GEO_LOGIX

SITE CONCEPTUAL MODEL

476 Henry Lawson Drive

Milperra, NSW

Flower Power Pty Ltd – March 2012

DOCUMENT CONTROL

SITE CONCEPTUAL MODEL

479 Henry Lawson Drive

Milperra NSW 2214

PREPARED FOR

Mr Michael Spiteri

Flower Power Pty Ltd

124 Newbridge Road

Moorebank NSW 2170

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ABN: 86 116 892 936

Ben Pearce

BSc (Hons), MEIANZ, CEnvP#321

Environmental Manager

David Gregory

BSc(Hons), R.G. MEIANZ CEnvP#139

Principal Geologist

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1. INTRODUCTION

Geo-Logix Pty Ltd (Geo-Logix) was retained by Flower Power Pty Ltd (Flower Power) to complete a Site Conceptual Model (SCM) of a former landfill at 479 Henry Lawson Drive, Milperra, NSW (Figure 1). Flower Power is considering developing the site into a retail nursery.

The SCM is a summary of known environmental conditions of the site, which are relevant in understanding the processes that determine the transport of contaminants from contaminant sources, through environmental media, to human / environmental receptors within a system.

The SCM defines potential impacts to human health and environmental presented by site contamination. It enables future investigations to focus on evaluating whether those identified potential impacts are likely to occur.

2. SITE INFORMATION

The investigation area is a former landfill and comprises the following properties (Figure 2):

Street Address	Lot and Deposited Plan (DP)	Approximate Area (m2)
479 Henry Lawson Drive, Milperra NSW 2214	Lot 2 DP 576251	29,610
479 Henry Lawson Drive, Milperra NSW 2214	Lot 3 DP 576251	9,682

3. SITE SETTING

3.1 Site Description and Surrounding Landuse

The landfill site is located on Henry Lawson Drive, Milperra, NSW. The subject site is a large parcel of predominantly vacant land surrounded by the following:

- **West** - Gordon Park Reserve and Milperra Sports Centre, recreational parklands on opposite side of Henry Lawson Drive;
- **East** – Bankstown Golf Club adjoins eastern property boundary;
- **South** – Residences, approximately 30m south of southern landfill boundary; and
- **North** – Vacant bushland of Lot 3 DP 576251, followed by residences approximately 100 – 150m north of landfill boundary.

The landfill footprint encompasses approximately 29,500m^2 and occurs mostly within Lot 2. At its northern extremity the landfill crosses over into Lot 3 and is bound by and un-named southeast – northwest trending creek, referred to from this point forth as Golfcourse Creek (GCC). GCC drains the upgradient golf course and Milperra Industrial Precinct and discharges into the Georges River approximately 0.7km northwest of the site.

The former landfill is a mound type landfill and is easily defined by its elevation with respect to the surrounding floodplain topography. The elevation of the landfill varies from 5 - 6m AHD and falls away steeply around the sides to an elevation of approximately 3 – 3.5m AHD (Figure 3).

An inspection of the site in 2011 found the site vacant, fenced and heavily vegetated with grasses, weeds, bushes and trees on the landfill boundaries. A large vacant shed constructed from steel with a concrete slab floor is located in the southeast portion of the site. The remainder of the site is vacant.

Minor waste including asbestos containing material (ACM) in the form of fragments of bonded asbestos cement sheeting, scrap metal, concrete, brick rubble, a car body, discarded drums were randomly observed across the landfill ground surface.

3.2 Regional Geology

Review of the NSW 1:100,000 Penrith Geological Map (Geological Survey of NSW, 1991) indicates the site is on the border of Quaternary age deposits comprising quartz sand, silty sand, silt and clay, and Tertiary age clayey quartzose sand, and clay.

3.3 Site Specific Geology

Investigations to date have focussed on the landfill and only minor intrusive works have occurred into native soils beneath the landfill (Geo-Logix 2011b). Given the site is in proximity to creeks and is on the Georges River Flood Plain, soils are anticipated to be fine consisting of silt and clay with inter-bedded fine sand.

Intrusive investigation beneath the landfill waste has identified a sequence of silty Sand grading to sandy Clay and Clay with depth. Soil boring and test pit logs are presented in Attachment A.

DATA GAP – Approximately 60% of the landfill waste depository is within the original flood plain. The native soils, which form the walls of the waste depositary, will control the rate of contaminant migration in aqueous and gas phase. Investigation of the natural geology surrounding the landfill is necessary to assist with risk evaluation and/or predictive modelling.

3.4 Surface Water Receptors

The nearest surface water receptor to the landfill is GCC located approximately 30m from the northern landfill boundary.

Midway along the northern landfill boundary GCC forks upstream to the southeast and north – northeast. The southeast arm of GCC becomes an engineered concrete lined storm water canal draining stormwater from the Bankstown Golfcourse and residential area of Whittle Avenue, Milperra.

The northern arm of GCC runs along the western boundary of Bankstown Golf Course and becomes a concrete lined engineered stormwater canal at Milperra Road, where it veers east and drains stormwater from the Milperra Industrial Precinct.

Passing through the subject site GCC veers southwest under Henry Lawson Drive for approximately 950m where it discharges into the Georges River. Given the catchment area GCC ecosystem is expected to be highly degraded.

DATA GAP – GCC water quality has not been evaluated. An understanding of GCC water quality is required to establish environmental value and potential ecological impacts that may result from contaminated groundwater discharge to GCC.

In addition to GCC, a small body of water approximately 40m long by 2m wide is located behind the shed on the southern boundary of the landfill. It is believed this water body is a former arm of GCC which has been cut off by the land filling. The water body is stagnant and contains waste such as discarded furniture and scrap metal.

3.5 Hydrogeology

It is expected that regional groundwater would follow the natural topography and flow west - northwest towards the Georges River. In 2011 Geo-Logix installed five groundwater wells onsite, wells MW1-MW5. Well construction details are summarised below:

WELL ID	TOTAL DEPTH (mbg)	SCREENED INTERVAL (mbg)	TOP OF CASING ELEVATION (RELATIVE TO TBM)	STANDING WATER LEVEL (mBTOC)
MW1	4.5	4.5 – 1.5	20.000	2.650
MW2	4.5	4.5 – 1.5	20.006	2.490
MW3	5.0	5.0 – 2.0	21.096	3.716
MW4	5.0	5.0 – 1.0	21.811	4.178
MW5	4.0	4.0 – 1.0	18.768	3.571

Groundwater was encountered at depths ranging between 2.4 – 4.2m below surface within the landfill footprint. At all locations the landfill waste extends into groundwater. Groundwater elevation contours indicate groundwater flows towards GCC at a gradient of 0.002 – 0.006 (Figure 4). Given the depth to groundwater it is highly probable groundwater from the landfill discharges into GCC. Groundwater flow velocity has not been determined.

DATA GAP – Groundwater flow velocity has not been determined and groundwater discharge into GCC has not been confirmed. Groundwater wells require surveying to mAHD, hydraulic testing of aquifer required inside and outside of landfill footprint, wells are required along GCC stream bank and water chemistry assessed to estimate groundwater discharge and contaminant flux to GCC.

Measurements of groundwater physical parameters during groundwater sampling in 2011 indicate the following groundwater quality characteristics;

pH	Redox (mV)	TDS (mg/L)	DO (mg/L)
6.4 – 7.1	-53 to -136	900 – 2000 mg/L	0.15 – 0.74

Groundwater parameters pH and TDS are within suitable drinking water ranges.

3.6 Groundwater Beneficial Use

Reference to the NSW Natural Resource Atlas (NSW Government, 2011) indicates that there are two groundwater bores within a 500m radius as summarised below (Attachment B):

Bore ID	Distance from Site	Area	Depth	Screen	Geology	Use
NA	380m NNE	Intersection of Henry Lawson Drive and Newbridge Road	NA	NA	NA	NA
GW024357	330m SE	Milperra Sports Centre	3m	NA	Sand Loam	Irrigation

Given the surrounding land use and current nearby shallow groundwater user (Milperra Sports Centre), the beneficial uses considered applicable for shallow groundwater protection at this stage of investigation include;

- Irrigation, both commercial and residential;
- Freshwater ecosystem protection; and
- Recreational users of GCC.

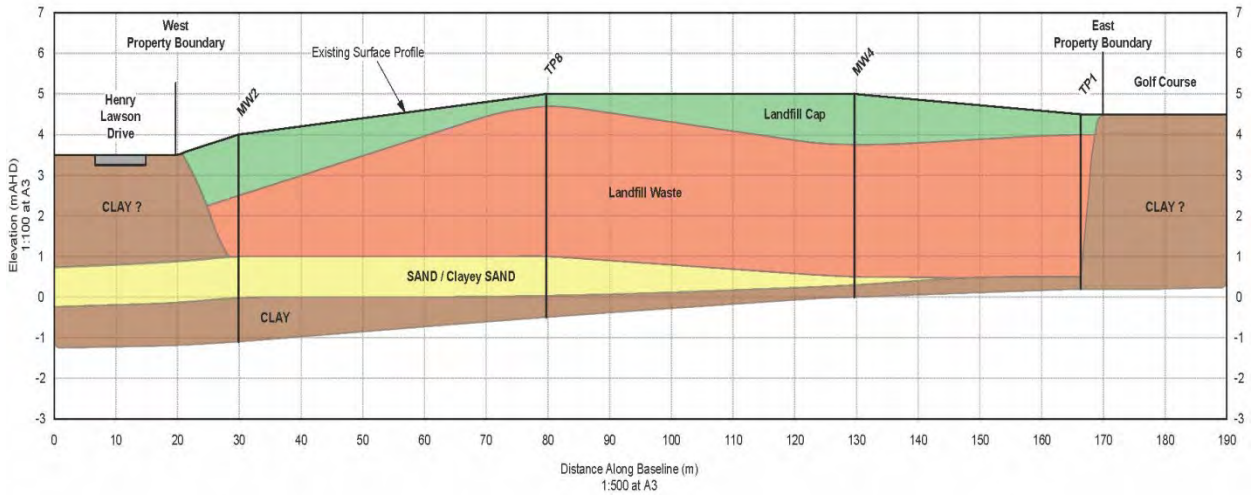
DATA GAP – Additional characterisation of groundwater quality outside landfill footprint necessary to assess potential impact upon groundwater users and GCC.

4. LANDFILL CONSTRUCTION

Investigations to date have defined the following with respect to the existing landfill construction:

Characteristics	Landfill Cap	Landfill Waste
Composition	Mostly sandy Clay, sandy Silt, Clay with gravel, clayey Sand. Some areas with silty Sand and crushed sandstone used as capping material.	Mixture of Silt, Clay, plastic bags, packing strap, ceramic and plastic pots, scrap metal, paper, timber, bricks, tiles, glass, ash, fabric, foam, rocks, aluminium cans, tyres, insulation bats, sawdust.
Thickness	0.45 – 1.50m (Figure 5)	1.2 – 3.75m (Figure 6)
Estimated Volume Material	23,500m^3	81,000m^3
Comments	Landfill cap was not engineered, is of variable thickness and constructed with variable materials. Cap thickest at margins of landfill.	Waste is mostly inert, poorly compacted, cap is hummocky and evidence of differential settlement. Methane has been detected emitting from cap.

A schematic cross section of the landfill is presented below;



5. CHRONOLOGY OF SITE HISTORY

A summary of site history as defined in Geo-Logix Phase 1 Environmental Report (Geo-Logix 2011a) is detailed below.

Year	Land use
Prior to 1938	Site was privately owned.
1938 – 1947	Site owned by M. Collins, turf contractor. Operations onsite are unknown, 1951 aerial photo indicates site is undeveloped, therefore suggests no operations occurred during this period.
1947	Site ownership change to M Collins and Sons P/L.
1961	Aerial photographs indicates site (Lot 2 and Lot 3) as per 1951 photo, vacant and undeveloped.
1965 – 1973	Approval was granted to M Collins and Sons P/L for use of Lot 2 as a landfill between 1970 – 1973. Golder Associates (1989) reports land filling may have occurred earlier than 1970 based on review of aerial photos of 1965 and 1970. Lot 3 unchanged.
1973	Landfill ceased operation. Up to 4m of mixed waste including putrescible household waste was placed across Lot 2. Lot 3 unchanged.
1980	Lot 2 and Lot 3 changed ownership to Seysun P/L, a holding company of Flower Power P/L.
Late 1970's – 1989	Lot 2 used as a wholesale nursery by Flower Power P/L. Lot 3 unchanged.
1990's	Lot 2 used for manufacturing timber lattice gates and storage of CCA treated timber. Lot 3 unchanged.
1994 – 2009	Removal of structures comprising potential asbestos containing material on the southern portion of Lot 2. Lot 3 unchanged
2009 - Present	Lot 2 and Lot 3 vacant.

5.1 Historical Environmental Investigations

Golder Associates Pty Ltd 1989

Golder conducted a preliminary assessment of the landfill. The key findings of the assessment include;

- Establishing the site history;
- Suggestion based on review of aerial photos land filling was occurring onsite prior Council approval;
- No inventory record of land filling;
- Methane detected emitting from south western portion of Lot 2 up to 0.8% Lower Explosive Limit (LEL) at ground surface.

ADI Ltd 1996

In December 1995, ADI Services (later ADI Ltd) were commissioned by Bankstown City Council to undertake an Environmental Site Assessment (ESA) of Lot 2. The key findings of the assessment include;

- Approved for the tipping of industrial and trade waste on the site dated 1970. The condition of approval was that no liquid waste was to be received;
- The site was filled with 3 – 4m of fill, including household rubbish, clay and building rubble. Fill was placed in a number of containment cells separated by clay walls and roof;
- Putrescible waste filled in parts of the landfill;
- Landfilling operation was completed prior to March 1973; and
- After filling, the site was capped with clay and subsequently used as a nursery and a timber storage yard.

ADI completed a contamination investigation comprising the following:

- A soil gas survey at 12 locations across the site on a 25m grid. The soil gas survey was completed by driving sampling probes to 1m below ground surface using a slide hammer;
- Test pits were excavated at the 12 soil gas survey locations. Soil samples were collected from the cap material and landfill material;
- Installation and sampling of three shallow groundwater wells; and
- Collection of surface water samples from the drainage easement creek on the northern portion of the site and pond located on the southern portion of the site.

The results of soil gas investigation identified the following:

- Concentrations of methane gas in excess of the recommended 5% LEL were detected on the boundaries of the landfill area below the cap;
- Benzene, toluene, ethylbenzene and xylene (BTEX) were detected at various sample locations across Lot 2;
- Styrene was detected at a concentration of 2.014 ppm at sample location M10;
- Chlorinated compounds including trichloroethylene, 1,1,2-trichloroethane and 1,1-dicholorethene were variously detected at locations M3, M10, M11 and M12; and

- Carbon disulfide was detected at sample location M3.

The results of soil sampling identified the following:

- Chromium was detected at the ANZECC (1992) guideline level and elevated concentrations of copper were detected in a sample of burnt timber on the north eastern portion of the property;
- Polycyclic Aromatic Hydrocarbons (PAHs) and heavy metals were detected at elevated concentrations in the landfill waste material;
- Total petroleum hydrocarbons (TPH) were detected at concentrations exceeding EPA (1994) guidelines in sample location adjacent to the above ground hydrocarbon storage tank (M16). TPH were not detected in a sample taken from the underlying natural clay layer at this location.

The results of sediment sampling identified the following:

- Copper and zinc were found at concentrations exceeding ANZECC (1992) guidelines in the sediment samples from the southern pond and creek at the northern boundary.

The results of groundwater sampling identified the following:

- Ammonia was detected at concentrations above the assessment criteria in all groundwater samples;
- Petroleum hydrocarbons were detected in all groundwater samples; and
- Copper, zinc and lead were detected at concentrations exceeding ANZECC (1992) guidelines in groundwater samples from monitoring wells MW2 and MW3.

The results of the surface water sampling identified the following:

- Copper and zinc were detected at concentrations exceeding ANZECC (1992) guidelines in samples taken from the southern pond and creek on northern boundary. ADI found the concentrations of copper and zinc in surface water samples to be consistent with groundwater and sediment results. On that basis ADI suggested leachate from landfill was impacting the surrounding surface water; and
- Ammonia concentrations were detected above the ANZECC (1992) guidelines in the sample taken from the southern pond.

Based on the results of the investigation, ADI concluded that the land was not suitable for public open space use.

Golder Associates Pty Ltd 1999

Geo-Logix obtained an incomplete copy of a Golder Associates Preliminary Contamination Investigation Report (Golder, 1999) which included the executive summary, table of contents, and summary and conclusions. Golder was commissioned by Co-Bolt Constructions Pty Ltd, to complete a preliminary contamination assessment of the site. The purpose of the investigation was to provide a broad-based assessment of site contamination for the proposed use of the site for residential purposes. The scope of work included:

- Review of site information;
- A soil vapour survey;
- A limited sampling and analysis program; and
- Assessment of results.

The key findings of the assessment include:

- Subsequent activities on site post landfill included a nursery and a workshop for the repair of semi-trailers;
- Elevated concentrations of methane up to 42% by volume detected in the subsurface;
- Capping material with an average depth of about 1m;
- A soil/waste mixture with an average depth of about 0.5m;
- A waste layer with an average depth of about 3m. The layer contained putrescible waste and other material including timber, paper, metal, plastic and glass;
- Native soil 0.2m thick underlying waste layer was observed discoloured and odorous. Below this depth, residual soil was without odour or discolouration;
- Soil testing indentified metals in six samples, total recoverable hydrocarbons in 8 samples, PAHs in one sample and Polychlorinated Biphenyls (PCBs) in one sample above assessment criteria. Sample locations are unknown due to incomplete report.

EH&S Risk Management Pty Ltd 2005

In 2005, EH&S Risk Management Pty Ltd (EH&S) provided a peer review of the ADI (1996) environmental report. Questions were raised with respect to the validity of ADI investigations however has no real impact on the assessment of site contamination.

5.2 Contaminants of Potential Concern (COPC)

Based on the site history Geo-Logix (2011a) identified the following soil and groundwater COPC:

- TPH;
- Volatile Organic Compounds (VOCs);
- PAHs;
- Organochlorine (OCP) and Organophosphate (OPPs) Pesticides;
- PCBs;
- Phenols;

- Heavy Metals (Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Mercury, Zinc, Beryllium, Boron, Aluminium, Vanadium, Manganese, Iron, Cobalt, Selenium, Tin, Molybdenum, Silver, Thallium and Lithium);
- pH;
- Ammonia;
- Nitrate and Nitrite;
- Fluoride;
- Cyanide (total);
- Methylene Blue Active Substances (MBAS);
- Asbestos;
- Methane (dissolved and gaseous phase).

6. GEO-LOGIX ENVIRONMENTAL INVESTIGATION 2011

Given the site history and COPC Geo-Logix undertook the following investigations in 2011 (Figure 7):

- Systematic shallow surface soil sampling across landfill cap on a 50m grid. All soil samples were analysed for COPC;
- Collection of five evenly spaced samples of landfill waste beneath the cap at locations MW1 through MW5, TP3 and TP7 for analysis of COPC;
- Collection of four native soil samples beneath landfill waste at evenly spaced locations MW1, MW2, MW4 and TP3 for analysis of COPC;
- Installation of five groundwater wells (MW1-MW5) evenly spaced across landfill for collection of groundwater samples and analysis of COPC;
- Surface methane gas emission survey on 25m grid based transects;
- Measurement of gas accumulation (CH4, CO2, H2S, O2) and explosive limits within monitoring wells MW1-MW5.

The results of the assessment defined the following:

Landfill Surface Soils

- Lead was detected in one surface sample at location TP11 at a concentration above commercial land use assessment criteria;
- PCBs were detected in one surface soil sample at location TP11 below commercial land use assessment criteria however the concentration was above the PCB Contaminated Soil Chemical Control Order;
- Random fragments of bonded Asbestos Containing Materials (ACM) were observed on the ground surface in the northern portion of the landfill in the vicinity of and north of testpit TP7;
- No other COPC were detected in soil at concentrations in excess of assessment criteria.

DATA GAP – Surface soil sampling does not meet NSW EPA (1997) minimum sampling requirements for a site of this size. Current sampling frequency does not characterise suitable size contamination hotspot. Soil sampling required on 25m grid to detect a circular hotspot of approximately 30m diameter.

Landfill Waste

- The bulk of buried landfill waste comprises household and commercial waste including paper, plastic, timber, sawdust, cloth and metal with mixed soil material;
- Long chain petroleum hydrocarbons indicative of oil and grease were detected at concentrations greater than the assessment criteria in waste samples MW1/2.7, MW2/2.7, TP3/2.0 and TP7/2.5;
- Very high concentrations of petroleum hydrocarbons and PAHs and low levels of toluene, ethylbenzene and xylenes were detected in sample MW3/2.0 and are associated with the creosote/coal tar caked gauze;
- Lead was detected at a concentration greater than the assessment criteria in sample MW2/2.7;
- Asbestos fibres were detected in landfill waste in MW1, MW2 and MW5; and
- Coal tar matting material was observed at 2mbg in soil boring MW3.

COMMENT – No further assessment of landfill waste is recommended as it provides no further value in defining contamination risk. Dissolved contaminants and gaseous contaminants will reflect waste characteristics and risk.

Underlying Native Soil

- Ammonia was detected at elevated concentrations in samples MW1 at 3mbg and MW4 at 5mbg; and
- No other COPC were detected at concentrations in excess of assessment criteria in underlying native soil samples.

COMMENT – No further targeted assessment of underlying soil is considered necessary as landfill waste extends into saturated zone. Groundwater chemistry will reflect contamination risk.

Groundwater

- Aluminium, boron, copper, nickel, zinc, selenium, ammonia, cyanide and surfactants were detected at concentrations greater than freshwater ecosystem protection criteria in groundwater beneath the site;
- Benzene, boron, manganese, nickel and ammonia were detected in groundwater at concentrations greater than drinking water guidelines; and
- Dissolved methane was detected at elevated concentrations in wells MW1 to MW4.

DATA GAP – Drinking water assessment criteria is not considered relevant to the site and further investigations will focus on freshwater ecosystem protection, irrigation and recreational beneficial use. Heavy metals, ammonia, surfactants and dissolved methane impact to groundwater is undefined in all directions. Additional groundwater assessment is required.

Landfill Gas

- Methane was detected emitting from landfill cap (Figure 8); and
- Gas accumulation in monitoring wells identified significant methane accumulation at locations MW3, MW4 and MW5. Gas was observed emitting from well MW3. The composition of landfill gas in these wells (high methane, low O_2) is typical of gas generated in older landfills undergoing anaerobic decomposition.

DATA GAP – It is not known whether methane gas from the landfill is migrating offsite laterally through the subsurface in gaseous and dissolved phase or via utility trenches. Additional assessment is required.

COMMENT – For commercial land use and development it is accepted methane gas is an unacceptable site condition which requires mitigation. Additional assessment is required to aid gas mitigation design.

7. PROPOSED STAGE 2 INVESTIGATION COPC

The results of preliminary investigation and detailed analysis for a wide range of potential contaminants enable elimination of certain contaminants from the COPC list. The updated list of COPC, which will form the basis for the next stage of environmental assessment are defined below:

Landfill Surface Soils COPC

- OCPs – Although not present in initial cap soil samples, past site use has included commercial nursery. OPPs are not considered a COPC as they were not identified during initial sampling and are not environmentally persistent.
- Heavy Metals- arsenic, cadmium, chromium, lead, copper, zinc, nickel and mercury. These are common metals used in pesticides and herbicides and can originate from machinery use and maintenance. Past investigations have identified lead and chromium at an elevated concentrations in surface soil;
- Total Recoverable Hydrocarbons (TRH) – TRH has historically been detected at elevated concentrations in surface soils;
- PAHs – PAHs have historically been detected at elevated concentrations in surface soils;
- PCBs – PCBs have historically been detected in surface soil samples in excess of PCB Chemical Control Order trigger concentration; and
- Asbestos – bonded ACM previously observed on surface soils.

Groundwater COPC

- Metals - aluminium, boron, copper, nickel, zinc, selenium have been detected in groundwater at concentrations in excess of freshwater ecosystem water quality trigger values (FWQTV);
- Ammonia – ammonia present in groundwater in excess of FWQTV;
- Cyanide – cyanide present in groundwater in excess of FWQTV;
- Anionic Surfactants (MBAS) – were present in groundwater in excess of FWQTV;
- Petroleum hydrocarbons (TRH, BTEX) – although not detected in excess of FWQTV are very common contaminants in landfills;
- Dissolved Methane – high levels of dissolved methane were detected in groundwater.

Gas COPC

- Methane

8. PROPOSED SITE USE

Flower Power are proposing to use the site as a commercial nursery. The proposed development comprises commercial retail buildings over the centre of the site surrounded by hardstand including car parking and outdoor nursery display (Attachment C).

The site is located within a flood zone. Site preparation will require cut and fill of existing topography to ensure the site elevation is complaint with Bankstown City Council flood control elevation.

9. SITE CONCEPTUAL MODEL

The SCM is site specific and has taken into account the toxicity and mobility of contaminants, the geology and hydrogeology which control contaminant transport, surrounding environment and land use, and proposed site development to identify those routes of contaminant exposure which may potentially present a risk to human health and the environment. The SCM forms the foundation for assessment and remediation of the site.

A SCM is presented in Table 1. Key issues identified in the SCM include the following:

Landfill Surface Soils

Current information suggests the following;

- In its current state, site surface soils present a low human health and environment contaminant exposure risk as the site is currently unoccupied and stabilised with grass cover and dense vegetation; and
- Contaminant exposure to identified human receptors (adjacent residents and construction workers), and ecological receptor (GCC) would only occur during the site development phase when the site is stripped of ground cover and surface soils are tracked and engineered. These risks can be managed through implementation of construction environmental management plans (EMPs).

COMMENT: Additional investigation of surface soil is necessary to adequately characterise soil contamination so that appropriate EMPs can be developed to support site development.

Groundwater

Current information suggests the following:

- The risk of residential, commercial or construction worker exposure to toxicants volatilising from contaminated groundwater is considered low as volatile contaminants have not been detected in groundwater at sufficient concentrations. Dissolved methane may present a risk if explosive concentrations of gas are volatilising from groundwater.
- A low risk of human exposure to contaminated groundwater from nearby groundwater user Milperra Sports Centre exists. Further assessment is necessary to confirm preliminary assumptions;
- Potential ecological impact from contaminated groundwater discharging to GCC is considered moderate to high given proximity of site to GCC.

COMMENT: Additional groundwater investigation is required offsite towards Milperra Sports Centre to assess groundwater user risk, and at the banks of GCC to assess groundwater discharge impacts. Equilibrium partitioning calculations may be sufficient to assess risk posed by dissolved methane.

Landfill Gas

Current information suggests the following;

- Methane gas exposure risk is complete and requires mitigation before the site can be considered suitable for the proposed commercial land use;
- Risk of methane gas migration outside of landfill confines has not been evaluated.

COMMENT: Additional gas assessment is required around the perimeters of the landfill and in utility conduits. Additional gas assessment is required in the subsurface outside confines of landfill towards residential area.

10. CONCLUSIONS

The SCM has identified a number of potential contaminant transport mechanisms and exposure routes requiring additional assessment. A process of targeted investigation is now necessary to evaluate whether the indentified contaminant transport – exposure routes are complete or incomplete. Once evaluated a site remediation plan can be prepared to mitigate methane gas and any other complete exposure route identified.

11. REFERENCES

ADI (1996) Environmental Site Investigation for 459 Henry Lawson Drive Milperra, NSW, ADI Limited.

ANZECC, Guidelines for the Assessment and Management of Contaminated Sites, 1992.

ANZECC & ARMECC (2000) *Australian and New Zealand Guidelines for Freshwater and Marine Water*, Australia and New Zealand Environment Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand.

EH&S Risk Management (2005) Review of Previous Environmental Assessments, 459 Henry Lawson Drive, Milperra NSW, EH&S Risk Management Pty Ltd.

Geo-Logix (2011a) Phase 1 Environmental Site Assessment Report, 479 Henry Lawson Drive, Milperra, NSW, Geo-Logix Pty Ltd Ref 1101046Rpt01FinalV01_22Aug11

Geo-Logix (2011b) Phase II Environmental Site Assessment Report, 479 Henry Lawson Drive, Milperra, NSW, Geo-Logix Pty Ltd Ref 1101046Rpt02FinalV01_9Dec11

Geological Survey of New South Wales (1991), *1:250,000 Penrith,* NSW Department of Minerals and Energy, Sydney.

Geoscience Australia (2004) Sydney Topographic Map, *1:250,000 Sydney NSW*, Australian Government.

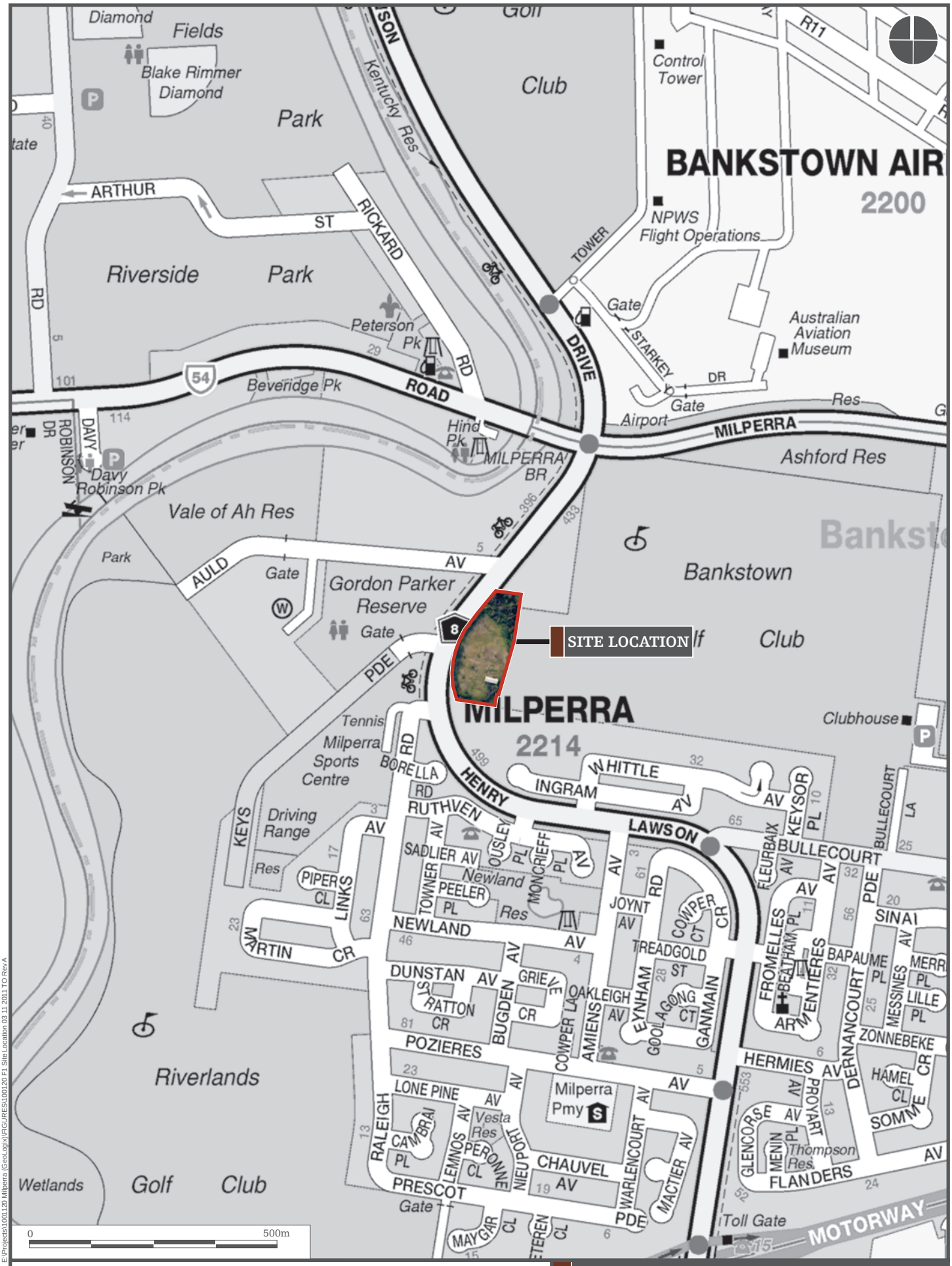
Golder Associates (1989) Preliminary Geotechnical Assessment, Lots 2 & 3 (No 459) Henry Lawson Drive, Milperra NSW, Golder Associates Pty Ltd.

Golder Associates (1999) Preliminary Contamination Investigation, Lots 2 and 3 DP 576251, Henry Lawson Drive Milperra NSW, Golder Associates Pty Ltd, incomplete report.

NSW EPA (1997) *Sampling Design Guidelines,* NSW Environmental Protection Authority, 1997.

NSW Government (2012) *NSW Natural Resource Atlas*, http://www.nratlas.nsw.gov.au. Accessed 13/07/2011.

FIGURES



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SITE LOCATION MAP

Flower Power Pty Ltd

Phase II Environmental Site Assessment

479 Henry Lawson Drive, Milperra, New South Wales 2214

Project No. 1101046

Figure 1

E:\Projects\1001120 Milperra (GeoLogix)\FIGURES\100120 F1 Site Location 03 11 2011 TO Rev A

E:\Projects\1001120 Milperra (GeoLogix)\FIGURES\100120 F2 Site Layout 03 11 2011 TO Rev A

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SITE MAP

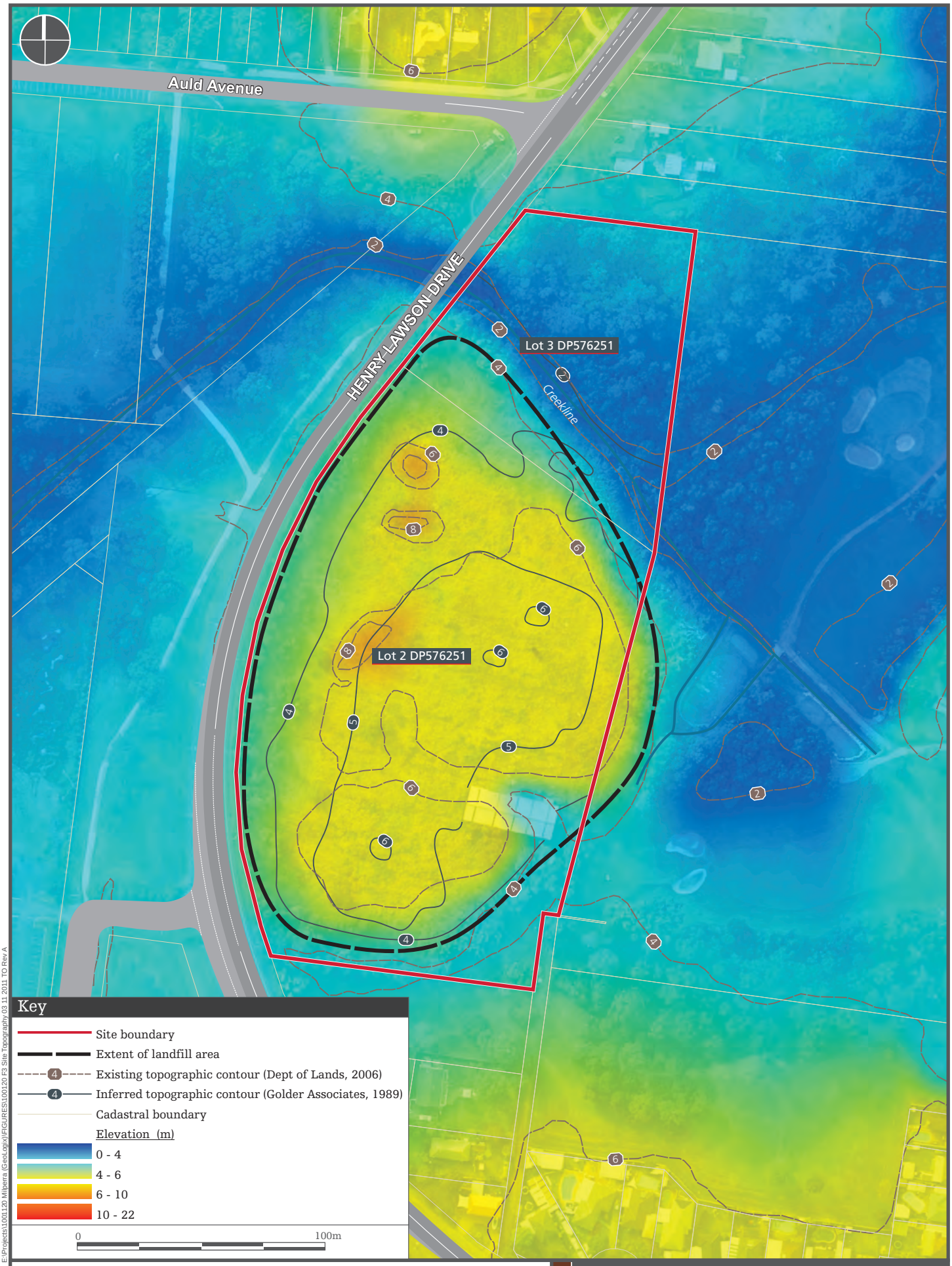
Flower Power Pty Ltd

Phase II Environmental Site Assessment

479 Henry Lawson Drive, Milperra, New South Wales 2214

Project No. 1101046

Figure 2



E:\Projects\1001120 Milperra (GeoLogix)\FIGURES\100120 F3 Site Topography 03 11 2011 TO Rev A

GEO_LOGIX
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SITE TOPOGRAPHY MAP

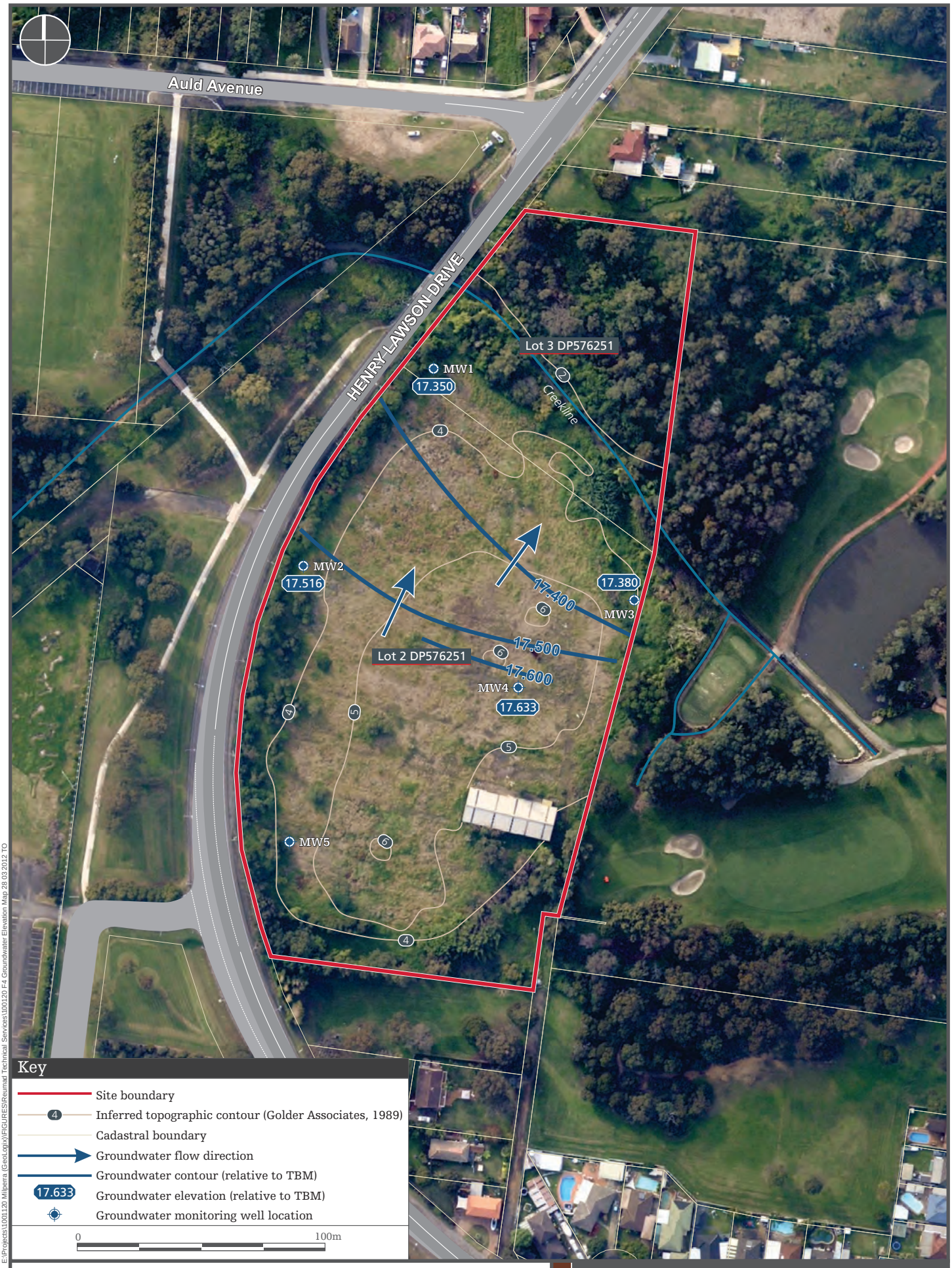
Flower Power Pty Ltd

Phase II Environmental Site Assessment

479 Henry Lawson Drive, Milperra, New South Wales 2214

Project No. 1101046

Figure 3



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GEO_LOGIX Environmental Consultants

GROUNDWATER ELEVATION MAP

Flower Power Pty Ltd

Phase II Environmental Site Assessment

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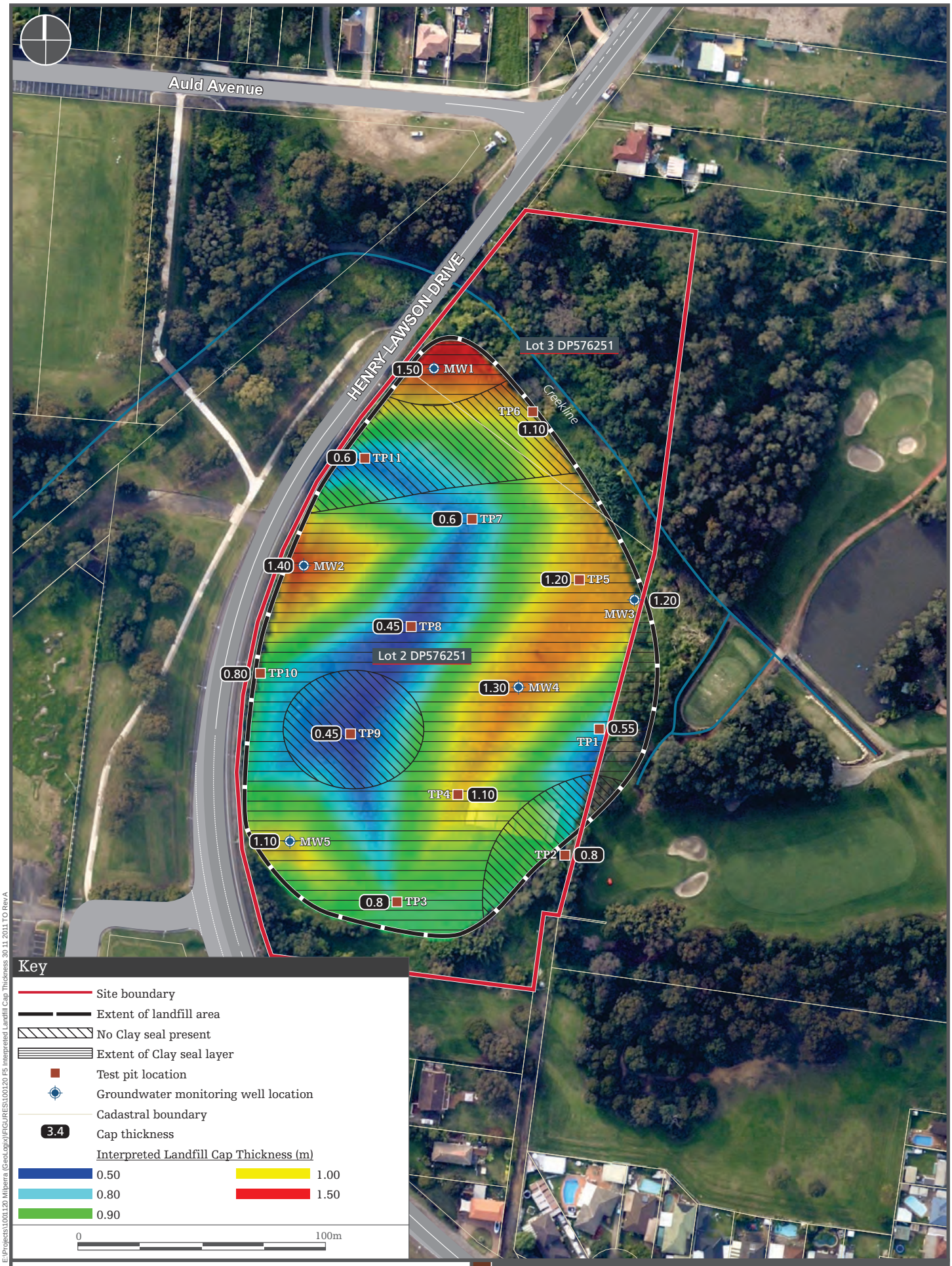
Project No. 1101046

Figure 4



E:\Projects\1001120 Milperra (GeoLogix)\FIGURES\100120 F5 Interpreted Landfill Cap Thickness 30 11 2011 TO RevA

INTERPRETED LANDFILL CAP THICKNESS

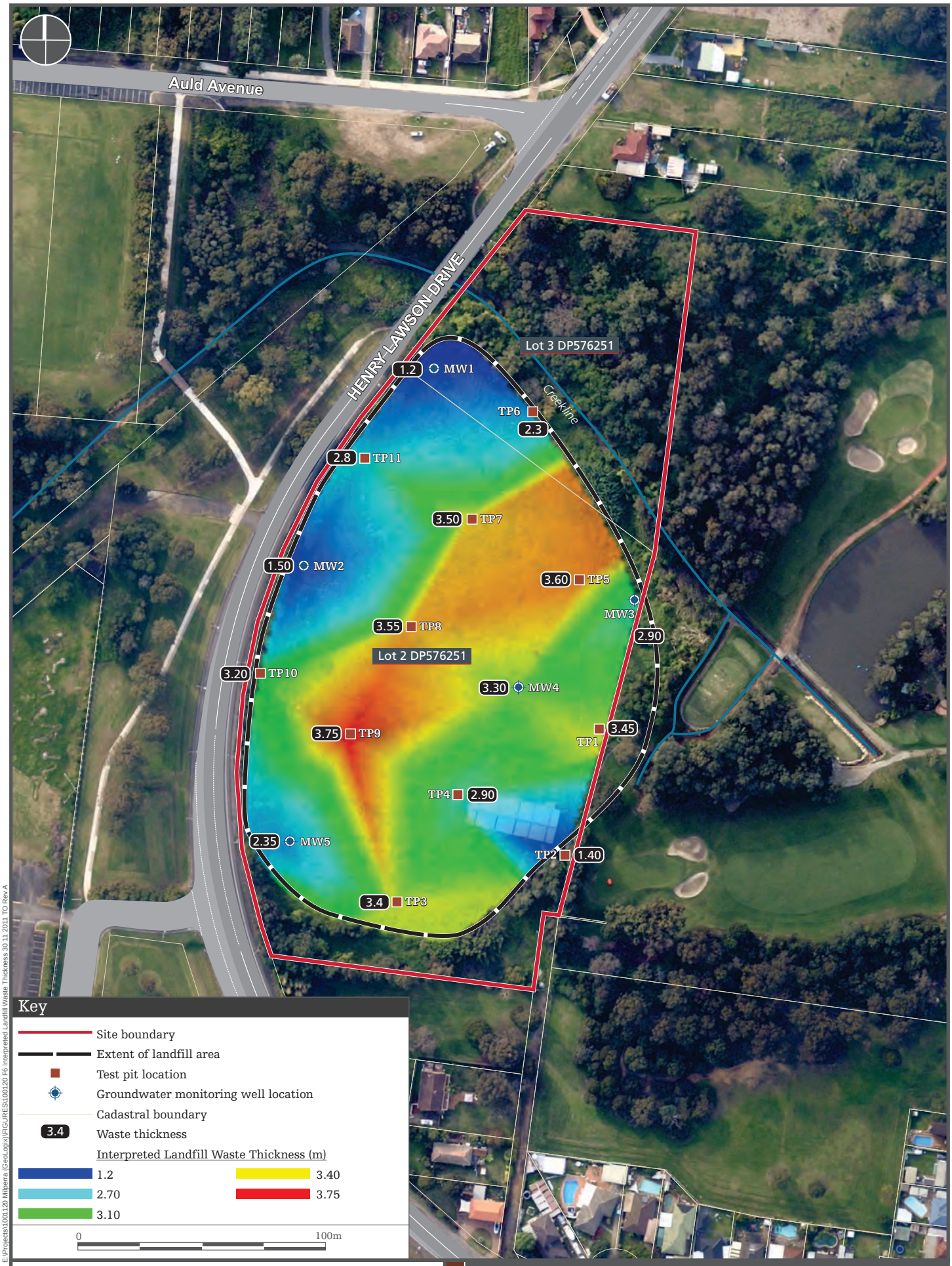
Flower Power Pty Ltd

Phase II Environmental Site Assessment

479 Henry Lawson Drive, Milperra, New South Wales 2214

Project No. 1101046

Figure 5



E:\Projects\1001120 Milperra (GeoLogix)\FIGURES\100120 F6 Interpreted Landfill Waste Thickness 30 11 2011 TO Rev A

INTERPRETED LANDFILL WASTE THICKNESS

Flower Power Pty Ltd

Phase II Environmental Site Assessment

479 Henry Lawson Drive, Milperra, New South Wales 2214

Project No. 1101046

Figure 6

E:\Projects\1001120 Milperra (GeoLogix)\FIGURES\Reumad Technical Services\1001120-F4 Sampling Locations 28 03 2012 TO

GEO_LOGIX Environmental Consultants

SAMPLE LOCATION MAP

Flower Power Pty Ltd

Phase II Environmental Site Assessment

479 Henry Lawson Drive, Milperra, New South Wales 2214

Project No. 1101046

Figure 7

GEO_LOGIX Environmental Consultants

SURFACE GAS SURVEY MAP

Flower Power Pty Ltd

Phase II Environmental Site Assessment

479 Henry Lawson Drive, Milperra, New South Wales 2214

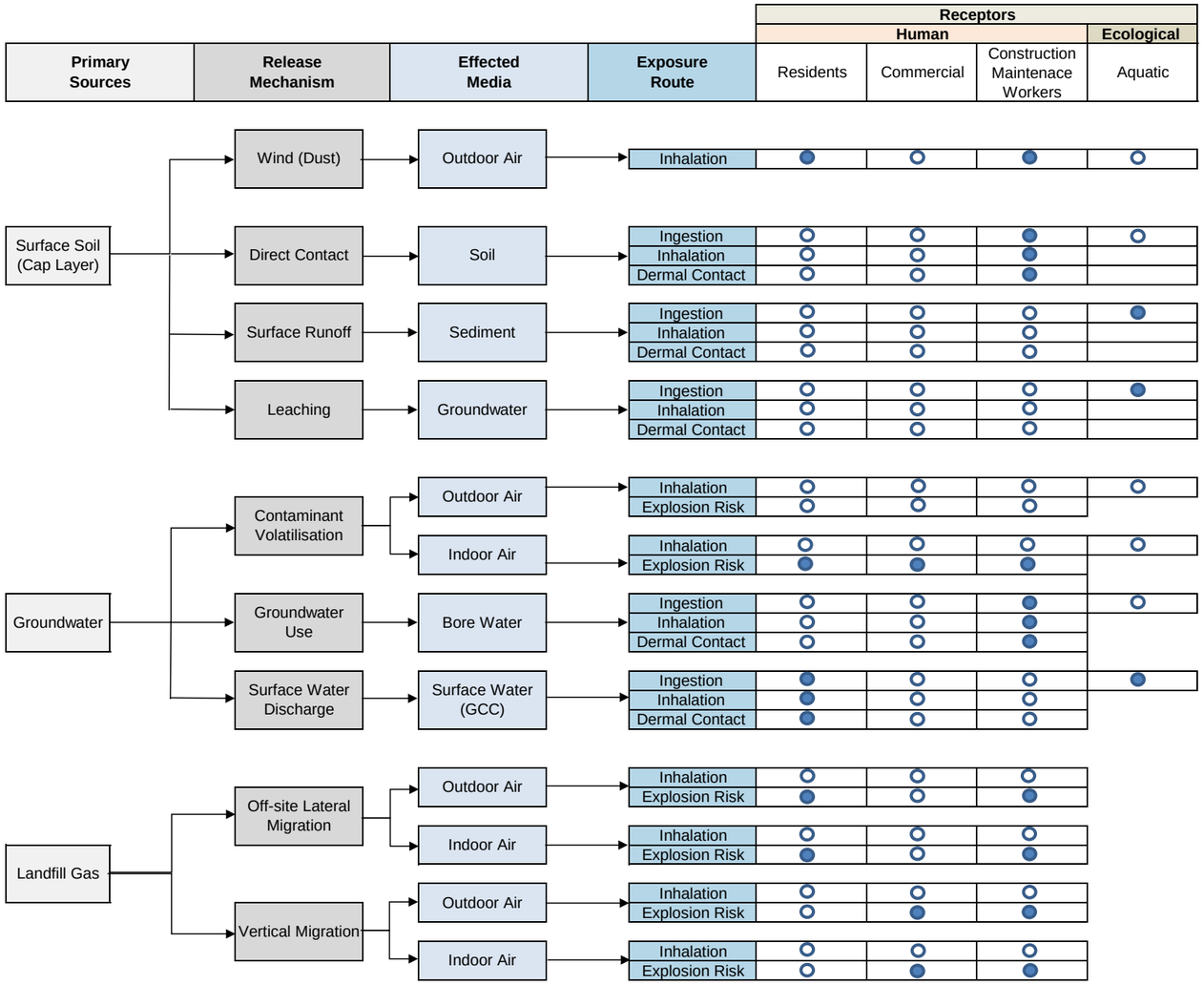
Project No. 1101046

Figure 8

E:\Projects\1001120 Milperra (GeoLogix)\FIGURES\Reumad TEchnical Services\100120 F8 Surface Gas Survey Map 28 03 2012 TO

TABLES

SITE CONCEPTUAL MODEL 26.3.12 - Former Landfill 479 Henry Lawson Drive, Milperra, NSW



Comments
Excluding TRH, soil COPC are not sufficiently volatile to present chemcial vapour inhalation risk to future commercial occupants. Potential dust exposure only likley to occur during constuction works - adequate characterisaion and construction environmental controls will be sufficent to prevent exposure.
Environmental controls and appropriate PPE at construction phase sufficent to minimise exposure.
Sediment control during construction phase sufficiet to prevent impact to GCC
Risk considered to be very low as soil COPC have low solubility and mobility in soil.
Volatile toxicants have not been reported at sufficent concentration in groundwater to present outdoor inhalation risk.
Volatile toxicants have not been reported at sufficent concentration in groundwater to present indoor inhalation risk. Explosion risk from dissolved methane requires further consideration.
Risk considered to be low. Further assessment required to assess risk of exposure to bore water user Milperra Sports Centre
Risk of impact upon aquatic ecosystem of GCC considered to be moderate. Risk of exposure due to recreational use of GCC considered to be low given highly degreaded sytem. Further assessment required.
Explosion risk from offsite methane gas impacts upon neighbouring residential properties considered to be low. Explosion risk to utilities and utlility workers considered to be moderate for utilities in proximity to landfill. Further assessment of gas migration necessary.
Given landfill is emitting methane the exposure path is considered complete. Future works to focus on gas mitigation for commercial use of the site.

ATTACHMENT A

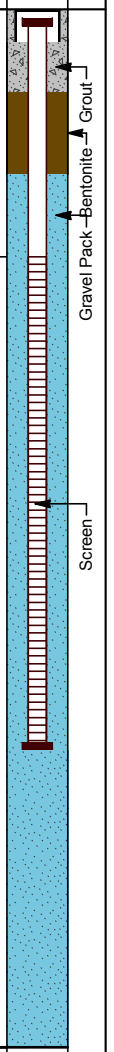
Monitor Well Log

Geo-Logix Pty Ltd
Building Q2, Level 3
Unit 2309 / 4 Daydream Street, Warriewood NSW 2102
Ph: (02) 9979 1722 | Fax: (02) 9979 1222
www.geo-logix.com.au

Hole ID.	**MW1**
Project Number:	**1101046**
Hole Depth:	**6.30 m**
Sheet:	**1 of 1**

Project Name:	**Milperra**	Date Started:	**25/10/2011**
Location / Site:	**479 Henry Lawson Drive, Milperra NSW**	Date Completed:	**25/10/2011**
Client:	**Flower Power Pty Ltd**	Level:	----------
Drilling Company:	**Epoca Environmental Pty Ltd**	Easting:	----------
Drill Method:	**Push Tube (Geoprobe)**	Northing:	----------

Method	Depth (m)	Sample Type	HC Odour	Sample ID	PID (ppm)	Material Type	USCS Symbol	Material Description	Moisture	Observations / Comments
Push Tube	0.0	U	Z	MW1 / 0.1m	0.0	Fill		**FILL** - Gravelly Sandy Silty Clay, light brown (5YR 5/6), 40% clay, 30% silt, 20% sand, 10% gravel, firm, low plasticity.	Dry	Landfill Cap.
	1.50	U	Z	MW1 / 1.5m	0.0			**FILL** - Landfill waste. Timber fragments, packing strap, metal fragments, wire, glass with minor greenish black (5G 2/1) Silty Clay throughout, very soft.	Wet	
	2.70	U	L	MW1 / 2.7m	5.8	Natural	ML	**Clayey Sandy SILT** - medium dark grey (N4), 10% clay, 50% silt, 40% fine sand, soft, low plasticity.	Moist	Hydrogen Sulphide odour.
	2.90		Z				SP		Moist to Wet	
	3.05	U	Z	MW1 / 3.0m	0.0		SP	**Clayey SAND** - dark yellowish orange (10YR 6/6), 25% clay, 75% fine sand, medium dense.	Moist to Wet	
	3.20		Z				SP	**Clayey SAND** - moderate yellowish brown (10YR 5/4), 25% clay, 75% fine sand, medium dense.	Moist to Wet	
	3.30		Z				CL	**Clayey SAND** - medium dark grey (N4), 25% clay, 75% fine sand, medium dense.	Moist	
	3.60		Z				CL	**Silty CLAY** - medium dark grey (N4), 70% clay, 30% silt, stiff, medium plasticity.	Damp	
	4.80	U	Z	MW1 / 3.9m	0.0		CL	**Silty CLAY** - light brown (5YR 5/6), mottled medium dark grey (N4), 80% clay, 20% silt, stiff, medium plasticity.	Wet	
	4.90		Z				CL	**Silty CLAY** - medium dark grey (N4), 60% clay, 40% silt, soft, low plasticity.	Wet	
	5.10		Z				CL	**Silty CLAY** - medium dark grey (N4), mottled dark yellowish orange (10YR 6/6), 80% clay, 20% silt, firm, medium plasticity.	Damp	
	6.20		Z				SP	**Clayey SAND** - medium dark grey (N4), 30% clay, 70% sand, medium dense.	Moist to Wet	
	6.30							**End of Hole at 6.30 m**		



Hydrocarbon Odour
H High
M Moderate
L Low
Z Zero

Sample Type
D Disturbed
U Undisturbed

Additional Comments

Log Drawn By:	Laurie White	Logged By:	**Ben Pearce**	Date:	**25/10/2011**
Contact:	laurie.white@reumad.com.au	Checked By:	**Ben Pearce**	Date:	**25/11/2011**

GL LOG 2 MILPERRA 1101046.GPJ GL.GDT 11/25/11 2:29:05 PM

Monitor Well Log

Geo-Logix Pty Ltd
Building Q2, Level 3
Unit 2309 / 4 Daydream Street, Warriewood NSW 2102
Ph: (02) 9979 1722 | Fax: (02) 9979 1222
www.geo-logix.com.au

Hole ID.	**MW2**
Project Number:	**1101046**
Hole Depth:	**5.10 m**
Sheet:	**1 of 1**

Project Name:	**Milperra**	Date Started:	**25/10/2011**
Location / Site:	**479 Henry Lawson Drive, Milperra NSW**	Date Completed:	**25/10/2011**
Client:	**Flower Power Pty Ltd**	Level:	----------
Drilling Company:	**Epoca Environmental Pty Ltd**	Easting:	----------
Drill Method:	**Push Tube (Geoprobe)**	Northing:	----------

Method	Depth (m)	Sample Type	HC Odour	Sample ID	PID (ppm)	Material Type	USCS Symbol	Material Description	Moisture	Observations / Comments
Push Tube	0.30	U	Z	MW2 / 0.1m	0.0	Fill		**FILL** - Gravelly Silty Clayey Sand, light brown (5YR 5/6), 30% clay, 20% silt, 40% sand, 10% gravel, medium dense.	Dry	Landfill Cap.
	0.5							**FILL** - Silty Sandy Clay, light brown (5YR 5/6), 60% clay, 10% silt, 30% sand, firm, low plasticity.	Dry	
	1.0									
	1.40	U	Z	MW2 / 1.4m	0.6			**FILL** - Landfill waste. Paper, glass, tile, timber, minor greenish black (5G 2/1) Silty Clay throughout.	Wet	
	1.5									
	2.0									
	2.5									
	2.90	U	Z	MW2 / 2.7m	1.3					
	3.0					Natural	SP	**Clayey SAND** - dark yellowish orange (10YR 6/6), minor light grey (N7), 30% clay, 70% sand, medium dense.	Moist	
	3.10	U	Z	MW2 / 3.0m	0.0		SP	**CLAY & SAND** - medium grey (N5), 50% clay, 50% sand, medium dense.	Wet	Consistent grading below 3.1m.
	3.5									
	3.70						SP	**Clayey SAND** - medium grey (N5), 20% clay, 80% sand, medium dense.	Wet	
	4.0	U	Z	MW2 / 3.9m	0.0		CL	**Silty Sandy CLAY** - medium grey (N5), 60% clay, 10% silt, 30% sand, soft.	Wet	
	4.10									
	4.5									
	4.60						CL	**Silty CLAY** - medium grey (N5), 70% clay, 30% silt, soft.	Moist	
	5.0									
	5.10	U	Z	MW2 / 5.1m	0.0			**End of Hole at 5.10 m**		

Well Details: 0.50 Grout; 1.00 Bentonite; 1.50 Gravel Pack; 4.50 Screen

Well Construction

Hydrocarbon Odour
H High
M Moderate
L Low
Z Zero

Sample Type
D Disturbed
U Undisturbed

Additional Comments

Log Drawn By: Laurie White
Contact: laurie.white@reumad.com.au

Logged By: **Ben Pearce** Date: **25/10/2011**
Checked By: **Ben Pearce** Date: **25/11/2011**

Monitor Well Log

Geo-Logix Pty Ltd
Building Q2, Level 3
Unit 2309 / 4 Daydream Street, Warriewood NSW 2102
Ph: (02) 9979 1722 | Fax: (02) 9979 1222
www.geo-logix.com.au

Hole ID.	**MW3**
Project Number:	**1101046**
Hole Depth:	**5.00 m**
Sheet:	**1 of 1**

Project Name:	**Milperra**	Date Started:	**26/10/2011**
Location / Site:	**479 Henry Lawson Drive, Milperra NSW**	Date Completed:	**26/10/2011**
Client:	**Flower Power Pty Ltd**	Level:	----------
Drilling Company:	**Epoca Environmental Pty Ltd**	Easting:	----------
Drill Method:	**Push Tube (Geoprobe)**	Northing:	----------

Depth (m)	Sample Type	HC Odour	Sample ID	PID (ppm)	Material Type	USCS Symbol	Material Description	Moisture	Observations / Comments
0.10	U	Z	MW3 / 0.1m	0.0	Fill		**FILL** - Clayey Sandy Silt, greyish brown (5YR 3/2), 10% clay, 50% silt, 40% fine to medium sand, soft, organic rich, roots.	Damp	Landfill Cap.
0.40		Z						Damp	
0.50							**FILL** - Clayey Sandy Silt, moderate brown (5YR 3/4), 20% clay, 50% silt, 30% fine sand, soft.		
0.70		Z					**FILL** - Brick.	Damp	
1.0	U	Z	MW3 / 1.0m	0.0			**FILL** - Silty Sandy Clay, pale yellowish brown (10YR 6/2) and brownish grey (5YR 4/1) and moderate brown (5YR 3/4), 50% clay, 10% silt, 40% sand, soft, zero to low plasticity.	Damp	
1.20							**FILL** - Sandy Silty Clay, dark yellowish orange (10YR 6/6) and medium light grey (N6), 60% clay, 30% silt, 10% sand, firm, low plasticity, minor weathered shale fragments.		
1.80							**FILL** - Landfill waste. Silty Clay with timber pieces, minor plastic and glass fragments.		
2.00	U	H	MW3 / 2.0m	480			**FILL** - Landfill waste. Fibrous mat layers caked with black hard charcoal / coal like material, mixed with thin steel plates and plastic.		Strong odour (creosote / coal tar like) 1.8 to 2.0m.
2.15							**FILL** - Landfill waste. Timber pieces (plywood) with plastic woven mat.		
2.5	U	L	MW3 / 2.7m	2.2			**FILL** - Landfill waste. Silty Clay with sand & sandstone gravel, some metal and timber fragments.		
3.10							**FILL** - Landfill waste. Timber.	Wet	
3.5		Z		ND					
3.70							**FILL** - Landfill waste. Sandy Clay mixed with PVC, some fabric and timber pieces, plastic bag piece, brownish grey (5YR 4/1).	Wet	
4.10					Natural	SP	**Gravelly Silty SAND** - 10% silt, 80% fine sand, 10% gravel, flowing.	Wet	
5.00							**End of Hole at 5.00 m**		

Push Tube

Water Level: 2.8m 26/10/2011

Well Details: Grout 1.00; Bentonite 1.50; Gravel Pack 2.00; Screen

Well Construction

Hydrocarbon Odour
H High
M Moderate
L Low
Z Zero

Sample Type
D Disturbed
U Undisturbed

Additional Comments

Log Drawn By: Laurie White
Contact: laurie.white@reumad.com.au

Logged By: **Ben Pearce** Date: **26/10/2011**
Checked By: **Ben Pearce** Date: **25/11/2011**

Monitor Well Log

Geo-Logix Pty Ltd
Building Q2, Level 3
Unit 2309 / 4 Daydream Street, Warriewood NSW 2102
Ph: (02) 9979 1722 | Fax: (02) 9979 1222
www.geo-logix.com.au

Hole ID.	**MW4**
Project Number:	**1101046**
Hole Depth:	**5.00 m**
Sheet:	**1 of 1**

Project Name:	**Milperra**	Date Started:	**26/10/2011**
Location / Site:	**479 Henry Lawson Drive, Milperra NSW**	Date Completed:	**26/10/2011**
Client:	**Flower Power Pty Ltd**	Level:	**----------**
Drilling Company:	**Epoca Environmental Pty Ltd**	Easting:	**----------**
Drill Method:	**Push Tube / Solid Flight Auger (Geoprobe)**	Northing:	**----------**

Method	Depth (m)	Sample Type	HC Odour	Sample ID	PID (ppm)	Material Type	USCS Symbol	Material Description	Moisture	Observations / Comments
Push Tube	0.10	U	Z	MW4 / 0.1m	0.0	Fill		**FILL** - Topsoil. Silty Sand, dull reddish brown (5YR 5/4), 10% silt, 90% sand, loose.	Damp	Landfill Cap.
	0.25							**FILL** - Brick.	Damp	
	0.35	U	Z	MW4 / 0.4m	0.8			**FILL** - Silty Sandy Gravel, black (N1), 10% silt, 30% sand, 60% medium to coarse gravel, medium dense, predominantly basalt, minor slag.	Damp	
	0.5									
	0.90							**FILL** - Sandy Silty Clay, dark yellowish brown (10YR 4/2), mottled moderate yellowish brown (10YR 5/4), 60% clay, 20% silt, 20% sand, firm, low plasticity.	Damp	
	1.00	U	Z	MW4 / 1.0m	13.0				Damp	
	1.30							**FILL** - Silty Sandy Clay, dusky brown (5YR 2/2), 50% clay, 20% silt, 30% sand, firm, low plasticity, organic rich, some roots, minor glass.	Damp	
	1.40	U	Z	MW4 / 1.4m	15			**FILL** - Landfill waste. Timber, paper, plastic waste.		
	1.5							**FILL** - Landfill waste. Silty Gravelly Sand, black (N1), 10% silt, 80% sand, 10% gravel, low plasticity, loose, ash present.		
	1.90							**FILL** - Landfill waste. Paper, glass, camera film, plastic tape, minor ash.	Damp	
	2.0							**FILL** - Landfill waste. Timber waste.		
	2.10							**FILL** - Landfill waste. Paper waste.		
	2.30							**FILL** - Landfill waste. Silty Clay mixed with paper & plastic, firm, low plasticity.		
Solid Flight Auger	2.40	U	Z	MW4 / 2.4m	7.2			**FILL** - Landfill waste. *Solid object encountered at 2.4m.* *Moved hole an augered to 4.0m, composition not known.*		
	2.5									
	3.0									
	3.5									
	4.00									
Push Tube	4.5							**FILL** - Landfill waste. Silty Clay, plastic, sand.	Wet	
	4.60									
	4.70					Natural	SP	**Silty SAND** - medium dark grey (N4), 10% silt, 90% sand, medium dense.	Wet	
	5.00	U	Z	MW4 / 5.0m	0.0		CL	**Sandy Silty CLAY** - pale yellowish brown (10YR 6/2), minor dark yellowish orange (10YR 6/6), 50% clay, 30% silt, 20% sand, firm, low plasticity.	Damp	Aquitard.

End of Hole at 5.00 m

Well Details / Well Construction: Grout (1.00), Bentonite (1.50), Gravel Pack (2.00), Screen

Hydrocarbon Odour
H High
M Moderate
L Low
Z Zero

Sample Type
D Disturbed
U Undisturbed

Additional Comments

Solid object encountered at 2.4m.
Moved hole an augered to 4.0m

Log Drawn By: Laurie White
Contact: laurie.white@reumad.com.au

Logged By: **Ben Pearce** Date: **26/10/2011**
Checked By: **Ben Pearce** Date: **25/11/2011**

GL LOG 2 MILPERRA 1101046.GPJ GL.GDT 11/25/11 2:29:13 PM

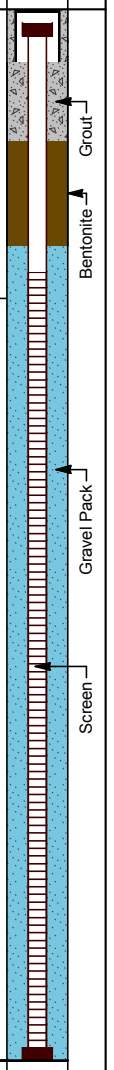
Monitor Well Log

Geo-Logix Pty Ltd
Building Q2, Level 3
Unit 2309 / 4 Daydream Street, Warriewood NSW 2102
Ph: (02) 9979 1722 | Fax: (02) 9979 1222
www.geo-logix.com.au

Hole ID.	**MW5**
Project Number:	**1101046**
Hole Depth:	**4.00 m**
Sheet:	**1 of 1**

Project Name:	**Milperra**	Date Started:	**27/10/2011**
Location / Site:	**479 Henry Lawson Drive, Milperra NSW**	Date Completed:	**27/10/2011**
Client:	**Flower Power Pty Ltd**	Level:	----------
Drilling Company:	**Epoca Environmental Pty Ltd**	Easting:	----------
Drill Method:	**Push Tube (Geoprobe)**	Northing:	----------

Method	Water Level	Depth (m)	Sample Type	HC Odour	Sample ID	PID (ppm)	Material Type	USCS Symbol	Graphic Log	Material Description	Moisture	Observations / Comments
Push Tube	2.8m 27/10/2011	0.25	U	Z	MW5 / 0.1m	0.0	Fill			**FILL** - Gravelly Sand, brownish black (5YR 2/1), 70% fine to coarse sand, 30% fine gravel, medium dense, coal waste, minor vitreous slag nodules.	Dry	Landfill Cap.
		0.30		Z								
		0.5		Z						**FILL** - Coal piece, 100% gravel.	Damp	
		0.60								**FILL** - Gravelly Silty Clay, greyish orange pink (5YR 7/2), mottled light brown (5YR 5/6), 60% clay, 30% silt, 10% gravel, firm, low plasticity, reworked clay with shale gravel.	Damp	
		1.0	U	Z	MW5 / 1.0m	2.7				**FILL** - Silty Sandy Clay, greyish orange (10YR 7/4) and medium dark grey (N4) and moderate yellowish brown (10YR 5/4), 60% clay, 10% silt, 30% sand, firm, low plasticity, minor slag inclusions.		
		1.10										
		1.33								**FILL** - Landfill waste. Piece of plywood followed by sawdust.	Damp to Moist	
		1.35								**FILL** - Landfill waste. Piece of timber.		
		1.5								**FILL** - Landfill waste. Gravelly Sandy Silty Clay, moderate yellowish brown (10YR 5/4) and medium dark grey (N4) and moderate reddish brown (10R 4/6), 50% clay, 20% silt, 20% sand, 10% gravel, soft, low plasticity, sandstone gravel, ceramic tiles, minor timber.		
		1.98		Z								
		2.01	U	Z	MW5 / 2.0m	0.4						Purple staining from cloth 2.01 to 2.5m. Turpentine odour.
			U	Z	MW5 / 2.3m	41.9				**FILL** - Landfill waste. Piece of foam / sponge.		
		2.50								**FILL** - Landfill waste. Silty Clay mixed with cloth, plastic, plastic packing strap, brownish grey (5YR 4/1).		
		2.80								**FILL** - Landfill waste. Silty Clay mixed with plastic & plastic packing strap, light brown (5YR 5/6).	Moist to Wet	Organic odour 2.8 to 3.0m.
		3.00		Z						**FILL** - Landfill waste. Gravelly Clayey Silty Sand, black (N1), 10% clay, 20% silt, 60% sand, 10% coarse gravel, loose, organic rich, rounded gravel , minor metal waste.		
		3.40								**FILL** - Landfill waste. Sand mixed with Silty Clay fragments, metal pieces, glass, terracotta, sandstone gravel, medium dark grey (N4).		
		3.45										
		3.5								**FILL** - Landfill waste. Glass.	Wet	
							Natural	SP		**SAND** - dark grey (N3), 10% clay, 30% silt, 60% sand, medium dense.		
		4.00	U	Z	MW5 / 4.0m	0.0						
										End of Hole at 4.00 m		



Hydrocarbon Odour
H High
M Moderate
L Low
Z Zero

Sample Type
D Disturbed
U Undisturbed

Additional Comments

Log Drawn By:	Laurie White	Logged By:	**Ben Pearce**	Date:	**27/10/2011**
Contact:	laurie.white@reumad.com.au	Checked By:	**Ben Pearce**	Date:	**25/11/2011**

GL LOG 2 MILPERRA 1101046.GPJ GL.GDT 11/25/11 2:29:16 PM

Monitor Well Log

Geo-Logix Pty Ltd
Building Q2, Level 3
Unit 2309 / 4 Daydream Street, Warriewood NSW 2102
Ph: (02) 9979 1722 | Fax: (02) 9979 1222
www.geo-logix.com.au

Hole ID.	**TP1**
Project Number:	**1101046**
Hole Depth:	**4.20 m**
Sheet:	**1 of 1**

Project Name:	**Milperra**	Date Started:	**27/10/2011**
Location / Site:	**479 Henry Lawson Drive, Milperra NSW**	Date Completed:	**27/10/2011**
Client:	**Flower Power Pty Ltd**	Level:	**----------**
Drilling Company:		Easting:	**----------**
Drill Method:	**Excavation**	Northing:	**----------**

Method	Water Level	Depth (m)	Sample ID	PID (ppm)	DUP / TRIP	Material Type	USCS Symbol	Graphic Log	Material Description	Moisture	Observations / Comments
Excavation		0.5 / 0.55	TP1 / 0.2m	0.0	Dup1 Trip1	Fill			**FILL** - Sandy Silty Clay, dark yellowish orange (10YR 6/6), 70% clay, 20% silt, 10% sand, firm, low plasticity.	Dry	CH_4 = 0.0, CO_2 = 0.0, O_2 = 21.1 Landfill Cap.
			TP1 / 0.5m	0.0							
		1.0	TP1 / 1.0m	2.0					**FILL** - Landfill waste. Clayey Sandy Silt, with plastic, cloth, glass, 10% clay, 70% silt, 20% sand, loose.	Damp	CH_4 = 0.2, CO_2 = 0.3, O_2 = 21.1
		1.5									
		2.0 / 2.30									
		2.5	TP1 / 2.5m	0.0					**FILL** - Landfill waste. Wood / Mulch, loose.	Wet	CH_4 = 0.3, CO_2 = 0.4, O_2 = 21.1
		3.0									
		3.5									
		4.00	TP1 / 4.0m	0.0							
		4.20				Nat.	CL		**Silty CLAY** - 90% clay, 10% silt, firm, high plasticity.	Moist	
		4.5							**End of Hole at 4.20 m**		
		5.0									

Hydrocarbon Odour
H High
M Moderate
L Low
Z Zero

Sample Type
D Disturbed
U Undisturbed

Additional Comments

Log Drawn By:	Laurie White	Logged By:	**Grant Russell**	Date:	**27/10/2011**
Contact:	laurie.white@reumad.com.au	Checked By:	**Ben Pearce**	Date:	**25/11/2011**

GL LOG 2 MILPERRA 1101046.GPJ GL.GDT 11/25/11 2:29:18 PM

Monitor Well Log

Geo-Logix Pty Ltd
Building Q2, Level 3
Unit 2309 / 4 Daydream Street, Warriewood NSW 2102
Ph: (02) 9979 1722 | Fax: (02) 9979 1222
www.geo-logix.com.au

Hole ID.	**TP2**
Project Number:	**1101046**
Hole Depth:	**4.10 m**
Sheet:	**1 of 1**

Project Name:	**Milperra**	Date Started:	**27/10/2011**
Location / Site:	**479 Henry Lawson Drive, Milperra NSW**	Date Completed:	**27/10/2011**
Client:	**Flower Power Pty Ltd**	Level:	**----------**
Drilling Company:		Easting:	**----------**
Drill Method:	**Excavation**	Northing:	**----------**

Method	Water Level	Depth (m)	Sample ID	PID (ppm)	Material Type	USCS Symbol	Graphic Log	Material Description	Moisture	Observations / Comments
Excavation		0.01	TP2 / 0.2m	0.0	Fill			**FILL** - Topsoil.	Dry	CH_4 = 0.0, CO_2 = 0.0, O_2 = 21.1 Landfill Cap.
		0.30						**FILL** - Roadbase. Silty Sandy Gravel, moderate brown (5YR 4/4), 20% silt, 40% sand, 40% gravel.		
		0.5	TP2 / 0.5m	0.0				**FILL** - Crushed Sandstone, dark yellowish orange (10YR 6/6).	Dry	CH_4 = 0.0, CO_2 = 0.0, O_2 = 21.1 Landfill Cap.
		0.80								
		1.0	TP2 / 1.0m	0.0				**FILL** - Landfill waste. Sandy Silty Clay, pale yellowish brown (10YR 6/2), 80% clay, 10% silt, 10% sand, with thick wire cable, some bricks.	Dry to Damp	CH_4 = 0.0, CO_2 = 0.0, O_2 = 21.1
		1.5								
		2.0								
		2.20			Natural	CL		**Sandy Silty CLAY** - dark yellowish orange (10YR 6/6), with pale yellowish brown (10YR 6/2), 80% clay, 10% silt, 10% sand.	Damp	CH_4 = 0.0, CO_2 = 0.0, O_2 = 21.1
		2.5								
		3.0								
		3.5								
		4.0	TP2 / 4.0m	0.0						
		4.10						**End of Hole at 4.10 m**		
		4.5								
		5.0								

Hydrocarbon Odour
H High
M Moderate
L Low
Z Zero

Sample Type
D Disturbed
U Undisturbed

Additional Comments

Log Drawn By:	Laurie White	Logged By:	**Grant Russell**	Date:	**27/10/2011**
Contact:	laurie.white@reumad.com.au	Checked By:	**Ben Pearce**	Date:	**25/11/2011**

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Hole ID.	**TP3**
Project Number:	**1101046**
Hole Depth:	**4.70 m**
Sheet:	**1 of 1**

Project Name:	**Milperra**	Date Started:	**27/10/2011**
Location / Site:	**479 Henry Lawson Drive, Milperra NSW**	Date Completed:	**27/10/2011**
Client:	**Flower Power Pty Ltd**	Level:	**----------**
Drilling Company:		Easting:	**----------**
Drill Method:	**Excavation**	Northing:	**----------**

Method	Water Level	Depth (m)	Sample ID	PID (ppm)	Material Type	USCS Symbol	Graphic Log	Material Description	Moisture	Observations / Comments
Excavation		0.01			Fill			**FILL** - Topsoil.	Damp	CH_4 = 0.0, CO_2 = 0.0, O_2 = 21.1 Landfill Cap.
		0.25	TP3 / 0.2m	0.0				**FILL** - Clayey Silty Sand, moderate yellowish brown (10YR 5/4), 10% clay, 10% silt, 80% sand, loose.	Damp	CH_4 = 0.0, CO_2 = 0.0, O_2 = 21.1 Landfill Cap.
		0.5	TP3 / 0.5m	0.0				**FILL** - Sandy Silty Clay, moderate reddish orange (10R 6/6), with pale yellowish brown (10YR 6/2), 80% clay, 10% silt, 10% sand, firm.		
		0.80								
		1.0	TP3 / 1.0m	0.9				**FILL** - Landfill waste. Plastic, paper, glass, tin, wood, cloth.	Damp	CH_4 = 0.0, CO_2 = 0.0, O_2 = 21.1
		1.5								
		2.0	TP3 / 2.0m	0.7						
		2.5								
		3.0								
		3.10						**FILL** - Landfill waste. Plastic, paper, glass, tin, wood, cloth, bricks.	Wet	
		3.5								
		4.0								
		4.20			Nat.			**Silty Sandy CLAY** - 60% clay, 10% silt, 30% sand, soft.	Wet	CH_4 = 0.0, CO_2 = 0.0, O_2 = 21.1
		4.5	TP3 / 4.5m	0.0						
		4.70						**End of Hole at 4.70 m**		
		5.0								

Hydrocarbon Odour
H High
M Moderate
L Low
Z Zero

Sample Type
D Disturbed
U Undisturbed

Additional Comments

Log Drawn By: Laurie White
Contact: laurie.white@reumad.com.au

Logged By: **Grant Russell** Date: **27/10/2011**
Checked By: **Ben Pearce** Date: **25/11/2011**

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Hole ID.	**TP4**
Project Number:	**1101046**
Hole Depth:	**4.50 m**
Sheet:	**1 of 1**

Project Name:	**Milperra**	Date Started:	**27/10/2011**
Location / Site:	**479 Henry Lawson Drive, Milperra NSW**	Date Completed:	**27/10/2011**
Client:	**Flower Power Pty Ltd**	Level:	**----------**
Drilling Company:		Easting:	**----------**
Drill Method:	**Excavation**	Northing:	**----------**

Method	Water Level	Depth (m)	Sample ID	PID (ppm)	DUP / TRIP	Material Type	USCS Symbol	Graphic Log	Material Description	Moisture	Observations / Comments
Excavation		0.01	TP4 / 0.2m	0.0	Dup5 Trip5	Fill			**FILL** - Topsoil.	Damp	CH_4 = 0.0, CO_2 = 0.0 Landfill Cap.
		0.5							**FILL** - Gravelly Clayey Silty Sand, dark yellowish brown (10YR 4/2), 10% clay, 10% silt, 70% sand, 10% gravel, loose, with ash.		
		0.60	TP4 / 0.7m	0.0					**FILL** - Sandy Silty Clay, dark yellowish orange (10YR 6/6), 80% clay, 10% silt, 10% sand.	Damp	CH_4 = 0.0, CO_2 = 0.0 Landfill Cap.
		1.0									
		1.10	TP4 / 1.5m	0.0					**FILL** - Landfill waste. Plastic, aluminium cans, wood, loose.	Damp	CH_4 = 0.0, CO_2 = 0.0
		1.5									
		2.0									
		2.5									
		2.80	TP4 / 3.0m	0.0					**FILL** - Landfill waste. Plastic, aluminium cans, wood, loose.	Wet	CH_4 = 0.0, CO_2 = 0.0
		3.0									
		3.5									
		4.00	TP4 / 4.1m	0.0		Natural	CL		**Sandy Silty CLAY** - dark yellowish orange (10YR 6/6), 80% clay, 10% silt, 10% sand, firm.	Wet	CH_4 = 0.0, CO_2 = 0.0
		4.50							**End of Hole at 4.50 m**		
		5.0									

Hydrocarbon Odour
H High
M Moderate
L Low
Z Zero

Sample Type
D Disturbed
U Undisturbed

Additional Comments

Log Drawn By:	Laurie White	Logged By:	**Grant Russell**	Date:	**27/10/2011**
Contact:	laurie.white@reumad.com.au	Checked By:	**Ben Pearce**	Date:	**25/11/2011**

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Hole ID.	**TP5**
Project Number:	**1101046**
Hole Depth:	**5.50 m**
Sheet:	**1 of 1**

Project Name:	**Milperra**	Date Started:	**27/10/2011**
Location / Site:	**479 Henry Lawson Drive, Milperra NSW**	Date Completed:	**27/10/2011**
Client:	**Flower Power Pty Ltd**	Level:	----------
Drilling Company:		Easting:	----------
Drill Method:	**Excavation**	Northing:	----------

Method	Water Level	Depth (m)	Sample ID	PID (ppm)	Material Type	USCS Symbol	Graphic Log	Material Description	Moisture	Observations / Comments
Excavation		0.01			Fill			**FILL** - Topsoil.	Damp	CH_4 = 0.0, CO_2 = 0.0, O_2 = 21.1 Landfill Cap.
		0.30	TP5 / 0.2m	0.0				**FILL** - Clayey Silty Sand, moderate yellowish brown (10YR 5/4), 10% clay, 10% silt, 80% sand, loose.	Damp	CH_4 = 0.0, CO_2 = 0.0, O_2 = 21.1 Landfill Cap.
		0.5	TP5 / 0.5m	0.0				**FILL** - Silty Clayey Sand, dark yellowish orange (10YR 6/6), 70% clay, 10% silt, 20% sand, firm, medium plasticity.		
		1.0								
		1.20						**FILL** - Landfill waste. Plastic, wood, glass, loose.	Damp	CH_4 = 0.6, CO_2 = 0.3, O_2 = 21.1
		1.5	TP5 / 1.5m	5.4						
		2.0								
		2.5								
		2.70						**FILL** - Landfill waste. Plastic, wood, glass, tyre, logs, loose.	Wet	CH_4 = 0.1, CO_2 = 0.1, O_2 = 21.1
		3.0	TP5 / 3.0m	4.3						
		3.5								
		4.0								
		4.5								
		4.80								
		5.0	TP5 / 5.0m	0.0	Natural	SP		**Silty SAND** - 20% silt, 80% sand, very loose.	Wet	CH_4 = 0.1, CO_2 = 0.1, O_2 = 21.1
		5.50						**End of Hole at 5.50 m**		
		6.0								

Hydrocarbon Odour
H High
M Moderate
L Low
Z Zero

Sample Type
D Disturbed
U Undisturbed

Additional Comments

Log Drawn By:	Laurie White	Logged By:	**Grant Russell**	Date:	**27/10/2011**
Contact:	laurie.white@reumad.com.au	Checked By:	**Ben Pearce**	Date:	**25/11/2011**

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Hole ID.	**TP6**
Project Number:	**1101046**
Hole Depth:	**4.10 m**
Sheet:	**1 of 1**

Project Name:	**Milperra**	Date Started:	**27/10/2011**
Location / Site:	**479 Henry Lawson Drive, Milperra NSW**	Date Completed:	**27/10/2011**
Client:	**Flower Power Pty Ltd**	Level:	**----------**
Drilling Company:		Easting:	**----------**
Drill Method:	**Excavation**	Northing:	**----------**

Method	Water Level	Depth (m)	Sample ID	PID (ppm)	Material Type	USCS Symbol	Graphic Log	Material Description	Moisture	Observations / Comments
Excavation		0.01	TP6 / 0.2m	0.0	Fill			**FILL** - Topsoil.	Damp	CH_4 = 0.0, CO_2 = 0.0
		0.5						**FILL** - Clayey Silty Sand, moderate yellowish brown (10YR 5/4), 10% clay, 10% silt, 80% sand, loose.		Landfill Cap.
		1.0	TP6 / 1.0m	0.0						
		1.10						**FILL** - Landfill waste. Clayey Silty Sand, with plastic pots, glass, moderate yellowish brown (10YR 5/4), 10% clay, 10% silt, 80% sand, loose.	Damp	CH_4 = 0.0, CO_2 = 0.0
		1.5	TP6 / 1.5m	0.0						
		2.0								
		2.5	TP6 / 2.5m	0.0						
		3.0								
		3.40								
		3.5	TP6 / 3.5m	0.0	Natural	SP		**Clayey Silty SAND** - pale yellowish brown (10YR 6/2), 10% clay, 10% silt, 80% sand, loose.	Wet	CH_4 = 0.0, CO_2 = 0.0
		4.0								
		4.10						**End of Hole at 4.10 m**		
		4.5								
		5.0								

Hydrocarbon Odour
H High
M Moderate
L Low
Z Zero

Sample Type
D Disturbed
U Undisturbed

Additional Comments

Log Drawn By:	Laurie White	Logged By:	**Grant Russell**	Date:	**27/10/2011**
Contact:	laurie.white@reumad.com.au	Checked By:	**Ben Pearce**	Date:	**25/11/2011**

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Hole ID.	**TP7**
Project Number:	**1101046**
Hole Depth:	**5.00 m**
Sheet:	**1 of 1**

Project Name:	**Milperra**	Date Started:	**27/10/2011**
Location / Site:	**479 Henry Lawson Drive, Milperra NSW**	Date Completed:	**27/10/2011**
Client:	**Flower Power Pty Ltd**	Level:	**----------**
Drilling Company:		Easting:	**----------**
Drill Method:	**Excavation**	Northing:	**----------**

Method	Water Level	Depth (m)	Sample ID	PID (ppm)	DUP / TRIP	Material Type	USCS Symbol	Graphic Log	Material Description	Moisture	Observations / Comments
Excavation		0.01	TP7 / 0.2m	0.0	Dup2 Trip2	Fill			**FILL** - Topsoil.	Damp	CH_4 = 0.0, CO_2 = 0.0, O_2 = 21.1 Landfill Cap.
		0.30							**FILL** - Silty Clayey Sand, moderate yellowish brown (10YR 5/4), 30% clay, 20% silt, 50% sand, loose.	Damp	CH_4 = 0.0, CO_2 = 0.0, O_2 = 21.1 Landfill Cap.
		0.5	TP7 / 0.5m	0.0							
		0.60							**FILL** - Silty Clayey Sand, moderate yellowish brown (10YR 5/4), 50% clay, 10% silt, 40% sand, loose.	Damp	CH_4 = 0.0, CO_2 = 0.0, O_2 = 21.1
		1.0							**FILL** - Landfill waste. Plastic, aluminium cans, wood, loose.		
		1.5	TP7 / 1.5m	0.2							
		2.0									
		2.30									
		2.5	TP7 / 2.5m	0.3					**FILL** - Landfill waste. Plastic, wood, medical supplies, loose.	Wet	CH_4 = 0.0, CO_2 = 0.0, O_2 = 21.1
		3.0									
		3.5									
		4.0									
		4.10	TP7 / 4.1m	0.0		Natural	SP		**Silty SAND** - pale yellowish orange (10YR 8/6), 10% silt, 90% sand, loose.	Wet	CH_4 = 0.0, CO_2 = 0.0, O_2 = 21.1
		4.5									
		5.00							**End of Hole at 5.00 m**		

Hydrocarbon Odour
H High
M Moderate
L Low
Z Zero

Sample Type
D Disturbed
U Undisturbed

Additional Comments

Log Drawn By:	Laurie White	Logged By:	**Grant Russell**	Date:	**27/10/2011**
Contact:	laurie.white@reumad.com.au	Checked By:	**Ben Pearce**	Date:	**25/11/2011**

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Hole ID.	**TP8**
Project Number:	**1101046**
Hole Depth:	**5.00 m**
Sheet:	**1 of 1**

Project Name:	**Milperra**	Date Started:	**27/10/2011**
Location / Site:	**479 Henry Lawson Drive, Milperra NSW**	Date Completed:	**27/10/2011**
Client:	**Flower Power Pty Ltd**	Level:	----------
Drilling Company:		Easting:	----------
Drill Method:	**Excavation**	Northing:	----------

Method	Water Level	Depth (m)	Sample ID	PID (ppm)	Material Type	USCS Symbol	Graphic Log	Material Description	Moisture	Observations / Comments
Excavation		0.01			Fill			**FILL** - Topsoil.	Damp	CH_4 = 0.0, CO_2 = 0.0, O_2 = 21.1 Landfill Cap (0.0 to 0.45m).
		0.25	TP8 / 0.2m	0.0				**FILL** - Silty Gravelly Sand, dark yellowish brown (10YR 4/2), 20% silt, 60% sand, 20% gravel, loose, mostly ash.	Damp	CH_4 = 0.0, CO_2 = 0.0, O_2 = 21.1
		0.45	TP8 / 0.4m	0.3				**FILL** - Sandy Silty Clay, moderate yellowish brown (10YR 5/4), mottled dark yellowish orange (10YR 6/6), 70% clay, 20% silt, 10% sand, firm.	Damp	CH_4 = 0.2, CO_2 = 0.2, O_2 = 21.1
		0.5						**FILL** - Landfill waste. Plastic, tyres, wood, metal, loose.		
		1.0	TP8 / 1.0m	25.3						
		1.5								
		2.0	TP8 / 2.0m	9.9						
		2.50						**FILL** - Landfill waste. Plastic, tyres, wood, metal, loose.	Wet	CH_4 = 0.0, CO_2 = 0.2, O_2 = 21.1
		3.0								
		3.5								
		4.00								
		4.5	TP8 / 4.1m	2.1	Natural	SP		**Clayey Silty SAND** - pale yellowish brown (10YR 6/2), 10% clay, 10% silt, 80% sand, loose.	Wet	
		5.00						**End of Hole at 5.00 m**		

Hydrocarbon Odour
H High
M Moderate
L Low
Z Zero

Sample Type
D Disturbed
U Undisturbed

Additional Comments

Log Drawn By:	Laurie White	Logged By:	**Grant Russell**	Date:	**27/10/2011**
Contact:	laurie.white@reumad.com.au	Checked By:	**Ben Pearce**	Date:	**25/11/2011**

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Hole ID.	**TP9**
Project Number:	**1101046**
Hole Depth:	**5.00 m**
Sheet:	**1 of 1**

Project Name:	**Milperra**	Date Started:	**27/10/2011**
Location / Site:	**479 Henry Lawson Drive, Milperra NSW**	Date Completed:	**27/10/2011**
Client:	**Flower Power Pty Ltd**	Level:	----------
Drilling Company:		Easting:	----------
Drill Method:	**Excavation**	Northing:	----------

Method	Water Level	Depth (m)	Sample ID	PID (ppm)	DUP / TRIP	Material Type	USCS Symbol	Graphic Log	Material Description	Moisture	Observations / Comments
Excavation		0.01	TP9 / 0.2m	0.0	Dup4 Trip4	Fill			**FILL** - Topsoil.	Damp	CH_4 = 0.0, CO_2 = 0.0, O_2 = 21.1 Landfill Cap.
		0.45							**FILL** - Clayey Silty Gravelly Sand, dark yellowish brown (10YR 4/2), 10% clay, 10% silt, 70% sand, 10% gravel, loose, ash.		
		0.5	TP9 / 0.5m	0.0					**FILL** - Silty Clayey Sand, pale yellowish brown (10YR 6/2), 20% clay, 10% silt, 70% sand, loose.	Damp	CH_4 = 0.0, CO_2 = 0.0, O_2 = 21.1 Landfill Cap.
		1.0									
		1.5									
		1.70							**FILL** - Landfill waste. Wood, bricks, glass, synthetic mineral fibres plastic.	Damp	CH_4 = 0.5, CO_2 = 0.4, O_2 = 21.1
		2.0	TP9 / 2.0m	1.8							
		2.5									
		2.80							**FILL** - Landfill waste. Wood, organic matter.	Wet	CH_4 = 0.6, CO_2 = 0.7, O_2 = 21.1
		3.0	TP9 / 3.0m	0.3							
		3.5									
		4.0									
		4.20				Natural	SP		**Silty SAND** - 10% silt, 90% sand, loose.	Wet	CH_4 = 0.6, CO_2 = 0.6, O_2 = 21.1
		4.5	TP9 / 4.5m	0.1							
		5.00							**End of Hole at 5.00 m**		

Hydrocarbon Odour
H High
M Moderate
L Low
Z Zero

Sample Type
D Disturbed
U Undisturbed

Additional Comments

Log Drawn By:	Laurie White	Logged By:	**Grant Russell**	Date:	**27/10/2011**
Contact:	laurie.white@reumad.com.au	Checked By:	**Ben Pearce**	Date:	**25/11/2011**

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Hole ID.	**TP10**
Project Number:	**1101046**
Hole Depth:	**5.00 m**
Sheet:	**1 of 1**

Project Name:	**Milperra**	Date Started:	**27/10/2011**
Location / Site:	**479 Henry Lawson Drive, Milperra NSW**	Date Completed:	**27/10/2011**
Client:	**Flower Power Pty Ltd**	Level:	**----------**
Drilling Company:		Easting:	**----------**
Drill Method:	**Excavation**	Northing:	**----------**

Method	Water Level	Depth (m)	Sample ID	PID (ppm)	DUP / TRIP	Material Type	USCS Symbol	Graphic Log	Material Description	Moisture	Observations / Comments
Excavation		0.01	TP10 / 0.2m	0.0	Dup3 Trip3	Fill			**FILL** - Topsoil.	Damp	CH_4 = 0.0, CO_2 = 0.0 Landfill Cap.
		0.30							**FILL** - Clayey Silty Gravelly Sand, moderate yellowish brown (10YR 5/4), 10% clay, 10% silt, 60% sand, 20% gravel, loose.	Damp	CH_4 = 0.0, CO_2 = 0.0 Landfill Cap.
		0.5	TP10 / 0.5m	0.0					**FILL** - Sandy Silty Clay, dark yellowish orange (10YR 6/6), 80% clay, 10% silt, 10% sand, firm.		
		0.80							**FILL** - Landfill waste. Plastic, wood, glass, loose.	Damp	CH_4 = 0.0, CO_2 = 0.0
		1.0	TP10 / 1.0m	0.3							
		1.5									
		2.0									
		2.30							**FILL** - Landfill waste. Plastic, wood, glass, loose.	Wet	CH_4 = 0.0, CO_2 = 0.0
		2.5	TP10 / 2.5m	0.4							
		3.0									
		3.5									
		4.00	TP10 / 4.0m	0.0		Natural	CL		**Sandy Silty CLAY** - dark yellowish orange (10YR 6/6), 80% clay, 10% silt, 10% sand, firm.	Wet	CH_4 = 0.0, CO_2 = 0.0
		4.5									
		5.00							**End of Hole at 5.00 m**		

Hydrocarbon Odour
H High
M Moderate
L Low
Z Zero

Sample Type
D Disturbed
U Undisturbed

Additional Comments

Log Drawn By:	Laurie White	Logged By:	**Grant Russell**	Date:	**27/10/2011**
Contact:	laurie.white@reumad.com.au	Checked By:	**Ben Pearce**	Date:	**25/11/2011**

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Hole ID.	**TP11**
Project Number:	**1101046**
Hole Depth:	**4.00 m**
Sheet:	**1 of 1**

Project Name:	**Milperra**	Date Started:	**27/10/2011**
Location / Site:	**479 Henry Lawson Drive, Milperra NSW**	Date Completed:	**27/10/2011**
Client:	**Flower Power Pty Ltd**	Level:	**----------**
Drilling Company:		Easting:	**----------**
Drill Method:	**Excavation**	Northing:	**----------**

Method	Water Level	Depth (m)	Sample ID	PID (ppm)	Material Type	USCS Symbol	Graphic Log	Material Description	Moisture	Observations / Comments
Excavation		0.01	TP11 / 0.2m	---	Fill			**FILL** - Topsoil.	Damp	CH_4 = 0.0, CO_2 = 0.0 Landfill Cap.
		0.30						**FILL** - Clayey Silty Sand, moderate yellowish brown (10YR 5/4), 10% clay, 10% silt, 80% sand, loose.	Damp	Landfill Cap.
		0.5	TP11 / 0.5m	---				**FILL** - Silty Clay Sand, moderate yellowish brown (10YR 5/4), 40% clay, 20% silt, 40% sand, medium dense.	Damp	CH_4 = 0.8, CO_2 = 0.8, O_2 = 20.8
		0.60						**FILL** - Landfill waste. Plastic, fibro, plywood, wood, loose.		
		1.0	TP11 / 1.0m	---						
		1.5								
		2.0								
		2.30						**FILL** - Landfill waste. Plastic, glass, metal, wood, 60% sand, loose.	Wet	
		2.5	TP11 / 2.5m	---						
		3.0								
		3.40								
		3.5	TP11 / 3.5m	---	Natural	SP		**Silty SAND** - pale brown (5YR 5/2), 10% silt, 90% sand, loose.	Wet	CH_4 = 0.0, CO_2 = 0.5, O_2 = 21.1
		4.00						**End of Hole at 4.00 m**		
		4.5								
		5.0								

Hydrocarbon Odour
H High
M Moderate
L Low
Z Zero

Sample Type
D Disturbed
U Undisturbed

Additional Comments

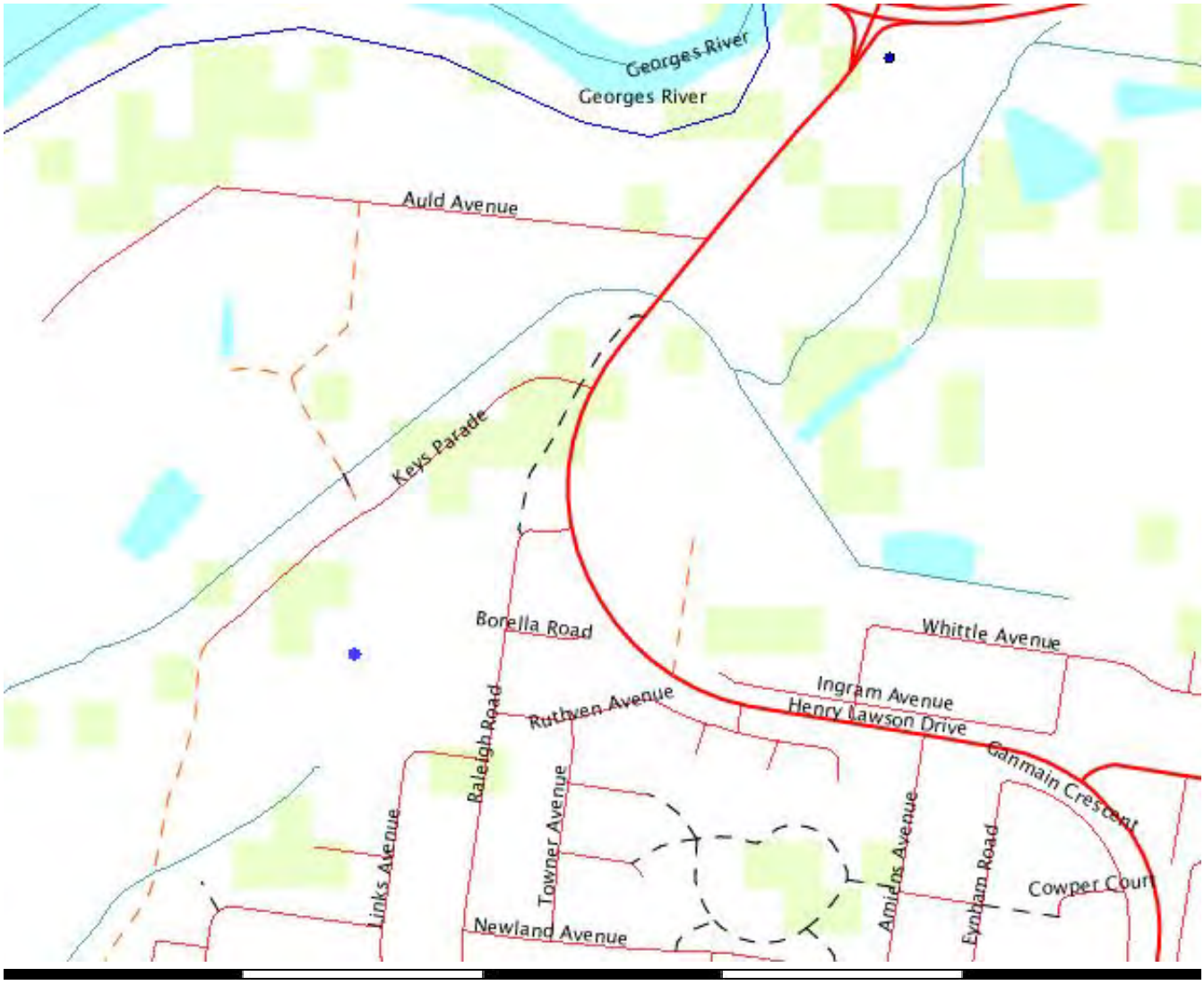
Log Drawn By:	Laurie White	Logged By:	**Grant Russell**	Date:	**27/10/2011**
Contact:	laurie.white@reumad.com.au	Checked By:	**Ben Pearce**	Date:	**25/11/2011**

GL LOG 2 MILPERRA 1101046.GPJ GL.GDT 11/25/11 2:29:21 PM

ATTACHMENT B

Map from the NSW Natural Resource Atlas

Map created with NSW Natural Resource Atlas - http://www.nratlas.nsw.gov.au
Wednesday, July 13, 2011



0 1 Km

Legend

Symbol	Layer	Custodian
	Cities and large towns renderImage: Cannot build image from features	
Cowra	Populated places renderImage: Cannot build image from features	
	Towns	
	Groundwater Bores	
	Catchment Management Authority boundaries	
	Major rivers	

Topographic base map

Groundwater Works Summary

For information on the meaning of fields please see Glossary
Document Generated on Wednesday, July 13, 2011

Print Report

Works Details Site Details Form A Licensed Construction Water Bearing Zones Drillers Log

Work Requested -- GW024357

Works Details (top)

GROUNDWATER NUMBER	GW024357
LIC-NUM	10BL018551
AUTHORISED-PURPOSES	IRRIGATION
INTENDED-PURPOSES	IRRIGATION
WORK-TYPE	Excavation
WORK-STATUS	(Unknown)
CONSTRUCTION-METHOD	> 100 sq.m.
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	
FINAL-DEPTH (metres)	3.00
DRILLED-DEPTH (metres)	3.00
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	JOBS TOWN
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	
SALINITY	
YIELD	

Site Details (top)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	213 - SYDNEY COAST - GEORGES RIVER
AREA-DISTRICT	
CMA-MAP	9030-2S
GRID-ZONE	56/1
SCALE	1:25,000
ELEVATION	
ELEVATION-SOURCE	(Unknown)
NORTHING	6243069.00
EASTING	312769.00
LATITUDE	33 56' 10"

LONGITUDE	150 58' 27"
GS-MAP	0056D4
AMG-ZONE	56
COORD-SOURCE	GD.,ACC.MAP
REMARK	

Form-A (top)

COUNTY	CUMBERLAND
PARISH	BANKSTOWN
PORTION-LOT-DP	L64 (35)

Licensed (top)

COUNTY	CUMBERLAND
PARISH	BANKSTOWN
PORTION-LOT-DP	101 603087

Construction (top)

Negative depths indicate Above Ground Level;H-Hole;P-Pipe;OD-Outside Diameter;
ID-Inside Diameter;C-Cemented;SL-Slot Length;A-Aperture;GS-Grain Size;Q-Quantity

HOLE-NO	PIPE-NO	COMPONENT-CODE	COMPONENT-TYPE	DEPTH-FROM (metres)	DEPTH-TO (metres)	OD (mm)	ID (mm)	INTERVAL	DETAIL
1	1	Casing	Nil	0.00	0.00	0			(Unknown)

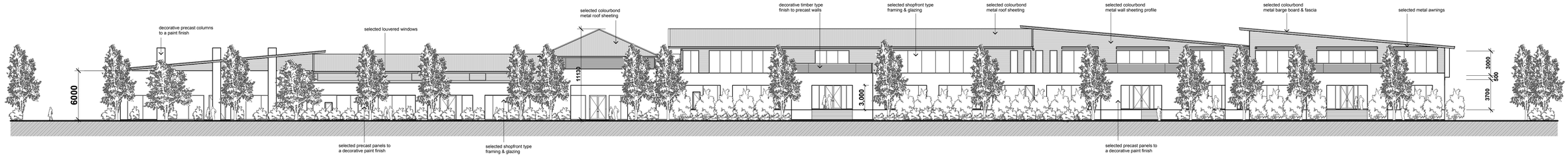
Water Bearing Zones (top)

no details

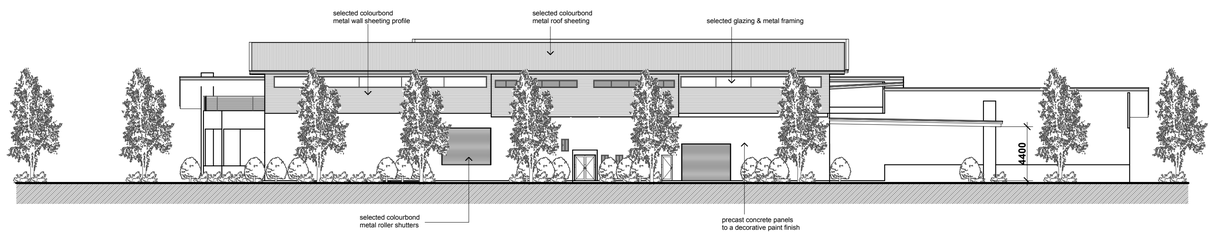
Drillers Log (top)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	3.04	3.04	Loam Sand Water Supply		

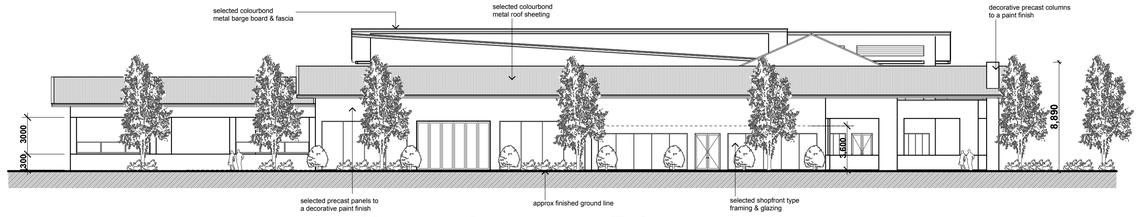
ATTACHMENT C



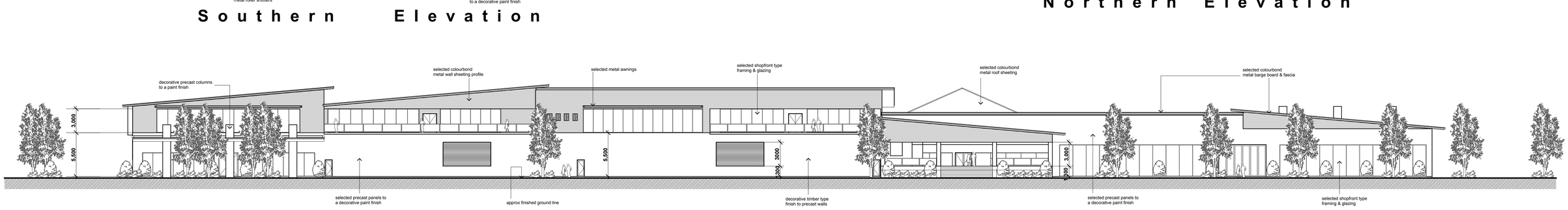
Western Elevation



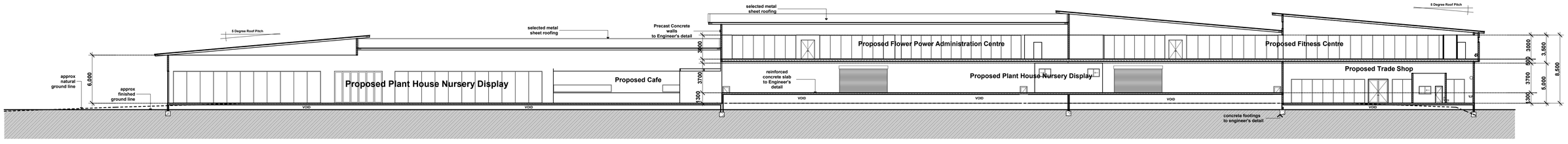
Southern Elevation



Northern Elevation



Eastern Elevation



Section A - A

Plot Date: 25/08/2011

Issue	Amendment	Date
A	DEVELOPMENT APPLICATION	October 2009
B	Revised building facade and uses as per councils letter dated 3rd February 2011	August 2011

ROSS OLIVERI
building designer
ABN: 53 904 543 625
Ross Oliveri
Principal
PO Box 1337 Valley Plaza,
Green Valley NSW 2168
Phone: 02 9825 0018
Fax: 02 9825 8826
Email: rossoliveri@ozemail.com.au

General Notes

All work shall be carried out strictly in accordance with The Building Code Of Australia, relevant S.A.A. codes & to the satisfaction of the regulatory authority.
All levels, dimensions & areas are to be verified by the Builder, prior to the preparation of contracts & the commencement of any building works.
Any discrepancies are to be brought to the attention of Ross Oliveri Building Designer, prior to the commencement of any building works.

Where Engineering Detail Plans are required, such must take preference to this drawing.
Levels shown are approximate unless accompanied by reduced levels or Australian Height Datum Levels.
Figured dimensions to be taken in preference to scaling.
All Boundary clearances must be verified by Survey.
Stormwater to be disharged to Councils requirements before any work commences.
All services to be located & verified by the Builder with relevant Authorities before any work commences.

Proposed
Nursery

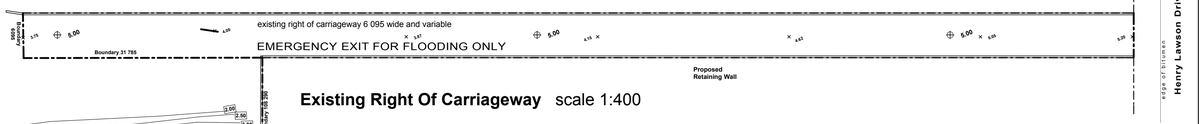
At
No 49, Lot 2 DP 576251 Henry Lawson Drive
MILPERRA

For
FLOWER POWER PTY LTD

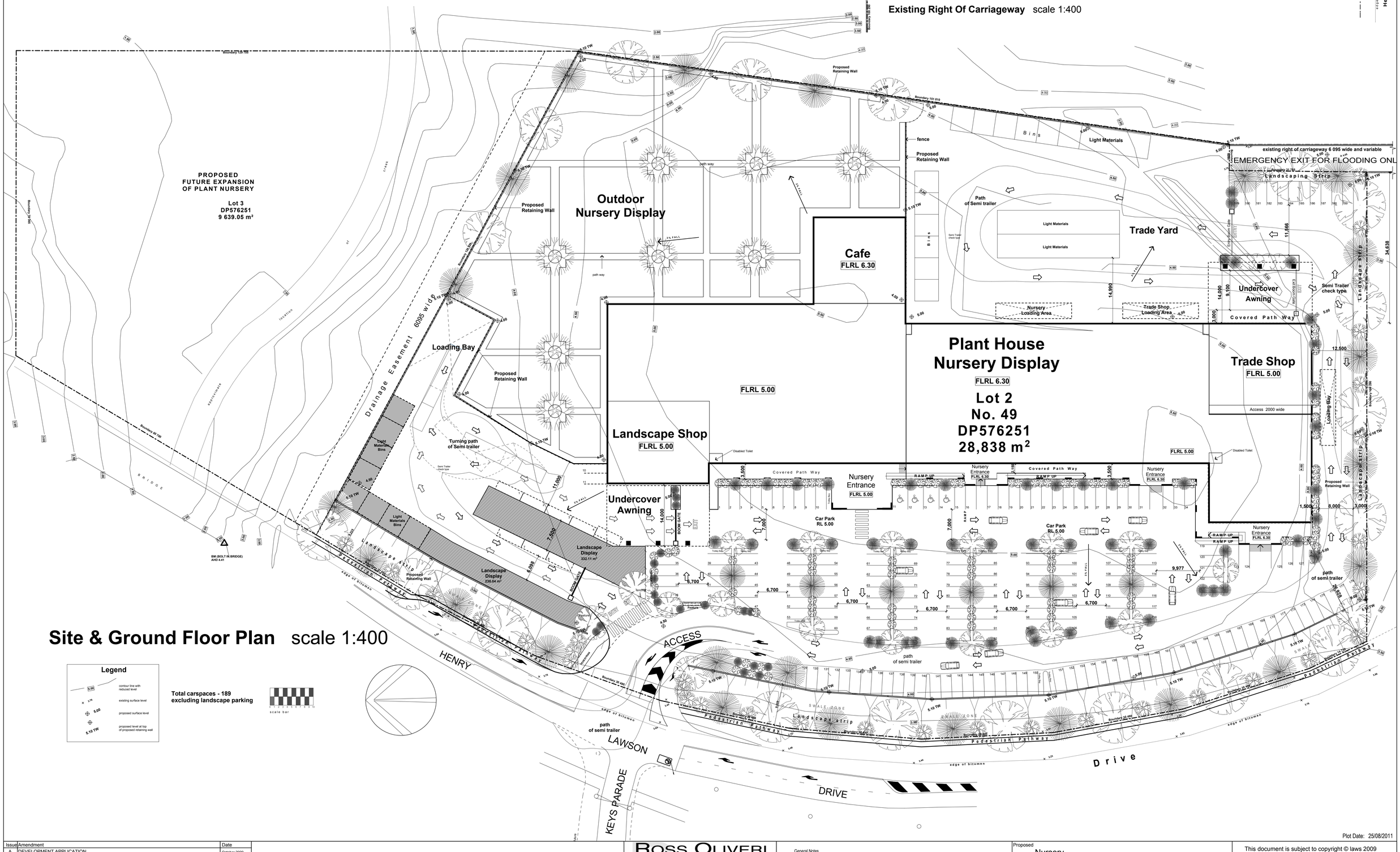
Title 1 Elevation, 2 Elevation, 3 Elevation, 4 Elevation, Section A

Designed	Drawn	Checked	Job No.
RO	RO	RO	B 17-07
Date: October 2009	Scale: 1:250	Sheet: 4 of 4	

Existing Right Of Carriageway scale 1:400



Site & Ground Floor Plan scale 1:400



Total carspaces - 189
excluding landscape parking

scale bar

Legend

5.00	contour line with reduced level
× 3.79	existing surface level
5.00	proposed surface level
5.10 TW	proposed level at top of proposed retaining wall

Plot Date: 25/08/2011

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building designer
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Nursery

At
No 49, Lot 2 DP 576251 Henry Lawson Drive
MILPERRA

For
FLOWER POWER PTY LTD

Title Site Plan

Designed	Drawn	Checked	Job No.
RO	RO	RO	B 17-07
Date: October 2009	Scale: 1:400	Sheet: 1 of 4	

GEO_LOGIX PTY LTD
ABN 86 116 892 936

Building Q2, Level 3
Suite 2309, 4 Daydream Street
Warriewood NSW 2102

Phone 02 9979 1722
Fax 02 9979 1222

Email info@geo-logix.com.au
Web www.geo-logix.com.au