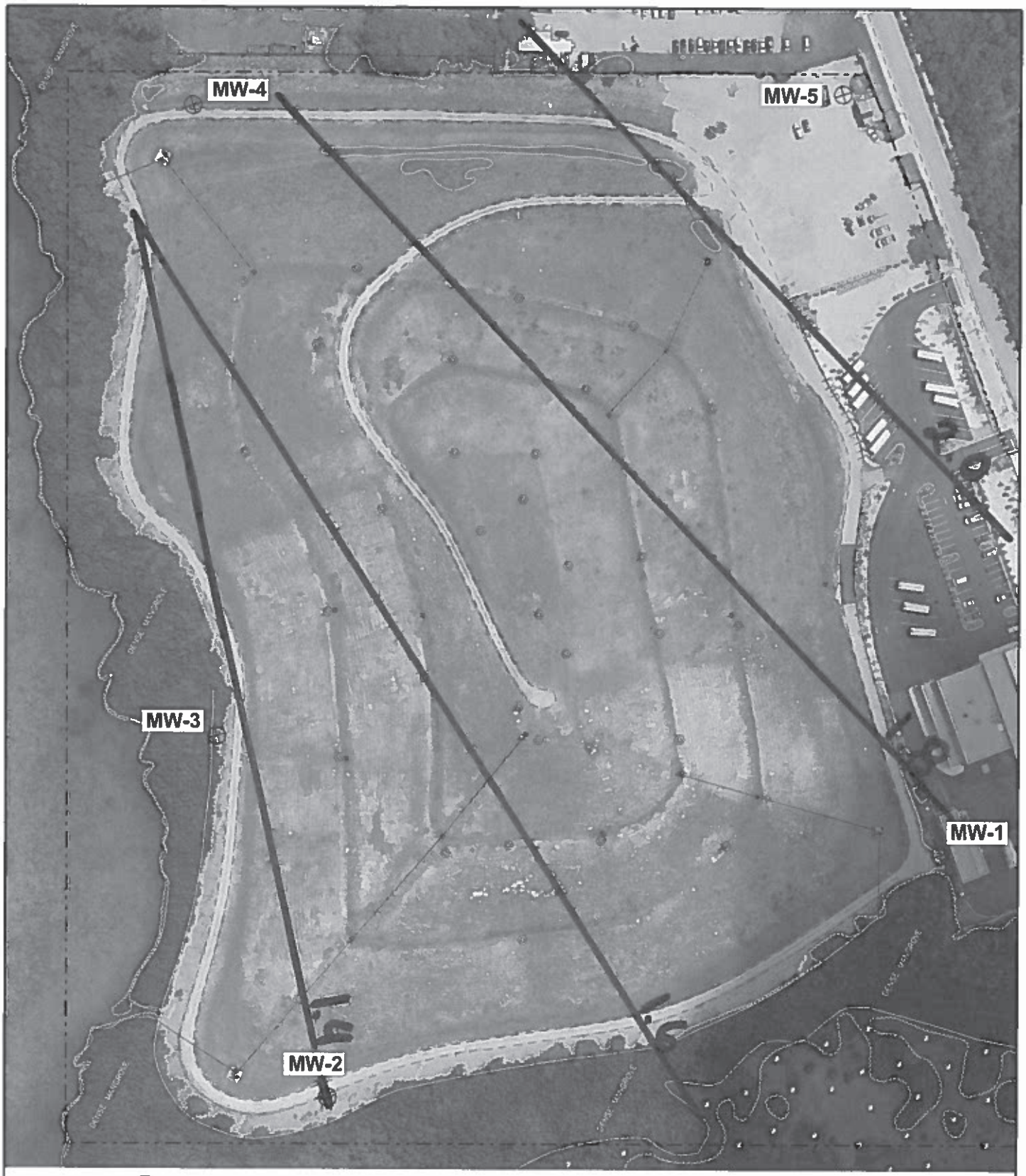


Figure 5: Groundwater Contours May 2013

KEY WEST STOCK ISLAND LANDFILL
POST-CLOSURE ASSISTANCE
CITY OF KEY WEST, FLORIDA

ch2m:

Fig-02_671926.dgn

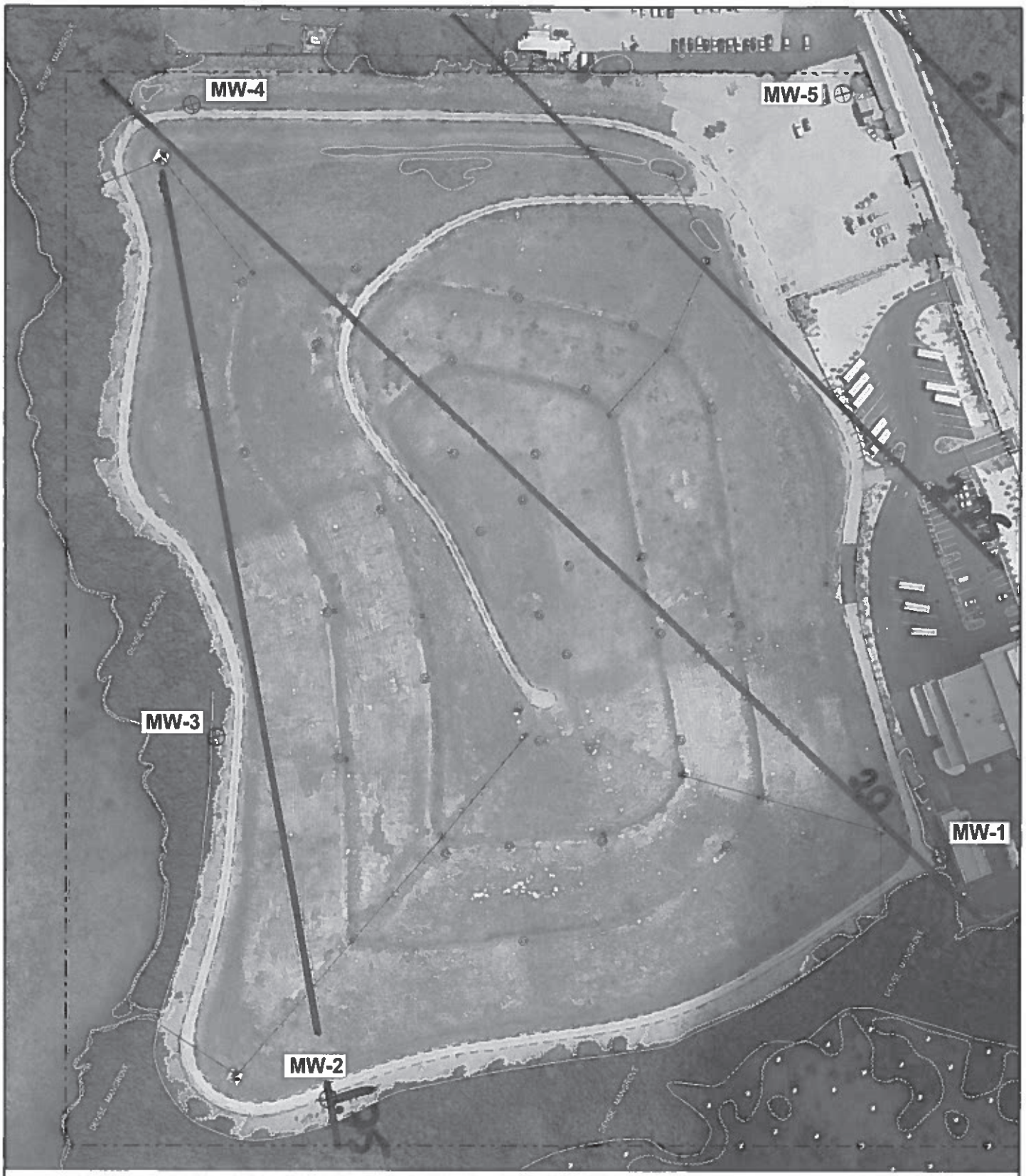


Figure 6: Groundwater Contours October 2013

KEY WEST STOCK ISLAND LANDFILL
POST-CLOSURE ASSISTANCE
CITY OF KEY WEST, FLORIDA

ch2m:

Fig-02_671926.dgn

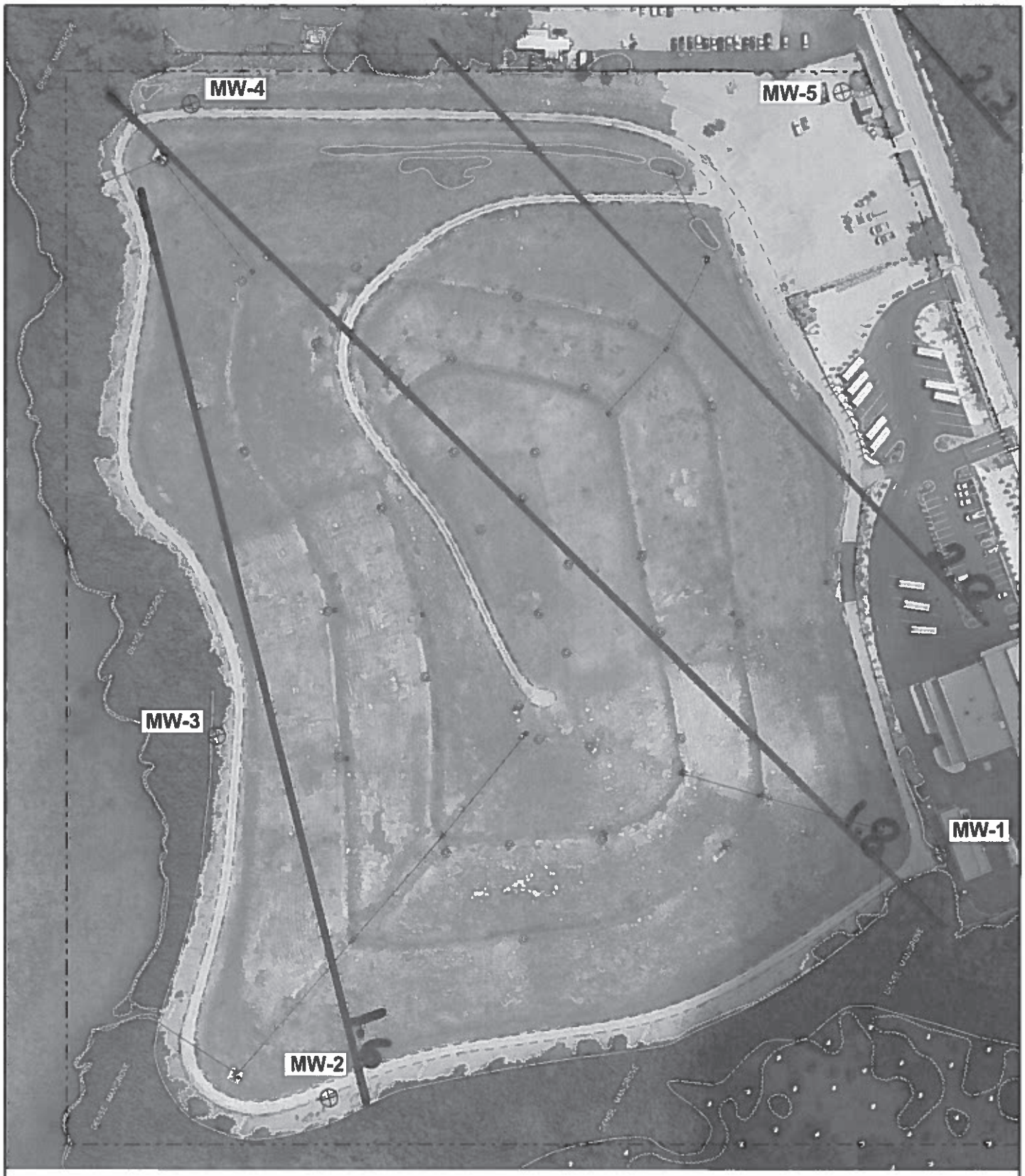


Figure 7: Groundwater Contours April 2014

N

0 150 300

SCALE IN FEET

KEY WEST STOCK ISLAND LANDFILL
POST-CLOSURE ASSISTANCE
CITY OF KEY WEST, FLORIDA

ch2m:

Fig-02_671926.dgn

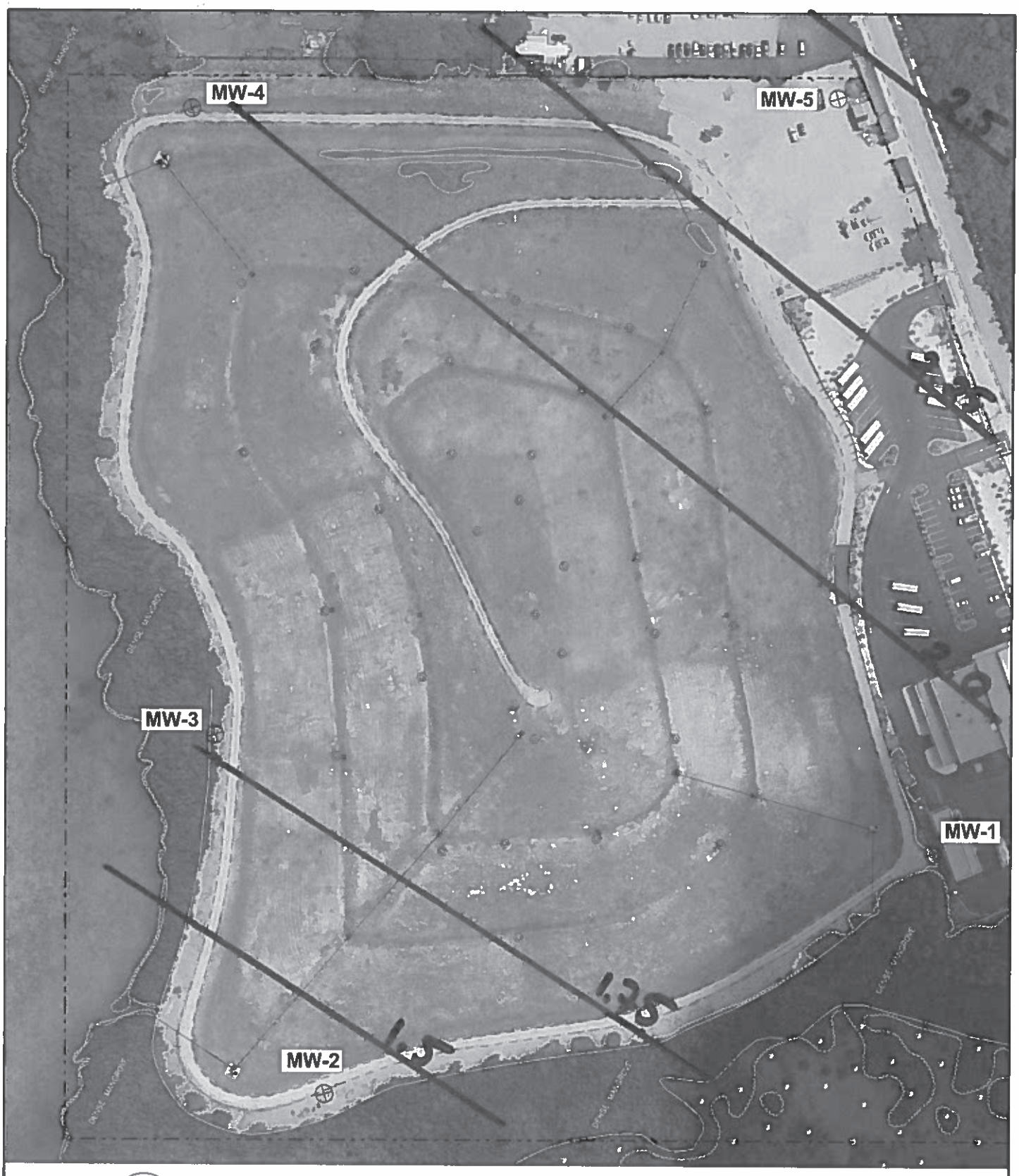


Figure 8: Groundwater Contours November 2014

N

0 150 300

SCALE IN FEET

KEY WEST STOCK ISLAND LANDFILL
POST-CLOSURE ASSISTANCE
CITY OF KEY WEST, FLORIDA

ch2m:

Fig-02_671926.dgn

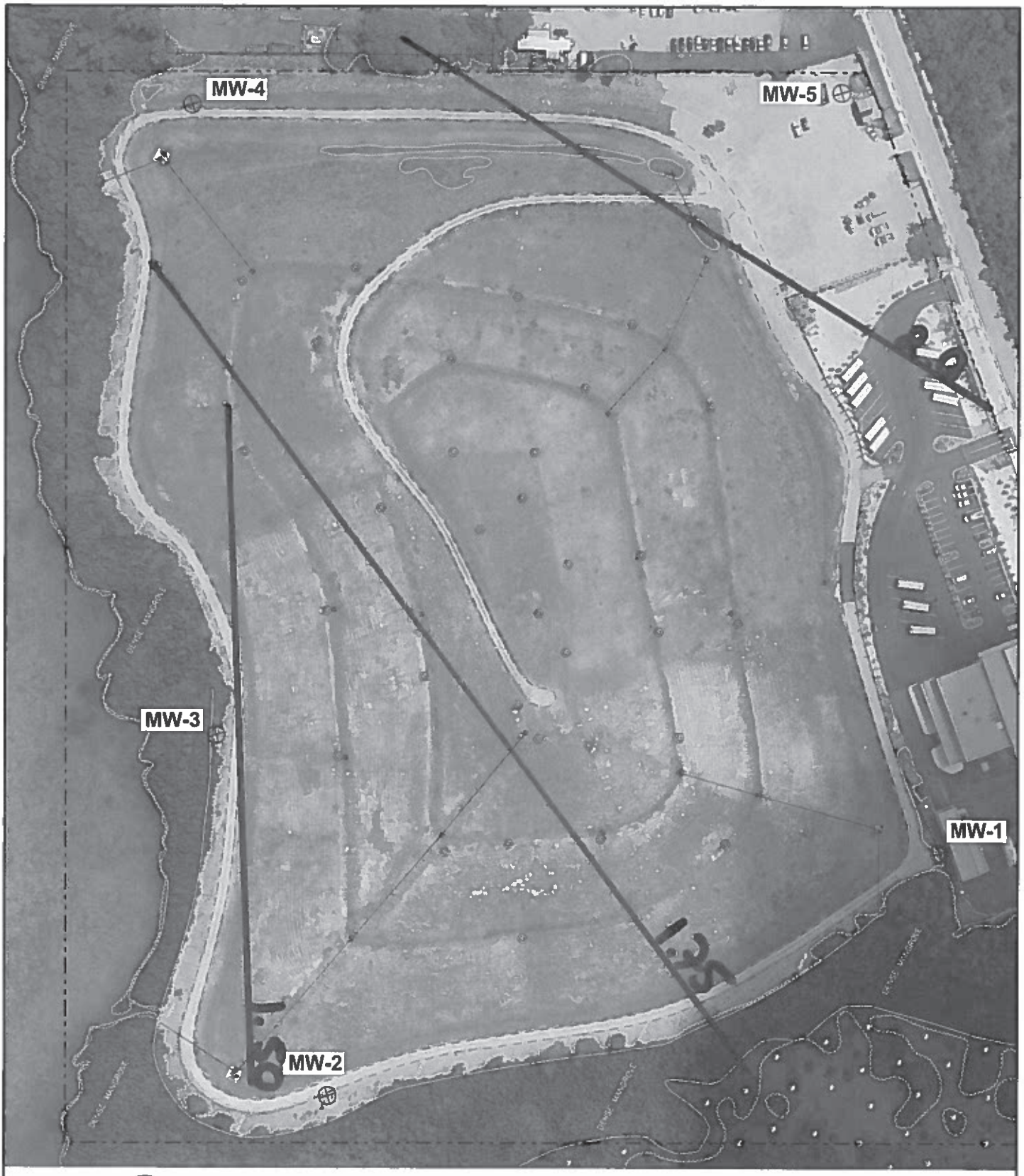


Figure 9: Groundwater Contours May 2015

KEY WEST STOCK ISLAND LANDFILL
POST-CLOSURE ASSISTANCE
CITY OF KEY WEST, FLORIDA

ch2m:

Fig-02_671926.dgn

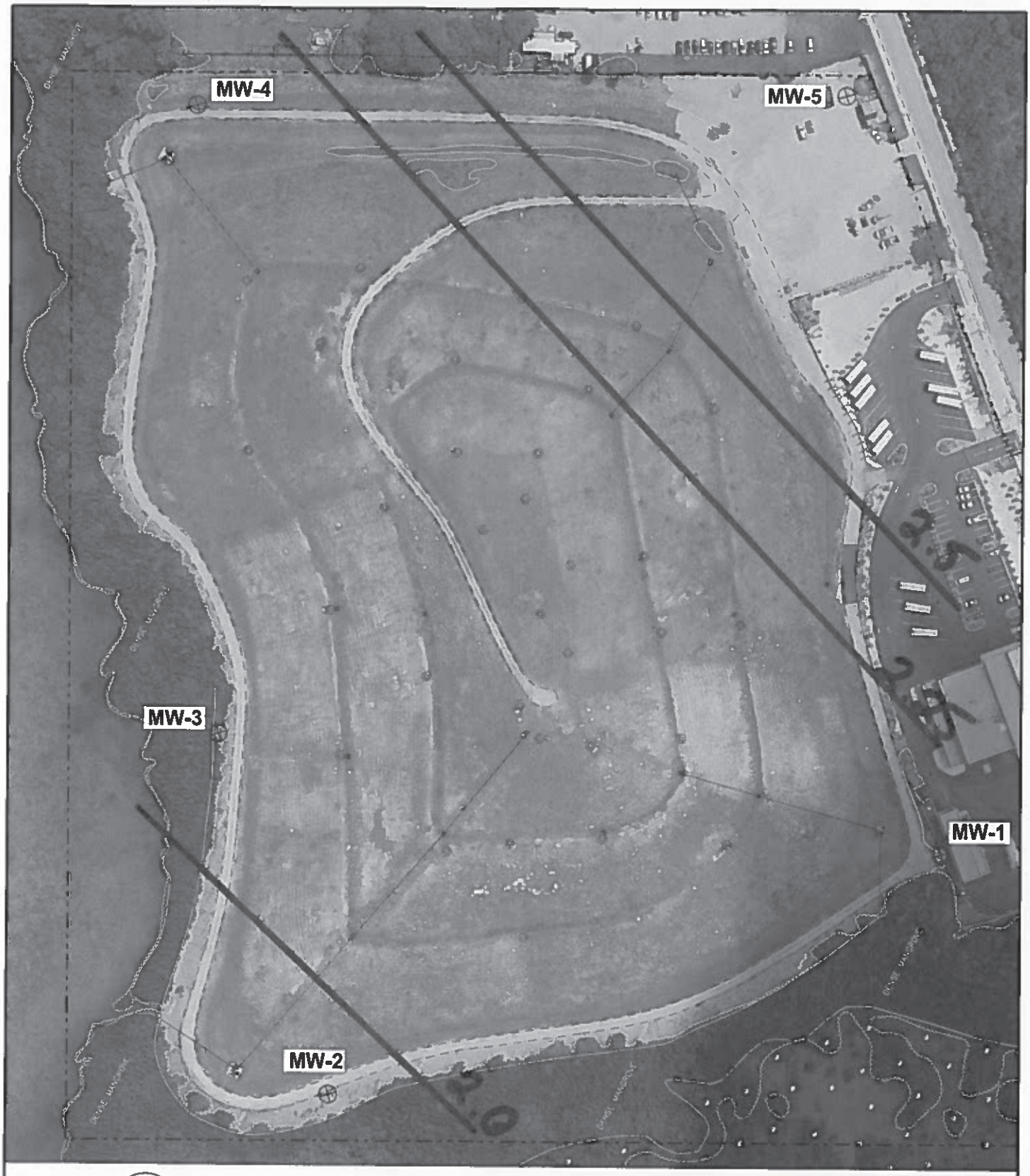


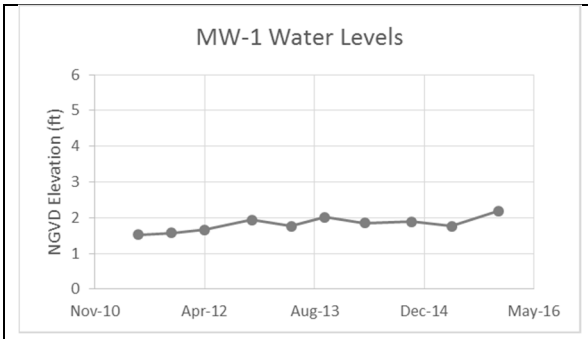
Figure 10: Groundwater Contours December 2015

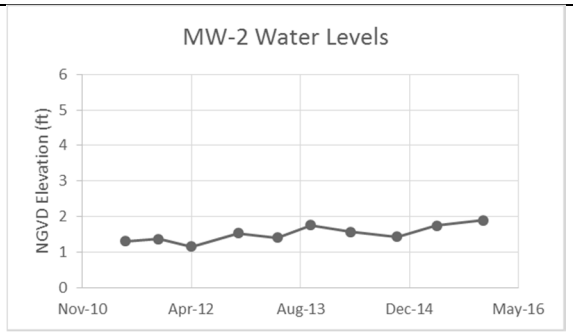
KEY WEST STOCK ISLAND LANDFILL
POST-CLOSURE ASSISTANCE
CITY OF KEY WEST, FLORIDA

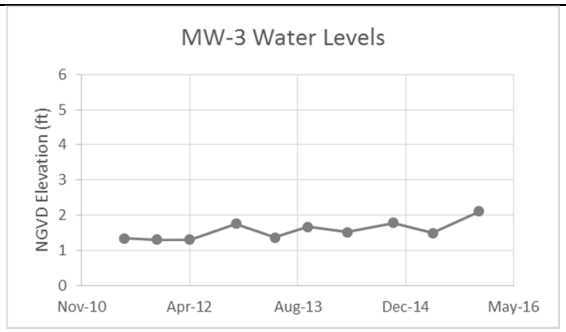
ch2m:

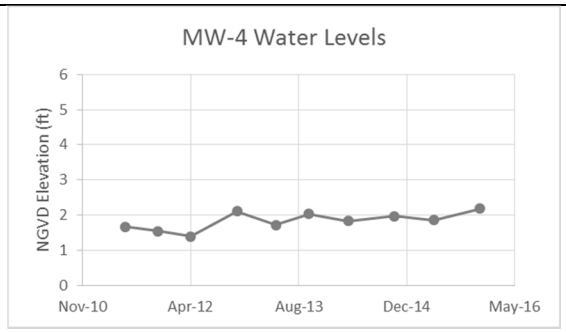
Fig-02_671926.dgn

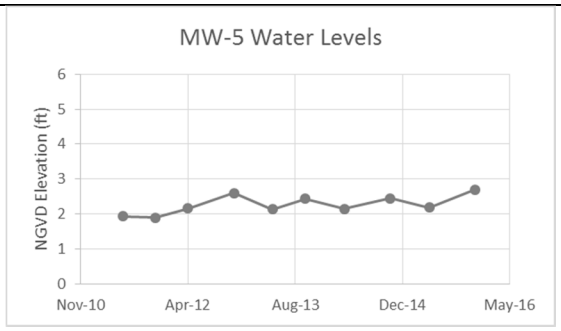
Exhibit 8: Monitoring Well Hydrographs











Stock Island Landfill

Monitoring Wells Hydrographs

Photographs

Photograph 1: Monitoring Well #3 is located to the N of the landfill between the landfill and the Gulf of Mexico. The well is surrounded by mangroves.

Photograph 2: Monitoring Well #4 is located to the East of the landfill. The well is situated between the landfill and an adjacent parcel.

APPENDIX IV – CLOSURE PLAN

Attachment 6
CLOSURE PLAN

6. CLOSURE PLAN

6.1 CLOSURE

As stated in Section 17-701.070 of the Florida Administrative Code (FAC), new permit applications for landfills shall include general plans and schedules for closure of the facility. This section contains a description of the activities required for closure of the Stock Island landfill. This section references the appropriate sections of the permit application as applicable.

6.1.1 CLOSURE SCHEDULE

At least one year prior to the projected date when wastes will no longer be accepted, the City of Key West will notify in writing the Florida Department of Environmental Regulation (FDER) district office with the schedule for cessation of waste acceptance and closure of the landfill. At least 120 days prior to such closure, the city will also provide notice of closure to users of the landfill by posting and maintaining signs at the landfill entrance giving the date of closure, the location of alternative disposal facilities, and the name of the person responsible for closing the landfill. At least 90 days prior to closure, the city will resubmit the approved closure plan, revised if necessary, in accordance with the requirements of FAC section 17-701.073. Within 10 days prior to closure the City will publish a notice in the legal advertising section of a newspaper of general circulation in Key West. Proof of

such notification will be provided to FDER within seven (7) days after publication.

6.1.2 CLOSURE PLAN

All landfills are required to submit a closure plan that addresses eight subsections. These are addressed below for the Stock Island landfill with references noted to other sections of the permit, as applicable.

6.1.2.1 General Information Report

Identification: The City of Key West Landfill is located on Stock Island, east of Key West, Florida as shown in Figure 1 of the initial permit application. The landfill contains a Class I disposal facility.

Primary Contact Person: The primary person to contact regarding the landfill is Mr. Paul Cates, Solid Waste Coordinator, City of Key West, P.O. Box 1409, Key West, Florida 33041, Telephone (305) 292-8150.

Consultants: The initial permit application was prepared by Malcolm Pirnie, Inc. of White Plains, New York. The additional information requested by FDER was prepared by CH2M HILL of Key West, Florida. The persons to contact are Mr. Paul Cates of the City of Key West, Florida, and Mr. R. J. Bruner III, P.E. of CH2M HILL.

Owner and Operator: The landfill is owned by, and operated under the jurisdiction of the City of Key West, Key West, Florida.

Location: The main entrance of the landfill is located in Section 26 and 27, Township 67 South, Range 25 East, and latitude 24 degrees, 34 minutes, 42 seconds north and longitude 81 degrees, 44 minutes, 49 seconds west.

Total Areas: The landfill property covers a total land area of 32.5 acres. The total land area of the disposal site is approximately 19 acres.

Legal Description: A legal description of the landfill property is included in Appendix A of the permit application.

History: A history of the landfill is presented in Section 1.1 of the permit application. The sequence of filling at the site has been to fill a single lift over the entire footprint of the landfill. The initial lifts were spread over the entire 19 acres of the landfilled area and then additional lifts gradually brought the landfill to its current grade. Before the resource recovery operation was begun, there was no separation of waste types and all wastes were disposed of together in the landfill.

Waste Types: The waste types that have been disposed of at the landfill are described in Section 1.1 of the permit application. A description of the current operations and wastes being disposed of is presented in Sections 3.1 and 3.2 of the permit application.

6.1.2.2 Area Information Report

Information for the area surrounding the landfill property is presented below with references to the permit application as applicable.

Topography: The topography at the landfill site is discussed in Section 2.2 of the permit application. The surrounding area is extremely flat with most elevations varying between 0 and 10 feet mean sea level (msl). Figure 6-1 shows the United States Geological Survey (USGS) Quadrangle Map for the Stock Island area.

Hydrology: The local surface hydrology is discussed in Section 3.4.4 of the permit application.

Geology: The general and site geology of the area is discussed in Sections 3.4.1 and 3.4.2 of the permit application.

Hydrogeology: The hydrogeology of the area is described in Section 3.4.2 of the permit application.

Ground and Surface Water Quality: The groundwater quality is discussed in Section 3.4.2 of the permit application. The surrounding surface water, as discussed in Section 3.4.4 of the permit application, is the Gulf of Mexico and is saline water.

Land Use Information: The Land Use and Zoning information is discussed in Section 2.3 of the permit application. Adjacent property owners are Gerald Adams Elementary School

to the northeast, the Murray Marina on the southwest, and Junior College Road on the southeast.

6.1.2.3 Groundwater Monitoring Plan

The groundwater monitoring plan is presented in Section 5.6 of the permit application. Clarifications to this Section are also presented in CH2M HILL's reply to FDER.

6.1.2.4 Gas Migration Investigation

The control of gas migration is addressed in Section 5.7 of the permit application. Additional information on the gas migration is contained in CH2M HILL's reply to FDER.

6.1.2.5 Effectiveness of Existing Landfill Design and Operation

Groundwater: The FDER consent order requires ongoing quarterly monitoring of the groundwater from the existing monitoring wells. Samples from the wells are analyzed for pH, total dissolved solids, nitrates, lead, mercury, zinc, nickel, chromium, and copper. These results are submitted to FDER quarterly and indicate little contamination above background levels. Two additional wells have been proposed in CH2M HILL's reply to FDER along with the addition of cadmium to the quarterly parameter coverage.

Surface Water: Surface water runoff from the landfill consists mainly of sheet flow. The existing topography of the landfill sheds the water in all directions. The only water body in the area that receives any runoff is the Gulf of Mexico. Because of the high permeability of the crushed

coral surface layer over the entire site, most rainfall percolates into the ground upon contact. Any surface runoff is detained on-site by a system of perimeter berms. The perimeter berms between the landfill and the shoreline reduces the velocity of the runoff and promotes further percolation thereby reducing direct discharge to the Gulf.

Gas Migration: The majority of the gas that is produced at the site is probably vented to the atmosphere. There are no existing gas vents at the landfill since it is still being filled. There is a limited layer of potential gas migration that exists between the water table and the ground surface. The vegetation around the site does not exhibit any problems associated with gas migration. The vegetation is very healthy and there is no indication of any effect from the landfill. Gas monitoring probes will be installed around the landfill to verify that the gas is not migrating offsite.

The potential problem at the site is odor from the landfill that could be obnoxious to the neighboring elementary school and marina. The passive vents that will be installed at the landfill will be vented directly to the atmosphere. If excessive complaints occur during the life of the landfill, an active venting system will be evaluated to determine if it will reduce the odors.

Cover System: There is no existing cover system in place at the landfill. The ash/residue from the incineration operation is currently used to cover any refuse. This ash/residue does not reduce the amount of leachate by inhibiting the percolation of precipitation.

Characteristics of the Wastes: Characteristics of the wastes that have been disposed of at the site since the incineration operation was started is addressed in Section 3.1 of the permit application. The wastes that were placed since the 1960's have been municipal solid waste generated by the City of Key West and the Naval Air Station. In addition, demolition debris and white goods are accepted at the landfill.

6.1.2.6 Closure Design Plan

Phases of Site Closing: The landfill will be closed in two phases. The first phase will be closed by January 1991. The rest of the landfill will be closed in accordance with the time frames specified in the Consent Order. Final cover will be constructed within 180 days from the time when the final waste layer has been applied to that portion of the landfill. Plan sheets showing the phases of site closing are provided on Sheets 7A and 8A of the permit application.

Topography: Existing topography is depicted on Sheet 1 of the permit application. Proposed final grades at the time of complete closure of the landfill are presented on Sheet 4 of the permit application.

Final Cover Installation: The final cover is described in Section 4.6 of the permit application and drawings showing the sequence of constructing the final cover are presented in Sheets 7A and 8A. Sheet 6A contains a standard section of the cap construction and clarifies Section 4.6 of the permit application.

The closure of the landfill will require large amounts of imported materials. The source of these materials has not been identified at this time. The estimated quantities of cover material required for complete closure of the landfill are presented below:

1. Bedding sand - 6-inch thickness - 16,200 cubic yards

2. Synthetic membrane - 870,000 square feet

3. Select fill - 12-inch thickness - 32,300 cubic yards

4. Topsoil - 6-inch thickness - 16,200 cubic yards

The landfill will require maintenance over its lifetime including erosion control, repair of subsidence areas, and maintenance of the exterior berm. The erosion control measure that will be most effective at the landfill will be maintaining a good stand of grass. If areas of the landfill are void of grass, they will be reseeded to produce a satisfactory grass growth. The grass will be mowed regularly to reduce weed growth and to maintain a healthy stand of grass. Fertilizer, weed killer, or pesticide will be selectively applied as needed to maintain the grass in a condition to control erosion for the post-closure care period of the landfill.

There is likely to be subsidence of isolated areas of the landfill that will produce areas of standing water on top of the cap. These areas should be repaired by placing topsoil to eliminate the ponding of water and to restore the runoff

pattern of stormwater. Ash from the incinerator is the majority of the refuse currently disposed of at the landfill. The ash will subside much less than a landfill of putrescible wastes.

The exterior berm that surrounds the landfill will require periodic maintenance due to large storm events and minor erosion repair. The berm will be visually inspected at least yearly to identify deficiencies and maintenance requirements. These repairs will then be implemented to keep the berm in good condition.

Leachate Control: The leachate control at the landfill will consist of the relatively impermeable synthetic membrane reducing infiltration through the wastes and subsequent generation of leachate. A key factor in controlling leachate is the final cover and stormwater management system. The cover system will reduce infiltration into the landfill and the stormwater system will remove the runoff from the area of the landfill. Additional items are covered in Section 5.6 of the permit application.

Groundwater Protection: Prevention of groundwater contamination is controlled by a number of methods which include the relatively impermeable final cover, the stormwater control system, and the groundwater monitoring system. The groundwater monitoring system is to verify that the other measures are performing as designed. Section 5.6 of the permit application addresses the proposed groundwater monitoring program.

Gas and Odor Control: Gas and odors will be controlled as discussed in Section 5.7 of the permit application. In addition gas monitoring probes will be installed surrounding the landfill to monitor any migration off site. Approximate locations of the probes are shown on Drawings 2A, 3A, and 4A. These probes will be monitored for methane gas quarterly.

Stormwater Control: Stormwater will be routed off the landfill through a series of drainage swales to three detention basins. Drainage facilities and detention basins are designed for the 25 year storm. Section 5.6 in the permit application addresses stormwater control and sheets 2A, 3A, and 4A show the detention basins and drainage swales.

Access Control: The landfill property is surrounded by a chain link fence on the south and east. The landfill is surrounded on the north and west by the Gulf of Mexico. Access is limited to a gate at the property entrance. After closure of the landfill, the gate will be locked to prevent unauthorized persons from entering the facility.

Final Use: After the landfill closure has been completed, the site may be available for other uses. The final use will be consistent with the safety and maintenance requirements of the site.

6.1.2.7 Closure Operation Plan

The closure of the landfill will proceed in two phases as shown on Sheets 7A and 8A. The final cover will be applied as soon as practical but within 180 days after the final

disposal of waste to that area. The final cover will consist of 6 inches of bedding sand, a synthetic membrane, a minimum of 6 inches of select fill, and 6 inches of topsoil. Cover installation includes seeding and maintaining a good stand of grass. Gas and odor control features will consist of passive gas vents throughout the landfill and gas monitoring probes surrounding the landfill. The projected schedule for timing of these activities is included in Figure 6-2. Drainage and stormwater control features which include the exterior berm will be installed by January. Minor additions to the drainage system such as culverts and inlets will continue as portions of the landfill receive the final cover. The design of the stormwater system is included in Section 4.3 of the permit application.

The final cover system will be constructed by a private contractor. This will include importing fill, installing the synthetic membrane and geotextile, and seeding. When portions of the landfill are ready for closure, Key West will submit the contract documents for closing the respective area of the landfill to FDER.

The City of Key West forwarded to FDER a letter descibing the funding approach and financial responsibilities for this work on June 22, 1989. A copy is included in Attachment 7.

6.1.3 CLOSURE PROCEDURES

Upon approval of the closure plan and the issuance of a closure permit by FDER, the City will close the landfill in accordance with the approved plans.

6.1.3.1 Survey Monuments

The City will install concrete monuments to mark the boundaries of the landfill property and other permanent markers to outline the waste filled areas. These latter markers will be tied to one or more of the boundary markers by a survey performed by a registered land surveyor. The location and elevation of all markers will be shown on the site plan filed with the "Declaration to the Public" described below.

6.1.3.2 Final Survey and As Built Report

The City will have a final survey performed by a registered land surveyor to verify that final contours and elevations of the facility are in accordance with the plans as approved in the permit. Contours will be shown at no greater than 5-foot intervals. The City will include this information in an "as built" report and submit this report to FDER in accordance with the closing schedule.

6.1.3.3 Declaration to the Public

After closing operations are inspected and approved by FDER, the City will file a declaration to the public in the deed records in the office of the Monroe County Clerk. This will include a legal description of the property and a site plan specifying the area actually filled with solid waste with reference to the monuments referred to earlier. The declaration will also include a notice that any future owner or user of the site should consult with FDER prior to planning or initiating any activity involving the disturbance of the landfill cover system, monitoring system,

or other control structures. A certified copy of the declaration will be filed with FDER.

6.1.3.4 Official Closing Date

Upon receipt of the documents required under "Final Survey" and "Declaration to the Public" above, FDER will acknowledge by letter to the County within 30 days, that notice of termination of operations and closing of the facility has been received. The date of this letter will be the official date of landfill closing for the purposes of determining the long-term care period.

6.1.3.5 Use of Closed Areas and Construction on Closed Landfill

Closed landfill areas, if disturbed, are a potential hazard to public health, groundwater, and the environment. FDER will be consulted prior to conducting any activities at the closed landfill site.

6.1.4 LONG-TERM CARE

Following closure of the landfill, long-term care is required to ensure that the closed landfill poses no threat to human health or the environment. Such threat can be caused by abuse or misuse of the landfill property and decay or damage to the design features discussed throughout this report. It is essential to inspect the landfill and its facilities periodically during the post-closure period.

The City of Key West will take the responsibility to ensure that the landfill will not pose a threat to human health,

safety, or the environment. The long-term care period will last for a minimum of 20 years following the official closing date of the landfill.

The following is a list of items to be inspected and maintained during the long-term care period.

Fencing and Security: The security fence and gates must be secure to prevent unauthorized entry into the landfill. Any damage to the security fence and gates will be noted and repaired as soon as practical. The landfill grounds should be inspected at the same time for signs of unauthorized use.

Vegetation: Vegetative cover will be inspected to insure its viability as an erosion control measure. Watering, fertilizing, herbicide, and pesticide application will be performed, as necessary, to maintain the grass. No large vegetation such as trees, bushes, or other vegetation with a deep root system will be allowed to grow as the roots can penetrate and damage the synthethic membrane cover.

Cover: The cover will be inspected for signs of stormwater ponding, or damage which may be caused by burrowing animals, erosion, or settlement. Repairs will be undertaken in such a manner as to maintain the integrity of the final cover and drainage system.

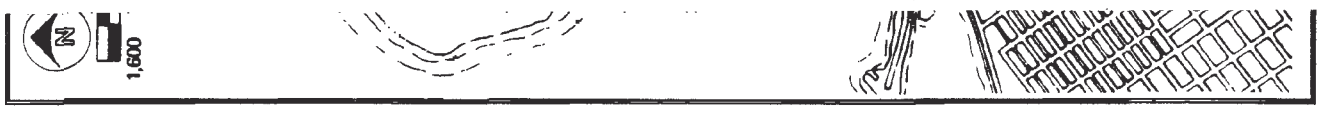
Exterior Berm: The exterior berm will be inspected for signs of sloughing or erosion. Such conditions will be repaired as soon as practical. Repairs will include restoring any vegetation lost as a result of the damage.

Drainage System: The drainage system will be maintained free of debris which might block or inhibit drainage. Damage to any pipes or underdrain systems will be repaired as soon as practical.

Monitor Wells: Monitor wells will be inspected and sampled according to the schedule outlined in Section 5.6 of the permit application. If any of these wells have been damaged or fail to operate for any reason, repairs will be performed or the well replaced within 60 days of the inspection.

6.5 FINANCIAL RESPONSIBILITY

As part of the permit application, Section 17-701.076 of the regulations requires proof of financial responsibility for the total cost of closure and long-term care costs. These costs shall be based on estimates for final cover, topsoil, seeding, fertilizing, mulching, labor, and long-term care. Cost estimates for the long-term care costs and closure costs are presented in Attachment 7 along with a copy of the financial responsibility from the City of Key West.



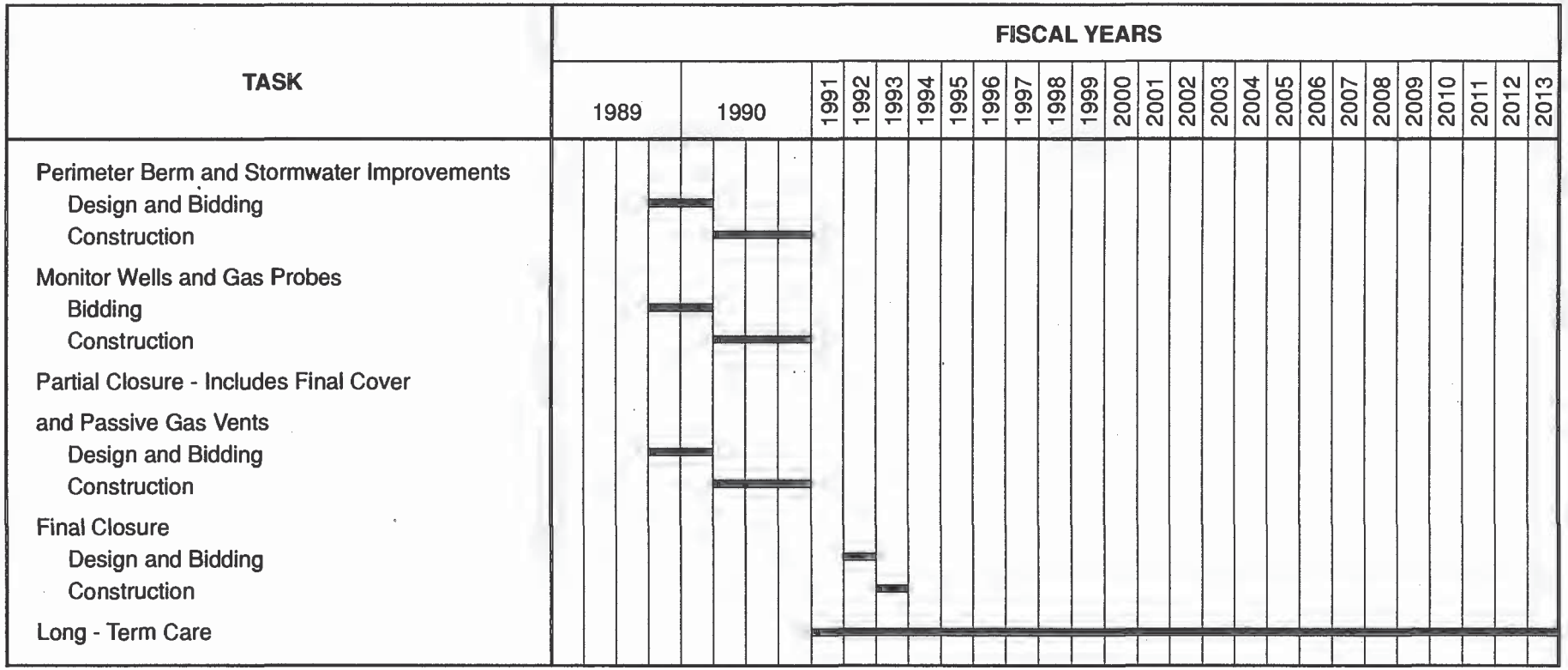


FIGURE 6-2.
Proposed Implementation Schedule.