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28th March 2012

Ms Melissa Porter
Environ Australia Pty Ltd
Level 3, 100 Pacific Highway
North Sydney 2060

Cc: Mr Michael Spiteri, Flower Power Pty Ltd

SUBJECT: Sampling and Analysis Plan

SITE: 479 Henry Lawson Drive Milperra NSW

Dear Melissa,

Please find attached Geo-Logix proposed sampling analysis plan (SAP) for further investigation of the site. The SAP has been prepared based on consideration and preparation of Geo-Logix Site Conceptual Model Report (2012).

Surface Soils Sampling Plan

As defined in the SCM further assessment of surface soils is required to meet minimum sampling requirements as per NSW EPA (1997). Initial soil investigations have enabled elimination of a number of COPC that were adopted for broad screening purpose. The COPC considered appropriate to complete surface soil contamination characterisation as per NSW EPA 1997 include:

- OCPs;
- Arsenic, cadmium, chromium, lead, copper, zinc, nickel and mercury;
- Total Recoverable Hydrocarbons (TRH);
- Polyaromatic Hydrocarbons (PAHs);
- PCBs; and
- Asbestos

A review of soil data from the 50m grid suggest the presence of significant contamination (excluding asbestos) is unlikely. Given those findings Geo-Logix considers the further assessment of surface soils to be suitable for composite soil sampling.

Geo-Logix proposes to collect a composite sample consisting of two subsamples from the 25m grid for analysis of COPC (excluding asbestos and TPH). An asbestos and TPH sample will be collected from each 25m grid sample location. Proposed sample locations are depicted in Figure 1.

The methodology for composite sampling includes:

- ◊ Collection of a 250 gram surface soil sample from two 25m grid sample locations into a clean plastic bag. The sample will be thoroughly mixed in the bag and a subsample will be collected and placed in laboratory prepared sample jar for submittal to the laboratory;

- ◊ The problem of hotspot dilution will be resolved by dividing assessment criteria by n, where n is the number of subsamples making up the composite, in this case n = 2.

In addition to the above Geo-Logix will collect four surface soil samples surrounding previous sample location TP11 to define the extent of lead, TPH and PCB impact to surface soil.

Surface soil data quality objectives are defined below:

Step 1: State the problem.

Further surface soil sampling is required to meet NSW EPA (1997) minimum sampling requirements for a site of this size.

Step 2: Identify the decision.

- COPC do not exist in surface soils as circular hotspots greater than 30m diameter at a 95% statistical degree of certainty;

Step 3: Identify inputs into the decision.

- Appropriate identification of COPC based on site history and site conceptual model;

- Systematic grid based soil sampling;

- Comparison of soil analytical results against appropriate assessment criteria for the site setting and intended landuse.

Step 4: Define the boundaries of the site.

The project boundary is defined by Golfcourse Creek (GCC) to the southern, eastern and western site boundaries.

Step 5: Develop a decision rule.

- Surface soils are free of contamination hotspots greater than 30m diameter at a 95% statistical degree of certainty.

Step 6. Specify acceptable limits on decision errors.

This is achieved by defining the QA/QC acceptance criteria.

Step 7. Optimize the design for obtaining data.

This is achieved by referencing regulatory guidelines for sample design in consideration of the likely nature of contaminant distribution. In addition decisions may be made in the field based on logistical constraints or observations to alter or optimise the sampling program.

Quality Assurance / Quality Control

The sampling program will include the following QA procedures:

◊ Decontamination sampling tools between sample locations utilising Decon 90 and double rinsing in freshwater;

◊ A new bag will be utilised for each composite sample;

◊ Sample will be collected in laboratory prepared jars, labelled and stored in an esky on ice for transport under Chain of Custody to a NATA Accredited Laboratory for analysis;

The sampling program will include the following QC procedures:

◊ Collection and analysis of one inter laboratory duplicate soil sample for every 20 samples;

◊ Collection and analysis of one intra laboratory (secondary lab) triplicate soil sample for every 20 samples collected;

◊ Collection and analysis of one rinsate sample per day collected of the decontaminated soil sampling tool;

A blank sample and trip spike sample are not considered necessary given the physical properties of the COPC (low volatility).

Groundwater Sampling Plan

As defined in the SCM further assessment of groundwater is required to assess the contamination risk to groundwater users, adjacent residents and environment. Groundwater COPC defined by initial groundwater assessment include;

◊ Aluminium, boron, copper, nickel, zinc, and selenium;
◊ Ammonia;
◊ Cyanide;
◊ Anionic surfactants (MBAS);
◊ Petroleum (TPH, BTEX);
◊ Dissolved Methane.

The proposed investigation strategy and rationale is presented in Figure 2 and described below:

Well ID	Location	Rationale
MW6	Downgradient (north) of landfill	Assess downgradient extent of groundwater contamination. Will define whether GCC is groundwater divide.
MW7,8, 9	GCC foreshore (install by hand)	Establish whether contaminant discharge is occurring and at what levels. Hydraulic K test can be used to estimate flux rates.
MW10	Centre of landfill	Assess groundwater contaminant levels in centre of landfill, will demonstrate contaminant attenuation between source and receptor (MW8).
MW11,12,13	Offsite on west of landfill.	Enable assessment of risk to groundwater user Milperra Sports Centre and to Georges River. Geological and hydrogeological information (K) enable assessment of contaminant migration rates through natural subsurface environment. Data can be extrapolated to evaluate east side of landfill.
MW14, 15	Upgradient boundary	Assess risk to upgradient residents, potentially define background metals, assess dissolved methane risk to residents.

In addition to installation and sampling for COPC the following data is proposed to be collected:

◊ Prior installed wells will also be sampled for COPC;

◊ All wells will be surveyed by a surveyor to mAHD;

◊ All wells will be constructed so that they are screened from 1m below surface to groundwater so they can be used for Methane monitoring;

◊ Hydraulic conductivity tests will be performed on well MW8, MW12,MW14. Data will be solved utilising computer software Aqtesolve to establish groundwater and dissolved contaminant flow rates and contaminant flux rates into GCC;

◊ Methane gas accumulation monitoring will be performed in each well prior to groundwater sample collection;

◊ Cyanide analysis will be undertaken to determine what species of Cyanide is present in groundwater as metal complexed cyanides present little risk to environment (as opposed to free cyanide);

◊ Three surface water samples collected from GCC, one upgradient, central to landfill and downgradient for analysis of COPC and water hardness to establish background water quality.

Groundwater data quality objectives are defined below:

Step 1: State the problem.

Contaminated groundwater may present a risk of harm to nearby groundwater users, residents and GCC.

Step 2: Identify the decision.

- Contamination in groundwater presents no risk of harm to upgradient residents;

- Contamination in groundwater has not been detected west of the landfill therefore does not present a risk to groundwater user Milperra Sports Centre;

- Contaminated groundwater is not discharging into GCC at concentrations in excess of freshwater quality trigger values;

- Dissolved methane does not present an explosion risk to residents and or surrounding utilities.

Step 3: Identify inputs into the decision.

- Appropriate identification of COPC based on site history and site conceptual model;
- Characterisation of groundwater contamination upgradient (south) of the landfill (south);
- Characterisation of groundwater contamination west of the landfill;
- Assessment of contamination levels in groundwater at the point of suspected discharge into GCC;
- Characterisation of groundwater contamination north of GCC;
- Assessment of water quality within GCC;
- Establishing groundwater flow velocity;
- Assessment of dissolved methane concentrations in groundwater offsite;
- Mapping underground utilities in proximity of the site;
- Field screening for explosive atmospheres within utility access points;
- Comparison of groundwater analytical results against appropriate assessment criteria;

Step 4: Define the boundaries of the site.

The project boundary is defined by Golfcourse Creek (GCC) to the southern, eastern and western site boundaries.

Step 5: Develop a decision rule.

- No risk of harm to GCC ecosystem if COPC are not detected in groundwater from GCC foreshore wells in excess of background concentrations and/or ANZECC 2000 Freshwater ecosystem trigger values;
- No risk of harm to recreational users of GCC if COPC are not detected in GCC water samples in excess of background concentrations and/or ANZECC 2000 Recreational Water Guidelines;

- No risk of harm to groundwater user Milperra Sports Centre if COPC are not detected in groundwater from wells west of Henry Lawson Drive (MW11, MW12, MW13) at concentrations in excess of ANZECC 2000 Recreational Water Quality Trigger Values (Replicate accidental exposure during irrigation).
- No groundwater / methane risk to residents or utilities as dissolved methane not present in offsite groundwater at a concentration of 1mg/L which is equal to an equilibrium partition gas phase concentration of approximately 50,000 ppm (5% LEL).

Step 6. Specify acceptable limits on decision errors

This is achieved by defining the QA/QC acceptance criteria.

Step 7. Optimize the design for obtaining data

This is achieved by referencing regulatory guidelines for sample design in consideration of the likely nature of contaminant distribution. In addition decisions may be made in the field based on logistical constraints or observations to alter or optimise the sampling program.

Quality Assurance / Quality Control

The sampling program will include the following QA procedures:

◊ Decontamination sampling tools between sample locations utilising Decon 90 and double rinsing in freshwater;

◊ Dedicating bailers and sample tubing to each well;

◊ Sample will be collected in laboratory prepared jars, labelled and stored in an esky on ice for transport under Chain of Custody to a NATA Accredited Laboratory for analysis;

The sampling program will include the following QC procedures:

◊ Collection and analysis of one inter laboratory duplicate sample for every 20 samples;

◊ Collection and analysis of one intra laboratory (secondary lab) triplicate sample for every 20 samples collected;

◊ Collection and analysis of one rinsate sample per day collected of the groundwater probes;

GAS Sampling Plan

As defined in the SCM further assessment of methane gas onsite and offsite is required.

Onsite gas assessment will involve the installation of 5 gas monitoring wells into the landfill (Figure). Well locations have been selected in consideration of proximity to groundwater monitoring wells to maximise landfill coverage.

Gas wells will be installed into the waste only and will not extend into groundwater. Gas wells in conjunction with the landfill groundwater wells will be used to map methane gas levels and pressures throughout landfill. Gas assessment will utilise a Landfill Gas Analyser.

Offsite gas assessment will involve the following:

- Mapping of nearby utilities and assessment of landfill gases within utility trenches utilising a Landfill Gas Analyser;

- Measuring gas in all groundwater wells not located in the landfill with a Landfill Gas Analyser.

Gas data quality objectives are defined below:

Step 1: State the problem.

Methane gas occurs within landfill and an assessment of its distribution and levels are needed for gas mitigation design;

Methane gas may be migrating offsite and potentially presenting an explosion risk to nearby residents and utility workers.

Step 2: Identify the decision.

- Methane is not present in surrounding utilities or offsite wells.

Step 3: Identify inputs into the decision.

- Gas monitoring of utilities and offsite wells;

- Comparison of gas levels against methane LEL.

Step 4: Define the boundaries of the site.

The project boundary is defined by Golfcourse Creek (GCC) to the southern, eastern and western site boundaries.

Step 5: Develop a decision rule.

- Methane is not present in surrounding utilities or offsite wells therefore presents no risk of harm to adjacent residents or utilities.

Step 6. Specify acceptable limits on decision errors

NA

Step 7. Optimize the design for obtaining data

Decisions may be made in the field based on logistical constraints or observations to alter or optimise the sampling program.

Please do not hesitate to call Geo-Logix should you have any questions (02) 9979 1722.

Yours Sincerely,

David Gregory
BSc (Hons), R.G., MEIANZ CEnvP#139
Principal Geologist

Attachments:

Figure 1 – Proposed Surface Soil Sample Locations
Figure 2 – Proposed Groundwater and Surface Water Sample Locations
Figure 3 – Proposed Gas Wells

Key

- Site boundary
- 4 Inferred topographic contour (Golder Associates, 1989)
- Cadastral boundary
- Test pit surface soil sample location (2011)
- Groundwater monitoring well surface soil location (2011)
- Proposed sample location

0 100m

E:\Projects\1001120 Milperra (GeoLogix)\FIGURES\Proposed Investigation Locations\100120 F1 Proposed Surface Soil Sample Locations 29 03 2012 TO Rev A

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PROPOSED SURFACE SOIL SAMPLE LOCATIONS

Flower Power Pty Ltd
479 Henry Lawson Drive, Milperra, New South Wales 2214

Project No. 1101046

Figure 1

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GROUNDWATER AND SURFACE WATER SAMPLING PLAN

Flower Power Pty Ltd
479 Henry Lawson Drive, Milperra, New South Wales 2214

Project No. 1101046

Figure 1

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PROPOSED GAS WELLS

Flower Power Pty Ltd
479 Henry Lawson Drive, Milperra, New South Wales 2214

Project No. 1101046

Figure 3