SKYLINE LANDFILL
CITY OF FERRIS
DALLAS AND ELLIS COUNTIES, TEXAS
TCEQ PERMIT APPLICATION NO. MSW 42D

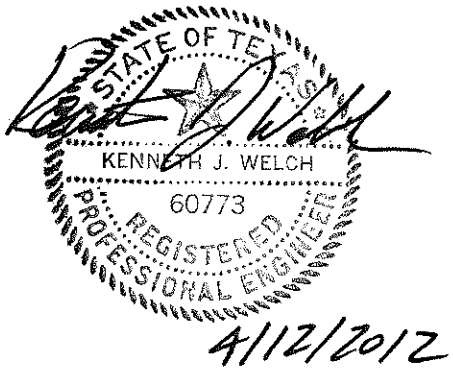
PERMIT AMENDMENT APPLICATION

VOLUME 5 OF 5

Prepared for

Waste Management of Texas, Inc.

April 2012



Prepared by

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TEXAS BOARD OF PROFESSIONAL ENGINEERS
FIRM REGISTRATION NO. F-256

TEXAS BOARD OF PROFESSIONAL GEOSCIENTISTS
FIRM REGISTRATION NO. 50222

SKYLINE LANDFILL
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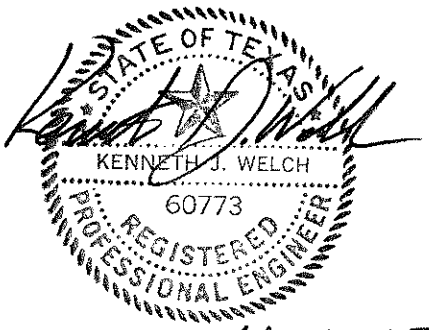
VOLUME 5 OF 5

CONTENTS



4/12/2012

SKYLINE LANDFILL
CITY OF FERRIS
DALLAS AND ELLIS COUNTIES, TEXAS
TCEQ PERMIT NO. MSW 42D

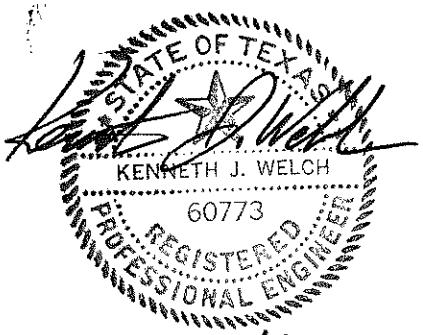
PERMIT AMENDMENT APPLICATION

PART III – FACILITY INVESTIGATION AND DESIGN
ATTACHMENT G
LANDFILL GAS MANAGEMENT PLAN

Prepared for

Waste Management of Texas, Inc.

April 2012



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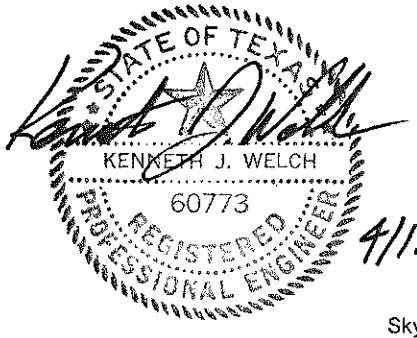

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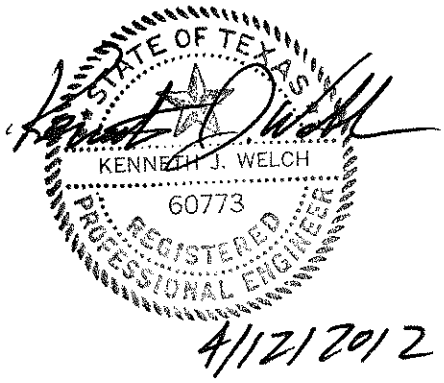

1 INTRODUCTION

30 TAC §§330.63(g), 330.371

1.1 Scope

This landfill gas (LFG) management plan has been developed for the Skyline Landfill as required by 30 TAC §330.63(g). This LFG management plan is consistent with the requirements set forth in §330.371. The LFG management plan provides a site-specific approach to implementing LFG monitoring. This plan describes the existing and proposed LFG monitoring network and discusses the operation and monitoring of this network, the verification of monitoring results, notification procedures, and outlines possible remediation activities, if required.

The Skyline Landfill will comply with all applicable federal and state regulations. These include the Environmental Protection Agency's (EPA) – Clean Air Act, Section 111(b), New Source Performance Standards (NSPS) for municipal solid waste (MSW) landfills, and the requirements of the TCEQ Office of Air Quality.

The NSPS for MSW landfills applies to landfills with design capacities greater than 2.5 million megagrams (2.75 million tons) or 2.5 million cubic meters. It is anticipated that the Skyline Landfill will operate per NSPS in April 2013 based on the following requirements:

- The design capacity exceeding 2.5 million megagrams and 2.5 million cubic meters
- The nonmethane organic compound (NMOC) emissions exceeding 50 megagrams per year

The site operates and monitors an active LFG collection and control system for completed waste disposal areas. Refer to Section 6 of this attachment for discussion on the active LFG collection and control system.

1.2 Purpose

Compliance with §330.371 requires landfills to implement a routine LFG monitoring program to verify that (1) the concentration of methane does not exceed 1.25 percent methane by volume in facility structures (excluding LFG collection and control system components), and that (2) the concentration of methane does not exceed 5 percent methane by volume in monitoring points, probes, subsurface soils, or other matrices at the facility permit boundary.

The lower explosive limit (LEL) and the upper explosive limit (UEL) are defined as the lowest and highest percent by volume of a mixture of explosive gases in air that will

propagate a flame at 25 degrees Celsius and atmospheric pressure. Methane is explosive when present between 5 (LEL) and 15 (UEL) percent by volume in air.

The purpose of this LFG management plan is to provide guidance for management of LFG at the site. These guidelines cover the evaluation of LFG migration at the points of compliance (permit boundary) and in structures on the permitted site. This will be verified by monitoring LFG concentrations at or within the facility permit boundary and within on-site buildings. Various options for LFG migration mitigation are discussed in Section 5 of this attachment.

1.3 General

Consistent with §330.371(d), the executive director may establish alternative schedules for demonstrating compliance with methane monitoring as required by §330.371(b), and with action plan activities as required by §330.371(c).

Consistent with §330.371(e), the landfill gas monitoring and control program will continue for a period of 30 years after certification of final closure of the facility, or until Waste Management of Texas, Inc. (WMTX) receives written authorization to reduce the program. Authorization to reduce gas monitoring and control shall be based on a demonstration by the owner or operator that there is no potential for gas migration beyond the permit boundary or into on-site structures. The demonstration will be supported by data collected and additional studies, as required.

Consistent with §330.371(f), gas monitoring and control systems will be revised as needed to maintain current and effective gas monitoring and control systems. Postclosure land use of the facility will not interfere with the function of gas monitoring and control systems.

2 SITE CHARACTERISTICS

30 TAC §330.371

2.1 Introduction

Twenty-four permanent LFG monitoring probes have been installed along the perimeter of the active waste fill area to detect potential LFG migration. The installed LFG monitoring probes serve as the point of compliance regarding LFG migration. The existing and proposed LFG monitoring probe locations are shown on Drawing G1.1 – Landfill Gas Monitoring Probe Plan in Appendix G1. GP-31R, GP-32R, GP-33R, GP-37R, and GP-38 will be relocated and GP-35, GP-36, GP-39, GP-40, and GP-41 will be replaced within 120 days from the issuance of the permit for this proposed expansion.

2.2 Soil Conditions

The site geologic conditions present at the Skyline Landfill are discussed in Part III, Attachment E – Geology Report.

2.3 Hydrogeologic Conditions

The hydrogeologic conditions present at the Skyline Landfill are discussed in detail in Part III, Attachment E – Geology Report.

2.4 Hydraulic Conditions

Hydraulic conditions at the Skyline Landfill are discussed in Part III, Attachment C1 – Permit Boundary Drainage Analysis and Design.

2.5 Facility Structures within the Property Boundary

The Skyline Landfill has a permit boundary encompassing approximately 662 acres, of which approximately 284 acres will be available for waste placement. There are several existing structures within the Skyline Landfill permit boundary. These structures include a gatehouse, maintenance and office facility, and Landfill Gas to Energy (LFGTE) facility. The gatehouse, maintenance and office facility, storage and powerwash building, and LFGTE facility are enclosed and have permanent methane monitors. There is a maintenance and office facility that houses the Waste Management Hauling Company and a training facility that is located within the permit boundary and has permanent methane monitors. All enclosed structures will be monitored for the presence of LFG as

described in Section 3.2.1 of this attachment. Refer to Drawing G1.1 and G1.3 for location of structures.

2.6 Underground Utilities

There are no underground utility lines or easements that enter or exit the Skyline Landfill permit boundary within the vicinity of the perimeter of the active waste fill area that require monitoring or venting.

2.7 Offsite Structures

All Skyline Landfill facility structures are located within the permit boundary. All known habitable structures located off site within 1/4 mile (1,320 feet) of the waste disposal area are depicted on Drawing G1.4 in Appendix G1.

3 MONITORING

30 TAC §330.371

3.1 Perimeter Monitoring

3.1.1 Perimeter Monitoring Network

The LFG monitoring probe network at the landfill includes a total of 24 existing LFG monitoring probes located along the perimeter of the active waste fill area. Locations of the existing LFG monitoring probes are shown in Appendix G1, Drawing G1.1 – Landfill Gas Monitoring Probe Plan. Copies of the available installation logs for the existing permanent LFG monitoring probes are included in Appendix G3.

The existing LFG monitoring probes GP-35, GP-36, GP-39, GP-40, and GP-41 will be replaced and deepened consistent with the deepened excavation. Existing gas probes GP-37R and GP-38 will be relocated since they are currently located in the proposed waste disposal footprint. Proposed gas probes GP-29, GP-30, GP-31RR-A, and GP-32RR-A will be added and existing gas probes GP-31R, GP-32R, and GP-33R will be relocated along the permit boundary. The remaining existing gas probes will remain in place for the proposed configuration.

Refer to Appendix G1, Drawing G1.1 for the proposed LFG monitoring probe network. As discussed in Section 2.1, the proposed LFG monitoring probes will be installed within 120 days from the issuance of the permit for this proposed expansion.

3.1.2 Landfill Gas Monitoring Probes

LFG monitoring probes have been installed along the perimeter of the waste fill area.

Boring logs and typical construction details for the LFG probes were submitted to the TCEQ as part of the Gas Monitoring Probe Installation Report. Copies of the available installation logs for the existing permanent LFG monitoring probes are included in Appendix G3. Proposed LFG monitoring probes will be installed in accordance with the detail shown on Drawing G1.2 – Monitoring Probe Detail.

3.1.3 Monitoring Procedures

Monitoring will be conducted by a qualified landfill representative or a qualified consultant. To avoid artificially impacting the probe static pressure during the induction of the gas sample into the instrument, the static pressure will be measured and recorded prior to measuring gas composition. Static gas pressure will be measured and recorded in inches of water column. The operation of the monitoring equipment will be as recommended by the instrument manufacturer.

During each monitoring event, the probes will be monitored for the following parameters:

- Methane concentration, as measured in percent by volume
- Oxygen concentration, as measured in percent by volume
- Static pressure, as measured in inches of water column, gauge
- Depth to groundwater, as measured in feet

Monitoring for gas composition, gas pressure, and ambient temperature will be performed using a portable Landtec® GEM-2000, or equivalent instrument, capable of measuring the required parameters. The instrument will be calibrated against known methane and oxygen standards prior to each monitoring event. The instrument may also be checked against known gas standards in the event of encountering methane concentrations at or near regulatory compliance levels, or questionable or suspicious monitoring results. The monitoring equipment will be calibrated and maintained in accordance with the manufacturer's recommended procedures. Manufacturer's maintenance and calibration requirements for the monitoring instruments will be maintained on site with the LFG monitoring records described in Section 3.3.

After these parameters are measured, the probe of a liquid level indicator will be lowered into the LFG probe through an opening located on the top of the LFG probe to measure water level (if any) inside the LFG probe. If no water is present, the level indicator will be used to verify and report total depth of probe to assure that a probe is not obstructed.

3.1.4 Maintenance Procedures

Each time LFG monitoring is conducted, the sampler will inspect the integrity of the LFG monitoring probes. The sampler will record pertinent information on the Quarterly Landfill Gas Monitoring Report (see Appendix G2 – Reporting and Recording Forms) or similar forms. The Quarterly Landfill Gas Monitoring Report will be kept in the Site Operating Record. The sampler will perform the following at each monitoring event:

- Verify that the LFG monitoring probe is clearly labeled on the outer casing or lid.
- Verify that the protective casing is intact and is not bent or excessively corroded.
- Verify that the concrete pad is intact (no evidence of cracking or heaving).
- Verify that the padlock is functional.
- Verify that the inner casing is intact.

If damage to the LFG monitoring probe is observed, it will be reported to the landfill manager. If it is not possible to repair the LFG monitoring probe and the damage can

potentially affect the accuracy of future monitoring results, the LFG monitoring probe will be decommissioned and replaced with a new LFG monitoring probe in accordance with Sections 3.1.2 and 3.4 of this attachment.

The combustible gas monitoring instrument will be calibrated and maintained in accordance with the manufacturer's instructions.

3.2 Facility Structures Monitoring

3.2.1 Monitoring Procedures

On-site buildings and structures designed for human occupation will be monitored, at a minimum, quarterly with either a portable combustible gas indicator or a continuous LFG monitor/alarm that will provide an audible alarm if methane concentrations exceed 1.25 percent methane by volume.

If allowable methane concentration limits are exceeded within structures, the building will be immediately evacuated and ventilated by opening doors and windows. Notification consistent with procedures in Section 4.2 of this attachment will be implemented immediately.

3.2.2 Maintenance Procedures

If continuous LFG monitors/alarms are used, they will be calibrated and maintained in accordance with the manufacturer's recommendations. Continuous LFG monitors/alarms will be tested, following the manufacturer's testing specifications.

3.3 Recordkeeping/Reporting

Field monitoring data records will be maintained for the methane monitoring and kept in the Site Operating Record. Field data will be recorded on the Quarterly Landfill Gas Monitoring Report form (or similar form) as shown in Appendix G2 – Reporting and Recording Forms.

Quarterly monitoring results will be placed in the Site Operating Record. LFG monitoring points, probes, subsurface soils, or other matrices will be monitored quarterly. The LFG monitoring program will continue for a period of 30 years after the final closure of the facility or until the owner or operator receives written authorization from the TCEQ to revise or discontinue the program. Gas monitoring records will be maintained in the site operating record.

3.4 Backup Plan for Monitoring Probes and Continuous Monitors

The following is a back-up plan to be used if any installed LFG monitoring probes or continuous monitoring devices become unusable or inoperative.

Stationary Perimeter Probes

1. Damaged or inoperative perimeter probes will be repaired within 30 days of the date of damage or replaced within 60 days from the TCEQ approval date of the permit modification requesting replacement.

2. Upon completion of the replacement probe, an installation report including boring logs and construction details will be submitted to the TCEQ.

3. Should a monitoring event occur prior to replacement of a damaged probe, a barhole will be placed next to the damaged probe or vent and a portable gas monitor used until the probe or vent is replaced.

Stationary Combustible Gas Monitor

1. Damaged or inoperative stationary combustible gas monitors will be repaired within 30 days of the date of damage.

2. A portable gas indicator will be used until the damaged or inoperative stationary unit is replaced.

3.5 Monitoring Frequency

LFG monitoring points, probes, subsurface soils, or other matrices and facility structures are monitored quarterly, at a minimum. The facility will monitor more frequently those locations where monitoring results indicate that LFG migration is occurring or is accumulating in structures.

4 ACTION PLAN

30 TAC §330.371

4.1 Initial Response Measures

As required under 30 TAC §330.371, this action plan has been prepared for the protection of human health in the event concentrations of methane exceed allowable limits either within on-site buildings or at the permit boundary of the site. The appropriate emergency response is different for each situation; therefore, this plan addresses buildings and permit boundaries separately.

This plan also recognizes that a single event exceedance of allowable limits on a gas indicator or alarm does not necessarily mean that the concentration of methane has actually exceeded allowable levels.

4.1.1 Emergency Action

The initial action in the event methane is detected at levels above regulatory limits is to protect human health. The specific response depends on the circumstances of the situation.

Buildings/Structures. If the monitoring device in a facility building/structure is triggered, or if gas monitoring equipment indicates that the methane concentration has exceeded the regulatory limit, the building/structure is to be evacuated of all personnel immediately and the landfill manager will be notified. Personnel (except for authorized monitoring personnel) will not be allowed to re-enter the affected building/structure until additional measures are taken. Notification consistent with procedures in Section 4.2 of this attachment will be conducted immediately.

Permit Boundary. If methane levels above the regulatory limit are detected at the permit boundary in the LFG monitoring points, probes, subsurface soils, or other matrices, the landfill manager will be notified. The immediate emergency response measure will be for the landfill manager to determine if any nearby buildings or structures (including off-site) are at risk and if evacuation of the buildings or structures should be requested.

4.1.2 Verification Procedures

Once emergency measures have been taken to protect human health, the landfill manager will require monitoring personnel to begin verification procedures. Such procedures are intended to determine if the methane levels detected are accurate, or if erroneous levels have been detected due to equipment malfunction or other reasons. Field monitoring data records will be maintained for the methane verification monitoring and kept on site as part of the site operating record.

Buildings/Structures. Verification of detected methane levels in the facility structures will be conducted within 24 hours by properly trained monitoring personnel using the following procedures:

- Monitor methane levels throughout the building/structure using a calibrated portable gas indicator. In particular, readings will be taken in each room and in confined spaces (i.e., closets). If there are natural gas appliances in the building/structure, they should be checked for leaks.

- Determine if continuous monitoring equipment, if installed, is working properly.

If concentrations of explosive gases above the regulatory limit are not detected (i.e., a malfunction or erroneous reading is suspected), personnel may return to the building/structure. Methane monitoring using a portable combustible gas detector will continue daily for one week after the incident. If levels of methane above the regulatory limit are not detected during that week, daily monitoring will cease and routine monitoring will resume.

In the event concentrations of methane above the regulatory limit are detected during initial verification procedures or during the follow-up procedures in the ensuing week, notification and remediation procedures must be implemented, as described in Sections 4.2 and 5 of this attachment.

Permit Boundary. Verification of methane levels above the regulatory limit in LFG monitoring points, probes, subsurface soils, or other matrices will be conducted within 24 hours by monitoring personnel using the following procedures:

- Recalibrate gas detection equipment according to recommended procedures.

- Immediately recheck the methane concentration in the LFG monitoring probe.

- Recheck the methane concentration again within 7 days on a day of operation.

If concentrations of methane above the regulatory limit are not detected in the above verification procedure, routine monitoring procedures will resume.

In the event concentrations of methane above regulatory limits are detected during the above verification procedures, notification and remediation procedures must be implemented, as described in Sections 4.2 and 5 of this attachment.

4.2 Notification Procedures

When methane concentrations above the regulatory limit have been verified in the monitoring points, probes, subsurface soils, or other matrices, or within any on-site structures, notification will be made immediately in accordance with §330.371. Notification will be made to the executive director of the TCEQ, county and local officials, emergency officials, and the public.

When methane levels above the regulatory limit have been verified (refer to Section 4.1.2 of this attachment), the landfill manager will place in the site operating record documentation of the methane gas levels detected and a description of the steps taken to ensure protection of human health within seven days of detection in accordance with §330.371. Written notification will also be sent to the TCEQ Region 4 Office within seven days outlining the steps taken.

5 REMEDIATION PLAN

30 TAC §330.371

5.1 Remediation Plan

If verification procedures have confirmed that methane levels are above regulatory limits in the buildings/structures or in one or more LFG monitoring points, probes, subsurface soils, or other matrices, remediation actions will be implemented within 60 days. The first remediation action will be an investigation of the cause of the methane levels. The investigation may include some or all of the following elements, depending on the circumstances:

- Bar-hole probe or hydropunch testing in the vicinity of the impacted monitoring probe
- Sampling and laboratory analysis of LFG monitoring probe samples to determine concentration of methane and trace compounds
- Additional LFG probe monitoring
- Installation of additional monitoring probes

Using accumulated data, an assessment will be made to determine an appropriate course of action to mitigate the migration of LFG. Such actions will vary with the specific incident. A remediation plan will be submitted as a permit modification in accordance with 30 TAC §330.371, if required for changes in the LFGMP, in monitoring frequency, installation of additional gas probes, construction of trenches or wells, or other changes required for modification. The incident specific remediation plan, based on results of the investigation, will be submitted within 60 days of detection. Copies of the remediation plan will be placed in the operating record and provided to the executive director of the TCEQ along with notification that the plan has been implemented. The executive director may establish an alternative schedule for demonstrating compliance.

6 LFG CONTROL SYSTEM

30 TAC §330.371

The Skyline Landfill is required to install, operate, and monitor an active LFG collection and control system in accordance with TCEQ and federal rules and regulations. An active LFG control system has been installed over the Pre-Subtitle D area with final cover and active waste disposal area, Phase 1A and portions of Phase 1B. This existing system consists of extraction wells, and extraction trench, collection and header piping and condensate sumps. In addition, a LFG flare and a Landfill Gas to Energy (LFGTE) facility have been installed, consistent with TCEQ Type IV Registration No. 48018. Refer to Appendix G4 for information related to the existing active LFG system.

The Skyline Landfill will expand the existing active LFG system as the remaining waste disposal areas are developed and filled. The timing for installation of the active LFG control system will depend on fill patterns. The future active LFG control system will be expanded into future areas as documented in Appendix G5.

SKYLINE LANDFILL

APPENDIX G1
LANDFILL GAS MONITORING PROBE LOCATIONS AND DETAILS

30 TAC §330.371

0 300 600
SCALE IN FEET

LEGEND

- PERMIT BOUNDARY
- LANDFILL FOOTPRINT
- 550 EXISTING GROUND CONTOUR
- N 323000 STATE PLANE GRID (NAD 27)
- PHASE BOUNDARY
- CELL BOUNDARY
- (10) CELL DESIGNATION
- GP-34 EXISTING LFG MONITORING PROBE
- GP-40R PROPOSED LFG MONITORING PROBE
- PRE-SUBTITLE D AREA WITH FINAL COVER

NOTE:

1. EXISTING CONTOURS COMPILED BY AEROMETRIC FROM AERIAL PHOTOGRAPHY. FLOWN MARCH 6, 2011. COORDINATE SYSTEM IS BASED ON TEXAS STATE PLANE NAD 27, TEXAS NORTH CENTRAL ZONE, US FEET.
2. REFER TO DRAWING G1.2 FOR LANDFILL GAS MONITORING PROBE DETAIL AND INFORMATION.

STATE OF TEXAS
KENNETH J. WELCH
60773
REGISTERED PROFESSIONAL ENGINEER
4/12/2012

ISSUED FOR PERMITTING PURPOSES ONLY

LANDFILL GAS MONITORING PROBE PLAN

WASTE MANAGEMENT OF TEXAS, INC.
SKYLINE LANDFILL
MAJOR PERMIT AMENDMENT

BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
MANSFIELD • WICHITA FALLS
817-553-1144

TBPE FIRM NO. F-256 | TBPG FIRM NO. 50222

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DRAWING G1.1

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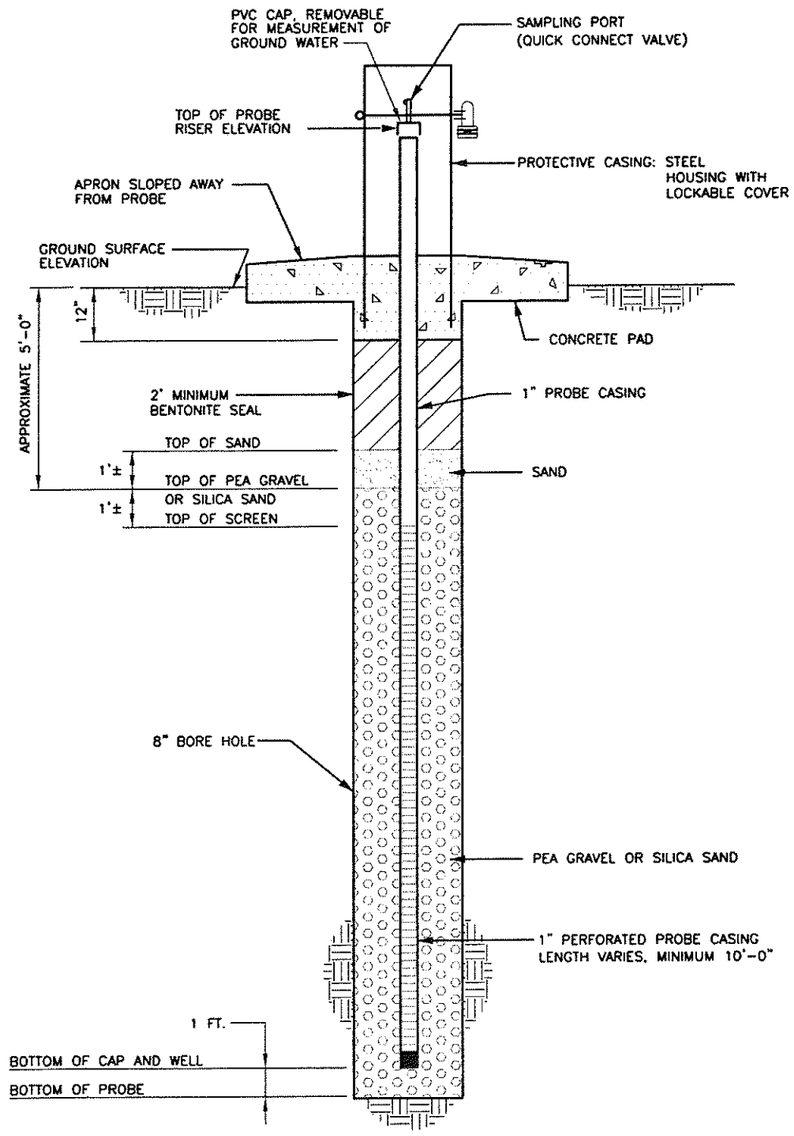

MONITORING PROBE DETAILS (MP-1) G1.2

GAS MONITORING PROBE INFORMATION					
GAS PROBE	GROUND ELEVATION (FT-MSL)	PROBE DEPTH (FT-BGS)	BOTTOM OF PROBE ELEVATION (FT-MSL)	NORTHING	EASTING
EXISTING GAS MONITORING PROBES					
GP-5	479.8	73.8	406.0	320411	2255306
GP-6	465.7	59.7	406.0	319112	2256522
GP-7	472.0	66.0	406.0	319084	2256373
GP-8	490.7	84.7	406.0	319562	2256089
GP-12	490.0	84.0	406.0	319742	2256058
GP-21R	450.1	45.0	405.1	319218	2256802
GP-22R	451.9	45.0	406.9	319338	2257146
GP-23	448.6	42.6	406.0	320387	2257085
GP-25	478.9	45.0	433.9	320052	2254947
GP-26	479.3	35.0	444.3	319737	2254903
GP-28	487.8	30.0	437.8	319681	2253895
GP-34	431.8	25.0	406.8	322528	2251214
GP-43R	447.4	26.0	421.4	321692	2256900
GP-44	441.5	21.5	420.0	320837	2257071
PROPOSED GAS MONITORING PROBE INFORMATION					
GP-29	486	52	434.0	318975	2253721
GP-30	476	42	434.0	318886	2252798
GP-31RR	478	44	434.0	318969	2252032
GP-31RR-A	492	58	434.0	319829	2251521
GP-32RR	478	44	434.0	320380	2251963
GP-32RR-A	468	44	424.0	321255	2251524
GP-33RR	450	26	424.0	321844	2251175
GP-35R	425.8	41.8	384.0	323430	2251631
GP-36R	417.5	33.5	384.0	324048	2251999
GP-37RR	455.6	71.6	384.0	324016	2252766
GP-38R	408.0	24.0	384.0	323983	2253532
GP-39R	415.6	31.6	384.0	323951	2254298
GP-40R	430.2	46.2	384.0	323800	2255252
GP-41R	433.6	49.6	384.0	322947	2255594

NOTES

1. ALL SIZES AND DIMENSIONS ARE APPROXIMATE.
2. REFER TO APPENDIX G3 FOR INSTALLATION LOGS OF EXISTING PROBES GP-21R, 22R, 25, 26, 28, 34, 43R, AND 44.
3. BASED ON LANDFILL GAS MANAGEMENT PLAN INCLUDED IN PERMIT 42-C, EXISTING GAS PROBES HAVE BEEN DESIGNED TO MONITOR THE UNSATURATED ZONE BENEATH THE GROUND SURFACE AND ELEVATION OF THE BASE OF THE NEAREST WASTE PLACEMENT.
4. EXISTING GAS PROBES GP-5, 6, 7, 8, 12, AND 23 ESTIMATED TO BE DESIGNED CONSISTENT WITH GP-21R AND 22R BASED ON CLOSE PROXIMITY AND LOCATION OF PRE-SUBTITLE D AREA WITH FINAL COVER.
5. PROPOSED PROBES WILL BE INSTALLED TO MONITOR THE SOIL STRATA ABOVE THE PROPOSED BOTTOM OF WASTE WITHIN 1,000 FEET OF THE MONITORING PROBE.

STATE OF TEXAS
KENNETH J. WELCH
60773
REGISTERED PROFESSIONAL ENGINEER
4/12/2012

ISSUED FOR PERMITTING PURPOSES ONLY

REVISIONS							
REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY	

MONITORING PROBE DETAIL

WASTE MANAGEMENT OF TEXAS, INC.
SKYLINE LANDFILL
MAJOR PERMIT AMENDMENT

BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
MANSFIELD • WICHITA FALLS
817-563-1144
TBPE FIRM NO. F-256 TBPG FIRM NO. 50222

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CHK. KJW	DWG : G1.2_ProbeDetail.dwg		

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0 100 200
SCALE IN FEET

LEGEND

- PERMIT BOUNDARY
- EXISTING CONTOUR
- N 323000 — STATE PLANE GRID (NAD 27)
- CONCRETE PAVEMENT

NOTES:

1. EXISTING CONTOURS COMPILED BY AEROMETRIC FROM AERIAL PHOTOGRAPHY, FLOWN MARCH 6, 2011. COORDINATE SYSTEM IS BASED ON TEXAS STATE PLANE NAD 27, TEXAS NORTH CENTRAL ZONE, US FEET.
2. ENCLOSED STRUCTURES INCLUDE GATEHOUSE, LANDFILL OFFICE AND MAINTENANCE BUILDING, STORAGE BUILDING, POWERWASH BUILDING, LANDFILL GAS TO ENERGY FACILITY BUILDING, HAULING COMPANY OFFICE AND MAINTENANCE BUILDING, AND HAULING COMPANY TRAINING BUILDING. ALL ENCLOSED STRUCTURES HAVE PERMANENT GAS MONITORS.

STATE OF TEXAS
KENNETH J. WELCH
60773
REGISTERED
PROFESSIONAL ENGINEER
4/12/2012

ISSUED FOR PERMITTING PURPOSES ONLY

REVISIONS						
REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY

STRUCTURES WITHIN PERMIT BOUNDARY

WASTE MANAGEMENT OF TEXAS, INC.
SKYLINE LANDFILL
MAJOR PERMIT AMENDMENT

BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
MANSFIELD • WICHITA FALLS
817-563-1144
TBPE FIRM NO. F-256 | TBPG FIRM NO. 50222

DSN. SAB	DATE : 04/12	DRAWING	G1.3
DWN. SRC	SCALE : GRAPHIC		
CHK. KJW	DWG : G1.3-WasteSchem.dwg		

0 500 1000

SCALE IN FEET

LEGEND

- PERMIT BOUNDARY
- LANDFILL FOOTPRINT
- 1/4 MILE RADIUS
- PRE-SUBTITLE D AREA WITH FINAL COVER

NOTES:

1. AERIAL PHOTOGRAPH PROVIDED BY AERO-METRIC FROM AERIAL PHOTOGRAPHY FLOWN MARCH 6, 2011.

STATE OF TEXAS
KENNETH J. WELCH
60773
REGISTERED
PROFESSIONAL ENGINEER

4/12/2012

ISSUED FOR PERMITTING PURPOSES ONLY

REVISIONS							
REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY	

STRUCTURES WITHIN 1/4 MILE OF WASTE FOOTPRINT

WASTE MANAGEMENT OF TEXAS, INC. SKYLINE LANDFILL MAJOR PERMIT AMENDMENT

BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
MANSFIELD • WICHITA FALLS
817-563-1144
TBPE FIRM NO. F-256 TBPG FIRM NO. 50222

DSN. SAB	DATE : 04/12	DRAWING	
DWN. SRC	SCALE : GRAPHIC	G1.4	
CHK. KJW	DWG : G1.4-QuartMileStruct.dwg		

SKYLINE LANDFILL

APPENDIX G2
REPORTING AND RECORDING FORMS

30 TAC §330.371

SKYLINE LANDFILL MSW 0042-D
LANDFILL GAS MONITORING REPORT

INSTRUMENTATION INFORMATION

Combustible Gas Instrument Type: _____ Serial No: _____
Pressure Instrument Type: _____ Serial No: _____
Water Level Instrument Type: _____ Serial No: _____

Field calibration report. Results are in tolerance with +/- 3 % of factory calibration.

	Time/Date	Methane	CO2	O2	Balance
Factory Calibration					
Field Calibration					

ADDITIONAL INFORMATION

Weather Conditions: _____
Barometric Pressure: _____ Temperature: _____
Sampling Date: _____ Sampler: _____
Time: Start: _____ Finish: _____

ON-SITE STRUCTURES

ON-SITE STRUCTURE	*Verify if Continuous LFG Alarm is Operational*		*Continuous LFG Alarm Activated (LEL>25%) During Previous Quarter*		*Continuous LFG Alarm have current calibration sticker; date on sticker*		
	Circle One		*Circle One*		*Circle One*		
Gate House	Yes	No	Yes	No	Yes	No	Date:
Maintenance (LF)	Yes	No	Yes	No	Yes	No	Date:
LFM Office	Yes	No	Yes	No	Yes	No	Date:
Power Wash Build	Yes	No	Yes	No	Yes	No	Date:
Container Shop Office	Yes	No	Yes	No	Yes	No	Date:
Hauling Mgr. Office	Yes	No	Yes	No	Yes	No	Date:
Haul Shop Mgr. Office	Yes	No	Yes	No	Yes	No	Date:
Barn	Yes	No	Yes	No	Yes	No	Date:

Tornado Shelter (Landfill) test quarterly for methane concentrations? *Yes* *No*

GENERAL COMMENTS:

_____
_____
_____
_____

SKYLINE LANDFILL MSW 0042-D
LANDFILL GAS MONITORING REPORT

GAS PROBES

PROBE #	SURFACE ELEV.	BOTTOM ELEV.	TIME SAMPLED	STATIC PRESSURE	% CH_4	% LEL[2]	DEPTH TO WATER	PROBE INTEGRITY VERIFIED
	Ft-msl	*Ft-msl*		*"w.c.*[1]	*0-100*	*0-100*		*YES/NO*[3]
5								
6								
7								
8								
12								
21								
22								
23								
25								
26								
28								
31RR								
31RR-A								
32RR								
32RR-A								
33RR								
34								
35								
36								
37RR								
38								
39								
40								
41								
42								
43R								
44								

1 *"w.c.-inches Water Column*
2 *% LEL=(20) X (observed % methane)- Note: Record>100% in LEL column if % methane is <5%*
3 Note any problems with the probes in the general comments section above.

Sampler: _____

Company: _____

Date: _____

Gas Operations Mgr: _____

Landfill Site Mgr: _____

SKYLINE LANDFILL

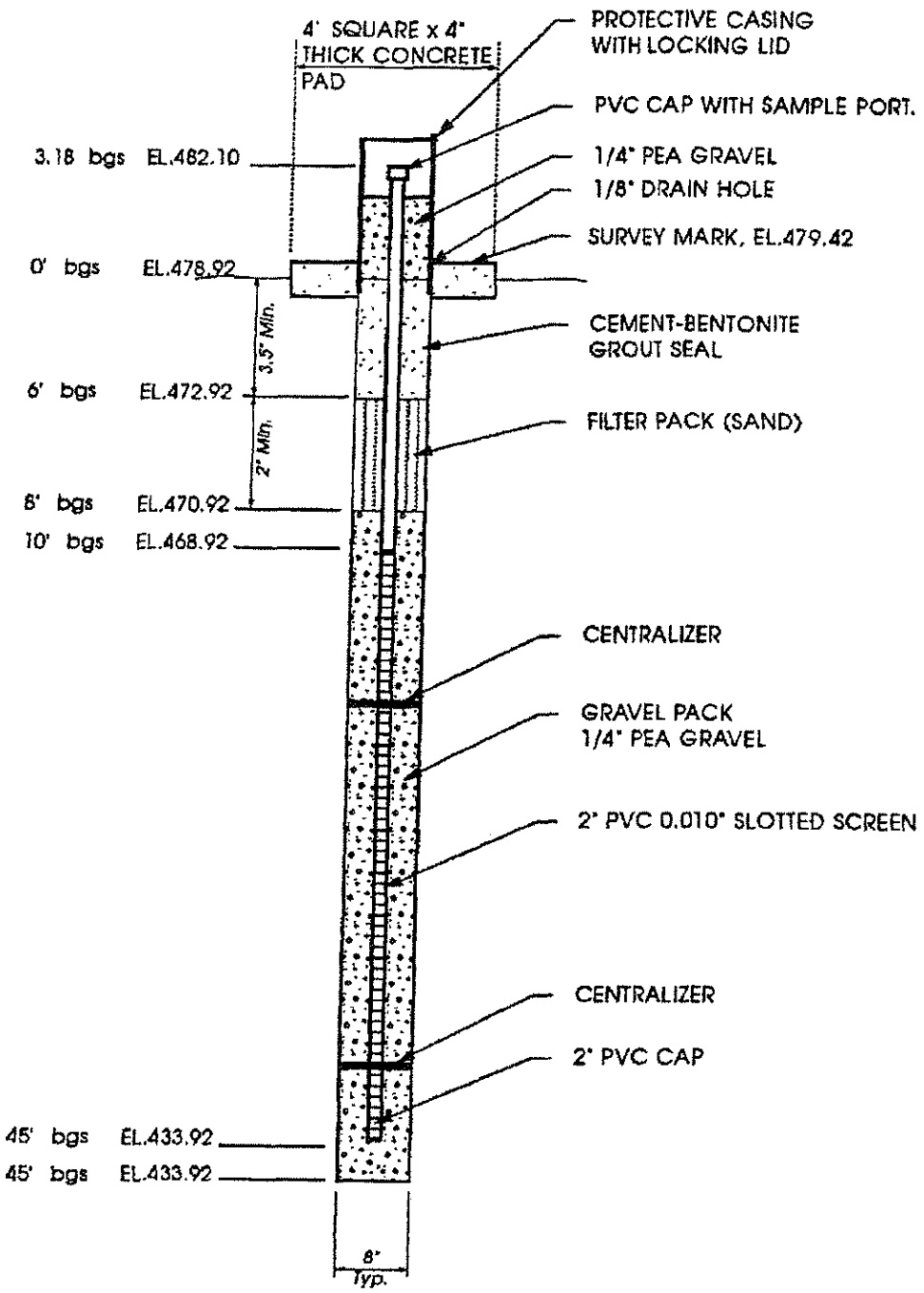
APPENDIX G3
INSTALLATION INFORMATION AND TCEQ PERMIT MODIFICATION APPROVALS – EXISTING LANDFILL GAS MONITORING PROBES

30 TAC §330.371

INSTALLATION OF LFG MONITORING PROBES
GMP 25, 26, 28, 34, 44

(COPY OF SOIL BOREHOLE LOG)

INSTALLED: JUNE 1995
INSTALLED BY: MCGUIRE DRILLING CO., INC.



GAS PROBE INSTALLATION

Skyline Landfill & Recycling Center

GAS PROBE 25

BLACK & VEATCH

8/17/95 26286.100

McGuire Drilling Co., Inc.
2406 Rochelle Rd.
Irving, Texas 75062
(214) 255-9129

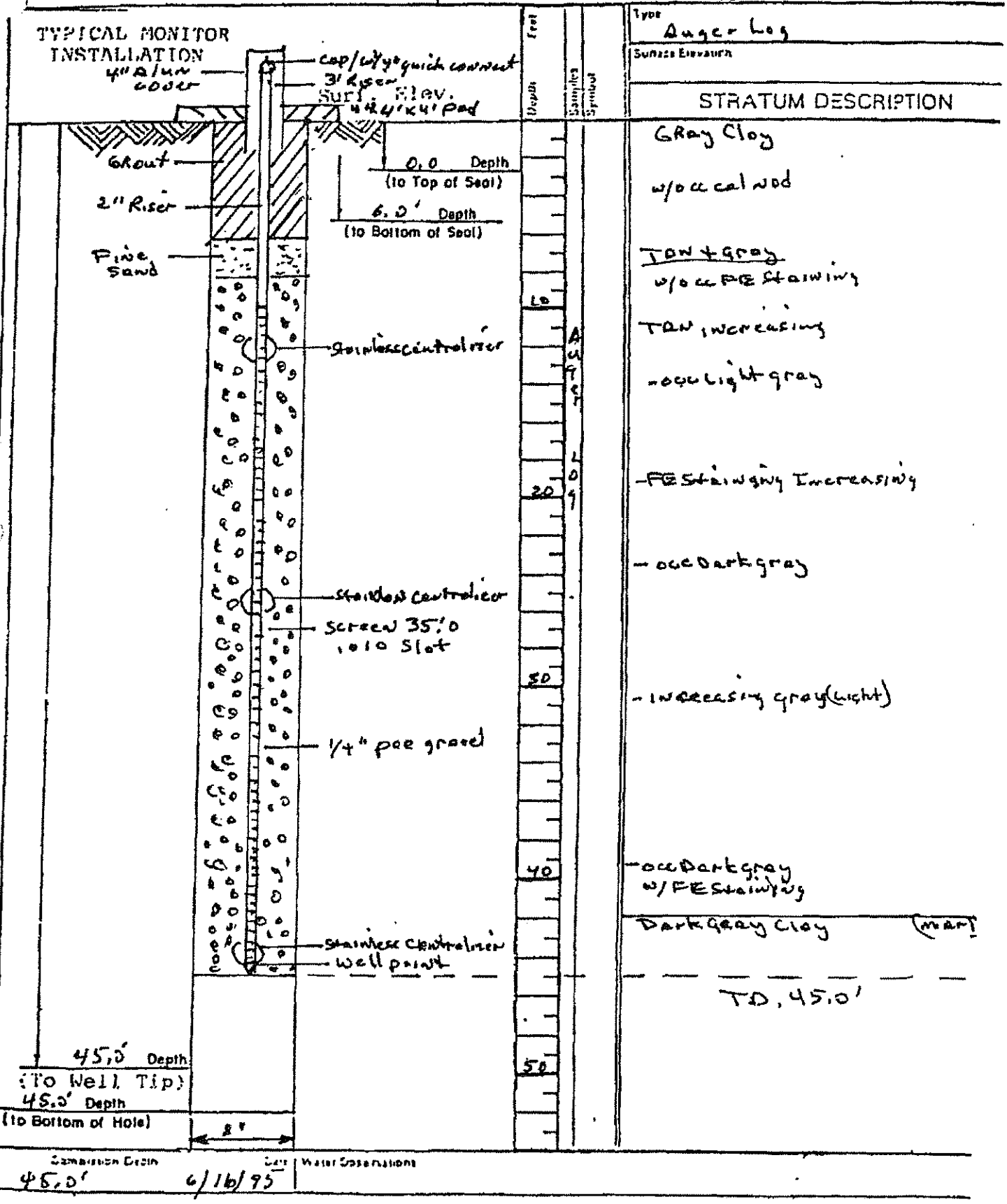
Log of Boring 1 of GP25

Project: WMI Skyline SLF (Doc Prob)

Location: Ferris, Tex.

Type: Auger Log

Surface Elevation:



STRATUM DESCRIPTION

Gray Clay

w/occ cal nod

TAN + gray

w/occ FE staining

TAN, increasing

-occ light gray

-FE staining increasing

-occ dark gray

-increasing gray (light)

-occ dark gray w/FE staining

Dark gray Clay (marl)

TD, 45.0'

Completion Depth	Date	Water Observations
45.0'	6/16/95	

LOG OF BORING GAS PROBE GP-25

WASTE MANAGEMENT OF TEXAS
MSW Permit 42-C
Dallas & Ellis County, Texas

TYPE OF BORING: HSA

LOCATION: T+47 53+49

ELEVATION: Top Pipe 482.10 Ground 478.92

DEPTH, FT.	SYMBOL	SAMPLES	SOIL DESCRIPTION
			Firm to stiff, dark brown CLAY.
			Occasional calcareous nodules.
5			
			7' (CH)
			Firm to very stiff, tan and gray CLAY (Weathered Taylor) with occasional iron staining.
10			
			Occasional light gray.
15			
			Increased iron staining.
20			
			Occasional gray.
25			
30			
			Increased light gray.
35			

7/28/95 20286.110

LOG OF BORING GAS PROBE GP-25 (cont.)

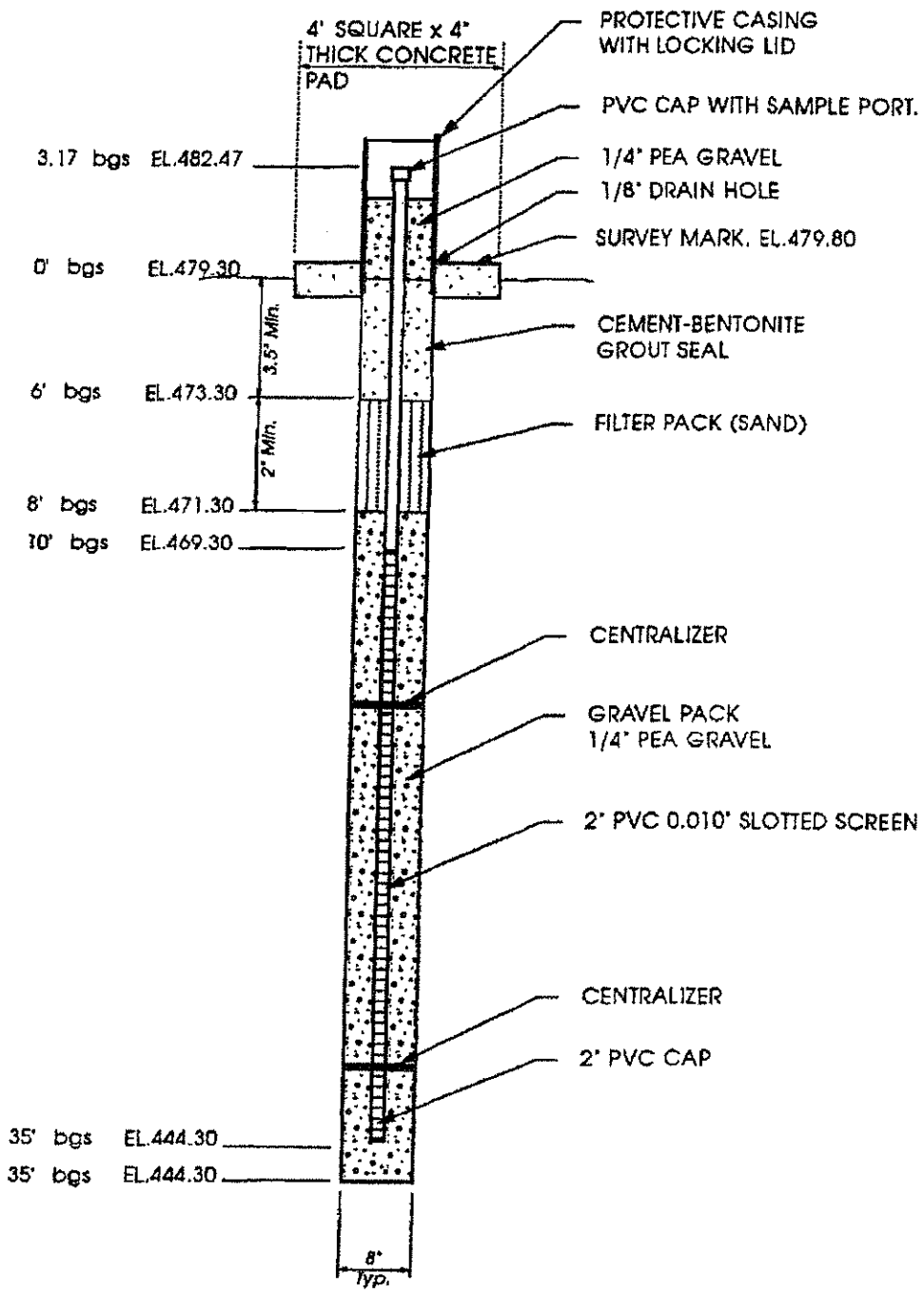
WASTE MANAGEMENT OF TEXAS
MSW Permit 42-C
Dallas & Ellis County, Texas

TYPE OF BORING: HSA | LOCATION:

DEPTH, FT.	SYMBOL	SAMPLES	SOIL DESCRIPTION	ELEVATION:
40			Occasional dark gray and iron staining.	
			42'	(CH)
			Hard, dark gray CLAY (Taylor Marl).	
45			*Total Depth 45'*	(CH)
50				
55				
60				
65				
70				

Notes:

7/28/95 26286.110



GAS PROBE INSTALLATION

Skyline Landfill & Recycling Center

GAS PROBE 26

BLACK & VEATCH

8/17/95 26286.100

McGuire Drilling Co., Inc.
2406 Rochelle Rd.
Irving, Texas 75062
(214) 255-9129

Log of Boring

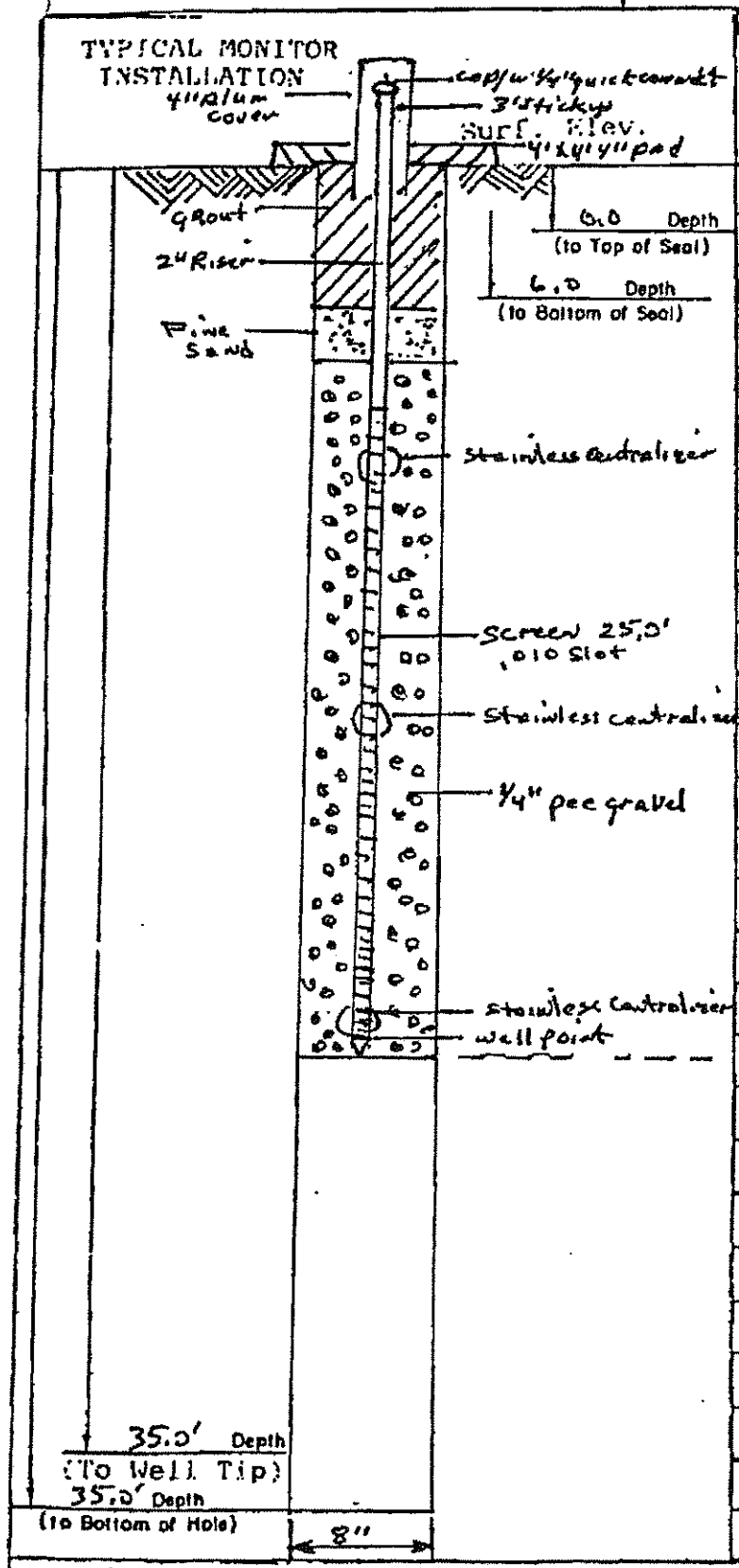
Number GP26

Project: WMI Skyline SLF (Gas Prob)

Location: Ferris Tex

Type: Auger Log

Surface Elevation:



STRATUM DESCRIPTION

Gray Clay w/ occ cal nods

Tan-tan gray w/ occ FeStaining

- increasing light gray

- occ Dark gray

Dark Gray Clay (marl)

T.D. 35.0'

Completion Depth	Date	Water Observations
35.0'	6/15/95	

LOG OF BORING GAS PROBE GP-26

WASTE MANAGEMENT OF TEXAS
MSW Permit 42-C
Dallas & Ellis County, Texas

TYPE OF BORING: HSA — LOCATION: T+02 56+64

DEPTH, FT. | SYMBOL | SAMPLES | SOIL DESCRIPTION — ELEVATION: Top Pipe 482.47, Ground 479.30

5

10

15

20

25

30

35

Firm to stiff, dark brown CLAY.

8' (CH)

Firm to very stiff, tan and gray CLAY (Weathered Taylor) with occasional iron staining.

Increasing light gray.

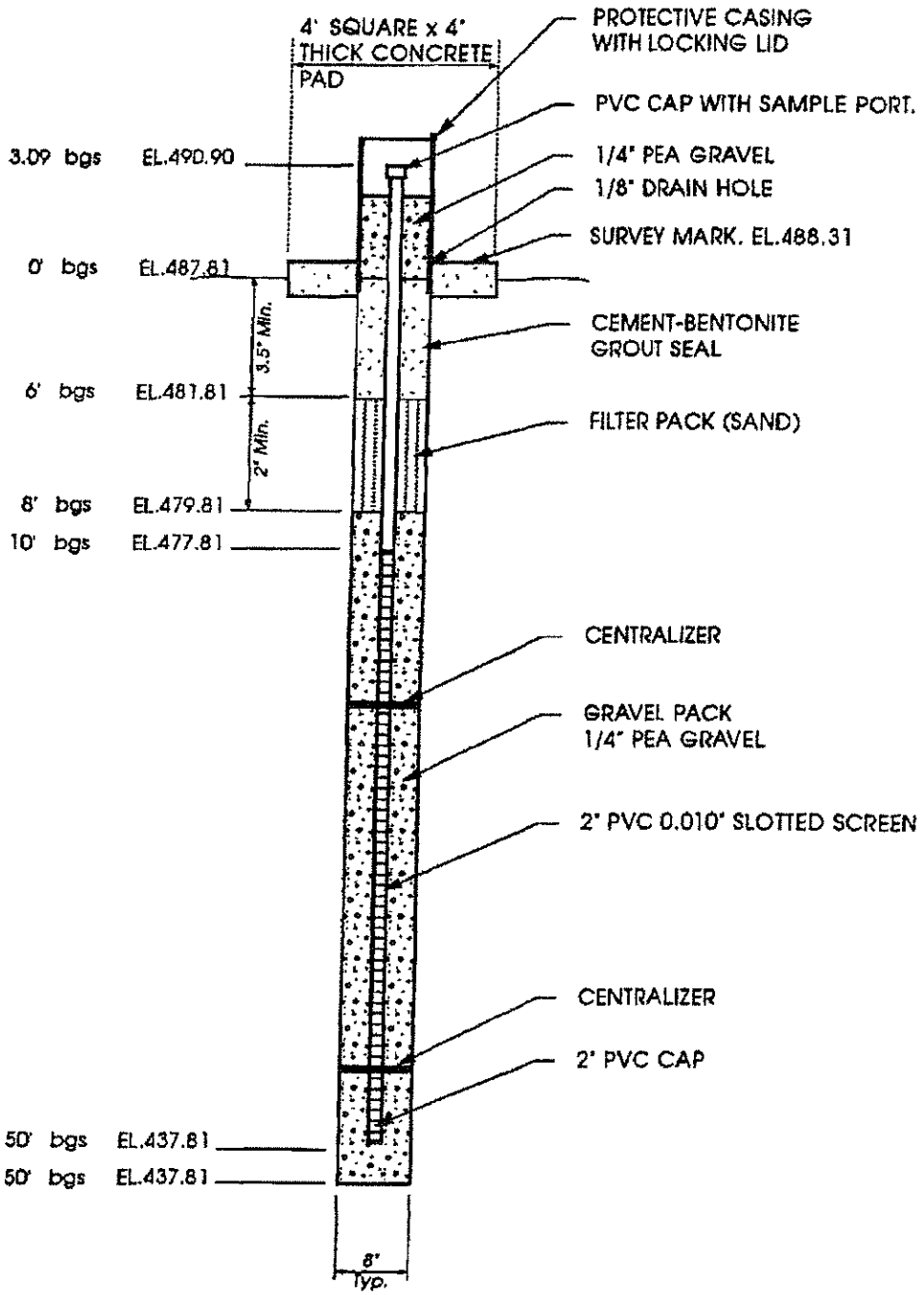
Occasional dark gray.

29' (CH)

Hard, dark gray CLAY (Taylor Marl).

Total Depth 35' (CH)

7/28/95 20286.11D



GAS PROBE INSTALLATION

Skyline Landfill & Recycling Center

GAS PROBE 28

BLACK & VEATCH

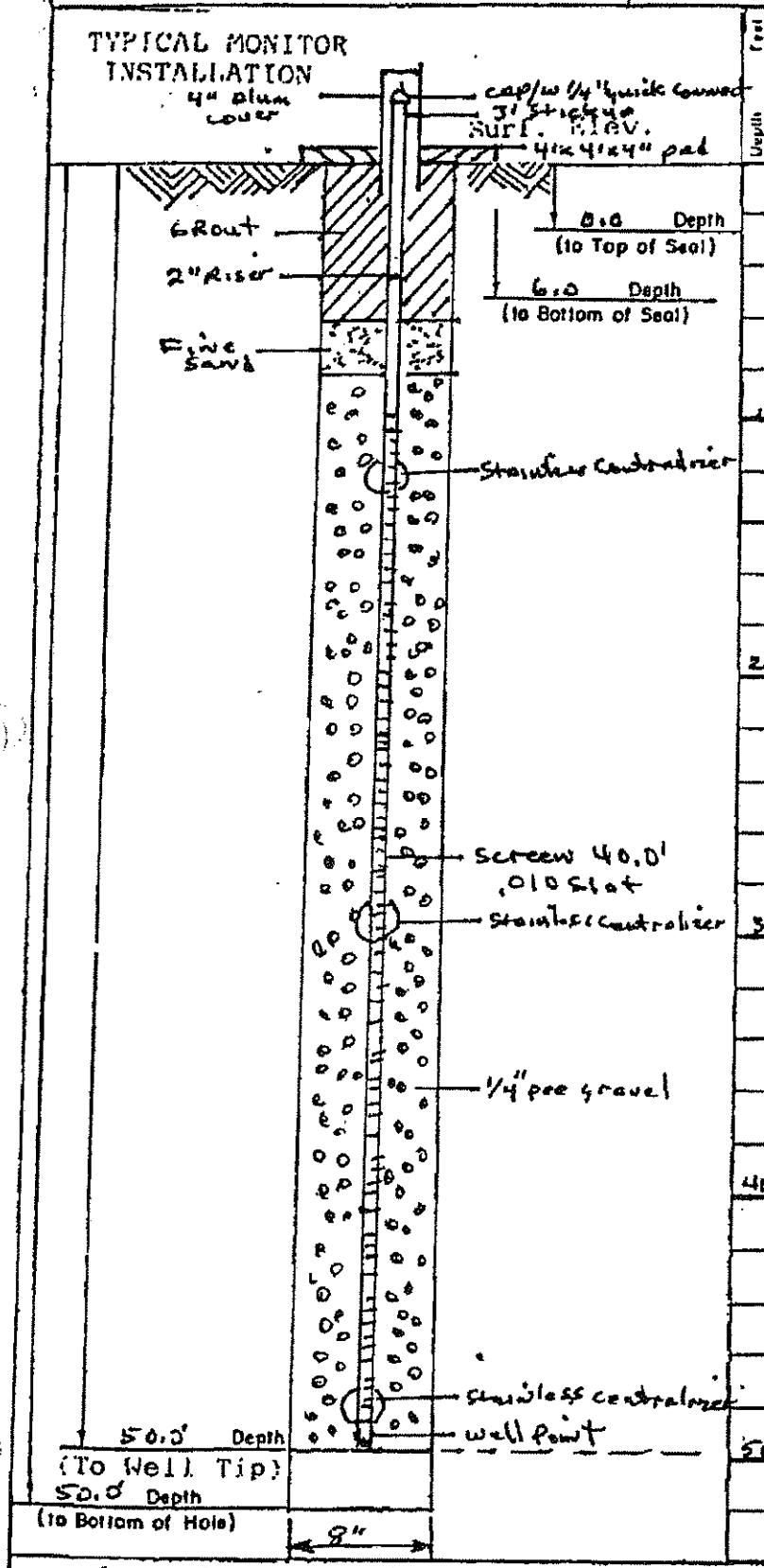
8/17/95 26286.100

McGuire Drilling Co., Inc.
2406 Rochelle Rd.
Irving, Texas 75062
(214) 255-9129

Log of Boring | Number GP 28

Project: WMI Skyline SIF (Gas Prob)

Location: Ferris, Tex.



Type: Auger Log

Surface Elevation:

STRATUM DESCRIPTION

Gray clay

TOW w/occ cal nods

Tan/gray w/occ FE staining w/occ cal inclusions

Light gray w/FE staining

Tan/gray

FE staining

occ Dark gray Hard

Dark Gray clay (marl)

T.D. 50.0'

Completion Depth: 50.6

Date: 6/7/95

Water Observations:

LOG OF BORING GAS PROBE GP-28

WASTE MANAGEMENT OF TEXAS
MSW Permit 42-C
Dallas & Ellis County, Texas

TYPE OF BORING: HSA

LOCATION: I-94 57+20

ELEVATION: Top Pipe 490.90 Ground 487.81

DEPTH, FT.	SYMBOL	SAMPLES	SOIL DESCRIPTION
			Firm to stiff, dark brown CLAY.
3'			(CH)
			Firm to very stiff, tan and gray CLAY (Weathered Taylor) with iron stains and occasional selenite crystals.
5			
10			
			Occasional light gray and iron staining.
15			
20			
			Tan and light gray.
25			
30			
			Iron staining.
35			

7/26/95 26286.110

LOG OF BORING GAS PROBE GP-28 (cont.)

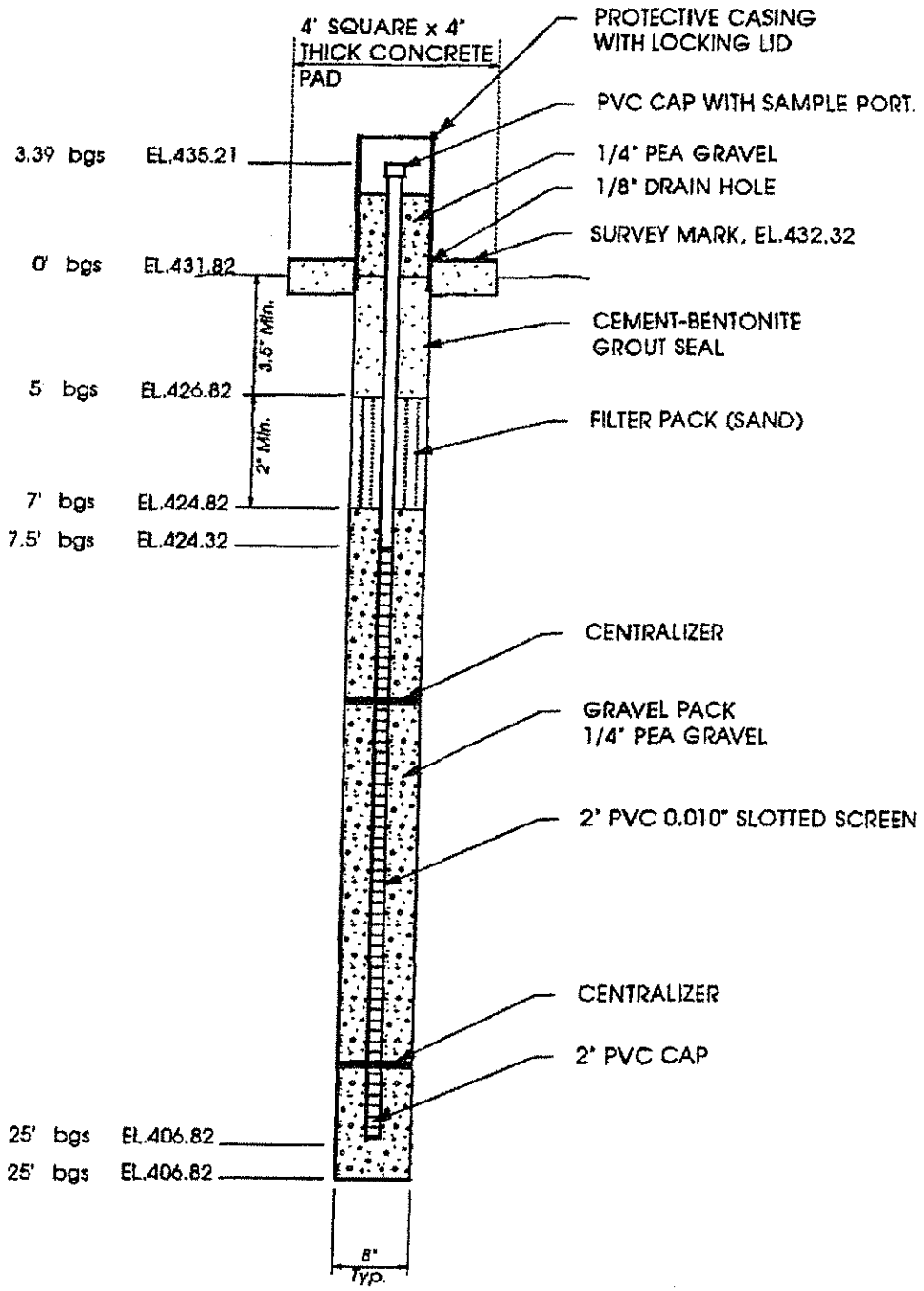
WASTE MANAGEMENT OF TEXAS
MSW Permit 42-C
Dallas & Ellis County, Texas

TYPE OF BORING: HSA | LOCATION:

DEPTH, FT.	SYMBOL	SAMPLES	SOIL DESCRIPTION	ELEVATION:
40				
			Occasional dark gray.	
45				
			46'	(CH)
			Hard, dark gray CLAY (Taylor Marl).	
50			*Total Depth 50'*	(CH)
55				
60				
65				
70				

Notes:

7/28/95 26265.110



GAS PROBE INSTALLATION

Skyline Landfill & Recycling Center

GAS PROBE 34

BLACK & VEATCH

8/17/95 28296.100

McGuire Drilling Co., Inc.
2406 Rochelle Rd.
Irving, Texas 75062
(214) 255-9129

Log of Boring Number GP34

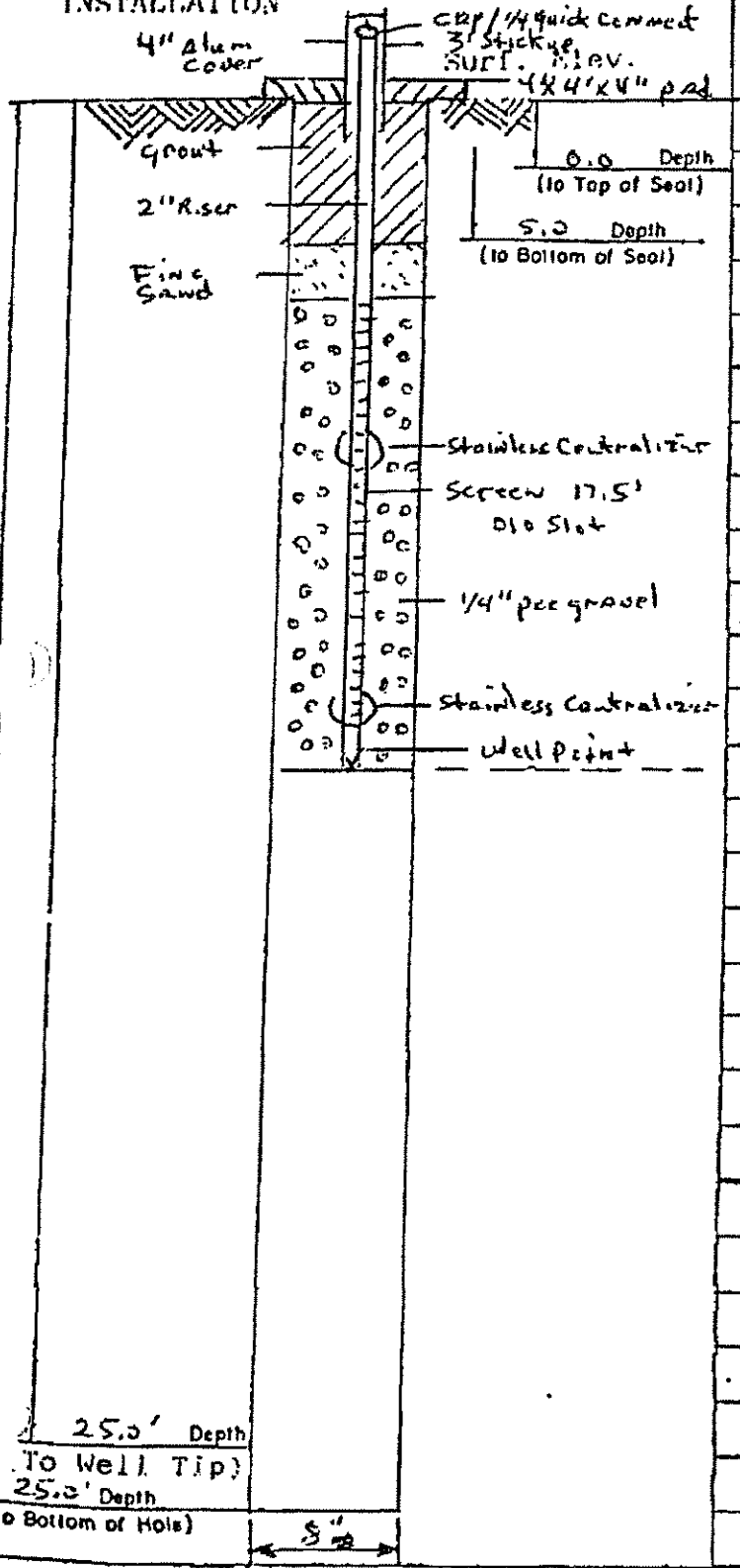
Project: WMI Skyline SIF (Gas Rob)

Location: Ferris Tex

Type: Auger Log

Surface Elevation:

TYPICAL MONITOR INSTALLATION



Depth	Sample	Graphic Symbol
10		
20		
30		

STRATUM DESCRIPTION

Gray Clay
Light tan
w/ reflective mica
weathered marl

-occ Light gray

-occ Dark gray

Dark Gray Clay (marl)

T.D. 25.0'

Completion Depth: 25.0'
Date: 4/25/95
Water Observations:

LOG OF BORING GAS PROBE GP-34

WASTE MANAGEMENT OF TEXAS
MSW Permit 42-C
Dallas & Ellis County, Texas

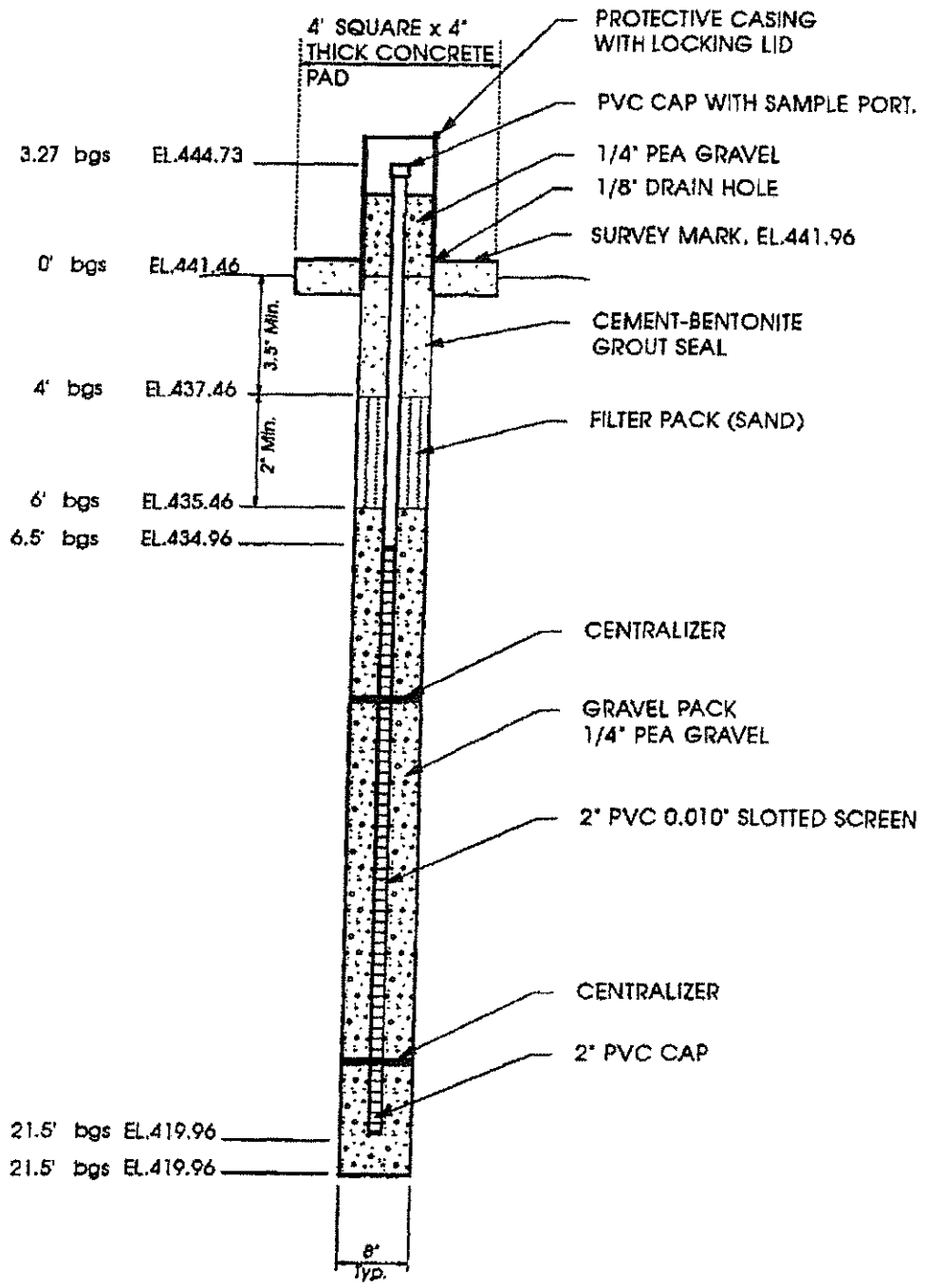
TYPE OF BORING: HSA

LOCATION: III+14 28+72

ELEVATION: Top Pipe 435.21 Ground 431.82

DEPTH, FT.	SYMBOL	SAMPLES	SOIL DESCRIPTION	
			Firm to stiff, dark brown CLAY.	
			2'	(CH)
			Firm to very stiff, tan and gray CLAY (Weathered Taylor) with occasional iron staining.	
5				
10			Occasional light gray.	
15			Occasional dark gray.	
			17'	(CH)
			Hard, dark gray CLAY (Taylor Marl).	
20				
25			*Total Depth 25'*	(CH)
30				
35				

7/28/95 26284.110



GAS PROBE INSTALLATION

Skyline Landfill & Recycling Center

GAS PROBE 44

BLACK & VEATCH

8/17/95 26286.100

McGuire Drilling Co., Inc.
2406 Rochelle Rd.
Irving, Texas 75062
(214) 255-9129

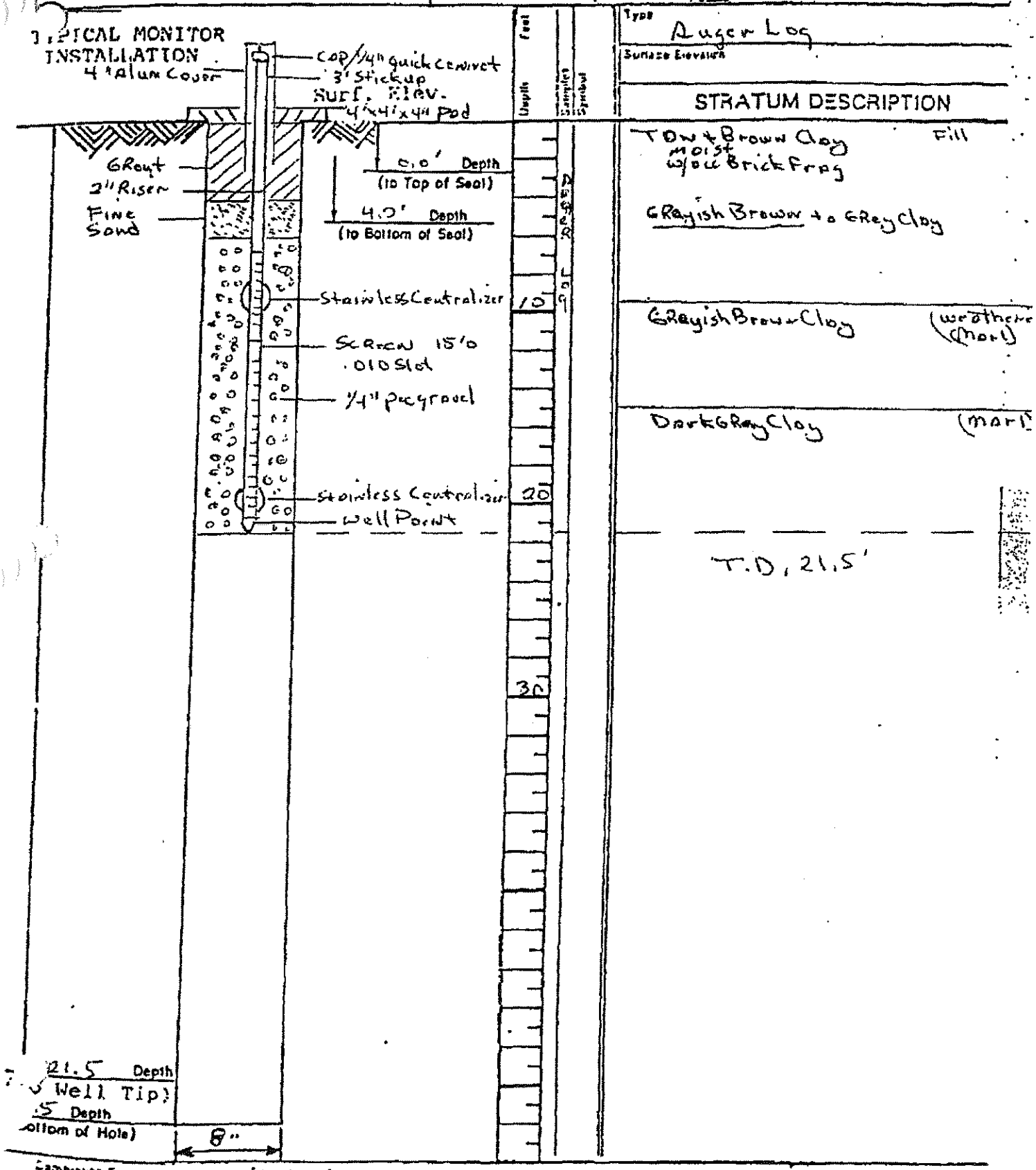
Log of Boring — Number GP 44

Project: WMI Skyline SIF (Geo Prob)

Location: Ferris, Tex

Type: Auger Log

Surface Elevation:



STRATUM DESCRIPTION

TOW + Brown Clay moist w/occ Brick Frag — Fill

Grayish Brown + o Grey Clay

Grayish Brown Clay (weathered Marl)

Dark Gray Clay (marl)

T.D. 21.5'

Completion Depth: 21.5'

Date: 4/3/95

Water Observations:

LOG OF BORING GAS PROBE GP-44

WASTE MANAGEMENT OF TEXAS
MSW Permit 42-C
Dallas & Ellis County, Texas

TYPE OF BORING: HSA

LOCATION: 00+71 45+63

ELEVATION: Top Pipe 444.73 Ground 441.46

DEPTH, FT.	SYMBOL	SAMPLES	SOIL DESCRIPTION
			Firm to very stiff, tan and brown CLAY with occasional brick fragments.
			4' (Fill)
5			Firm to very stiff, tan and gray CLAY (Weathered Taylor).
10			
15			*15'* (CH)
			Hard, dark gray CLAY (Taylor Marl).
20			
			Total Depth 21.5' (CH)
25			
30			
35			

7/28/95 26286.110

INSTALLATION OF LFG MONITORING PROBES
GMP 21R AND 22R

(COPY OF SOIL BOREHOLE LOG)

INSTALLED: AUGUST 2007
INSTALLED BY: APEX GEOSCIENCES, INC.

LOG OF BORING	Apex geoscience inc.	ENVIRONMENTAL SAMPLING
Project Number: 307-052	Name: Skyline Landfill	Boring No: GP – 21R
Location/Description: IH-45, Ferris, Texas		Date: 8/27/2007

SILTS & SANDS	CONSISTENCY	COLORS	MATERIALS	SAND TYPE	CHARACTERISTICS
VLo- Very Loose Lo- Loose MDe – Medium Dense De – Dense VDe – Very Dense	Vso – Very Soft So – Soft Mst – Medium Stiff St – Stiff Vst – Very Stiff H - Hard	Bk – Black, Bl – Blue Br – Brown, Dk – Dark G – Gray, Gr – Green Li – Light, R – Red Rdish – Reddish Y-Yellow, W - White	Cl – Clay, Clayey Gr – Gravel Ls – Limestone Sa – Sand, Sandy SS – Sandstone Sh – Shale, Si – Silt, Silty SiS - Siltstone	F – Fine M – Medium Co – Coarse Si - Silty	Calc – Calcareous Lam – Laminated Lig – Lignite Nod – Nodules Org – Organic Sm – Seam, Sl – Slightly Sls – Slickensided

SAMPLE #	DEPTH FT	CONDITION OR CONSISTENCY	COLOR	MINOR MATERIALS OR ADJECTIVES	PREDOMINATE MATERIAL	CHARACTERISTICS OR MODIFICATIONS	MOISTURE DESC.	PID	LEL
	0	So	Br	Si	Cl	Compacted fill	Dry		
		"	"	"	"	"	"		
		"	"	"	"	"	"		
		"	"	"	"	"	"		
	5	"	"	"	"	"	"		
		"	"	"	"	"	"		
		"	"	"	"	"	"		
		"	"	"	"	"	"		
		"	"	"	"	"	"		
	10	"	"	"	"	"	"		
		"	"	"	"	"	"		
		"	"	"	"	"	"		
		"	"	"	"	"	"		
		"	"	"	"	"	"		
	15	"	"	"	"	"	"		
		"	"	"	"	"	"		
		"	"	"	"	"	"		
		"	"	"	"	"	"		
		"	"	"	"	"	"		
	20	"	"	"	"	"	"		
		Vst	Lt Br	"	"	Calc	"		
		"	"	"	"	"	"		
		"	"	"	"	"	"		
		"	"	"	"	"	"		
	25	"	"	"	"	"	"		
		"	"	"	"	"	"		
		"	"	"	"	"	"		
		"	"	"	"	"	"		
		"	"	"	"	"	"		
	30	"	"	"	"	"	"		
		"	"	"	"	"	"		
		"	"	"	"	"	"		
		"	"	"	"	"	"		
		"	"	"	"	"	"		
	35	"	"	"	"	"	"		
		"	"	"	"	"	"		
		"	"	"	"	"	"		
		"	"	"	"	"	"		

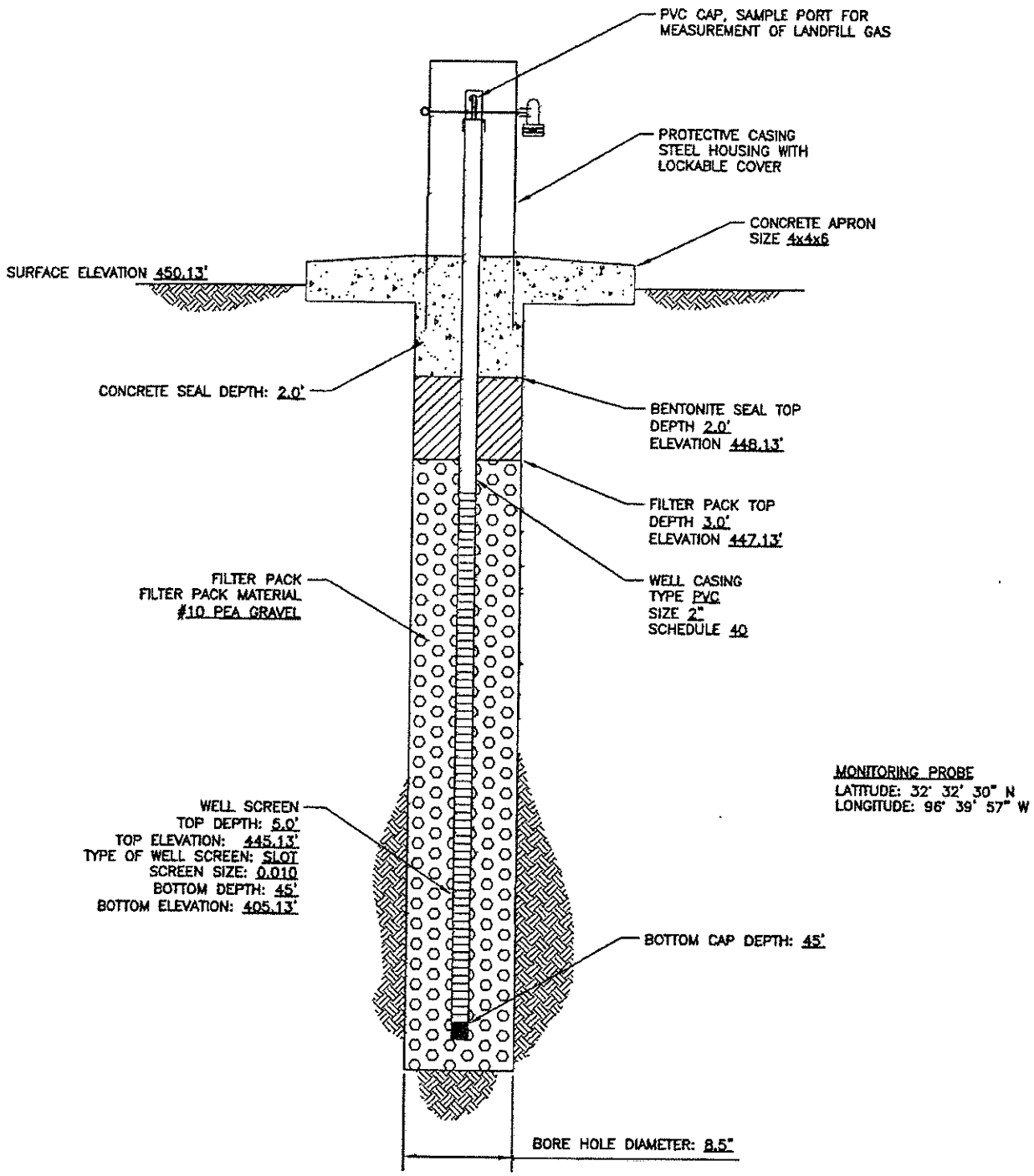
Project Number: 307-052	Name: Skyline Landfill	Boring No: GP – 21R
Location/Description: IH-45, Ferris, Texas		Date: 8/27/2007

SILTS & SANDS	CONSISTENCY	COLORS	MATERIALS	SAND TYPE	CHARACTERISTICS
Vlo- Very Loose Lo- Loose MDe – Medium Dense De – Dense VDe – Very Dense	Vso – Very Soft So – Soft Mst – Medium Stiff St – Stiff Vst – Very Stiff H - Hard	Bk – Black, Bl – Blue Br – Brown, Dk – Dark G – Gray, Gr – Green Li – Light, R – Red Rdish – Reddish Y-Yellow, W - White	Cl – Clay, Clayey Gr – Gravel Ls – Limestone Sa – Sand, Sandy SS – Sandstone Sh – Shale, Si – Silt, Silty SiS - Siltstone	F – Fine M – Medium Co – Coarse Si - Silty	Calc – Calcareous Lam – Laminated Lig – Lignite Nod – Nodules Org – Organic Sm – Seam, Sl – Slightly Sls – Slickensided

SAMPLE #	DEPTH FT	CONDITION OR CONSISTENCY	COLOR	MINOR MATERIALS OR ADJECTIVES	PREDOMINATE MATERIAL	CHARACTERISTICS OR MODIFICATIONS	MOISTURE DESC.	PID	LEL
	40	Vst	Li, Br	Si	Cl	Calc	Dry		
		"	"	"	"	"	"		
		"	"	"	"	"	"		
		"	"	"	"	"	"		
	45	"	"	"	"	TD –45'	"		

COMPLETION RECORD

Type of Boring: ☒HSA ☐ Other _____	Logged By: B. Collier	W.L. @ Dry Ft. On Completion; Caved to 0 Ft.
Screen From: 5 Ft. to 45 Ft.	Riser From 0 Ft. to 5 Ft.	Surface Completion ☐ Flush ☐ 2x2 Pad ☒ 4x4 Pad ☐ 6x6 Pad ☐ Other
Gravel: 3 Ft. to 45 Ft.; Bentonite 3 Ft. to 4 Ft.		TD @ 45 Ft.



GAS MONITORING PROBE DETAIL GP-21R

WASTE MANAGEMENT SKYLINE LANDFILL GAS MONITORING PROBE AS-BUILTS

BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
MANSFIELD
DALLAS • WICHITA FALLS
817-563-1144

ISSUED FOR INFORMATIONAL PURPOSES ONLY

REVISIONS						
REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY

G3-20

DSN. MRW	DATE : 02/08	DRAWING 1
DWN. RMP	SCALE : GRAPHIC	
CHK. MRW	DWG : MontProbe21R.dwg	

Installation Report\MontProbe21R.dwg Layout: 21R User: wn

LOG OF BORING	Apex geoscience inc.	ENVIRONMENTAL SAMPLING
Project Number: 307-052	Name: Skyline Landfill	Boring No: GP – 22R
Location/Description: IH-45, Ferris, Texas		Date: 8/27/2007

SILTS & SANDS	CONSISTENCY	COLORS	MATERIALS	SAND TYPE	CHARACTERISTICS
VLo- Very Loose Lo- Loose MDe – Medium Dense De – Dense VDe – Very Dense	Vso – Very Soft So – Soft Mst – Medium Stiff St – Stiff Vst – Very Stiff H - Hard	Bk – Black, Bl – Blue Br – Brown, Dk – Dark G – Gray, Gr – Green Li – Light, R – Red Rdish – Reddish Y-Yellow, W - White	Cl – Clay, Clayey Gr – Gravel Ls – Limestone Sa – Sand, Sandy SS – Sandstone Sh – Shale, Si – Silt, Silty SiS - Siltstone	F – Fine M – Medium Co – Coarse Si - Silty	Calc – Calcareous Lam – Laminated Lig – Lignite Nod – Nodules Org – Organic Sm – Seam, Sl – Slightly Sls – Slickensided

SAMPLE #	DEPTH FT	CONDITION OR CONSISTENCY	COLOR	MINOR MATERIALS OR ADJECTIVES	PREDOMINATE MATERIAL	CHARACTERISTICS OR MODIFICATIONS	MOISTURE DESC.	PID	LEL
	0	So	Br	Si	Cl	Compacted fill	Dry		
		"	"	"	"	"	"		
		"	"	"	"	"	"		
		"	"	"	"	"	"		
	5	"	"	"	"	"	"		
		"	"	"	"	"	"		
		"	"	"	"	"	"		
		"	"	"	"	"	"		
		"	"	"	"	"	"		
	10	"	"	"	"	"	"		
		"	"	"	"	"	"		
		"	"	"	"	"	"		
		"	"	"	"	"	"		
		"	"	"	"	"	"		
	15	"	"	"	"	"	"		
		"	"	"	"	"	"		
		"	"	"	"	"	"		
		"	"	"	"	"	"		
		"	"	"	"	"	"		
	20	"	"	"	"	"	"		
		Vst	Lt Br	"	"	Calc	"		
		"	"	"	"	"	"		
		"	"	"	"	"	"		
		"	"	"	"	"	"		
	25	"	"	"	"	"	"		
		"	"	"	"	"	"		
		"	"	"	"	"	"		
		"	"	"	"	"	"		
		"	"	"	"	"	"		
	30	"	"	"	"	"	"		
		"	"	"	"	"	"		
		"	"	"	"	"	"		
		"	"	"	"	"	"		
		"	"	"	"	"	"		
	35	"	"	"	"	"	"		
		"	"	"	"	"	"		
		"	"	"	"	"	"		
		"	"	"	"	"	"		
		"	"	"	"	"	"		

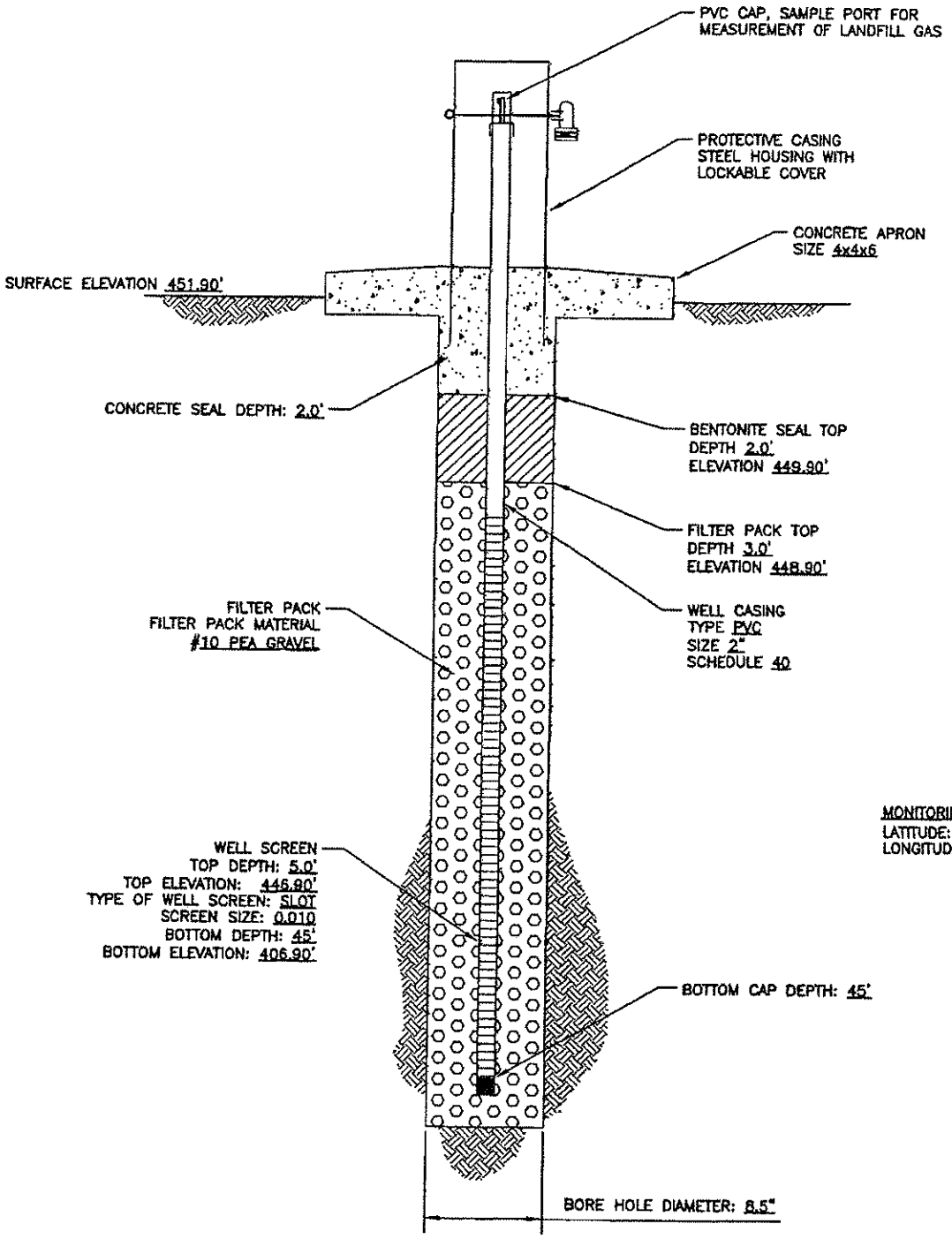
Project Number: 307-052	Name: Skyline Landfill	Boring No: GP – 22R
Location/Description: IH-45, Ferris, Texas		Date: 8/27/2007

SILTS & SANDS	CONSISTENCY	COLORS	MATERIALS	SAND TYPE	CHARACTERISTICS
VLo- Very Loose Lo- Loose MDe – Medium Dense De – Dense VDe – Very Dense	Vso – Very Soft So – Soft Mst – Medium Stiff St – Stiff Vst – Very Stiff H - Hard	Bk – Black, Bl – Blue Br – Brown, Dk – Dark G – Gray, Gr – Green Li – Light, R – Red Rdish – Reddish Y-Yellow, W - White	Cl – Clay, Clayey Gr – Gravel Ls – Limestone Sa – Sand, Sandy SS – Sandstone Sh – Shale, Si – Silt, Silty SiS - Siltstone	F – Fine M – Medium Co – Coarse Si - Silty	Calc – Calcareous Lam – Laminated Lig – Lignite Nod – Nodules Org – Organic Sm – Seam, Sl – Slightly Sls – Slickensided

SAMPLE #	DEPTH FT	CONDITION OR CONSISTENCY	COLOR	MINOR MATERIALS OR ADJECTIVES	PREDOMINATE MATERIAL	CHARACTERISTICS OR MODIFICATIONS	MOISTURE DESC.	PID	LEL
	40	Vst	Li, Br	Si	Cl	Calc	Dry		
		"	"	"	"	"	"		
		"	"	"	"	"	"		
		"	"	"	"	"	"		
	45	"	"	"	"	TD – 45'	"		

COMPLETION RECORD

Type of Boring: ☒HSA ☐ Other _____	Logged By: B. Collier	W.L. @ Dry Ft. On Completion; Caved to 0 Ft.
Screen From: 5 Ft. to 45 Ft.	Riser From 0 Ft. to 5 Ft.	Surface Completion ☐ Flush ☐ 2x2 Pad ☒ 4x4 Pad ☐ 6x6 Pad ☐ Other
Gravel: 3 Ft. to 45 Ft.; Bentonite 3 Ft. to 4 Ft.		TD @ 45 Ft.



MONITORING PROBE
LATITUDE: 32° 32' 33" N
LONGITUDE: 96° 39' 57" W

nstallation Report\MontProbe22R.dwg Layout: 22R User: wi

GAS MONITORING PROBE DETAIL GP-22R

WASTE MANAGEMENT SKYLINE LANDFILL GAS MONITORING PROBE AS-BUILTS

BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
MANSFIELD
DALLAS • WICHITA FALLS
817-563-1144

ISSUED FOR INFORMATIONAL PURPOSES ONLY

REVISIONS						
REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY

G3-23

DSN. MRW	DATE : 02/08	DRAWING
DWN. RMP	SCALE : GRAPHIC	1
CHK. MRW	DWG : MontProbe22R.dwg	

INSTALLATION OF LFG MONITORING PROBES
GMP43R

(COPY OF SOIL BOREHOLE LOG)

INSTALLED: SEPTEMBER 2009
INSTALLED BY: LANDTEC ENGINEERS

Project: Skyline Landfill
Dallas and Ellis Counties, Texas

Project Number: 0809-1377

BORING LOG
GMP-43R

Sheet 1 of 1

Location: See Gas Probe Map
Surface El.: 447.4
Northing: 321743 Easting: 2256900

Depth, feet	Samples	Symbol / USCS	MATERIAL DESCRIPTION	Hand Penetrometer, tsf	Penetration Blows / Foot	Recovery %	RQD	Moisture Content, %	Unit Dry Weight, pcf	Liquid Limit	Plastic Limit	Plasticity Index	% Passing No. 200 Sieve	Unc. Compressive Strength, tsf
0	A1		CLAY, brown, stiff, moist to dry											
5	A2													
			8.0											
10	A3		CLAY, light brown to tan, shaly, very stiff, dry											
			14.0											
15	A4		CLAY, shaly, tan & gray, very stiff, dry											
			17.0											
20	A5		SHALE (Unweathered), gray, very stiff, dry											
25	A6		26.0											
30														
35														
40														

STATE OF TEXAS
THOMAS E. BAKER
40760
12-8-09
Thomas E. Baker

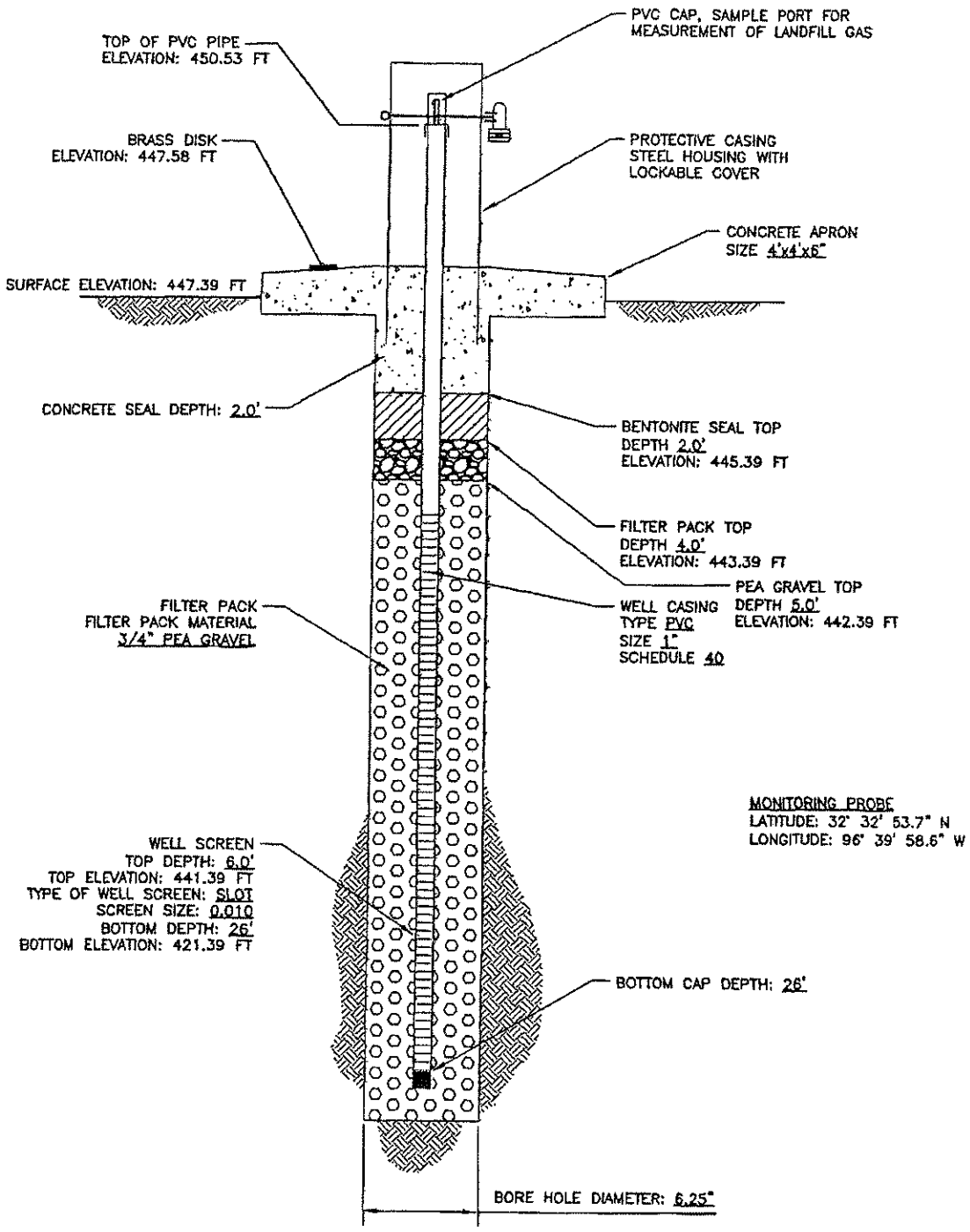
Completion Depth: 26 ft
Date: 9/29/09

Remarks: Dry at completion.
Top of Casing El.: 450.5'

LANDTEC

Soil and rock descriptions on this boring log are a compilation of data collected in both the field and the laboratory. The stratification lines represent the approximate boundary between soil types and the transition can be gradual.

BORING LOG NO WORD FIGURE 1377 SKYLINE LOGS.GPJ LANDTEC.GDT 12/8/09



LANDTEC engineers

TBPE REGISTRATION NO. F-329
1700 ROBERT ROAD, STE 101 MANSFIELD, TX 76063
PHONE 817.453.0069 FAX 817.453.9884

GAS MONITORING PROBE DETAIL
GP-43R
SKYLINE LANDFILL
DALLAS AND ELLIS COUNTIES, TEXAS

DATE: 10-2000 PROJ NO. 0809-1377
DRAWN BY: CLS APPD BY: TDB
DRAWING 2

TCEQ PERMIT MODIFICATION APPROVAL

INSTALLATION OF LFG MONITORING PROBES GMP 21R, 22R, 32R, AND 33R

APPROVAL DATE: AUGUST 9, 2007

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

MODIFICATION TO

MUNICIPAL SOLID WASTE PERMIT NO. 42C

SKYLINE RECYCLING AND DISPOSAL FACILITY

Municipal Solid Waste Permit No. 42C is hereby modified as follows:

Description of Change:

1. Groundwater monitoring wells (MW) MW-2 and MW-3 will be replaced with MW-2R and MW-3R, respectively. MW-2 and MW-3 will be rendered inoperable upon construction of a portion of the perimeter drainage system. The approval of modification for these monitoring wells is with the following conditions:

    a. There will be no change to the design or depth of the wells, or the monitoring system design.

    b. A Monitor Well Installation Report will be submitted to the TCEQ Municipal Solid Waste (MSW) Permit Section within 30 days of the well completion activities.

    c. The Monitor Well Installation Report will include a discussion of the monitor well installation technique, boring/monitor well log of the completed monitor well, State of Texas Well Report, Monitor Well Data Sheet (Form TCEQ-10308), site map indicating the location of MW-2R and MW-3R, well development information, and plugging and abandonment information for MW-2 and MW-3.

    d. If statistical evaluation of the data from the first groundwater monitoring event for MW-2R and MW-3R indicates a statistical difference from the old data, the facility shall implement a quarterly background sampling event.

2. Landfill gas monitoring probes (GP) GP-21, GP-22, GP-32, and GP-33 will be replaced with GP-21R, GP-22R, GP-32R and GP-33R, respectively. GP-32 and GP-33 will be rendered inoperable upon construction of a portion of the perimeter drainage system. GP-21 and GP-22 are damaged and currently inoperable, thus they need to be relocated. There will be no change in the design or depth of the gas probes, or the monitoring system design.

Updated drawings of the new locations of the monitoring probes for the landfill gas monitoring system will be submitted to the MSW Permits Section.

The details of this permit modification are contained in the application received on March 30, 2007 and the revisions received June 28, 2007.

Part of Permit Modified:

Site Development Plan – Appendix 12.3 – Groundwater Sampling Analysis Plan, Figures 4 and 5
Site Development Plant – Appendix 12.5 – Landfill Gas Management Plan, Figure 1

This modification is a part of Permit No. 42C and should be attached thereto.

APPROVED, ISSUED, AND EFFECTIVE in accordance with Title 30 Texas Administrative Code Chapter 305, Section 305.70(j)(17) and Chapter 330.

ISSUED DATE:

AUG 0 9 2007

For the Commission

TCEQ PERMIT MODIFICATION APPROVAL

INSTALLATION OF LFG MONITORING PROBES GMP 37R AND 43R

APPROVAL DATE: JUNE 5, 2009

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

MODIFICATION TO

MUNICIPAL SOLID WASTE PERMIT NO. 42C

SKYLINE RECYCLING AND DISPOSAL FACILITY

Municipal Solid Waste Permit No. 42C is hereby modified as follows:

Description of Change:

This permit modification changes the Landfill Gas (LFG) Monitoring System. The changes to the LFG monitoring system include the replacement of LFG monitoring wells GP-37 and GP-43 with GP-37R and GP-43R respectively and the removal of LFG monitoring well GP-5N.

The details of this permit modification are contained in the application dated April 6, 2009 and the revisions dated June 1, 2009.

Part of Permit Modified:

Site Development Plan
Attachment 12 (Site Operating Plan)
Appendix 12.5(Landfill Gas Management Plan)
Figure 1 (Landfill Gas Probe Locations)

This modification is a part of Permit No. 42C and should be attached thereto.

APPROVED, ISSUED, AND EFFECTIVE in accordance with Title 30 Texas Administrative Code Chapter 305, Section 305.70(j)(18), (21) and (27).

ISSUED DATE:

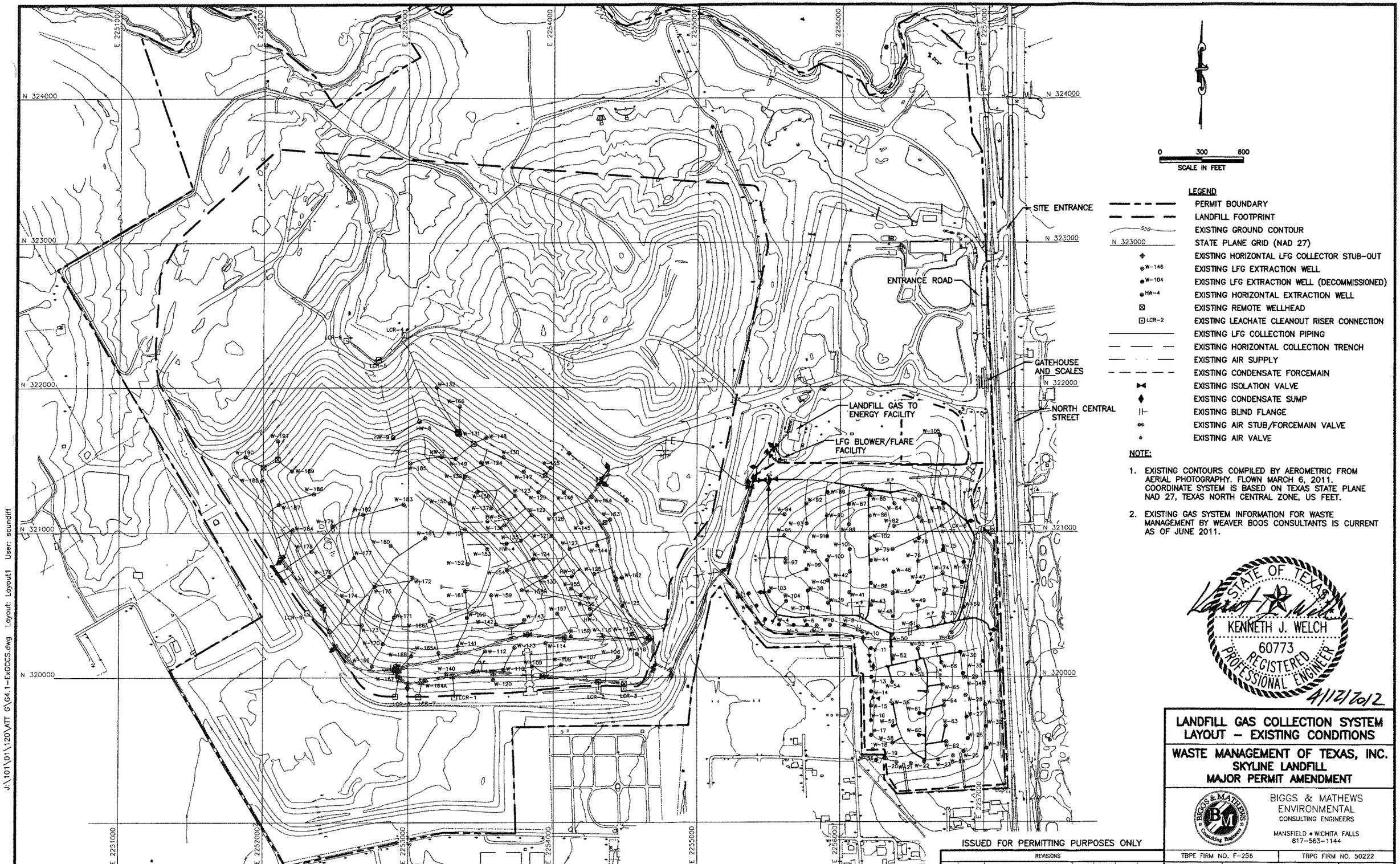
JUN 05 2009

For the Commission

SKYLINE LANDFILL

APPENDIX G4
LANDFILL GAS COLLECTION SYSTEM
EXISTING CONDITIONS

30 TAC §330.371



LEGEND

- PERMIT BOUNDARY
- LANDFILL FOOTPRINT
- EXISTING GROUND CONTOUR
- STATE PLANE GRID (NAD 27)
- EXISTING HORIZONTAL LFG COLLECTOR STUB-OUT
- EXISTING LFG EXTRACTION WELL
- EXISTING LFG EXTRACTION WELL (DECOMMISSIONED)
- EXISTING HORIZONTAL EXTRACTION WELL
- EXISTING REMOTE WELLHEAD
- EXISTING LEACHATE CLEANOUT RISER CONNECTION
- EXISTING LFG COLLECTION PIPING
- EXISTING HORIZONTAL COLLECTION TRENCH
- EXISTING AIR SUPPLY
- EXISTING CONDENSATE FORCEMAIN
- EXISTING ISOLATION VALVE
- EXISTING CONDENSATE SUMP
- EXISTING BLIND FLANGE
- EXISTING AIR STUB/FORCEMAIN VALVE
- EXISTING AIR VALVE

NOTE:

1. EXISTING CONTOURS COMPILED BY AEROMETRIC FROM AERIAL PHOTOGRAPHY, FLOWN MARCH 6, 2011. COORDINATE SYSTEM IS BASED ON TEXAS STATE PLANE NAD 27, TEXAS NORTH CENTRAL ZONE, US FEET.
2. EXISTING GAS SYSTEM INFORMATION FOR WASTE MANAGEMENT BY WEAVER BOOS CONSULTANTS IS CURRENT AS OF JUNE 2011.

STATE OF TEXAS
KENNETH J. WELCH
60773
REGISTERED PROFESSIONAL ENGINEER
4/12/2012

ISSUED FOR PERMITTING PURPOSES ONLY

REVISIONS						
REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY

LANDFILL GAS COLLECTION SYSTEM LAYOUT – EXISTING CONDITIONS

WASTE MANAGEMENT OF TEXAS, INC. SKYLINE LANDFILL MAJOR PERMIT AMENDMENT

BIGGS & MATHEWS ENVIRONMENTAL
CONSULTING ENGINEERS
MANSFIELD • WICHITA FALLS
817-563-1144

TBPE FIRM NO. F-256 | TBPG FIRM NO. 50222

DSN. SAB | DATE : 04/12
DWN. SRC | SCALE : GRAPHIC
CHK. KJW | DWG : G4.1-ExGCCS.dwg

DRAWING G4.1

J:\101\01\120\ATT G\G4.1-ExGCCS.dwg Layout: Layout1 User: scundiff

SKYLINE LANDFILL
CITY OF FERRIS
DALLAS AND ELLIS COUNTIES, TEXAS
TCEQ PERMIT NO. MSW 42D

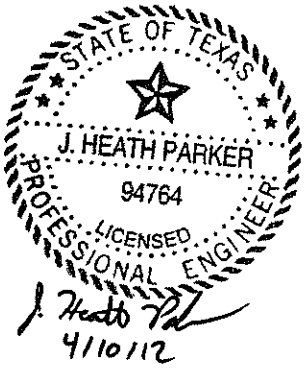
PERMIT AMENDMENT APPLICATION

PART III – FACILITY INVESTIGATION AND DESIGN
APPENDIX G5
LANDFILL GAS CONTROL SYSTEM DESIGN

Prepared for

Waste Management of Texas, Inc.

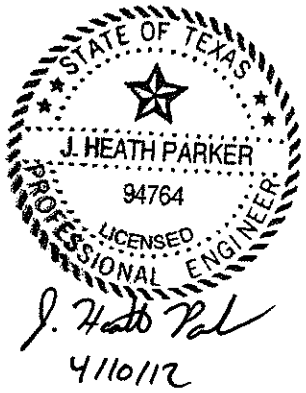
April 2012



Prepared by

Weaver Boos Consultants, LLC–Southwest
TBPE Registration No. F-3727
6420 Southwest Blvd., Suite 206
Fort Worth, Texas 76109
817-735-9770

CONTENTS



1 LFG SYSTEM

1.1 Existing LFG Collection and Control System

Currently, the site has an active LFG collection and control system (GCCS), as shown in Appendix G5-A on Drawing G5-A-1. The site has a design capacity greater than 2.5 million megagrams and 2.5 million cubic meters, and has a nonmethane organic compound (NMOC) emission rate greater than 50 megagrams per year. This makes the facility subject to the requirements under 40 CFR Part 60, Subpart WWW, New Source Performance Standards for Municipal Solid Waste Landfills (NSPS). As a result, the existing GCCS will be required to begin operating in accordance with NSPS requirements on April 29, 2013.

The existing GCCS consists of vertical LFG extraction wells, a piping network, a condensate management system, a blower/flare facility, and a Waste Management owned and operated landfill gas-to-energy (LFGTE) facility. The existing blowers provide vacuum to the extraction wells through the LFG collection piping network. The extracted LFG is routed from the collection points to the LFGTE facility, which uses extracted LFG from the landfill as fuel to generate electricity. Any remaining extracted LFG not sent to the LFGTE facility is diverted to an on-site flare where the gas is combusted.

As additional waste is placed, the existing LFG extraction wells will be extended and/or redrilled.

1.2 Future GCCS Expansions

As the site develops, additional extraction wells will be installed as needed to reduce the buildup of internal gas pressures caused by the increased generation of LFG and to comply with the requirements under 40 CFR Part 60, Subpart WWW. The locations of the anticipated future vertical extraction wells are shown on Drawing G5-A-1.

Two vertical extraction well alternatives are proposed for different final cover areas, as shown on Drawing G5-A-2. In areas with Subtitle D final cover, extraction wells will be constructed as shown on Detail LFG-1. If additional wells or redrills are needed in areas with pre-Subtitle D final cover, the vertical extraction wells will be constructed as shown on Detail LFG-2.

Each LFG extraction well will consist of a perforated pipe within a gravel backfill. The LFG extraction wells will be installed in phases as needed as the landfill develops. The exact number and location of wells, horizontal collectors, piping, and future LFG facilities will be determined based on field conditions at the time of installation.

Using the EPA Landfill Gas Emissions Model, it is estimated that the site will generate a maximum of approximately 13,315 standard cubic feet per minute (scfm) of LFG in 2044 (Appendix G5-B). As such, blowers and piping network will be installed as needed to provide the vacuum and capacity to handle the predicted maximum flow rate of LFG. In addition, each extraction well will be equipped with a control valve and monitoring port, as shown on Drawing G5-A-2. These control valves and monitoring ports, used in conjunction with controls on the blower, will allow the site to regulate vacuum and LFG levels at each individual extraction well. This will allow the site to make adjustments in order to effectively collect LFG.

The operation and maintenance of the proposed LFG system will be performed consistent with industry guidelines and practices. Wellhead and system monitoring will be performed on a routine basis to monitor overall system performance. As needed, system adjustments will be made to optimize the extraction of LFG from the landfill to control LFG migration, odors, and greenhouse gases. In addition, the system will be routinely visually inspected for any evidence of needed repairs or other maintenance. General maintenance procedures will include the following:

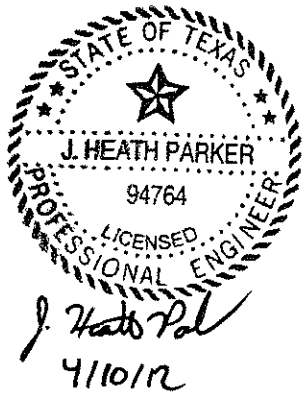
- Each wellhead will be monitored and adjusted as needed to control LFG while reducing oxygen intrusion into the landfill.
- Condensate sumps will be checked for proper operation.
- Blowers and flares will be inspected for proper operation.

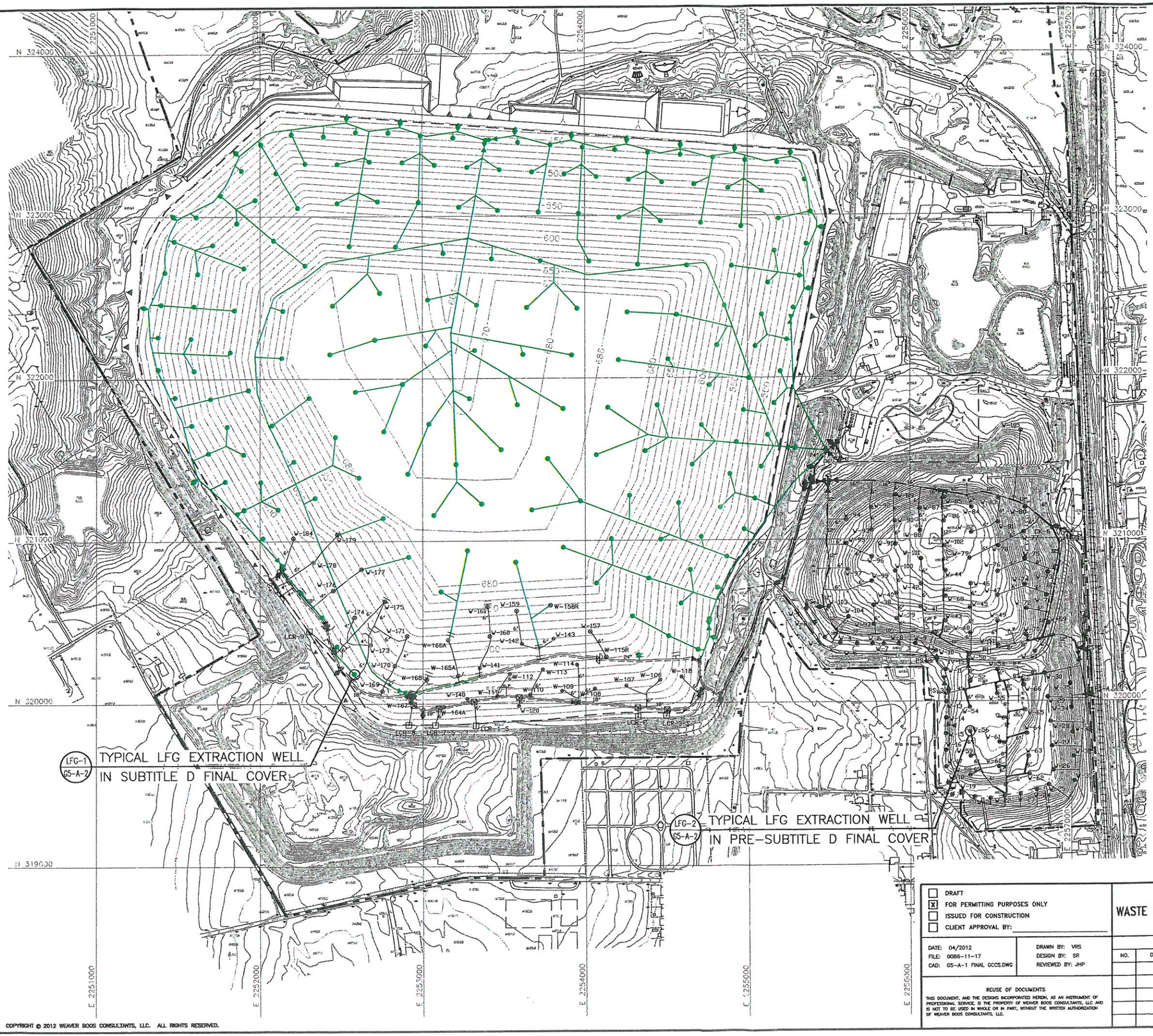
The system has been designed to include isolation valves and a looped piping network to allow the site to be adjusted, maintained, and quickly repaired.

SKYLINE LANDFILL

APPENDIX G5-A
LANDFILL GAS COLLECTION AND CONTROL SYSTEM PLAN

Includes Drawings G5-A-1 and G5-A-2





0 300 600
SCALE IN FEET

STATE OF TEXAS
J. HEATH PARKER
94764
LICENSED
PROFESSIONAL ENGINEER
J. Heath Parker PE
4/10/12

LEGEND

- PERMIT BOUNDARY
- LANDFILL FOOTPRINT
- EXISTING CONTOUR
- STATE PLANE GRID (NAD 27)
- EXISTING LFG EXTRACTION WELL
- EXISTING LFG EXTRACTION WELL (DECOMMISSIONED)
- EXISTING REMOTE WELLHEAD
- EXISTING LEACHATE CLEANOUT RISER CONNECTION
- EXISTING LFG COLLECTION PIPING
- EXISTING AIR SUPPLY
- EXISTING CONDENSATE FORCEMAIN
- EXISTING ISOLATION VALVE
- EXISTING CONDENSATE SUMP
- EXISTING BLIND FLANGE
- EXISTING AIR STUB/FORCEMAIN VALVE
- EXISTING AIR VALVE
- EXISTING ROAD CROSSING
- PROPOSED LFG EXTRACTION WELL
- PROPOSED ISOLATION VALVE
- PROPOSED CONDENSATE SUMP
- PROPOSED LFG COLLECTION PIPING

NOTES:

1. EXISTING CONTOURS COMPILED BY AEROMETRIC FROM AERIAL PHOTOGRAPHY FLOWN MARCH 6, 2011. COORDINATE SYSTEM IS BASED ON TEXAS STATE PLANE NAD 27, TEXAS NORTH CENTRAL ZONE, US FEET.
2. THE LOCATION AND NUMBER OF PROPOSED FUTURE EXTRACTION WELLS AND GCCS COMPONENTS ARE APPROXIMATE. EXACT NUMBER AND LOCATION WILL BE DETERMINED BASED ON SITE CONDITIONS AT THE TIME OF INSTALLATION. EXISTING WELLS MAY BE EXTENDED OR REDRILLED TO ACCOMMODATE FUTURE FILLING.

- [ ] DRAFT
- [x] FOR PERMITTING PURPOSES ONLY
- [ ] ISSUED FOR CONSTRUCTION
- [ ] CLIENT APPROVAL BY: _____

DATE: 04/2012
FILE: 0086-11-17
CAD: G5-A-1 FINAL GCCS.DWG

DRAWN BY: VRS
DESIGN BY: SR
REVIEWED BY: JHP

PREPARED FOR
WASTE MANAGEMENT OF TEXAS, INC.

REVISIONS

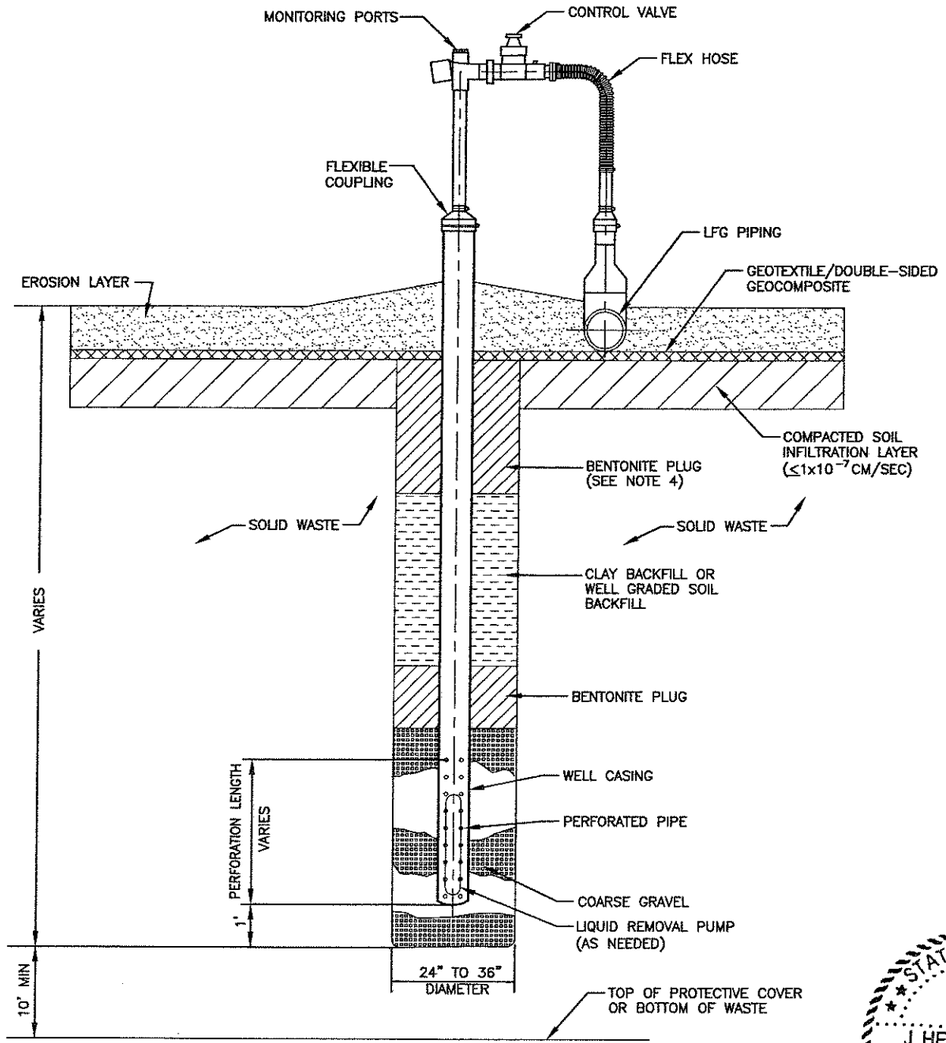
NO.	DATE	DESCRIPTION

MAJOR PERMIT AMENDMENT
FINAL GCCS PLAN

SKYLINE RECYCLING & DISPOSAL FACILITY
DALLAS & ELLIS COUNTIES, TEXAS

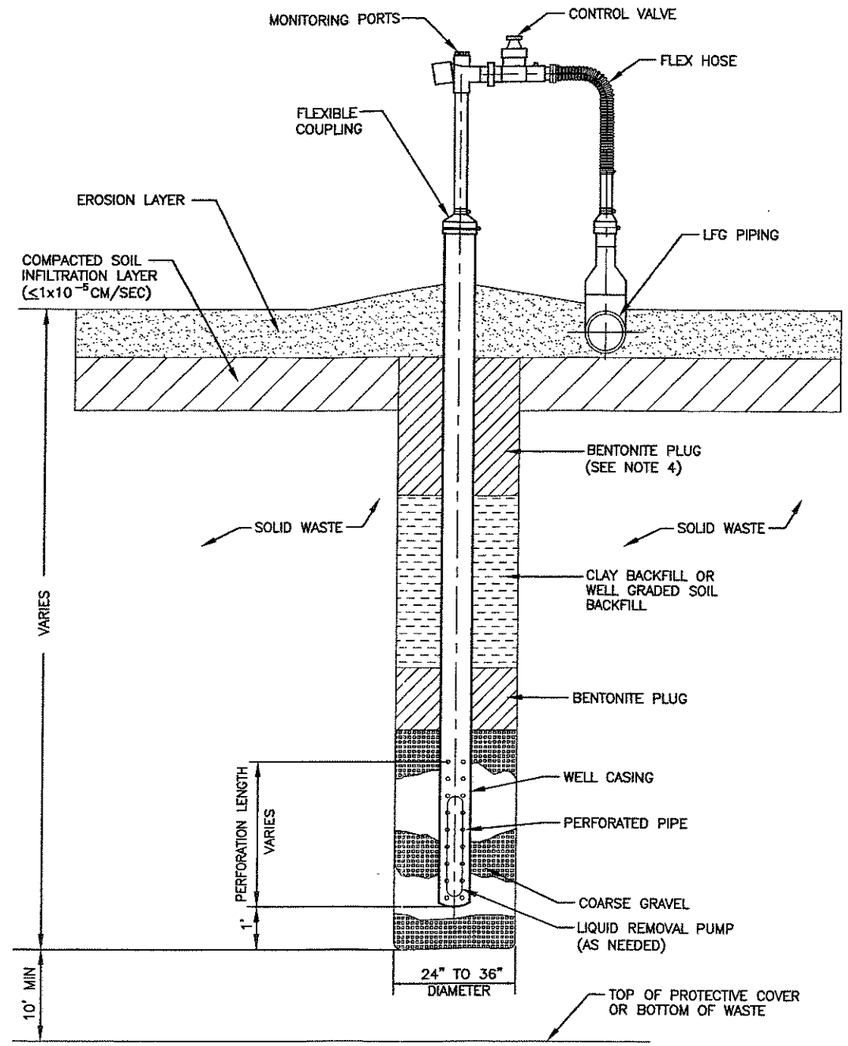
Weaver Boos Consultants
TBPE REGISTRATION NO. F-3727
CHICAGO, IL
NAPERVILLE, IL
COLUMBUS, OH
DENVER, CO
FORT WORTH, TX
EVANSVILLE, IN
RIVERSIDE, MO
GRAND RAPIDS, MI
SOUTH BEND, IN
SPRINGFIELD, IL
CLEARMONT, FL

DRAWING G5-A-1



TYPICAL LFG EXTRACTION WELL IN SUBTITLE D FINAL COVER (LFG-1, G-5-A-2)

NTS



TYPICAL LFG EXTRACTION WELL IN PRE-SUBTITLE D FINAL COVER (LFG-2, G-5-A-2)

NTS

STATE OF TEXAS
J. HEATH PARKER
94764
LICENSED
PROFESSIONAL ENGINEER

J. Heath Parker
4/10/12

NOTES:

1. ALL SIZES AND DIMENSIONS ARE APPROXIMATE.
2. THE EXACT WELLHEAD CONFIGURATION DEPENDS ON MANUFACTURER.
3. THE ELEVATION OF THE EXISTING LINER SYSTEM WILL BE VERIFIED PRIOR TO CONSTRUCTION. THE VERIFICATION PROCESS WILL INCLUDE THE REVIEW OF EXISTING AS-BUILT LINER CERTIFICATION INFORMATION.
4. UPPER BENTONITE PLUG WILL COINCIDE WITH THE LOCATION OF THE COMPACTED SOIL.

- [ ] DRAFT
- [x] FOR PERMITTING PURPOSES ONLY
- [ ] ISSUED FOR CONSTRUCTION
- [ ] CLIENT APPROVAL BY: _____

DATE: 04/2012
FILE: 0086-11-17
CAD: G5-A-2 WELL DETAIL.DWG

DRAWN BY: VRS
DESIGN BY: SR
REVIEWED BY: JHP

PREPARED FOR
WASTE MANAGEMENT OF TEXAS, INC.

REVISIONS

NO.	DATE	DESCRIPTION

MAJOR PERMIT AMENDMENT
TYPICAL EXTRACTION WELL DETAIL

SKYLINE RECYCLING & DISPOSAL FACILITY
DALLAS & ELLIS COUNTIES, TEXAS

Weaver Boos Consultants
TBPE REGISTRATION NO. F-3727
CHICAGO, IL · NAPERVILLE, IL · COLUMBUS, OH · DENVER, CO · FORT WORTH, TX · EVANSVILLE, IN · RIVERSIDE, MO · GRAND RAPIDS, MI · SOUTH BEND, IN · SPRINGFIELD, IL · CLEARMONT, FL

DRAWING G5-A-2

SKYLINE LANDFILL

APPENDIX G5-B
LANDFILL GAS GENERATION MODEL

Includes pages G5-B-1 through G5-B-4

LANDFILL GAS GENERATION MODEL

Table G5-B-1 presents the results of a LFG generation estimate prepared for the Skyline Landfill. The estimate was generated using the U.S. Environmental Protection Agency (EPA) Landfill Gas Emissions Model (LandGEM), Version 3.02. The modeling results reflect the estimated waste quantities accepted over the operating life of the site, including the proposed landfill expansion.

Gas generation parameters used in the model were those established by the EPA in AP-42, Compilation of Air Pollutant Emission Factors, including a methane generation potential (L_o) of 100 cubic meters per megagram of solid waste, and a methane generation constant (k) of 0.04 $year^{-1}$. For converting methane to LFG, a methane content of 50 percent was assumed.

The results suggest the LFG generation rate will continue to increase with time as more waste is placed in the landfill. Peak LFG generation is expected to be achieved at site closure with a maximum generation rate of approximately 13,315 standard cubic feet per minute in 2044.

TABLE G5-B-1
Estimated Landfill Gas Generation Rate
Skyline Landfill

Year	Waste In Place (Mg)	Landfill Gas Generation	
		m^3/yr	scfm
1950	0	0.000E+00	0
1951	42,727	3.357E+05	23
1952	85,240	6.566E+05	44
1953	127,540	9.633E+05	65
1954	169,629	1.256E+06	84
1955	211,508	1.536E+06	103
1956	253,177	1.803E+06	121
1957	294,638	2.058E+06	138
1958	335,891	2.302E+06	155
1959	376,938	2.534E+06	170
1960	417,780	2.756E+06	185
1961	458,418	2.967E+06	199
1962	499,340	3.172E+06	213
1963	540,549	3.372E+06	227
1964	582,046	3.565E+06	240
1965	623,834	3.754E+06	252
1966	665,914	3.937E+06	265
1967	708,289	4.116E+06	277
1968	750,960	4.290E+06	288
1969	793,930	4.459E+06	300
1970	837,201	4.625E+06	311
1971	880,775	4.786E+06	322
1972	925,438	4.949E+06	333
1973	971,217	5.115E+06	344
1974	1,018,142	5.283E+06	355
1975	1,066,239	5.454E+06	366
1976	1,115,539	5.627E+06	378
1977	1,166,071	5.804E+06	390
1978	1,217,866	5.983E+06	402
1979	1,270,956	6.166E+06	414
1980	1,325,374	6.351E+06	427
1981	1,381,152	6.541E+06	439
1982	1,438,938	6.738E+06	453
1983	1,498,805	6.944E+06	467

TABLE G5-B-1
Estimated Landfill Gas Generation Rate
Skyline Landfill
(Continued)

Year	Waste In Place (Mg)	Landfill Gas Generation	
		m^3/yr	scfm
1984	1,560,826	7.160E+06	481
1985	1,625,080	7.384E+06	496
1986	1,691,648	7.617E+06	512
1987	1,760,612	7.860E+06	528
1988	1,832,058	8.114E+06	545
1989	1,906,077	8.377E+06	563
1990	1,982,761	8.651E+06	581
1991	2,062,204	8.936E+06	600
1992	2,225,473	9.869E+06	663
1993	2,403,986	1.088E+07	731
1994	2,546,131	1.157E+07	778
1995	2,737,510	1.262E+07	848
1996	2,863,399	1.312E+07	881
1997	3,196,249	1.522E+07	1,023
1998	3,659,953	1.827E+07	1,227
1999	4,247,433	2.217E+07	1,489
2000	4,886,574	2.632E+07	1,768
2001	5,581,556	3.075E+07	2,066
2002	6,299,465	3.518E+07	2,364
2003	6,971,915	3.909E+07	2,626
2004	7,893,904	4.480E+07	3,010
2005	8,661,166	4.907E+07	3,297
2006	9,460,609	5.343E+07	3,590
2007	10,211,581	5.724E+07	3,846
2008	11,129,418	6.220E+07	4,180
2009	12,174,673	6.798E+07	4,568
2010	13,101,127	7.259E+07	4,878
2011	14,025,299	7.701E+07	5,174
2012	14,947,709	8.124E+07	5,458
2013	15,890,989	8.546E+07	5,742
2014	16,847,474	8.963E+07	6,022
2015	17,817,351	9.374E+07	6,298
2016	18,800,806	9.779E+07	6,570
2017	19,798,030	1.018E+08	6,839

TABLE G5-B-1
Estimated Landfill Gas Generation Rate
Skyline Landfill
(Continued)

Year	Waste In Place (Mg)	Landfill Gas Generation	
		m^3/yr	scfm
2018	20,809,214	1.057E+08	7,105
2019	21,834,555	1.097E+08	7,368
2020	22,874,251	1.135E+08	7,628
2021	23,928,503	1.174E+08	7,885
2022	24,997,514	1.212E+08	8,140
2023	26,081,491	1.249E+08	8,394
2024	27,180,644	1.287E+08	8,645
2025	28,295,185	1.324E+08	8,894
2026	29,425,330	1.361E+08	9,142
2027	30,571,296	1.397E+08	9,389
2028	31,733,307	1.434E+08	9,634
2029	32,911,585	1.470E+08	9,878
2030	34,106,359	1.506E+08	10,122
2031	35,317,860	1.543E+08	10,365
2032	36,546,322	1.579E+08	10,607
2033	37,791,983	1.615E+08	10,849
2034	39,055,083	1.651E+08	11,090
2035	40,335,866	1.686E+08	11,331
2036	41,634,580	1.722E+08	11,573
2037	42,951,477	1.758E+08	11,814
2038	44,286,809	1.794E+08	12,056
2039	45,640,837	1.830E+08	12,298
2040	47,013,820	1.866E+08	12,541
2041	48,406,026	1.903E+08	12,784
2042	49,817,723	1.939E+08	13,028
2043	51,249,183	1.975E+08	13,273
2044	**52,315,065**	**1.982E+08**	**13,315**
2045	52,315,065	1.904E+08	12,793
2046	52,315,065	1.829E+08	12,292
2047	52,315,065	1.758E+08	11,810
2048	52,315,065	1.689E+08	11,347
2049	52,315,065	1.623E+08	10,902
2050	52,315,065	1.559E+08	10,474