CORRECTIVE ACTION PLAN
OWL'S DEN LANDFILL
PERMIT NO. 55-02
LINCOLNTON, NORTH CAROLINA

S&ME Project No. 1356-10-028

Prepared for:

North Carolina Department of Environment and Natural Resources
Division of Waste Management – Solid Waste Section
1646 Mail Service Center
Raleigh, North Carolina 27699-1646

Prepared by:

S&ME, Inc.
9751 Southern Pine Blvd
Charlotte, North Carolina 28273

July 16, 2010

July 16, 2010

NC Department of Environment and Natural Resources
Division of Waste Management – Solid Waste Section
1646 Mail Service Center
Raleigh, NC 27699-1646

Attention: Ms. Jaclynne Drummond
Compliance Hydrogeologist

Reference: **Corrective Action Plan**
Owl's Den Landfill, Permit No. 55-02
Lincolnton, North Carolina
S&ME Project No. 1356-10-028

Dear Ms. Drummond:

S&ME, Inc. (S&ME), on behalf of Lincoln County, submits this Corrective Action Plan (CAP) for the Owl's Den Landfill. This CAP is in response to the issuance of your letter dated May 20, 2010 entitled "October 2009 Semiannual Monitoring of Groundwater, Surface Water, and Methane" requiring a CAP for the above referenced site. If you should have any questions or need additional information please contact us at (704)-523-4726.

Respectfully submitted,

S&ME, Inc.

Julie R. Petersen, P.G.
Project Manager/Senior Geologist

7/16/10

Ken Daly, P.E.
Senior Project Engineer

Senior reviewed by M. Neal McElveen, P.E., Environmental Services Manager

cc: Nancy Rickard, Lincoln County (1 copy)

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1. INTRODUCTION AND BACKGROUND

The follow sections detail the operational history of the site and the previous and current monitoring and assessment of the site.

1.1 Operational History

The Owl's Den Landfill (Owl's Den) is owned and formally operated by Lincoln County. Owl's Den is an unlined landfill that ceased operation in December 1987. The landfilled area of the property is approximately 21.2 acres and is illustrated on ***Figure 1, Existing Site Conditions.***

Because there are no records for the Owl's Den Landfill regarding its operational period, S&ME has estimated that it began operation following the purchase of the land by the County on October 22, 1971. Reviews of historical aerial photographs confirm that the property was utilized as a farm on February 6, 1968 and that the landfill was in operation by April 6, 1973. S&ME understands that the facility operated as a trench fill landfill.

The landfill continued receiving waste until December 1987 when the current Lincoln County Landfill began receiving waste. Based on historical engineering records, the landfill was "closed-out" prior to December 1988 with a 24-inch thick soil cover placed on top of the landfill.

Currently, Lincoln County utilizes portions of the Owl's Den site that have not been landfilled as a Convenience Site for the County residents.

1.2 Monitoring and Assessment History

After closure of the Owl's Den Landfill in 1988, surface water sample locations SW-1 and SW-2 were established and monitored semi-annually. In February 2000, The North Carolina Department of Environment and Natural Resources (NCDENR) issued a letter for assessment due to contaminants detected in the surface water samples. At that time, an edge of waste survey was performed, a receptor survey was performed, methane and groundwater monitoring wells were installed (MMW-1 through MMW-4 and MW-1 through MW-7A), an additional surface water sample location was established (SW-3), and a private well monitoring program was established.

In June 2004, NCDENR issued a letter for corrective measures to be taken for groundwater, surface water, and methane that exceeded standards at the property boundary. At that time, Lincoln County purchased buffer property to the South and North of the Landfill as a corrective action. Following the property purchase, NCDENR issued a letter in November 2007 for further assessment to characterize groundwater and gas to include the new property purchases. At that time, additional methane and groundwater monitoring wells were installed (MMW-5 through MMW-9 and MW-8 through MW-10).

In May 2010, NCDENR issued a letter for corrective measures to be taken for groundwater, surface water, and methane for which this Corrective Action Plan (CAP) was prepared. As requested in the NCDENR letter, the receptor survey for the site was

updated to include new construction within the area and a Methane Monitoring Plan was established.

2. SITE LOCATION AND FEATURES

The following sections discuss the location, geographic features of the site as well as potential receptors in the area.

2.1 Site Location

The Owl's Den Landfill is located at 701 Owl's Den Road in Lincolnton, North Carolina. The site is located in a rural section of Lincoln County that predominately consists of agricultural land and residences.

2.2 Geographic Features

The Owl's Den Landfill property is approximately 68 acres, of which 21.2 acres are landfill. The property contains a combination of open fields, scrub brush areas, wooded areas, and a developed area around the convenience site. The overall topography of the site is a knoll which slopes gently to the east and steeply to the north and west of the property. Within the limits of waste, there is a suspected area of non-disposal that is identified on ***Figure 5***. This area has old growth trees, and is referenced in one historical drawing (Law Environmental, 1989) as a stockpile area.

The site is bound to the west, north and part of the east by unnamed tributaries that create natural boundary conditions to the migration of groundwater and methane. Groundwater generally flows across the site from the south to the north and discharges to the unnamed tributaries. The unnamed tributaries flow generally to the north and discharge to Howard's Creek. Groundwater flow direction for the site is illustrated on ***Figure 2, Groundwater Elevation Map***.

2.3 Potential Receptors

The majority of the properties surrounding the Owl's Den Landfill are agricultural fields; however, there are residences along Owl's Den Road and Rock Dam Road that fall within a 1,500-foot radius from the edge of waste. Based on our most recent receptor survey, dated June 14, 2010, S&ME identified 38 properties that have or are suspected of having private supply wells and residences within the 1,500-foot buffer from the edge of waste, ***Figure 3, Receptor Survey Map***.

The Owl's Den Convenience Site is connected to County water and does not use a supply well; however, the Convenience Building is considered a potential receptor for methane gas.

3. AREAS OF CONCERN

The following sections describe the areas of the site where concentrations of contaminants and landfill gas potentially pose a threat to the environment and human health.

3.1 Methane

Methane gas has been recently and historically measured in five of the nine Methane Monitoring Wells above the lower explosive limit (LEL) of 5 percent methane in wells MMW-1 through MMW-5. The methane measurements for MMW-6 have fluctuated from 0 to <5 percent methane. The remaining Methane Monitoring Wells have not had measured concentrations of methane. Historical methane gas concentrations for the wells are included in ***Table 1, Methane Gas Measurements***.

The June 2010 Methane Concentrations map is included in this Plan as ***Figure 4***, and illustrates the areas on site with measurable methane concentrations. As illustrated on Figure 4, MMW-1 and MMW-2 have the highest methane concentrations in June 2010 above the upper explosive limit (UEL) of 15 percent. MMW-5 had a methane concentration between the UEL and LEL, and MMW-6 had a concentration below the LEL. MMW-7, MMW-8, and MMW-9 had no detectable concentration of methane. MMW-1 and MMW-3 are not currently monitored.

MMW-2 and MMW-4 monitor between the edge of waste and the tributaries to the north of the property. Although elevated concentrations of methane have been detected in these wells, the methane is most likely not migrating beyond the unnamed tributaries. The unnamed tributaries are groundwater discharge points for the landfill and are therefore natural boundaries to the migration of methane gas.

MMW-5 and MMW-6 monitor between the edge of waste and the residential properties located south of the landfill. Both wells have had measureable concentrations of methane gas. Historically MMW-5 has measured concentrations of methane greater than the LEL and MMW-6 has measured concentrations lower than the LEL. Due to the residential structures adjacent to the landfill to the south, corrective measures are recommended in this area to prevent the potential migration of methane gas towards the residences.

3.2 Groundwater

As stated previously, groundwater generally flows across the site from the south to the north toward the unnamed tributaries. The unnamed tributaries are the groundwater discharge for the site and the County owns the property up to the discharge.

Both volatile organic compounds and inorganic compounds have been detected above 15A NCAC 2L Standards and/or Solid Waste Groundwater Protection Standards in several wells across the site, most notably in MW-2, MW-4, and MW-7 located adjacent to the unnamed tributaries to the north of the property. Although these wells have detections above regulatory standards, the unnamed tributaries to which the groundwater discharges have not had detections above regulatory standards.

Monitoring wells MW-8 and MW-9, which are located up gradient from the edge of waste, have had detections of volatile organic constituents below regulatory standards. Because they are located hydraulically up gradient and approximately 200 feet from the edge of waste, the detections of volatile organics in these wells may be an indication of phase transfer between landfill gas and groundwater. If phase transfer of constituents is

occurring, corrective measures which reduce the methane concentrations on site may aid in the reduction of volatile organics in the groundwater.

3.3 Surface Water

Three surface water sample locations are monitored semi-annually for the site SW-1 through SW-3. SW-1 is located up gradient of the landfill; SW-2 is located down gradient of the landfill; and SW-3 is located in the unnamed tributary to the northeast of the property as illustrated on ***Figure 2***. SW-1 and SW-2 have historically detected one to two volatile organic compounds below regulatory standards. Such was the case for SW-3, until recently when an increased number of volatile organic compounds have been detected. The volatile organics detected have been below regulatory standards; however the detections are addressed in this CAP.

4. PROPOSED CORRECTIVE MEASURES

S&ME proposes the use of three corrective measures to address the methane, groundwater, and surface water issues at the site. The corrective measures include re-grading of the soil cover, installation of passive gas vents, and the installation of a passive gas trench. The proposed corrective measures are discussed in more detail in the following sections.

4.1 Re-Grading of Soil Cover

Based on recent site reconnaissance, the overall topography of the site has settled differentially over the existing waste area and leachate breakouts have been observed. This differential settlement has led to ponding of surface waters that have likely increased surface water infiltration in to the waste mass. Increased surface water infiltration into the waste mass has the potential to promote or contribute to methane and leachate production that in turn increases methane migration, groundwater and surface water impacts, and leachate breakouts. Due to the differential settlement on site, re-grading of depressed areas to provide for improved surface water run-off will be a necessary part of corrective actions.

S&ME anticipates that re-grading of the soil cover will address the following issues on site:

- **Methane Production**
  Reduction of surface water infiltration into the waste mass has the potential to reduce methane production by limiting waste degradation. Reduced methane production also has the potential to limit phase transfer of constituents from methane gas to groundwater.

- **Groundwater Quality**
  Reduction of surface water infiltration into the waste mass also has the potential to reduce leachate production, there by reducing leachate transport to the groundwater and the occurrence of leachate breakouts.

- **Surface Water Quality**
  Since the unnamed tributaries bounding the property receive groundwater discharge for the site, improvement in groundwater quality will influence surface water quality. Surface water quality may also benefit from the decrease in leachate breakouts that have the potential to discharge into the unnamed tributaries.

To prepare for re-grading of the soil cover, Lincoln County has bush-hogged within the limits of waste and cleared out the shrubs and trees. Clearing within the limits of waste was completed on June 30, 2010. An aerial survey was flown on July 4, 2010 to provide a topographic map of the site that will aid in the identification of areas of settlement and provide a baseline survey to support development of a grading plan.

Upon approval of this CAP and receipt of the aerial survey, S&ME will prepare a grading plan for review and approval by the NCDENR Solid Waste Section. The purpose of the grading plan will be to address localized areas on site that are not positively drained and allow for increased surface water migration through the soil cover. The grading plan and supporting documents will include:

- Soil specifications to address:
  - earthworks,
  - erosion and sediment control measures; and
  - vegetation and seeding requirements.
- Soil quantity estimates;
- Location and size requirements for potential borrow areas;
- Re-use of investigative derived waste (i.e. excavated waste); and
- Location specific grading recommendations.

Because it is anticipated than more than 1 acre will be disturbed during grading activities, S&ME will also prepare and submit an Erosion and Sediment Control (E&SC) Plan to the NCDENR Land Quality Section.

4.2 Passive Gas Vents

To address methane concentrations on site, S&ME proposes to install 16 passive gas vents (GV-1 through GV-16) across the site as illustrated on ***Figure 5, Proposed Passive Gas Vents and Trench***. The purpose of the passive gas vents is to vent methane into the atmosphere within localized areas of the waste mass. The effectiveness and radius of influence of passive gas vents is dependant on the environmental conditions of the landfill and vent design, and the intent of these passive vents is not a wide scale collection and control system, but rather to supplement the other proposed corrective measures.

The proposed detail for the passive gas vents is illustrated on ***Figure 6, Passive Gas Vent***. The vents will be installed using a bucket auger drill rig capable of creating a 36-inch diameter borehole through the soil cover and waste. Because the depth to waste is not known, borings will be advanced through the waste into residual soils. The borehole

will then be backfilled with bentonite within the residual material and two feet into the waste to seal across the waste/soil interface.

The vent screen will be constructed of 6-inch diameter perforated high density polyethylene (HDPE) which will extend from 2 feet above the bentonite seal to 10 feet below land surface. The vent casing will be constructed of 6-inch diameter non-perforated HDPE pipe extending from 10 feet below land surface to 5 feet above land surface. The end of the perforated screen will be capped, and the vent completed at the surface with a "gooseneck" style elbow (180 degree sweep). The top end of each vent will be covered with a protective screen to allow the free flow of LFG out of the vent and to prevent animals, insects and material from entering.

The annulus of the borehole will be backfilled with #57 aggregate (washed stone) that will extend from the bentonite seal to 2 feet below land surface. A non-woven geotextile fabric ring will then be placed around the vent pipe and on top of the gravel pack. The remainder of the annulus will be backfilled with re-compacted soil and completed with a 36-inch diameter concrete pad.

4.3 Passive Gas Trench

To address methane concentrations measured in the methane monitoring wells along the southern property boundary adjacent to the residential structures along Owl's Den Road, S&ME proposes to install a 400-foot long passive gas trench along the edge of waste as illustrated on ***Figure 5, Proposed Passive Gas Vents and Trench***. The purpose of the trench is to create a relief area between the edge of waste and the property boundary that provides a pathway for methane to vent to the atmosphere.

The design of the passive gas trench is illustrated on ***Figure 7, Passive Gas Trench***. The trench dimensions will be 400 feet long, by 18 inches wide, by 15 feet deep. The trench will be installed along the edge of waste boundary, adjacent to the waste mass. Five passive gas vents will be spaced at 100-foot intervals along the trench (T-1 through T-5) connected by a horizontal perforated pipe.

Once excavated, the trench will be backfilled with #57 aggregate (washed stone) to a depth of 8 feet below land surface. A 6-inch diameter perforated HDPE pipe will be placed on top of the gravel pack and connected to the vertical vent pipes. The vertical vent pipe will extend from the horizontal screen to 5 feet above land surface where each will terminate into a gooseneck. Once the HDPE pipe is installed and stabilized in-place, the remainder of the trench will be backfilled with gravel to 2 feet below land surface.

12-inch diameter sonatubes will be placed around the vertical vent pipes for later filling with concrete. A non-woven geotextile fabric will then be placed around the vent pipes and on top of the gravel pack. The remainder of the trench will be backfilled with re-compacted soil to ground surface. The vertical vent pipes will be completed by backfilling the sonatubes with concrete to create a collar.

5. HEALTH, SAFETY AND ENVIRONMENTAL PRECAUTIONS

Due to the environmental and health hazards associated with landfilled waste, leachate, and methane, S&ME has developed a proposed protocol for health and safety on site, and the handling, storage and re-use of investigative derived waste, as described in the following sections.

5.1 Health and Safety

During the course of remedial activities on site, landfilled waste will be exposed, as well as the possibility of wet waste containing leachate. Excavation and boring through the waste also carries the possibility of releasing trapped methane gas into the ambient air. To address these health and safety issues during remedial activities, S&ME will prepare a site specific Health and Safety Plan (HASP). The HASP will be prepared following approval of the CAP and will be submitted to NCDENR for review and approval prior to commencement of remedial activities on site.

The HASP will address the following items:

- Project contacts and roles;
- Emergency contacts and protocols;
- Personnel training and monitoring requirements;
- Safety meetings and documentation;
- Site access/egress and security;
- Site activities;
- Hazards assessment;
- Hazards mitigation;
- Site safety equipment;
- Investigative derived waste handling and storage; and
- Housekeeping

A copy of the HASP will be provided to Lincoln County for their records, one copy will remain on-site during field activities, and one copy will remain in the Charlotte S&ME office. Each individual and subcontractor performing work on site will be required to review the health and safety plan prior to performing site activities. S&ME employees will sign the HASP and subcontractors will use the hazards identification in the HASP to prepare their own site specific HASP. The subcontractors will provide a copy of their HASP to S&ME.

5.2 Investigative Derived Waste

In an effort to minimize the amount of soil required to re-grade the cover, S&ME proposes to re-bury the waste generated during installation of the passive gas vents and trench to "build-up" low lying areas across the waste area. In general, the cover soils in the low lying areas would be removed and stockpiled. Waste would then be placed in compacted lifts until the desired grade is achieved, followed by re-placement of the cover soils. Detailed specifications regarding re-burial of the waste will be detailed in the Grading Plan.

Prior to re-burial of the waste, spoils from the borings and excavation will be stockpiled on and covered with plastic adjacent to the boring/excavation. Re-grading of the cover will follow installation of the passive gas vents and trench. Any remaining waste not used during re-grading activities, or deemed unsuitable for fill, will be hauled to the Lincoln County Landfill to be disposed of in the municipal solid waste landfill.

6. REPORTING

Following implementation of the approved corrective measures, S&ME will prepare a report that will include but not be limited to the following:

- A detailed discussion of field activities performed;
- As built details of the passive gas vents and trench;
- A copy of the approved Grading Plan and E&SC Plan; and
- Photographs of field activities.

7. GROUNDWATER ASSESSMENT PLAN

As part of the NCDENR letter dated May 20, 2010 entitled "October 2009 Semiannual Monitoring of Groundwater, Surface Water, and Methane" NCDENR requires a "Phase II Groundwater Assessment Plan" for the site to be submitted by August 18, 2010. Because the corrective actions proposed within this CAP address not only landfill gas, but also groundwater and surface water concerns for the site, S&ME requests that the Groundwater Assessment Plan not be required at this time.

S&ME recommends that the need for further groundwater assessment at the site be re-evaluated following two semi-annual monitoring events after implementation of the CAP. At such time, S&ME will provide NCDENR with a status report summarizing the influence of the corrective measures on the groundwater and surface water quality and methane concentrations on site and provide recommendations for further assessment and corrective measures, if required.

8. PROPOSED SCHEDULE

S&ME proposes the following generalized schedule to complete corrective actions for the site:

- **Submittal of Grading Plan**
  Following approval of this CAP, and receipt of the aerial survey performed on July 4, 2010, S&ME will prepare the Grading Plan and Erosion and Sediment Control Plan for submittal to their respective NCDENR sections within 30 days. S&ME estimates that NCDENR will approve the CAP within 2 to 3 weeks of submittal.
  (Approximated submittal date August 31, 2010)

- **Submittal of Heath and Safety Plan**
  Following approval of this CAP, S&ME will submit a Health and Safety Plan for NCDENR approval within 30 days.
  (Approximated submittal date August 31, 2010)

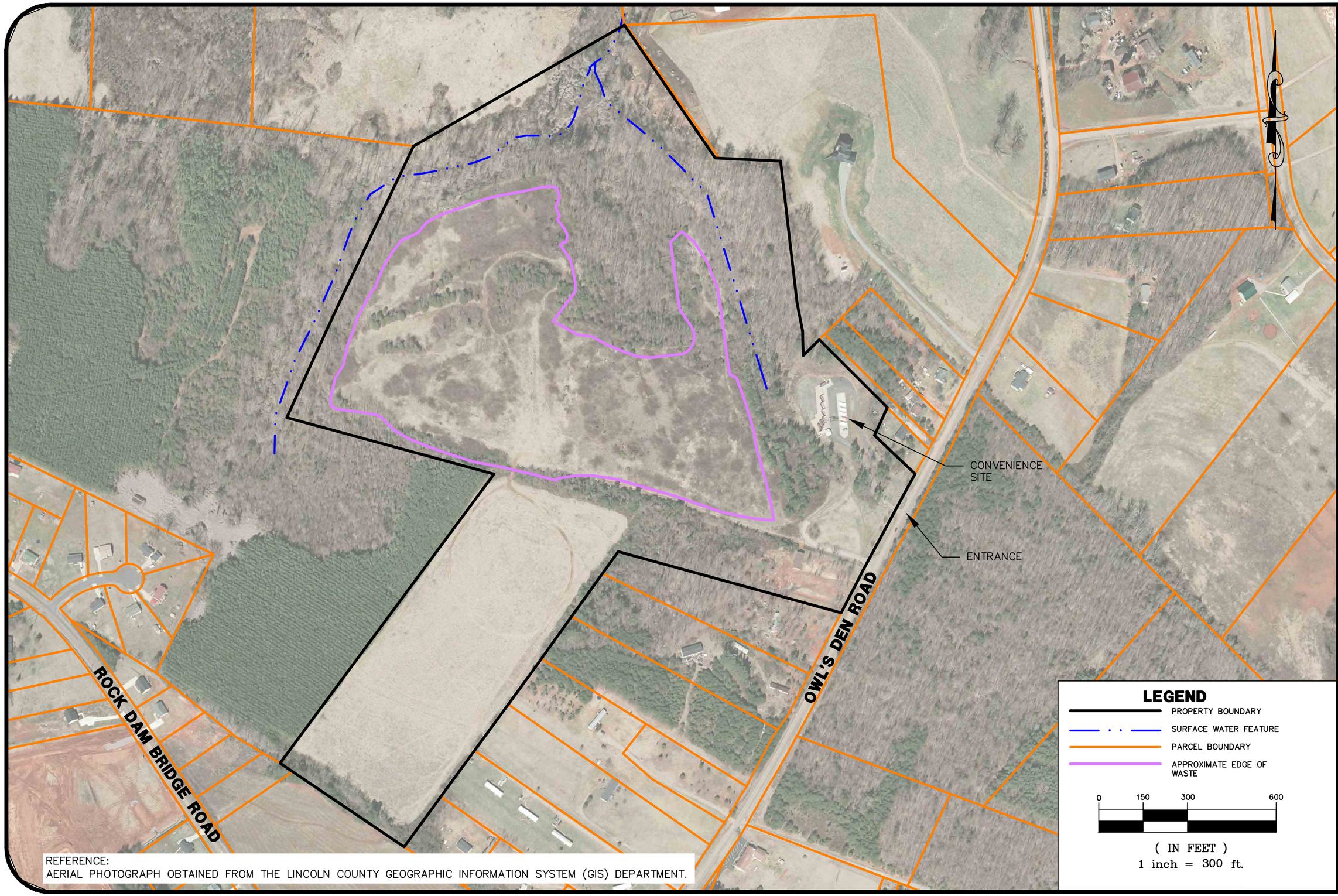
- **Performance of Corrective Measures**
  Following approval of the Grading Plan, Heath and Safety Plan, and Erosion and Sediment Control Plan, S&ME anticipates that it will take on the order of 90 to 120 days to complete corrective measures. S&ME estimates NCDENR will take on the order of 30 days to review and approve the above mentioned documents. (Approximated start date October 1, 2010)

- **Reporting for Implementation of Corrective Measures**
  Following the completion of remedial activities on-site, S&ME will provide NCDENR with a report within 30 days.
  (Approximated submittal date February 1, 2011)

- **Status Report for Corrective Measures**
  Following two semi-annual monitoring events for the site after corrective measures have been completed, S&ME will submit a status report within 30 of the second monitoring event.
  (Approximated submittal date December 1, 2011)

The schedule detailed above is approximate and is provided as a general timeline. S&ME and Lincoln County are dedicated to provide these services in a timely manner and within realistic timeframes. However, circumstances beyond our control may influence the schedule, such as weather, contractor delays, and regulatory review outside of the Solid Waste Section. S&ME and Lincoln County will keep the NCDENR informed as to any such delays to the schedule.

FIGURES



REFERENCE:
AERIAL PHOTOGRAPH OBTAINED FROM THE LINCOLN COUNTY GEOGRAPHIC INFORMATION SYSTEM (GIS) DEPARTMENT.

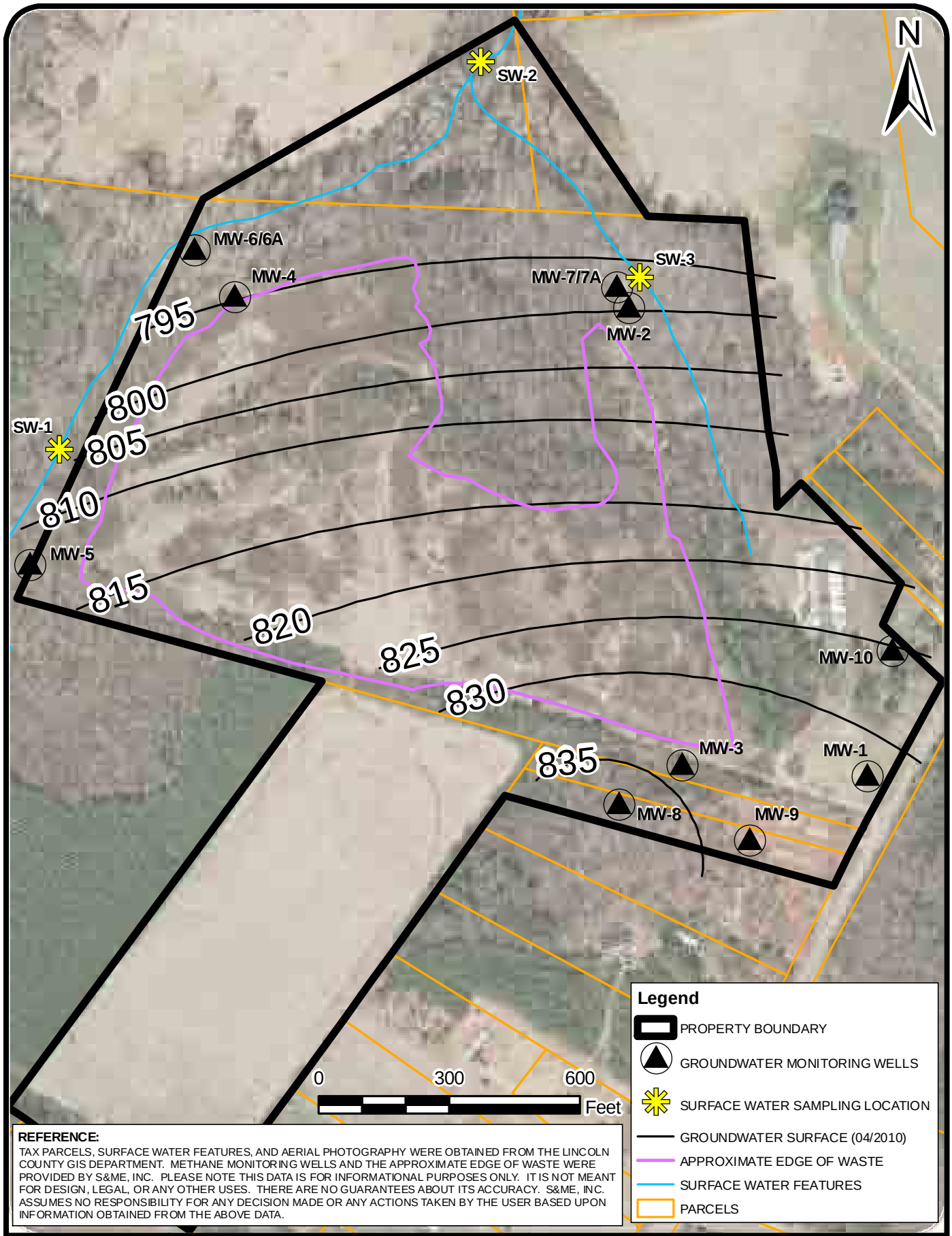
S&ME
9751 SOUTHERN PINE BLVD.
CHARLOTTE, N.C. 28273
(704)523-4726
WWW.SMEINC.COM

SCALE: AS SHOWN	DATE: 7-16-10	
PROJECT NO. 1356-10-028	DRAWN BY: CLD	
ENGINEERING LICENSE NO: F-0176	CHECKED BY:	

EXISTING SITE CONDITIONS

OWL'S DEN LANDFILL
LINCOLNTON, NORTH CAROLINA

FIGURE NO.
1



REFERENCE:
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DATE:	07/16/10
DRAWN BY:	CXR
PROJECT NO:	1356-10-028

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GROUNDWATER ELEVATION MAP APRIL, 2010

OWL'S DEN LANDFILL
LINCOLNTON, NC

FIGURE NO.
2

1500' BUFFER FROM EDGE OF WASTE

APPROXIMATE EDGE OF WASTE

OWL'S DEN LANDFILL

OWL'S DEN ROAD

ROCK DAM ROAD

1500' BUFFER FROM EDGE OF WASTE

0 100 200 400 600 800 Feet

REFERENCE:
TAX PARCEL AND SURFACE WATER FEATURES GIS DATA WAS OBTAINED FROM THE LINCOLN COUNTY GEOGRAPHIC INFORMATION SYSTEMS (GIS) DEPARTMENT. THE APPROXIMATE EDGE OF WASTE, THE 1500' BUFFER FROM EDGE OF WASTE, AND RECEPTOR SURVEY PARCELS GIS DATA WAS PROVIDED BY S&ME, INC. PLEASE NOTE THIS DATA IS FOR INFORMATIONAL PURPOSES ONLY. IT IS NOT MEANT FOR DESIGN, LEGAL, OR ANY OTHER USES. THERE ARE NO GUARANTEES ABOUT ITS ACCURACY. S&ME, INC. ASSUMES NO RESPONSIBILITY FOR ANY DECISION MADE OR ANY ACTIONS TAKEN BY THE USER BASED UPON INFORMATION OBTAINED FROM THE ABOVE DATA.

Legend

- OWL'S DEN LANDFILL
- APPROXIMATE EDGE OF WASTE
- 1500' BUFFER FROM EDGE OF WASTE
- SURFACE WATER FEATURES
- TAX PARCELS (WITH PIN #)
- PRIVATE SUPPLY WELL (SEE NOTE 1 BELOW)
- CONNECTED TO COUNTY WATER (SEE NOTE 2 BELOW)
- NO PRIVATE SUPPLY WELL (SEE NOTE 3 BELOW)

LEGEND NOTES

NOTE 1: PARCELS VISUALLY IDENTIFIED AND KNOWN TO HAVE PRIVATE SUPPLY WELLS, OR PROPERTIES SUSPECTED TO HAVE PRIVATE SUPPLY WELLS DUE TO RESIDENTIAL STRUCTURES ON THE PROPERTY.

NOTE 2: PARCELS KNOWN TO BE CONNECTED TO COUNTY WATER SUPPLY.

NOTE 3: PARCELS VISUALLY IDENTIFIED AS VACANT, HAVING NON-RESIDENTIAL STRUCTURES WITHOUT WELLS, OR PROPERTIES WITH RESIDENTIAL STRUCTURES AND WELLS OUTSIDE OF THE BUFFER.

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NO.	DATE	DESCRIPTION	BY

RECEPTOR SURVEY MAP

OWL'S DEN LANDFILL
LINCOLNTON, NORTH CAROLINA

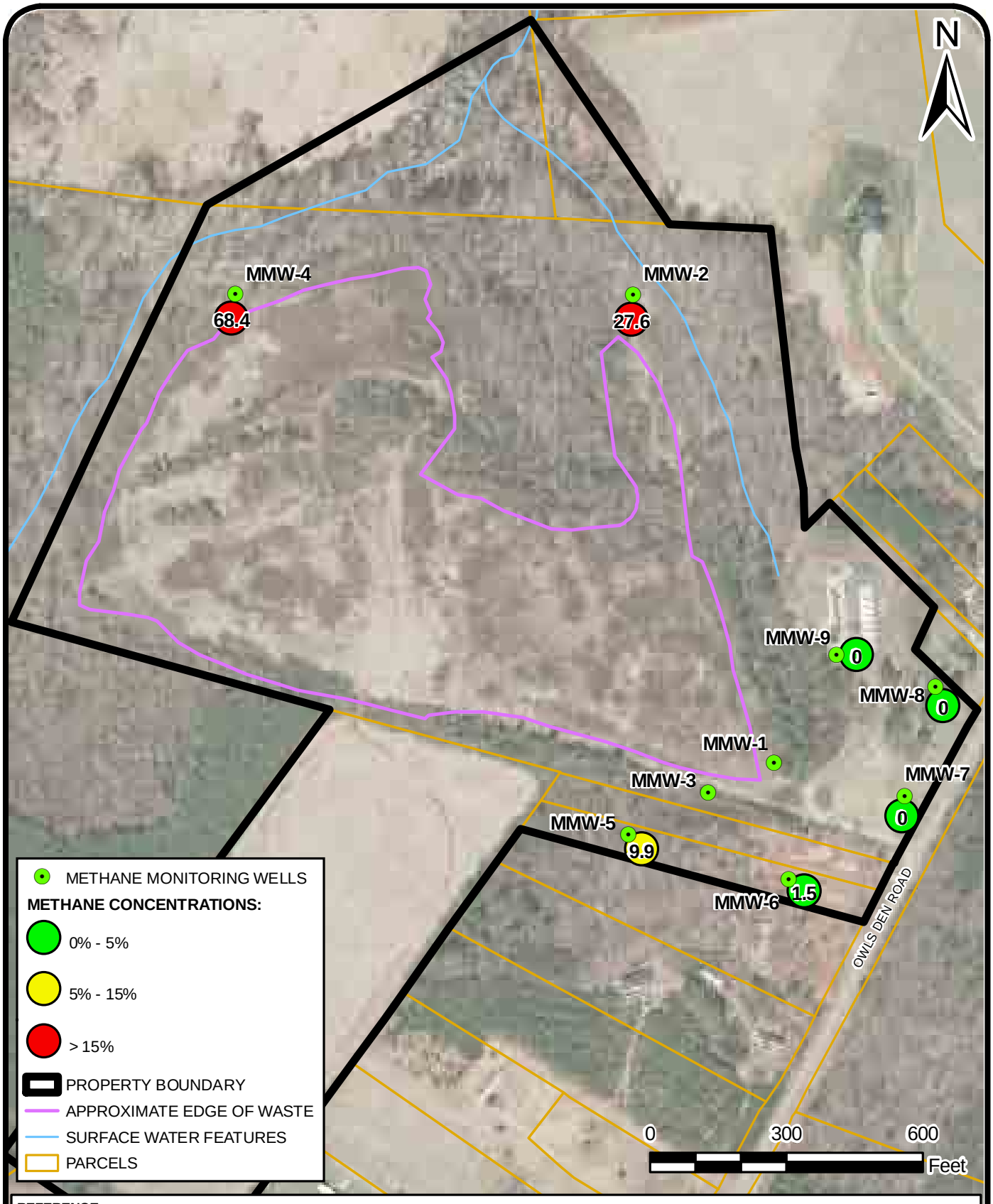
DRAWN BY:	CHECKED BY:
CXR	
DESIGNED BY:	APPROVED BY:

PROJECT NO: 1356-10-021, PH 03

SCALE:	DATE:
1" = 200'	07/16/10

FIGURE:	OF:
3	7

DRAWING PATH: Q:\1356\LINCOLN COUNTY\Owls Den Assessment Activities (1356-09-002)\GIS\Owls Den Receptor Survey 060810.mxd



REFERENCE:
THE ABOVE GIS BACKGROUND LAYERS OBTAINED FROM THE LINCOLN COUNTY GEOGRAPHIC INFORMATION SYSTEMS (GIS) DEPARTMENT. MONITORING WELL LOCATIONS AND APPROXIMATE EDGE OF WASTE WERE GENERATED BY S&ME INC. PLEASE NOTE THIS MAP IS FOR INFORMATIONAL PURPOSES ONLY. IT IS NOT MEANT FOR DESIGN, LEGAL, OR ANY OTHER USES. THERE ARE NO GUARANTEES ABOUT ITS ACCURACY. S&ME, INC. ASSUMES NO RESPONSIBILITY FOR ANY DECISION MADE OR ANY ACTIONS TAKEN BY THE USER BASED UPON THIS INFORMATION.

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DATE:	07/16/10
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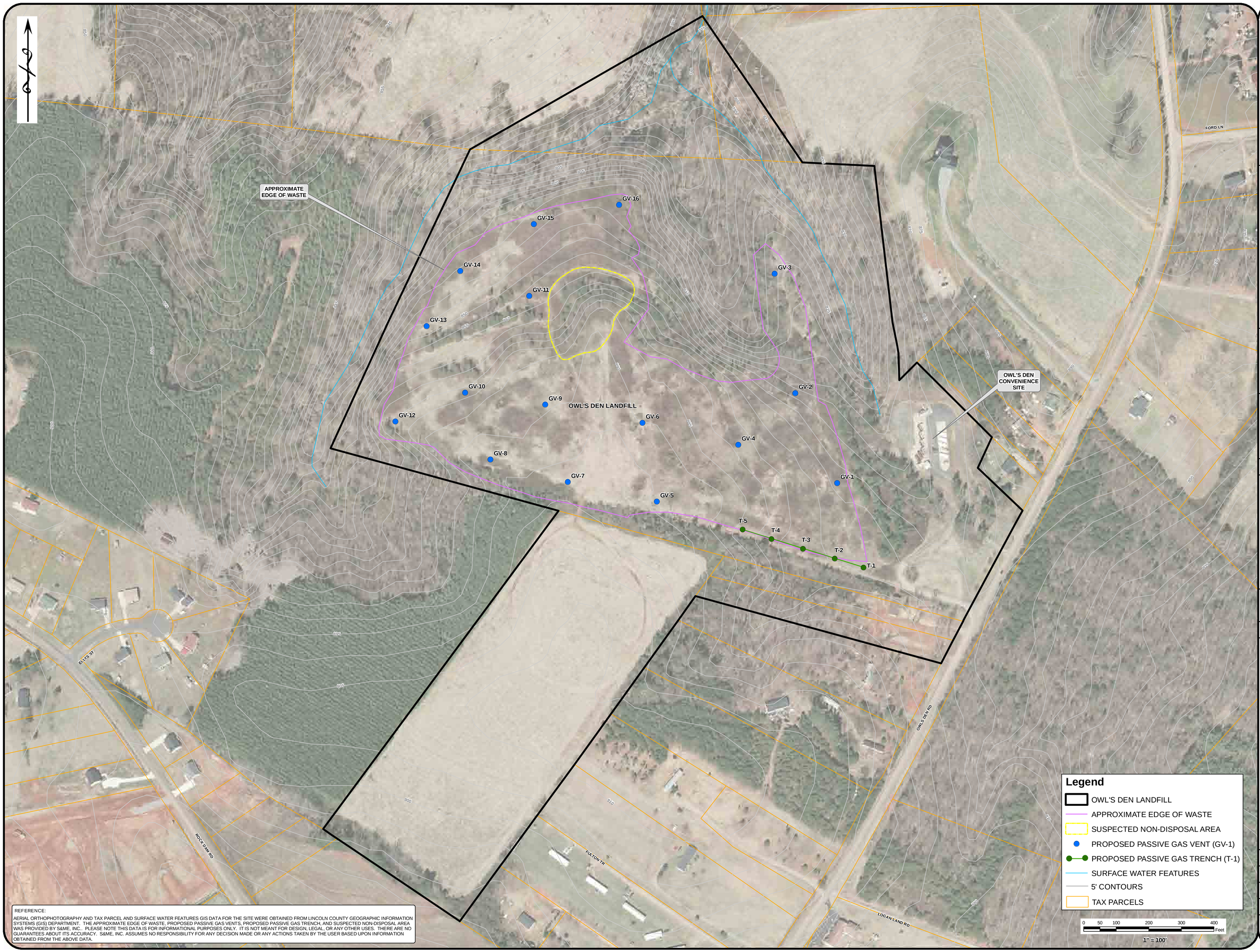
JUNE 2010 METHANE CONCENTRATIONS

OWLS DEN LANDFILL
LINCOLNTON, NORTH CAROLINA

PROJECT NO: 1356-10-028

FIGURE NO. 4



REFERENCE:
AERIAL ORTHOPHOTOGRAPHY AND TAX PARCEL AND SURFACE WATER FEATURES GIS DATA FOR THE SITE WERE OBTAINED FROM LINCOLN COUNTY GEOGRAPHIC INFORMATION SYSTEMS (GIS) DEPARTMENT. THE APPROXIMATE EDGE OF WASTE, PROPOSED PASSIVE GAS VENTS, PROPOSED PASSIVE GAS TRENCH, AND SUSPECTED NON-DISPOSAL AREA WAS PROVIDED BY S&ME, INC.. PLEASE NOTE THIS DATA IS FOR INFORMATIONAL PURPOSES ONLY. IT IS NOT MEANT FOR DESIGN, LEGAL, OR ANY OTHER USES. THERE ARE NO GUARANTEES ABOUT ITS ACCURACY. S&ME, INC. ASSUMES NO RESPONSIBILITY FOR ANY DECISION MADE OR ANY ACTIONS TAKEN BY THE USER BASED UPON INFORMATION OBTAINED FROM THE ABOVE DATA.

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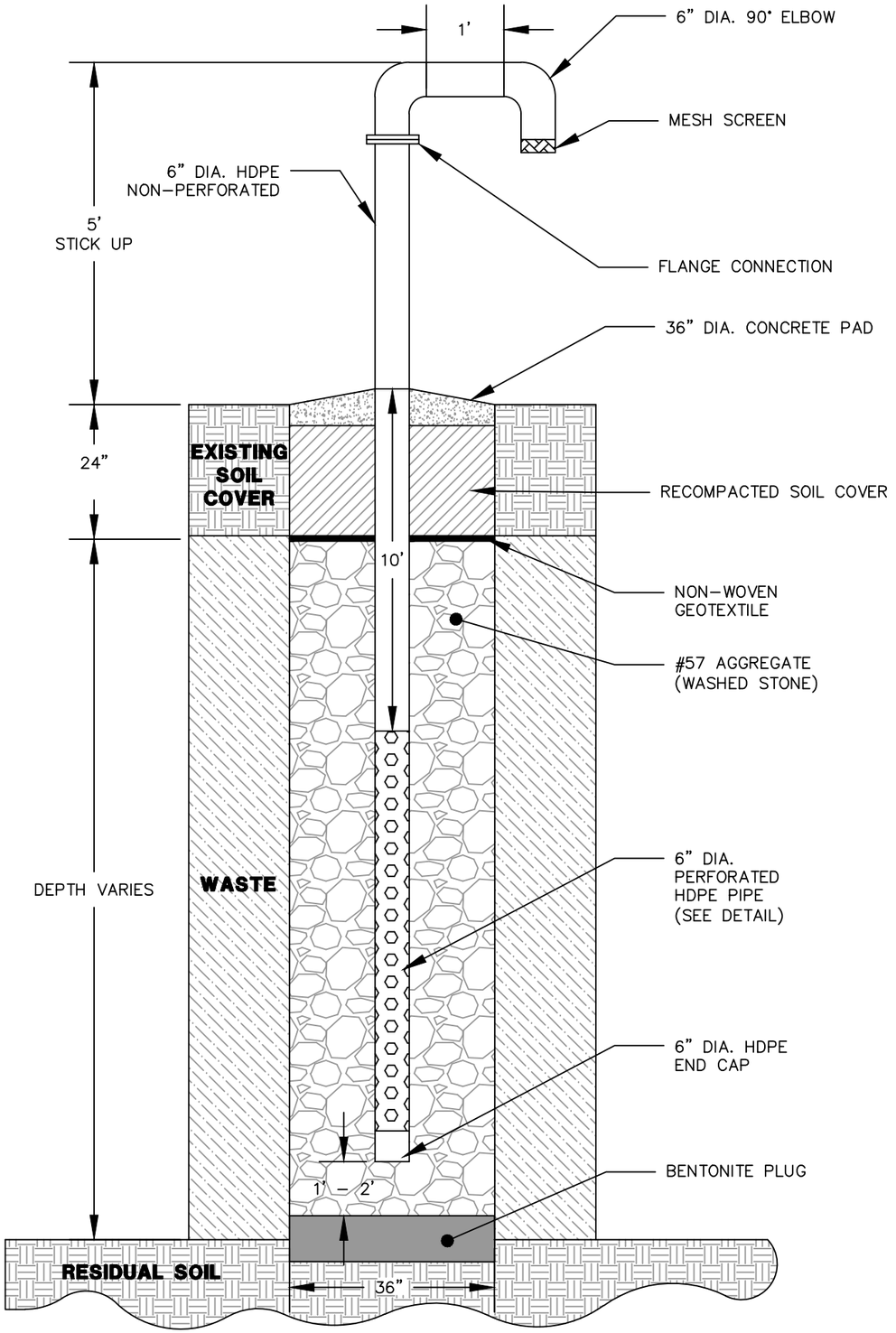
NO.	DATE	DESCRIPTION	BY

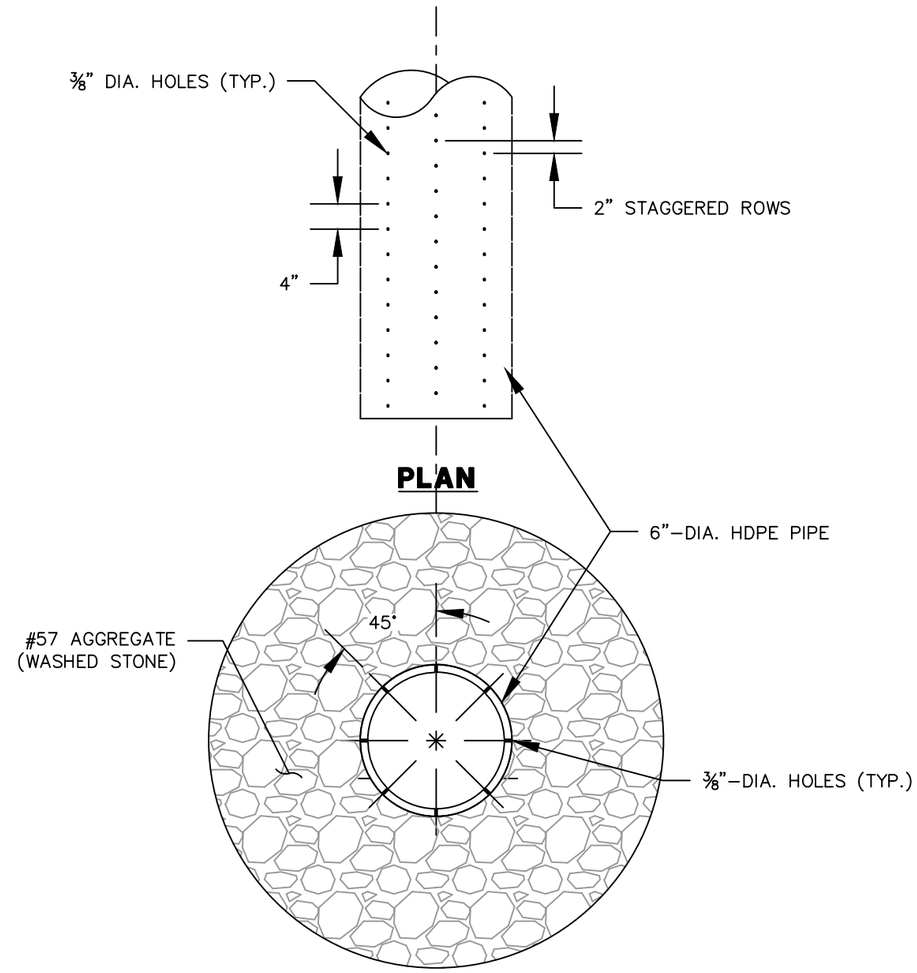
PROPOSED PASSIVE GAS VENT & TRENCH LOCATIONS

OWL'S DEN LANDFILL
LINCOLNTON, NORTH CAROLINA

DRAWN BY:	CHECKED BY:
CXR	JRP
DESIGNED BY:	APPROVED BY:
JRP	
PROJECT NO:	
1356-10-028	
SCALE:	DATE:
1" = 100'	07/16/10
FIGURE:	OF:
5	7

DRAWING PATH: Q:\1356\LINCOLN COUNTY\Owls Den Corrective Action Plan (10-028)\Proposed Passive Gas Vent and Trench 07/9/10.mxd





PIPE PERFORATIONS

DATE: 7-16-10
DRAWN BY: CLD
CHECKED BY:
SCALE: NTS
PROJECT NO. 1356-10-028
ENGINEERING LICENSE NO: F-0176

9751 SOUTHERN PINE BLVD.
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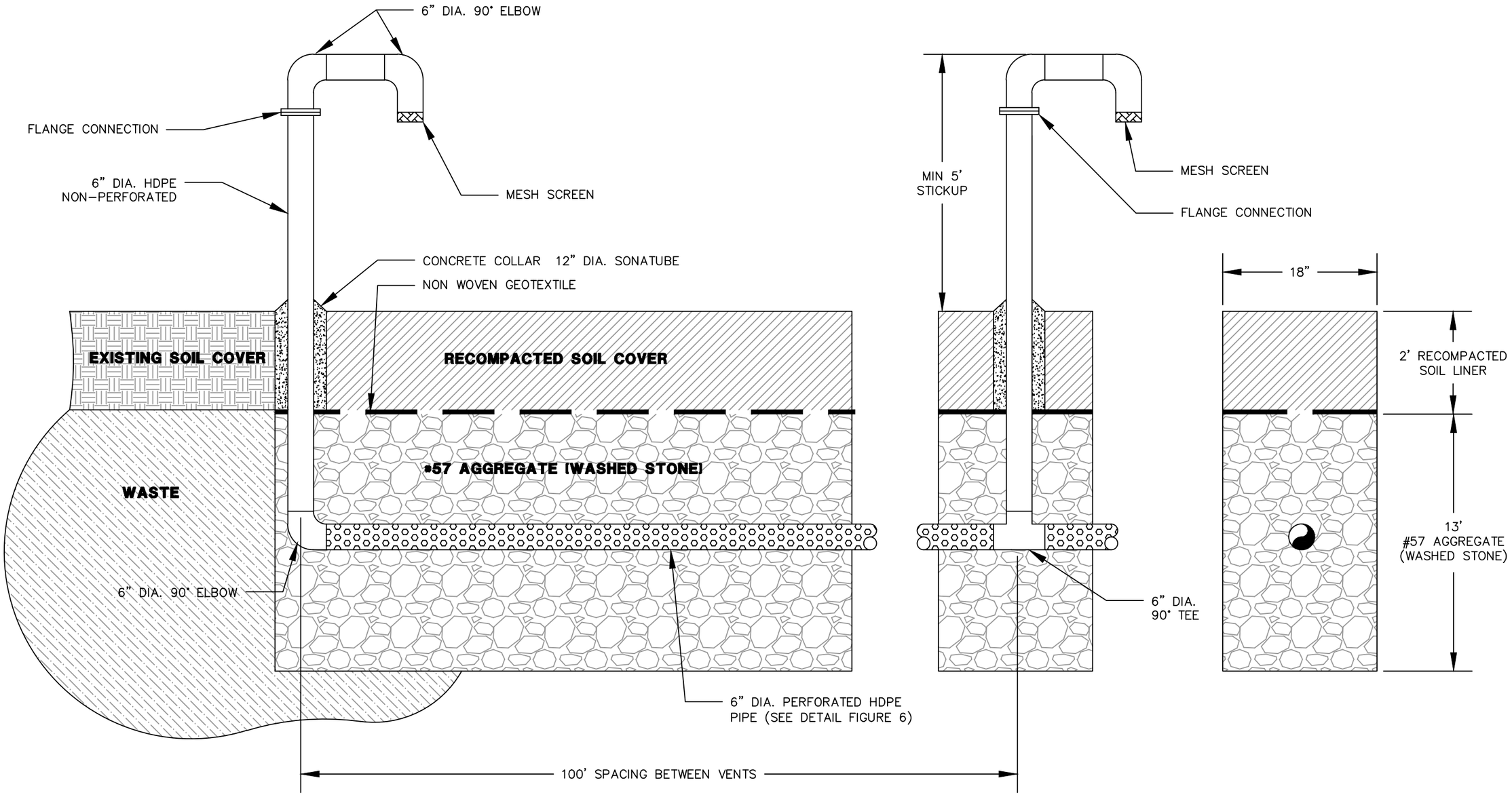
PASSIVE GAS VENT

OWL'S DEN LANDFILL
LINCOLNTON, NORTH CAROLINA

FIGURE NO.
6



PROFILE VIEW

CROSS SECTION VIEW

SCALE: NTS
DATE: 7-16-10
PROJECT NO. 1356-10-028
DRAWN BY: CLD
ENGINEERING LICENSE NO: F-0176
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PASSIVE GAS TRENCH

OWL'S DEN LANDFILL
CROUSE, NORTH CAROLINA

FIGURE NO.
7

TABLES

Table 1 - Methane Gas Measurements

Data Tracking
Owl's Den Landfill (Permit #55-02)

Percent Methane Gas by Date

Date	Well Identification								
	MMW-1	MMW-2	MMW-3	MMW-4	MMW-5	MMW-6	MMW-7	MMW-8	MMW-9
Apr-03	0	35	0	62	N/A	N/A	N/A	N/A	N/A
Oct-03	63	38	31	56	N/A	N/A	N/A	N/A	N/A
Apr-04	0	10	0	0	N/A	N/A	N/A	N/A	N/A
Oct-04	0	8	10	38	N/A	N/A	N/A	N/A	N/A
Apr-05	5	30	44	68	N/A	N/A	N/A	N/A	N/A
Oct-05	36	30	18	58	N/A	N/A	N/A	N/A	N/A
Apr-06	30	36	0	0	N/A	N/A	N/A	N/A	N/A
Oct-06	38	38	0	58	N/A	N/A	N/A	N/A	N/A
Apr-07	100	100	20	100	N/A	N/A	N/A	N/A	N/A
Oct-07	6	12	20	55	N/A	N/A	N/A	N/A	N/A
Apr-08	0.8	20	0	0	N/A	N/A	N/A	N/A	N/A
Jul-08	14.4	42	73	0.2	10.6	0	0	0	0
Oct-08	0	15.4	36	12.6	6.2	3.1	0	0	0
Apr-09	8.5	20.6	46	0	6.6	0.2	0	0	0
Oct-09	16.5	17.7	59.3	61.3	4.2	0	0	0	0
Apr-10	N/A	27	N/A	0.2	8.5	0	0	0	0
Jun-10	N/A	27.6	N/A	68.4	9.9	1.5	0	0	0

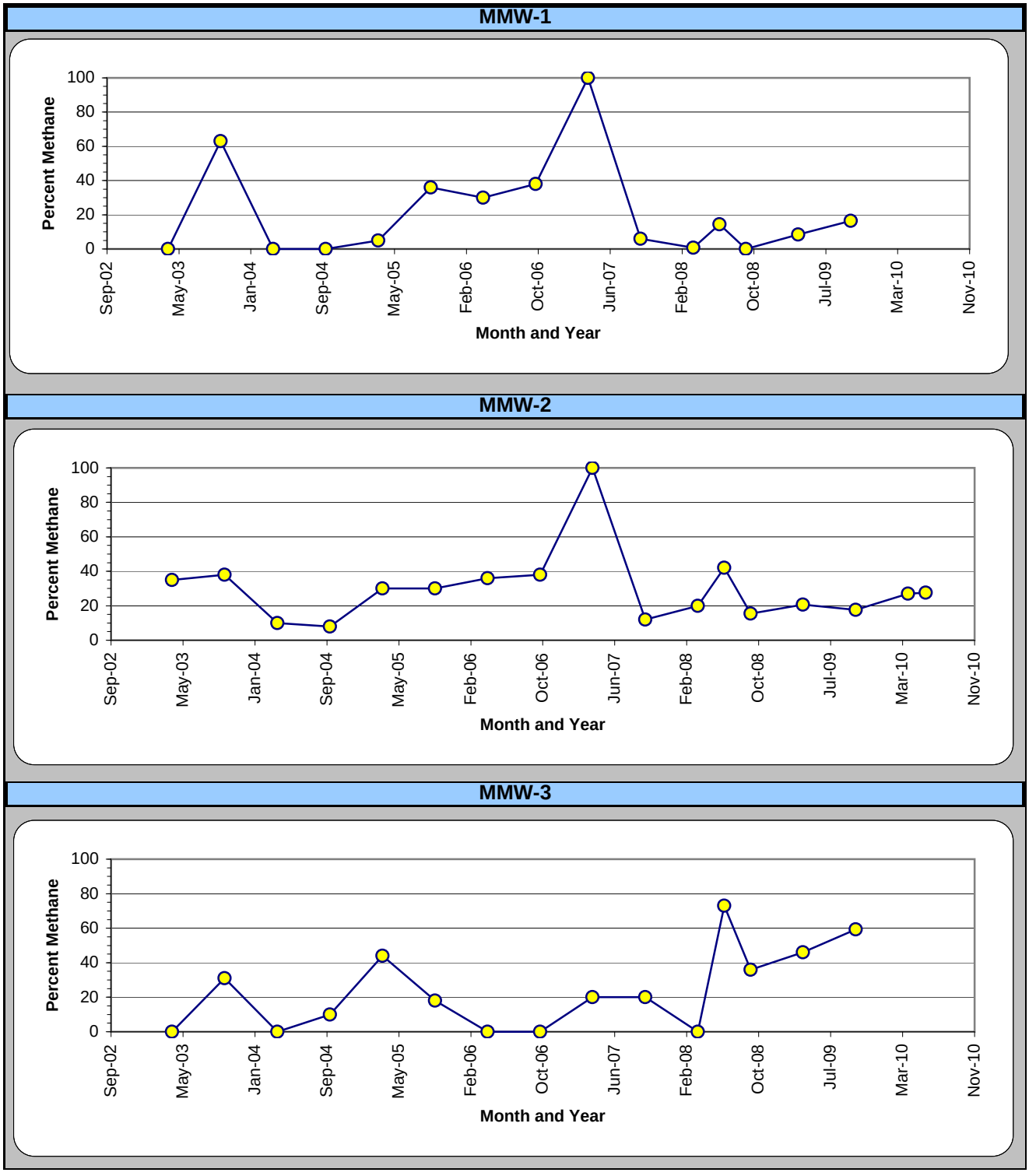
Notes:
(1) Recorded measurements are in percent methane.
(2) Methane monitoring wells 5 through 9 were installed during the 2008 assessment activities.
(3) Methane monitoring wells 1 and 3 were removed from the monitoring plan following the 2008 assessment activities due to their close proximity to the edge of waste.
(4) Highlighted data are above 100 percent of the lower explosive limit.
(5) Lower explosive limit for methane is 5 percent.
(6) Upper explosive limit for methane is 15 percent.
(7) N/A = Not Available

Charts - Methane Gas Measurements

Data Tracking

Owl's Den Landfill (Permit #55-02)

Percent Methane Gas by Date

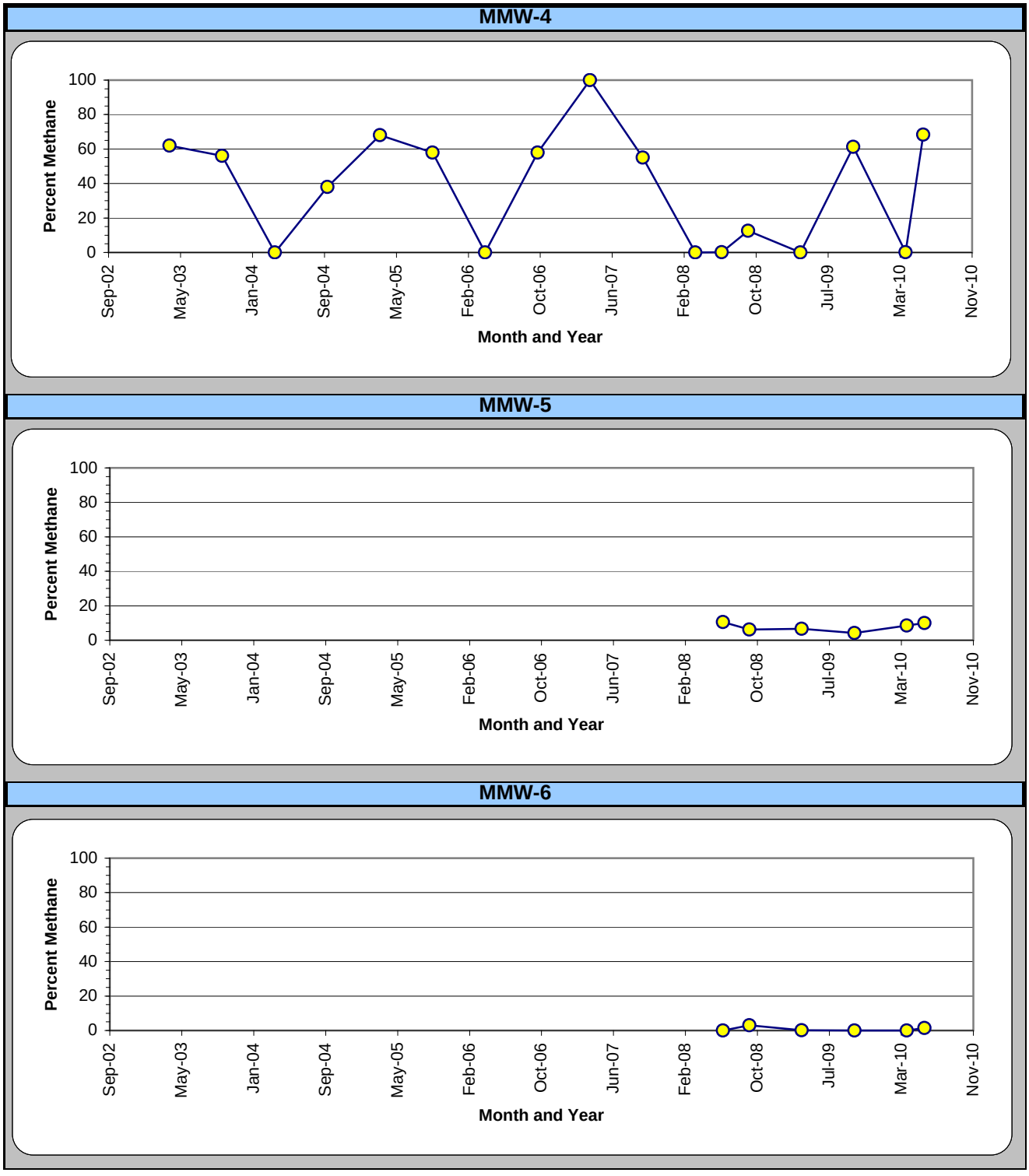


Charts - Methane Gas Measurements

Data Tracking

Owl's Den Landfill (Permit #55-02)

Percent Methane Gas by Date



Charts - Methane Gas Measurements

Data Tracking

Owl's Den Landfill (Permit #55-02)

Percent Methane Gas by Date