ENVIRONMENTAL INVESTIGATION SERVICES

REPORT

TO

B & M LOPREIATO

ON

STAGE 1 PRELIMINARY ENVIRONMENTAL SITE ASSESSMENT

FOR

PROPOSED COMMERCIAL/RETAIL DEVELOPMENT

AT

2316-2320 SILVERDALE ROAD, SILVERDALE

JULY 2011

REF: E25004KHrpt

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EXECUTIVE SUMMARY

Restifa & Partners Pty Ltd, on behalf of B & M Lopreiato, commissioned Environmental Investigation Services (EIS), a division of Jeffery & Katauskas Pty Ltd (J&K), to undertake a preliminary Stage 1 environmental site assessment for the proposed commercial/retail development at 2316-2320 Silverdale Road, Silverdale. A preliminary salinity assessment was undertaken in conjunction with the preliminary environmental site assessment and the results have been included within this report. The site is identified as Lots 199 and 200 DP 1092447. 'The site' for the purposes of this investigation has excluded the bushland in the east section of 2316 Silverdale Road.

At the time of the investigation the site included three sections:

1. The north-west section was occupied by a service station and small shopping centre;
2. The south-west section was occupied by a house and associated yards; and
3. The east section was occupied by vacant paddocks, dams and a nursery.

Petrolink Pty Ltd and IT Environmental have previously undertaken environmental investigations at the site. the investigations indicated the following:

- TPH contamination is present in soils up to 2m deep within the service station canopy footprint;
- TPH contamination was encountered in groundwater at the service station; and
- The fill in the area immediately south of the shopping centre is free of significant contamination (EIS note no analysis for asbestos was included in the assessment of fill).

The search of historical information has indicated the following:

- The site has been predominantly used for rural and residential purposes since at least 1955;
- The north-west corner of the site has been occupied by a service station since at least 1970;
- Three USTs in the service station were replaced in 2004;
- Five petrol/diesel USTs are located in the service station site and a waste oil UST is located at the rear (east) of the mechanics workshop;
- The north-west section of the site has been occupied by a shopping centre since at least 2000. Several smaller buildings were demolished to make way for the shopping centre;
- A (former) dam, located immediately east of the house in the south-west section of the site, was filled between 1978 and 1994;
- The old house in the south west section was demolished in approximately 2002 and a new house constructed;
- The area immediately south of the shopping centre was filled in approximately 2006; and
- There are no recorded notices listed on the NSW DECCW CLM or POEO register.

Elevated concentrations of PAHs were encountered in the fill material at BH22, located to the east of the house. EIS consider that the PAH contamination is likely to be associated with ash in the fill material. Historical information indicated that this area was formerly occupied by a dam that has been subsequently filled. Further investigation will be required to better assess the nature and extent of this contamination. As the area is grassed and based on the contaminant exposure pathway (inhalation and ingestion), EIS consider that the PAH contamination poses a low risk to human health in its current form.

Elevated concentrations of contaminants were not encountered in the remaining soil samples analysed for the investigation. All results were below the site assessment criteria (SAC). Based on the results, EIS are of the opinion that the potential for significant widespread soil contamination at the site is relatively low.

Petroleum Hydrocarbon (TPH) contamination is known to exist beneath the canopy footprint (IT Environmental 2005). EIS sampled from boreholes drilled around the service station. No TPH contamination was detected in the EIS boreholes, however VOCs were detected in the BH4 (located immediately south of the service station) samples using a photo-ionisation detector. Based on these results, EIS consider the potential for significant migration of contamination through soils to be low. Further assessment should be undertaken in the vicinity of BH4 to better assess the VOC detections in the BH4 samples.

EIS consider the potential for significant, widespread asbestos contamination to be low.

Based on the results of the assessment, the fill material is classified as 'General Solid Waste (non-putrescible)' according to the criteria outlined in Waste Classification Guidelines 2009.

The natural silty clay/silty sandy clay and underlying shale bedrock at the site is considered to be virgin excavated natural material (VENM). This classification is not applicable to natural soil beneath the canopy of the service station as these soils are known to be contaminated with TPH.

The results of the salinity assessment indicate that the majority of fill and natural soils at the site are non-saline and generally non-aggressive to structures. A small number of results indicate slightly saline and mildly to moderately aggressive conditions.

Based on the proposed development details provided, EIS consider that no detailed salinity management plan is necessary for the proposed development. Use of the NSW Government/Landcom Blue Book, *Managing Urban Stormwater – Soil and Construction (2004, 4th Ed*[1]*),* as a guide to prepare soil and water management plans. The approved plan and subsequent works are to be supervised by appropriately qualified experienced personnel.

The Petrolink 2011 assessment of the groundwater in the vicinity of the service station encountered elevated concentrations of TPH in the groundwater in two monitoring wells. As the monitoring wells were not developed prior to samples Petrolink considered that contamination may have accumulated in the wells. Petrolink concluded that GWMW1 and GWMW4 should be '*purged and allowed to re-charge with groundwater and then fresh samples be taken for analysis to determine current conditions as opposed to accumulation*'. EIS consider that all wells at the site should be developed and re-sampled using low-flow equipment. Following receipt of the results, a remedial strategy may be required for impacted groundwater at the site.

Water samples obtained from the two large dams on the site were analysed for the potential contaminants of concern identified at the site. Elevated concentrations of contaminants were not encountered in the water samples analysed for the investigation. All results were below the SAC. Based on the results of the assessment, EIS consider that the potential for significant, contamination of water in the dams is relatively low.

Dewatering of the dams is likely to be required prior to commencement of construction works at the site. Additional testing should be undertaken to confirm suitable disposal option, however, based on available data EIS consider that spraying the water over the site surface is likely to be suitable disposal option.

Based on the scope of work undertaken for this assessment EIS consider that the site can be made suitable for the proposed development provided that the following recommendations are implemented:

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[1] *Managing Urban Stormwater – Soil and Construction*, NSW Government/Landcom, 2004 (4th Ed) (Blue Book 2004)

- Additional assessment of the nature and extent of the PAH contaminated fill material east of the house;
- Additional assessment immediately south of the service station in the vicinity of BH4 for VOCs;
- Additional assessment of groundwater conditions in the vicinity of the service station;
- If groundwater contamination is encountered a remediation action plan (RAP) should be prepared for the proposed development. In the event that the contamination can be managed without remediation, an Environmental Management Plan (EMP) should be prepared for the service station site;
- Prepare an appropriate occupational health and safety plan for the contaminants encountered at this site; and
- Undertake inspections during demolition and excavation works to assess any unexpected conditions or subsurface facilities that may be discovered between investigation locations. This should facilitate appropriate adjustment of the works programme and schedule in relation to the changed site conditions. Inspections should be undertaken by experienced environmental personnel.

EIS note the requirement to obtain groundwater samples from at least three locations around UPSS every 6 months throughout continued operation.

The conclusions presented in this report have been made within the limitations of the scope of works undertaken for the investigation. The conclusions and recommendations should be read in conjunction with the limitations presented in the body of the report.

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1 INTRODUCTION

Restifa & Partners Pty Ltd, on behalf of B & M Lopreiato, commissioned Environmental Investigation Services (EIS), a division of Jeffery & Katauskas Pty Ltd (J&K), to undertake a preliminary Stage 1 environmental site assessment for the proposed commercial/retail development at 2316-2320 Silverdale Road, Silverdale.

The site is identified as Lots 199 and 200 DP 1092447 and at the time of this investigation was occupied by a service station, a shopping centre, a house and a nursery. The site location is shown on Figure 1 and the investigation was confined to the development site boundaries as shown on Figure 2. 'The site' for the purposes of this investigation has excluded the bushland in the east section of 2316 Silverdale Road.

A preliminary salinity assessment was undertaken in conjunction with the preliminary environmental site assessment and the results have been included within this report.

The screening was undertaken generally in accordance with an EIS proposal (Ref: EP5575KH2) of 1 June 2011 and written acceptance from Restifa & Partners Pty Ltd, on behalf of B & M Lopreiato, of 8 June 2011.

1.1 Proposed Development Details

The proposed development includes demolition of the existing shopping centre, excluding the service station, in the north-west section of the site. The proposal includes construction of a larger shopping centre over the majority of the west section of the site.

No development is proposed in the east section of the site, however, this area has been marked as a potential future development site.

1.2 Previous Investigation Reports and Documents

Petrolink Pty Ltd and IT Environmental have previously undertaken environmental investigations at the site. The investigation reports and documents prepared are as follows:

- "*Groundwater Contamination Assessment, Silverdale Road, Silverdale, NSW 2752*", dated May 2011[2];

[2] Referred to as Petrolink 2011 Report

- "Phase 2 Soil Contamination Assessment, 2320 Silverdale Road, Silverdale NSW 2752", dated 11 November 2009[3]; and
- "*Tank Excavation Assessment & Soil Validation Report, Mobil Silverdale Service Station (NN4791), 2320 Silverdale Road, Silverdale, NSW 2752*", Ref: J109942D, dated 29 April 2005[4].

A summary of the assessments is presented in Section 4 of this report. This report should be read in conjunction with the above reports.

1.3 References to the State Body for Environmental Regulation

Over the past few years the environmental regulatory body has undergone a number of name changes, including:

- Environmental Protection Authority (EPA);
- Department of Environment and Conservation (DEC);
- Department of Environment and Climate Change (DECC); and
- Department of Environment, Climate Change and Water (DECCW).

The department is currently known as the Office of Environment and Heritage (OEH).

[3] Referred to as Petrolink 2009 Report

[4] Referred to as IT Environmental 2005 Report

2 OBJECTIVES AND SCOPE OF WORK

2.1 Objectives

The primary objectives of the investigation were to:

- Assess the potential risk of significant widespread contamination of the site;
- Assess the soil contamination conditions at the site in relation to the proposed commercial/retail land use;
- Undertake a waste classification assessment for off-site disposal of excavated soil associated with the proposed development works;
- Prepare a report presenting the results of the assessment generally in accordance with the *NSW EPA (now DECCW) Guidelines for Consultants Reporting on Contaminated Sites (1997[5])* and *State Environmental Planning Policy No.55 – Remediation of Land (1998[6])*; and
- Undertake a preliminary assessment of salinity conditions. The assessment was undertaken generally in accordance with procedures outlined in the DLWC (now DECCW) publication *Site Investigations for Urban Salinity (2002[7]).*

2.2 Scope of Work

The scope of work undertaken to achieve the objective included:

1. Review the salinity map for western Sydney
2. Review of historical aerial photographs;
3. Review of historical land title records;
4. Search of the NSW OEH public register for notices on the site under Section 58 of the *Contaminated Land Management Act* (1997[8]);
5. Search of the NSW OEH public register (POEO) for licences, applications or notices for the site;
6. Search of the NSW OEH public register for sites notified to the NSW OEH under the *Guidelines on the Duty to Report Contamination*[9];
7. Search of WorkCover databases for licenses to store dangerous goods, including underground fuel storage tanks (USTs);
8. Review of Wollondilly Shire Council historical development applications (DA) and building approvals (BA) records for the site;

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[5] *Guidelines for Consultants Reporting on Contaminated Sites,* NSW EPA (now DECCW), 1997 (Reporting Guidelines 1997)

[6] *State Environmental Planning Policy No. 55 – Remediation of Land,* NSW Government, 1998 (SEPP55)

[7] *Site Investigations for Urban Salinity,* Department of Land and Water Conservation (DLWC) [now DECCW], 2002 (DLWC 2002)

[8] *Contaminated Land Management Act,* NSW Government Legislation, 1997 (CLM Act 1997)

[9] *Guidelines on the Duty to Report Contamination*, NSW Government Legislation, 2008 (Duty to Report Contamination 2008)

9. Purchase and review of the Section 149 (2 and 5) Planning Certificate (s149) for the site;
10. Review of regional geology and groundwater conditions, including the location of registered groundwater bores and major underground services in the vicinity of the site;
11. Walkover inspection of the site and immediate surrounds to identify potential contamination sources;
12. Design and implementation of a field sampling program;
13. Laboratory analysis of selected soil and dam water samples; and
14. Preparation of a report presenting the results of the assessment together with recommendations and comments on the suitability of the site for the proposed development.

Field work for this investigation included drilling, soil sampling and dam water sampling was undertaking on 29 and 30 June 2011.

3 SITE INFORMATION

3.1 Site Identification

The site identification details are summarised in the following table:

Site Owner:	Bruno and Maria Lopreiato
Site Address:	2316-2320 Silverdale Road, Silverdale
Lot & Deposited Plan:	Lots199 and 200 DP 1092447
Current Land Use:	Residential/Commercial/Retail
Proposed Land Use:	Commercial/Retail
Local Government Authority:	Wollondilly Shire Council
Current Zoning:	RU2 Rural Landscape
Site Area (development site):	Approximately 46,000m^2
AHD:	Approximately 160m
Geographical Location (MGA):	N: 6247380 E: 279820 (approximately)
Site Locality Plan:	Refer to Figure 1
Borehole Location Plan:	Refer to Figure 2

3.2 Site Description

The site is located to the east of Silverdale Road, which forms an approximate ridgeline. The area east of Silverdale Road falls to the east and north-east at approximately 1-2°. The site generally falls to the east at approximately 1-2°, however the shopping centre area had been levelled. 2320 Silverdale Road included the north-west section of the site. 2316 Silverdale Road included the south-west and east sections of the site.

At the time of the investigation the site included three sections:

4. The north-west section was occupied by a service station and small shopping centre;
5. The south-west section was occupied by a house and associated yards; and
6. The east section was occupied by vacant paddocks, dams and a nursery.

A service station was located in the north-west corner of the site and included a small shop and a mechanics workshop immediately north of the shop. A canopy extended west from the shop over four bowser stations. The canopy partially covered a concrete apron that extended to the west boundary of the site. Based on fill/dip points in the pavement up to approximately five underground storage tanks (USTs) were located in the concrete apron area, immediately north of the canopy. One above ground storage tank (AST) was located on the north boundary of the service station

and was used for storage of LPG. A small parking area and grassed area was located east of the mechanics workshop (rear of service station) and included a small chicken coup. A backhoe and several cars were parked in this area.

Part of the shopping centre was located east of and adjoined the service station shop and included a coffee shop, dvd rental shop and public bathroom. A concrete paved car park was located to the south of the service station building and extended to a shopping centre building. The building housed retail premises on the ground floor including a bakery, supermarket and real estate office. The first floor housed commercial office space. The car park area extended south along the west site boundary to an unpaved parking area. The shopping centre and car park area appeared to have been filled to create a level platform. The area was retained along the east side by a concrete wall approximately 1-2m high. Septic tanks were located at the south-east corner of the shopping centre. A vacant and grassed area was located immediately south of the shopping centre and east of the unpaved parking area. The grassed area included fill mounds at the east end and appeared to have been filled to create a level platform. Batter slopes retained the grassed area on the south and east sides and were up to approximately 2.5m high. EIS understand a soak away pit, filled with gravel and boulders, was located in the north section of the grassed area and was used to dispose of waste water from the adjacent hair dressers.

A single storey brick house was located in the south-west section of the site and was surrounded by grassed yards with scattered trees. Two septic tanks were located at the rear (east) of the house. A corrugated iron shed was located to the north-west of the house.

Vacant paddocks were located to the east of the shopping centre and house. Ash was observed in some areas of the paddocks and appeared to be associated with on-ground fires. A dam was located in the south-east section of the paddocks. The area immediately east of the paddocks was being leased by the adjacent nursery to the south and was occupied by rows of plants. Trees were scattered around the boundaries of the paddocks and nursery.

3.2.1 Surrounding Land Use

Rural areas were located to the north and west of the site. The area north was predominantly vacant and grassed and appeared to be used for grazing. The area west, beyond Silverdale Road, included rural/residential premises. EIS noted that signage indicated that a large parcel of land on the west side of Silverdale Road had been approved for commercial/industrial development. A nursery was located to the south of the site and included greenhouses and some very large dams. Bushland was

located to the east of the site and included a smaller dam located adjacent to the south-east corner of the site. The dam was located within the boundaries of 2316 Silverdale Road.

3.2.2 Underground Services

The 'Dial Before You Dig' (DBYD) plans and the electronic scan indicated that services at the site were generally limited to the shopping centre area. The predominant underground services included Telstra and water. Septic tanks were also associated with the shopping centre and house.

3.3 Interviews with Site Personnel

The site owner and operator, Mr Bruno Lopreiato, indicated the following about the site:

- The grassed area had been filled with 'clean' material that has been subsequently sampled and tested for contamination. No contamination was encountered; and
- A section of the filled area was excavated and replaced with gravel and boulders to enable disposal of waste water from the adjacent hairdressers.

3.4 Regional Geology

The geological map of Penrith (1991[10]) indicates the site to be underlain by Ashfield Shale of the Wianamatta Group, which typically consists of dark grey to black claystone-siltstone with fine sandstone-siltstone laminate. Smaller areas of Bringelly Shale of the Wianamatta Group (which typically consists of shale, carbonaceous claystone, claystone, laminite, fine to medium grained lithic sandstone, rare coal and tuff) and Minchinbury Sandstone (which typically consists of fine to medium grained quartz-lithic sandstone).

3.5 Hydrogeology

NSW Office of Water[11] records were researched for the investigation and indicated that thirteen registered groundwater bores lie within 1km of the site. The groundwater works summaries and a map indicating the location of the bores in relation to the site are attached in Appendix C. The details are summarised in the following table:

[10] *1:100,000 Geological Map of Penrith (Series 9030),* Department of Mineral Resources (1991)

[11] http://www.waterinfo.nsw.gov.au/gw/, visited on 26 July 2011

Ref No	Approximate Distance from site (m)	Approximate Direction from site	Gradient from site	Depth (m)	Registered Purpose
GW109736-GW109743	In service station	N/A	N/A	6.9-9	Monitoring Bore
GW072304	150	South	Cross	162.5	Domestic
GW108775	400	South	Cross	180	Domestic Stock
GW101239	250	North	Cross	180	Domestic Stock
GW104543	1000	East	Down	42.7	Domestic Stock
GW103835	1000	East	Down	48.8	Domestic Stock

The stratigraphy of the site is expected to consist of residual clayey soils overlying relatively shallow bedrock. Based on these conditions and the results of the groundwater bore search shallow groundwater is not considered to be a significant resource in the immediate area of the site. Deeper groundwater, unlikely to have been impacted by surficial activities, may be a resource in the area.

3.6 General Geological Information and Background on Salinity

Salinity is the accumulation and concentration of salt at or near the ground surface or within surface water bodies. Salt is naturally present in the landscape through deposition of salt from the ocean in coastal areas and through weathering of bedrock that contains salt, accumulated during deposition of original sediments in a prehistoric marine environment. The salts are commonly soluble chlorides, sulphates or carbonates of sodium and magnesium.

Salinity becomes a problem in urban areas when changes in the land use result in changes to the way water moves through the environment. This can result in vegetation die-back, decreases in water quality and damage to urban infrastructure. In Sydney, salinity issues are typically associated with the Wianamatta Group shales and their derived soil landscapes.

The natural vegetation of western Sydney is dominated by large isolated trees with deep root systems that remove subsurface moisture. Slow rates of percolation through the relatively impermeable clay soil and uptake of a large proportion of rainfall by the trees results in limited recharge of the groundwater system by rainfall. The depth to groundwater has developed a natural equilibrium and there is little tendency for salt contained in the groundwater or subsoils to rise to the surface.

Urban development commonly results in changes in the water distribution within the landscape. Removal of deep rooted tree species during development and replacement

with urban infrastructure, houses and industrial developments reduces the mechanism for the removal of subsurface moisture.

The development of urban salinity is commonly associated with changes in the way water is cycled through the environment (rainfall, surface run-off, water infiltration and groundwater system). An increase in the quantity of water reaching the groundwater table as a result of vegetation clearance, irrigation of parklands, leaking water infrastructure and changes in drainage patterns, can cause a relatively rapid rise in the groundwater table. Earthworks that include excavation of natural soil profiles and exposure of more saline subsurface soils or shale bedrock may also result in an increase in salt concentrations at the ground surface. Construction of roads, pipelines and buildings commonly results in removal of topsoil leading to exposure of the subsoils and interception of surficial and shallow subsurface drainage. In addition, over-irrigation of urban gardens, leaking water infrastructure and concentrated drainage patterns can result in increased water movement through the subsoil to the groundwater system leading to a relatively rapid rise in the groundwater table.

A rise in groundwater levels and impediments to subsurface drainage patterns can transport salt formerly stored in the bedrock to the surficial soil profile. This may result in salt encrustation of exposed soils, building foundations, roads, drainage infrastructure and corrosion of metal, concrete and other building materials. Increasing salt concentrations in surficial soils and consequently in surface waters may also result in die-off of the existing vegetation, further reducing the hydrological load on the groundwater system and resulting in further groundwater table rises.

Salinity is generally associated with the Wianamatta Shale Group in Western Sydney and may also be evident in tertiary alluvial sediments located adjacent to drainage lines.

3.7 Soil

The *Soil Landscape Map of Penrith (1990[12])* indicates that the site is located within the Luddenham soil landscape. Luddenham soils are characterised by high erodibility, moderate reactivity and localised areas of highly plastic, impermeable soil.

[12] *1:100,000 Map - Soil Landscapes of the Penrith Sheet 9030,* Soil Conservation Service of NSW [now DECCW], 1990 (Soil Landscapes Map 1990)

3.8 Salinity Hazard Map

The site is located in an area of Western Sydney included in the *Salinity Potential in Western Sydney Map (2002[13])*. The map indicates that the site is located in a region of moderate salinity potential and adjacent to an area of high salinity potential.

The moderate classification is attributed to scattered areas of scalding and indicator vegetation, in areas where concentrations have not been mapped. Saline areas may occur in this zone, which have not been identified or may occur if risk factors change adversely.

[13] *1:100,000 Map – Salinity Potential in Western Sydney*, Department of Infrastructure, Planning and Natural Resources (DIPNR) [now DECCW], 2002 (Salinity Potential Map 2002)

4 SUMMARY OF PREVIOUS INVESTIGATIONS

4.1 Groundwater Contamination Assessment (Petrolink 2011)

Petrolink obtained groundwater samples using disposable bailers from four monitoring wells in the service station site (GWMW1 to GWMW4). The samples were analysed for TRH, BTEX and PAHs. Elevated concentrations of TRH and PAHs were encountered in the samples from GWMW1 and GWMW4, located adjacent to the door of the mechanics workshop and adjacent to the exit driveway in the south-west corner of the service station, respectively. Concentrations encountered in the remaining samples, located adjacent to the service station shop and at the rear of the mechanics workshop, were less than the assessment criteria.

Petrolink noted that GWMW1 was located within the UST pit and was likely to have been impacted by collection of small fuel spills/leaks over time.

Petrolink concluded that GWMW1 and GWMW4 should be '*purged and allowed to re-charge with groundwater and then fresh samples be taken for analysis to determine current conditions as opposed to accumulation*'.

4.2 Phase 2 Soil Contamination Site Assessment (Petrolink 2009)

The assessment included soil sampling at nine locations in the filled area immediately south of the shopping centre and analysis of fifteen soil samples. The samples were analysed for heavy metals, TPH, BTEX, PAHs, Phenols, OC Pesticides, OP pesticides and PCBs. The laboratory results were compared to the criteria for 'standard residential with accessible soils' land use, as the proposed development details were unknown at the time of reporting. Trace concentrations of TPH (C_{10}-C_{36}) were identified in three samples, below the assessment criteria. The concentrations of all contaminants were less than the assessment criteria.

Petrolink concluded that 'the compacted soil is suitable for its current use and does not require remediation'.

EIS consider that analysis for asbestos should have been undertaken as part of this assessment; However, we note that no fibre-cement fragments or sheets were noted as present in the fill.

4.3 Tank Excavation Assessment & Soil Validation Report (IT Environmental 2005)

In 2004 and 2005 IT Environmental undertook removal of three USTs and validation at a former Mobile service station, located at 2320 Silverdale Road, Silverdale. Five USTs were identified on site, however, only three were removed. Two of the USTs (diesel and LRP – lead replacement petrol) appeared to be in good condition on removal. The third UST (ULP) was filled with a cement slurry and was dismantled in the tankpit for transportation.

Hydrocarbon contaminated soil was excavated to the extent practical. IT Environmental noted that impacted soil remained beneath the north-west corner of the canopy as excavation was restricted due to the presence of a canopy pillar. The soil was impacted to a depth of approximately 2m.

A health risk assessment concluded that the site was suitable for continued use as a service station.

EIS note that no groundwater assessment was undertaken as part of the validation. The impact of the remaining soil contamination on groundwater at the site is, therefore, unknown.

5 SITE HISTORY ASSESSMENT

5.1 Aerial Photographs

Aerial photographs of the site taken in 1955, 1961, 1970, 1978, 1986, 1994 and 2005 were obtained from the Department of Lands and were reviewed as part of the assessment of the site history. The information obtained from the photographs are summarised in the following table:

Year	Details
1955	A small building was located in the north-west section of the site in an area surrounded by scattered trees. A small house was located in the south-west section of the site in a similar location to the existing (2011) house. A medium sized dam was located immediately west of the house. A small shed was located in the central section of the south site boundary. The remainder of the site appeared vacant and grassed. A creek appeared to pass by the south-east corner of the site. Silverdale Road appeared narrow and possibly unpaved. A medium sized dam was located south of the house and medium sized dam. Some cultivated land was apparent on the west side of Silverdale Road. Rural areas were located to the north and south of the site which generally consisted of vacant and grassed areas amongst larger areas of bushland. Bushland was located to the east of the site.
1961	Additional buildings were located in the north-west section of the site. A 'drive-through' lane was located immediately north of the buildings and appeared to consist of an entry and exit drive from Silverdale Road. The majority of the north-east section of the site had been cleared of trees. Some small sheds were located to the south and east of the house in the south-west section of the site. The central section of 2316 Silverdale Road appeared overgrown. Additional rural/residential development had been undertaken to the south and west of the site. Both areas included relatively small areas of market gardens. Houses and sheds had been constructed to the south and west.
1970	A small building was located in the north-west corner of the site, immediately west of the drive-through bay that appeared similar to the existing (2011) service station shop. A medium sized dam had been constructed in the south-east section of the site that appeared similar to the existing (2011) dam. A medium sized dam or quarry was located immediately beyond the east site boundary (within the bounds of 2316 Silverdale Road). The dam/quarry was in a similar location to the existing (2011) dam. Additional rural/residential

	development had been undertaken to the west and south of the site. Development of the area to the south was largely restricted to the vicinity of Silverdale Road, whilst the areas to the east remained bushland.
1978	The site appeared similar to the 1970 photograph. The dam/quarry located adjacent to the east site boundary was filled with water. A very large dam was located south of the east section of the site. Significant clearing operations had been undertaken in the east section of the area south of the site. Some rural/residential development had been undertaken to the north of the site, along Silverdale Road.
1986	The site appeared similar to the 1978 photograph, except that the dam adjacent and to the east of the house appeared disused and possibly partly filled. The large dam to the south of the site had been extended. A medium sized dam was located immediately north-east of the large dam. The market garden areas to the west and south of the site appeared vacant and grassed. Some cultivated land or possibly small plant nurseries were located to the south of the site.
1994	The service station shop building had been extended to the north and west that appeared similar to the existing (2011) mechanics workshop and canopy, respectively. Some of the buildings located immediately south of the service station had been demolished and the area was vacant. The dam immediately east of the house had been filled. Some trees had been cleared from the east section of the site. Rows of plants were located on the area south of the site.
2005	The service station shop building had been extended to the east and appeared similar to the existing (2011) coffee shop and dvd rental store. All buildings immediately south of the service station had been demolished. A paved car park extended south from the service station to a large building that appeared similar to the existing (2011) shopping centre. The car park extended south along the west site boundary to an unpaved area. The area immediately south of the shopping centre appeared to have been disturbed. The house and sheds in the south-west section of the site had been demolished and a large house had been constructed that appeared similar to the existing (2011) house. Scattered trees were located in the east section of the site. A large-scale nursery was located to the south of the site that appeared similar to the existing nursery. Some land clearing had been undertaken to the west of the site. Additional rural/residential development had been undertaken to the north of the site.

5.2 Land Title Search

A limited historical land title search was performed on our behalf by Advance Legal Searcher Pty Ltd. Copies of the title records are presented in Appendix C and a summary of the relevant information is provided in the following table:

Lot 199 DP1092447 – 2320 Silverdale Road

Registration Date	Proprietor
2006 – todate	Bruno Lopreiato Maria Lopreiato
(2006 – todate)	*(various commercial leases shown on folio identifier 199/102447)*
(2006 – 2009)	*(various commercial leases shown on historical search Identifier 199/1092447)*
Lot 19 DP 1015250	
2000 - 2006	Bruno Lopreiato Maria Lopreiato
2000 – 2000	Rita Petrous
Lot 9 DP 38123	
1988 – 2000	Rita Petrous
1987 – 1988	Rita Petrous
1985 – 1987	Arthur Frederick Brighton
Lot 9 DP 1123 – Area 20 Acres 0 Roods 32 ¼ Perches – CTVol 8248 Fol 250	
1963 – 1985	Arthur Frederick Brighton, independent means
1961 – 1963	Margaret Carter, widow
1960 – 1961	Margaret Carter, widow
1960 – 1960	Lawrence Leonard Stewart, carpenter
1948 – 1960	Lawrence Leonard Stewart, carpenter
Part of Portion 9 Parish of Warragamba and other lands – Area 340 Acres 1 Rood 15 Perches – Conv Bk 1920 No. 622	
1930 – 1948	John Reginald Hamilton, farmer
That piece or parcel of land, County of Camden, Parish of Mulgoa Forest – Area 997 Acres – Conv Bk 1595 No. 288	
1917 – 1930	William Wentworth Victor Hamilton) Executors of the Estate of Sidney Tozer Peryman) John Subridge Hamilton
1917 – 1917	John Subridge Hamilton
Lot 1 DP 519533	

1988 – 2000	Bruno Lopreiato Maria Lopreiato
(1999 – 2000)	*(various leases shown on historical search identifier 1/519533)*
1986 – 1988	Bruno Lopreiato Maria Lopreiato
1986 – 1986	Bruno Lopreiato Maria Lopreiato
1983 – 1986	Keith Owen Marshall, retired bank officer Anthony Keith Marshall, electrical contractor Layden Anthony Rivett, pharmaceutical salesman
1966 – 1983	Margaret Jessie Jenkins, married woman
Lot 8 DP 1123 – Conv Bk 2147 No. 293	
1950 – 1966	John Henry Platt, plumber
1949 – 1950	Archie William Muir, carpenter
Part of Portion 9 Parish of Warragamba and other lands – Area 340 Acres 1 Rood 15 Perhes – Conv Bk 1920 Fol 622	
1932 – 1949	John Reginald Hamilton, farmer
That piece or parcel of land, County of Camden, Parish of Mulgoa Forest – Area 997 Acres – Conv Bk 1595 No. 288	
1917 – 1932	William Wentworth Victor Hamilton) Executors of the Estate of Sidney Tozer Peryman) John Subridge Hamilton
1917 – 1917	John Subridge Hamilton
Lot 20 DP 1015250	
2000 – 2006	Bruno Lopreiato Maria Lopreiato
Lot 9 DP 38123	
1988 – 2000	Bruno Lopreiato Maria Lopreiato
1987 – 1988	Rita Petrous
1985 – 1987	Arthur Frederick Brighton
Lot 9 DP 1123 – Area 20 Acres 0 Roods 32 ¼ Perches – CTVol 8248 Fol 250	
1963 – 1985	Arthur Frederick Brighton, independent means
1961 – 1963	Margaret Carter, widow
1960 – 1961	Margaret Carter, widow
1960 – 1960	Lawrence Leonard Stewart, carpenter
1948 – 1960	Lawrence Leonard Stewart, carpenter
Part of Portion 9 Parish of Warragamba and other lands – Area 340 Acres 1 Rood 15 Perches – Conv Bk 1920 No. 622	
1930 – 1948	John Reginald Hamilton, farmer

That piece or parcel of land, County of Camden, Parish of Mulgoa Forest – Area 997 Acres – Conv Bk 1595 No. 288	
1917 – 1930	William Wentworth Victor Hamilton) Executors of the Estate of Sidney Tozer Peryman) John Subridge Hamilton
1917 – 1917	John Subridge Hamilton

Lot 200 DP1092447 – 2316 Silverdale Road

Registration Date	Proprietor
2006 – todate	Bruno Lopreiato Maria Lopreiato
Lot 20 DP 1015250	
2000 – 2006	Bruno Lopreiato Maria Lopreiato
Lot 9 DP 38123	
1988 – 2000	Bruno Lopreiato Maria Lopreiato
1987 – 1988	Rita Petrous
1985 – 1987	Arthur Frederick Brighton
Lot 9 DP 1123 – Area 20 Acres 0 Roods 32 ¼ Perches – CTVol 8248 Fol 250	
1963 – 1985	Arthur Frederick Brighton, independent means
1961 – 1963	Margaret Carter, widow
1960 – 1961	Margaret Carter, widow
1960 – 1960	Lawrence Leonard Stewart, carpenter
1948 – 1960	Lawrence Leonard Stewart, carpenter
Part of Portion 9 Parish of Warragamba and other lands – Area 340 Acres 1 Rood 15 Perches – Conv Bk 1920 No. 622	
1930 – 1948	John Reginald Hamilton, farmer
That piece or parcel of land, County of Camden, Parish of Mulgoa Forest – Area 997 Acres – Conv Bk 1595 No. 288	
1917 – 1930	William Wentworth Victor Hamilton) Executors of the Estate of Sidney Tozer Peryman) John Subridge Hamilton
1917 – 1917	John Subridge Hamilton

The land search has not indicated any particular land use that may be considered to have resulted in significant contamination of the soil and groundwater at the site.

EIS note that no reference is made to any lease or purchase by a service station company (in particular Mobil) even though a service station is known to have occupied part of Lot 199.

5.3 Council Records

A search of Development Application (DA) and Building Approval (BA) records held by Wollondilly Shire Council was undertaken by EIS. Copies of the documents are presented in Appendix C. A summary of the relevant information is provided in the following table:

2320 Silverdale Road

DA/BA Number	Date of Approval	Application Details
D1364-00	2000	Solicitors Office
D1397-00	2000	Real estate Office
D810-01	2001	Signage
D1147-01	2001	Operate a swimming pool supplies outlet
D1308-01	2001	Hairdressing and beauty salon
C851-02	2002	Out Building – flagpole
D858-02	2002	Installation of equipment for take-away shop
D417-04	2004	Remove and replace fuel tanks
D722-04	2004	Change of use
D163-06	2006	Commercial car park
D783-06	2006	Land filling operation
D146-07	2007	Fitness studio
D158-07	2007	Alterations to existing take away and bakery shop
AD96-08	2008	Extension of trading hours for fitness studio
	2008	Establishment of a fitness studio
	2011	Shop fit-out for beauty salon

2316 Silverdale Road

DA/BA Number	Date of Approval	Application Details
S166-02	2002	Septic tank – aerated
C786-02	2002	Dwelling
I1408-03	2003	Boundary adjustment

The council records search has not indicated any particular site use or development that may be considered to have resulted in significant contamination of the soil and groundwater at the site, apart from the replacement of USTs on 2320 Silverdale Road in 2004 (which matches the date of the known replacement of USTs in the service station).

The landfilling operation in 2006 is considered likely to have been filling of the grassed area immediately south of the shopping centre.

5.3.1 Section 149 Planning Certificate

The s149 (2 and 5) planning certificate for the site is included in Appendix C. A summary of the information most relevant to the Stage 1 preliminary ESA information is presented below:

- The site is not deemed to be: significantly contaminated; subject to a management order; subject of an approved voluntary management proposal; or subject to an on-going management order under the provisions of CLM Act 1997;
- Council is not aware that a Site Audit Statement (SAS) has been issued for the site; and
- The site is located in a heritage conservation area or draft heritage conservation area, however, no heritage items have been identified at the site.

5.4 WorkCover Database Records

A records search for licenses to store dangerous goods was undertaken on our behalf by WorkCover. The records indicated the existence of five USTs (four petrol and one diesel) located in the concrete apron section of the service station. Four of the USTs were located immediately north of the canopy and one was located beneath the canopy, between the bowsers. The records indicated that USTs have been present at the site since at least 1972.

The records indicated that a waste oil UST was located at the rear (east) of the mechanics workshop.

The records indicated that an LPG AST and cylinders were also located on the service station site.

5.5 NSW OEH Records

A search of the NSW OEH on-line database[14] did not indicate the existence of any notices for the site under section 58 of the CLM Act 1997.

A search of the list[15] of contaminated sites notified to the NSW OEH did not indicate that the site had been notified.

A search of the NSW OEH public register (POEO)[16] did not indicate the existence of any notices, applications and licenses for the site.

[14] http://www.environment.nsw.gov.au/prclmapp/searchregister.aspx, visited on 27 July 2011
[15] http://www.environment.nsw.gov.au/clm/publiclist.htm, visited on 27 July 2011

5.6 Assessment of Historical Information Integrity

The site history assessment has generally been obtained from government records including the NSW land titles office, local government historical archives, historical aerial photographs and NSW WorkCover records. The veracity of the information from these sources is considered to be high, however, given the age of the development, the gap of up to 11 years between aerial photographs and the lack of information available on activities prior to 1950's, a certain degree of information loss is to be expected.

Non verifiable anecdotal information has not been relied upon during assessment of historical site use. Therefore, there is considered to be a high level of integrity associated with information obtained with respect to historical use of the site.

5.7 Summary of Historical Site Use

The search of historical information has indicated the following:

- The site has been predominantly used for rural and residential purposes since at least 1955;
- The north-west corner of the site has been occupied by a service station since at least 1970;
- Three USTs in the service station were replaced in 2004;
- Five petrol/diesel USTs are located in the service station site and a waste oil UST is located at the rear (east) of the mechanics workshop;
- The north-west section of the site has been occupied by a shopping centre since at least 2000. Several smaller buildings were demolished to make way for the shopping centre;
- A (former) dam, located immediately east of the house in the south-west section of the site, was filled between 1978 and 1994;
- The old house in the south west section was demolished in approximately 2002 and a new house constructed;
- The area immediately south of the shopping centre was filled in approximately 2006; and
- There are no recorded notices listed on the NSW DECCW CLM or POEO register.

[16] http://www.environment.nsw.gov.au/prpoeoapp/searchregister.aspx, visited on 27 July 2011

6 POTENTIAL CONTAMINATION SOURCES

Based on the scope of work undertaken for the assessment, the following potential contamination sources or potentially contaminating activities have been identified at the site:

- Potentially contaminated, imported fill material in particular south of the shopping centre and east of the house;
- The USTs located in the north-west section of the site (service station);
- Potential asbestos contamination associated with demolition of the former site buildings/sheds;
- Historical use of the north-west section of site for commercial/industrial purposes; and
- Historical activities such as use of pesticides.

It should be noted that TPH contamination is known to exist in soils to a depth of approximately 2m beneath the awning of the service station based on the results of the IT Environmental 2005 report.

TPH contamination of groundwater was also encountered in the tankpit area north of the service station canopy and south of the canopy, adjacent to the exit driveway. This contamination was attributed to 'collection' of TPH in the monitoring wells.

6.1 Potential Off-Site Contamination

No significant and/or obvious potential off-site contamination sources were identified during the assessment, except possible 'over-spraying' of pesticides on the nursery to the south of the site.

6.2 Site Specific Contaminants of Concern

6.2.1 Site Specific Soil Contaminants of Concern

The assessment has identified a number of potential soil contaminants of concern that may be associated with the potential contamination sources and/or potentially contaminating activities. The potential soil contaminants of concern are listed in the following table along with a description of the potential source/land use associated with each contaminant.

Potential Contaminant	Potential Source and/or Land Use Associated with the Contaminant
Heavy Metals (As, Cd, Cr, Cu, Pb, Hg, Ni, Zn)	• Imported fill soils.
Total Petroleum Hydrocarbons (TPHs)	• Imported fill soils; • Use of part of the service station site for servicing motor vehicles; and • The USTs and associated fuel infrastructure located in the north-west section of the site.
Monocyclic Aromatic Hydrocarbons (BTEX compounds)	• Imported fill soils; and • The USTs and associated fuel infrastructure located in the north-west section of the site.
Volatile Organic Compounds (VOCs)	• Imported fill soils; and • The USTs and associated fuel infrastructure located in the north-west section of the site.
Polycyclic Aromatic Hydrocarbons (PAHs)	• Imported fill soils; • Use of part of the service station site for servicing motor vehicles; and • The USTs and associated fuel infrastructure located in the north-west section of the site.
Organochlorine and Organophosphorus pesticides (OCPs and OPPs)	• Imported fill soils; and • The application of pesticides for pest control associated with the rural and nursery uses of the site.
Polychlorinated Biphenyls (PCBs)	• Imported fill soils.
Asbestos	• Imported fill soils; and • Demolition of the former shed/buildings in the north-west and south-west sections of the site.

6.2.2 Site Specific Groundwater Contaminants of Concern

The potential for groundwater contamination is likely to be partly associated with the presence of soil contaminants at the site. Therefore at this stage, the potential groundwater contaminants of concern have been established based on the more common groundwater contaminants encountered in Sydney (this list may be subject to revision in the event that actual soil contamination is identified at the site). The

potential groundwater contaminants of concern are listed in the following table along with a description of the potential source/land use associated with each contaminant.

Potential Contaminant	Potential Source and/or Land Use Associated with the Contaminant
Heavy Metals (As, Cd, Cr, Cu, Pb, Hg, Ni, Zn)	• Imported fill soils.
Total Petroleum Hydrocarbons (TPHs)	• Imported fill soils; • Use of part of the service station site for servicing motor vehicles; and • The USTs and associated fuel infrastructure located in the north-west section of the site.
Monocyclic Aromatic Hydrocarbons (BTEX compounds)	• Imported fill soils; and • The USTs and associated fuel infrastructure located in the north-west section of the site.
Volatile Organic Compounds (VOCs)	• Imported fill soils; and • The USTs and associated fuel infrastructure located in the north-west section of the site.
Polycyclic Aromatic Hydrocarbons (PAHs)	• Imported fill soils; • Use of part of the service station site for servicing motor vehicles; and • The USTs and associated fuel infrastructure located in the north-west section of the site.

6.3 Potential Receptors

The main potential contamination receptors are considered to include:

- Scotcheys Creek located approximately 500m to the east of the site;
- Site visitors, workers and adjacent property owners, who may come into contact with contaminated soil and/or be exposed to contaminated dust arising from construction activity; and
- Future site occupants.

6.4 Contaminant Laydown and Transport Mechanisms

At this site, mobile contaminants would be expected to move down to the rock surface and migrate laterally down-slope from the source. The movement of contaminants would be expected to be associated with groundwater flow and seepage at the top of the bedrock.

7 ASSESSMENT CRITERIA DEVELOPMENT

7.1 Regulatory Background

In 1997 the NSW Government introduced the CLM Act. This Act has been amended by the *Contaminated Land Management Amendment Act* (2008[17]).

The CLM Act 1997, associated regulations, SEPP55 and NSW OEH guidelines, were designed to provide uniform state-wide control of the management, investigation and remediation of contaminated land.

Prior to granting consent for any proposed rezoning or development, SEPP55 requires the consent authority to:

- Consider whether the land is contaminated;
- Consider whether the site is suitable, or if contaminated, can be made suitable by remediation, for the proposed land use; and
- Be satisfied that remediation works will be undertaken prior to use of the site for the proposed use.

Should the assessment indicate that the site poses a risk to human health or the environment, remediation of the site may be required prior to occupation of the proposed development. SEPP55 requires that the relevant local council be notified of all remediation works, whether or not development consent is required. Where development consent is not required, 30 days written notice of the proposed works must be provided to council. Details of validation of remediation work must also be submitted to Council within one month of completion of remediation works.

The consent authority may request that a site audit be undertaken during, or following the completion of the site assessment process. Under the terms of the CLM Act 1997 the NSW OEH Site Auditor Scheme was developed to provide a system of independent review for assessment reports. An accredited Contaminated Site Auditor is engaged to review reports prepared by suitably qualified consultants to ensure that the investigation has been undertaken in accordance with the guidelines and confirm that the sites are suitable for their intended use.

Section 59(2) of the CLM Act 1997 states that specific notation relating to contaminated land issues must be included on Section149 (s149) planning certificates prepared by Council where the land to which the certificate relates is:

[17] *Contaminated Land Management Amendment Act,* NSW Government Legislation, 2008 (CLM Amendment Act 2008)

- Within an investigation or remediation area;
- Subject to an investigation or remediation order by the OEH;
- The subject of a voluntary investigation or remediation proposal; and/or
- The subject of a site audit statement.

Submission of contaminated site investigation and validation reports to council as part of rezoning or development application submissions may also result in notation of actual or potential site contamination on future s149 certificates prepared for the site.

Section 60 of the CLM Amendment Act 2008 sets out a positive duty on a land owner, or person whose activities have caused contamination, to notify the OEH if they are or become aware that contamination exists on a site that generally poses "*an unacceptable risk to human health or the environment, given the site's current or approved use*". This duty to report is based on trigger values, above which notification is required.

Off-site disposal of fill, contaminated material and excess soil/rock excavated as part of the proposed development works is regulated by the provisions of the *Protection of the Environment Operations Act* (1997[18]) and associated regulations and guidelines including the *NSW DECC Waste Classification Guidelines - Part 1: Classifying Waste* (2009[19]). All materials should be classified in accordance with these guidelines prior to disposal.

Section 143 of the POEO Act 1997 states that if waste is transported to a place that cannot lawfully be used as a waste facility for that waste, then the transporter and owner of the waste are each guilty of an offence. The transporter and owner of the waste have a duty to ensure that the waste is disposed of in an appropriate manner.

7.1.1 Underground Petroleum Storage Systems (UPSS)

In 2008 the NSW Government introduced the *Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation* (2008[20]) under the POEO Act 1997. This regulation is designed to regulate the storage of petroleum in underground storage systems so as to minimise the risk of the discharge of substances that cause significant damage to the environment. The regulation has specific criteria

[18] *Protection of Environment Operations Act,* NSW Government, 1997 (POEO Act 1997)
[19] *Waste Classification Guidelines, Part 1: Classifying Waste,* NSW DECC, 2009 (Waste Classification Guidelines 2009)
[20] *Protection of Environment Operation (Underground Petroleum Storage Systems) Regulation*, NSW Government, 2008 (UPSS Regulation 2008)

that must be met for the: design and modification of new and existing storage systems; and repair and decommissioning of existing systems.

For new and existing storage systems this includes installation of ground water monitoring wells and preparation of environmental management plans. The regulations states that '*A storage system must not be used unless groundwater monitoring wells are installed on the storage site*' and that the wells should be located '*with a view to maximising the likelihood that the wells will intercept contaminated groundwater*'. The regulation makes a distinction between old and new storage systems. The following are defined as 'old storage systems':

- A storage system for which development consent had been obtained under the *Environmental Planning and Assessment Act* (1979[21]) before 1 June 2008; or
- A storage system for which installation had lawfully commenced before 1 June 2008; or
- A storage system that had been commissioned before 1 June 2008.

Installation of groundwater wells and subsequent monitoring does not apply to 'old storage systems' until 1 June 2011. For new storage systems installation of groundwater wells and subsequent monitoring is a requirement as of 1 June 2008.

7.1.2 Preliminary Salinity Assessment Requirements

WSROC in conjunction with the DLWC (now DECCW) have developed a document titled the *Western Sydney Salinity Code of Practice (March 2003 [amended January 2004][22])*, which has been developed as a management tool to assist individual councils to develop policy to address salinity within each local government area. DECCW have also released a series of documents under the Local Government Salinity Initiative providing information on salinity in urban areas. This series includes a document titled *"Site Investigations for Urban Salinity"* (2002).

The aim of the *'Site Investigations for Urban Salinity'* document (Department of Land & Water Conservation, 2002) is to provide a framework for the sustainable development and management of new developments in the western region of Sydney. In relation to salinity management, the development should be designed and constructed such that there is no significant increase in the water table level and no adverse salinity impacts.

[21] *Environmental Planning and Assessment Act,* NSW Government, 1979 (EP&AA 1979)

[22] *Western Sydney Salinity Code of Practice,* WSROC Ltd and DIPNR, 2003 [amended 2004] (amended Salinity Code of Practice 2004)

7.2 Soil Contaminant Threshold Concentrations

The soil investigation levels adopted for this investigation are derived from the NSW DEC document *Guidelines for the NSW Site Auditor Scheme, 2nd Edition* (2006[23]) and the National Environmental Protection Council document *National Environmental Protection (Assessment of Site Contamination) Measure* (1999[24]). The contaminant thresholds listed below are levels at which further investigation and evaluation is required to assess whether the site is considered suitable for the proposed urban land use.

To accommodate the range of human and ecological exposure settings, a number of generic settings are used on which the Health based Investigation Levels (HILs) can be based. Four categories of HILs are adopted for urban site assessments. Contaminant levels for a standard residential site with gardens and accessible soil (Column A) are based on protection of a young child resident at the site. The remaining categories (Columns D to F) present alternative exposure settings where there is reduced access to soil or reduced exposure time. These categories include residential land use with limited soil access, recreational and public open space and commercial/industrial use. Where the proposed land use will include more than one land use category (eg. mixed residential/commercial development) the exposure setting of the most "sensitive" land use is adopted for the site.

Threshold concentrations for petroleum hydrocarbon contaminants including total TPH and BTEX compounds have previously been established in the *NSW EPA Contaminated Sites: Guidelines for Assessing Service Station Sites* (1994[25]) publication and this document is referenced in the Site Auditor Guidelines 2006. Heavy fraction petroleum hydrocarbon aliphatic/aromatic component threshold concentrations have also been introduced in NEPM 1999.

Soil samples for this investigation have been analysed for total recoverable hydrocarbons (TRH) rather than TPH. TRH analysis is undertaken without a preliminary silica gel clean-up of the sample. Consequently the TRH result may include other compounds such as phthalates, humic acids, fatty acids and sterols (if present).

[23] *Guidelines for the NSW Site Auditor Scheme, 2nd ed.,* NSW DEC, 2006 (Site Auditor Guidelines 2006)

[24] *National Environmental Protection (Assessment of Site Contamination) Measure,* National Environment Protection Council (NEPC), 1999 (NEPM 1999)

[25] *Guidelines for Assessing Service Station Sites,* NSW EPA, 1994 (Service Station Guidelines 1994)

7.2.1 Provisional Phyto-toxicity Investigation Levels (PPILs)

The Provisional Phyto-toxicity Investigation Levels (PPILs) are generic values based on phytotoxicity data for plant response to specific contaminants in a sandy loam matrix and are included in the contaminated site assessment where the proposed land use includes gardens or accessible soils. The PPILs are listed in the Site Auditor Guidelines 2006. The PPILs are identical to the Ecological Investigation Levels (EILs) originally specified in NEPM 1999.

7.2.2 Asbestos in Soil

NEPM 1999 does not provide numeric guidelines for the assessment of asbestos in soil. NSW OEH advice (2006) has indicated that consultants should use their 'professional judgement' regarding determination of appropriate investigation and remediation levels for asbestos in soils; however the NSW OEH have not published numerical guidelines for the assessment of asbestos in subsurface soils.

The WorkCover publication *Working with Asbestos Guide* (2008[26]) states that, where buried asbestos is encountered, "A competent occupational hygienist should assess the site to determine:

- If asbestos material is bonded or friable
- The extent of asbestos contamination
- Safe work procedures for the remediation of the site"

"*Any asbestos cement products that have been subjected to weathering, or damaged by hail, fire or water blasting are considered to be friable asbestos and an asbestos removal contractor with a WorkCover license for friable asbestos removal is required for its removal*". Under the *NSW Occupational Health and Safety (OHS) Regulations 2001*[27] and WorkCover requirements all necessary disturbance works associated with friable asbestos containing materials must be conducted by a licensed AS-1 Asbestos Removal Contractor.

7.2.3 Site Assessment Criteria (SAC) for Soil Contaminants

The 'commercial/industrial' (Column F) exposure setting has been adopted for this assessment and the appropriate soil criteria are listed in the following table:

[26] *Working with Asbestos Guide,* NSW WorkCover, 2008 (WorkCover Working with Asbestos Guide 2008)
[27] *Occupational Health and Safety Regulation,* NSW Government, 2001 (NSW OH&S Regulation 2001)

Contaminant	SAC - HILs Column F (mg/kg)	PPILs (mg/kg)
Heavy Metals		
Arsenic (total)	500	20
Cadmium	100	3
Chromium (III)	60%	400
Copper	5000	100
Lead	1500	600
Mercury (inorganic)	75	1
Nickel	3000	60
Zinc	35000	200
Petroleum Hydrocarbons		
TPH (C_6-C_9)	65 [a]	-
TPH (C_{10}-C_{36})	1000 [a]	-
Benzene	1 [a]	-
Toluene	1.4 [a]	-
Ethylbenzene	3.1 [a]	-
Total Xylenes	14 [a]	-
PAHs		
Total PAHs	100	-
Benzo(a)pyrene	5	-
Pesticides (OCPs & OPPs)		
Aldrin + Dieldrin	50	-
Chlordane	250	-
DDT + DDD + DDE	1000	-
Heptachlor	50	-
Total OPPs	0.1[b]	-
Others		
PCBs (Total)	50	-
Asbestos	NDLR [c]	-

Note:

[a] Service Station Guidelines 1994

[b] Due to the absence of locally endorsed guideline criteria, the laboratory practical quantitation limit (PQL) has been adopted.

[c] Not Detected at Limit of Reporting (NDLR)

7.2.4 Waste Classification Assessment Criteria

For the purpose of off-site disposal, the classification of soil into 'General Solid Waste (non-putrescible)', 'Restricted Solid Waste (non-putrescible)' and 'Hazardous Waste

(non-putrescible)' categories is defined by chemical contaminant criteria outlined in the Waste Classification Guidelines 2009. The contaminant criteria are summarised in Table A-2.

7.2.5 Assessment Criteria for Salinity Characteristics

For the preliminary salinity assessment, the laboratory results were compared to assessment criteria presented in several documents. The criteria are generally based on three primary factors: soil structure/erodibility; soil aggressivity; and soil characteristics with respect to plant growth. Generally, within this report, soil structure/erodibility, soil aggressivity and soil characteristics with respect to plant growth have been referred to as 'salinity characteristics'. The assessment criteria used for each analyte is explained in the following sub-sections.

Soil Salinity

The electrical conductivity (EC) of a 1:5 soil:water extract is commonly used as an indicator of soil salinity conditions as the reading is directly related to the electrolyte (salt) concentration of the extract. In order to compare the laboratory data with published salinity classes, the results are converted to equivalent saturated paste (ECe) using texture adjustment values presented in DLWC (2002).

The following table provides a summary of salinity classes and the recommended concrete grade based on soil salinity. The table also includes plant response with reference to salinity:

ECe (dS/m)	Salinity Class	Concrete Grade#	Plant Response^
< 2	Non-saline	N20	Salinity effects mostly negligible
2-4	Slightly saline	N20	Yields of very sensitive crops may be affected
4-8	Moderately saline	N25	Yield of many crops affected
8-16	Very saline	N32	Only tolerant crops yield satisfactorily
> 16	Highly saline	≥N40	Only a few very tolerant crops yield satisfactorily

NOTE:
^ Plant Response to Salinity Class has been adopted from DLWC (2002)
# Concrete Grade for Salinity Class has been adopted from CCAA T56 (2004)

Salinity classes have not yet been developed for assessment of soil conditions in relation to built structures. However, in the absence of endorsed recommendations for buildings in saline environments, reference is made to the Cement and Concrete Aggregates Australia (CCAA) publication *T56: Guide to Residential Slabs and Footings*

in Saline Environments (2005[28]). The guide provides recommendations on the minimum concrete grade/strength required based on the salinity classes encountered.

Soil pH

Soil pH is a measure of the acidity or alkalinity of the soils and values have been assessed as an indicator of soil fertility (with respect to plant growth) and aggressiveness toward built structures.

Interpretation of soil pH with respect to plant growth is undertaken using the ratings published in Bruce and Rayment (1982[29]) presented below:

pH	Rating
<4.5	Extremely acidic
4.5-5.0	Very strongly acidic
5.1-5.5	Strongly acidic
5.6 – 7.3	Optimal plant growth
7.4-7.8	Mildly alkaline
7.9-8.4	Moderately alkaline
8.5-9.0	Strongly alkaline
>9.1	Very strongly alkaline

Soil and rock pH values in Australia are compared with *AS2159-2009[30]* values to provide an exposure classification. The exposure classifications with respect to concrete and steel are summarised below for low permeability soils (ie silts, clays and for all soils above the groundwater table).

Concrete Foundations[#]	
pH	**Classification**
>5	Non-aggressive
4.5-5	Mild
4.0-4.5	Moderate
<4.0	Severe

Steel Structures	
pH	**Classification**
>4	Non-aggressive
3-4	Mild
<3	Moderate

[#] Where there is running water the rating should be moved up at least one level due to the increased risk of erosion

Soil Cation Exchange Capacity (CEC)

The ability of soils to attract, retain and exchange cations (positively charged ions) is estimated by the calculated CEC value. CEC represents the major controlling factor in

[28] *T56: Guide to Residential Slabs and Footings in Saline Environments,* CCAA, 2005 (CCAA 2005)

[29] *Analytical Methods and Interpretations used by the Agricultural Chemistry Branch for Soil and Land Use Surveys,* Bruce, R.C. and Rayment, G.E., 1982 (Bruce and Rayment 1982)

[30] *Piling – Design and Installation,* Standards Australia, 2009 (AS2159-2009)

stability of clay soil structure, nutrient availability for plant growth, soil pH and the reaction of the soil to chemical applications (fertilisers, conditioners etc).

High CEC soils have a greater capacity to retain nutrients, however, deficient soils require greater applications of nutrients to correct imbalances. Low CEC soils have a reduced capacity to retain nutrients and may result in leaching of nutrients from the soil in the event of excess nutrient applications.

Metson (1961[31]) developed a set of ratings for effective CEC and the most abundant cations and these are summarised below (values are in meq/100g):

Rating	eCEC	Exch Na	Exch K	Exch Ca	Exch Mg
Very low	<6	0-0.1	0-0.2	0-2	0-0.3
Low	6-12	0.1-0.3	0.2-0.3	2-5	0.3-1
Moderate	12-25	0.3-0.7	0.3-0.7	5-10	1-3
High	25-40	0.7-2	0.7-2	10-20	3-8
Very high	>40	>2	>2	>20	>8

Exchangeable cation status in soils should be assessed not only in terms of the amounts of the particular cations present, but also their relative abundance in comparison with cation exchange capacity as well as other cations.

Exchangeable Sodium Percentage (ESP%) or Sodicity

Exchangeable sodium is an important soil stability and salinity parameter. Excessive exchangeable sodium leads to unstable soils, increased runoff, potential salinity, dispersivity and water logging problems.

Normally the sodium content is expressed as a percentage of the CEC as other cations counteract the negative effects of sodium (known as ESP% and termed sodicity). The effect of the exchangeable sodium (Exchangeable sodium percentage, ESP) varies with other soil factors such as the type of clay, the relative quantity of magnesium and the quantity of organic matter.

Sodicity of soils relates to the ability of water to move through a soil. Sodic soils are typically hard when dry, slow to wet up and boggy or soft when wet. Sodic soils are susceptible to:

- Very severe surface crusting
- Very low infiltration and hydraulic conductivity

[31] *Methods of Chemical Analysis for Soil Survey Samples,* Metson, A.J, 1961 (Metson 1961)

- Very hard, dense subsoils
- Severe gully and tunnel erosion
- Restricted root growth and shallow rooting depths for plants.

When wet, sodic soils lose their structure and disperse into small particles, which then clog the pores within the soil. This can create an impermeable layer that can severely impede water movement. Sodic soils (excessive exchangeable sodium) can lead to unstable soils, increased runoff, increased susceptibility of soils to salinity, increased dispersivity and water logging problems.

Normally the sodium content is expressed as a percentage of the CEC as other cations counteract the negative effects of sodium (known as ESP% and termed sodicity). The effect of the exchangeable sodium (Exchangeable sodium percentage, ESP) varies with other soil factors such as the type of clay, the relative quantity of magnesium and the quantity of organic matter. Typical classification (Charman & Murphy (2000[32]) of soils may be as follows:

- ESP <5% - Non-Sodic
- ESP 5-15% - Sodic
- ESP >15% - Highly Sodic

Ratio of Exchangeable Calcium to Magnesium

To maintain soil structure there should be a ratio of around 4:1 to 6:1 calcium to magnesium for a balanced soil (Eckert 1987[33]). At ratios of less than 4:1 calcium is considered to be deficient, whilst at ratios of greater than 6:1 are considered to be magnesium deficient.

Based on the analysis results, the soils are generally calcium deficient. For calcium deficient soils the use of lime and gypsum to stabilise the soils will add calcium and improve the ratio which will also result in improved soil structure for both engineering and fertility purposes.

Durability Of Concrete Piles

The Australian Standard AS2159-2009 exposure classification for concrete piles in soil is reproduced in the following table:

[32] *Soils: Their Management and Properties,* Charman, P.E.V and Murphy, B.W (eds), 2000 (Charman and Murphy 2000)

[33] *Soil Test Interpretation: Basic Cation Saturation Ratios and Sufficiency Levels*, Eckert, D.J, 1987 (Eckert 1987)

Exposure Conditions				Exposure Classification	
Sulphate (expressed as SO_4)		pH	Chlorides in Groundwater (ppm)	Soil Conditions A†	Soil Conditions B‡
In Soil (ppm)	In Groundwater (ppm)				
<5,000	<1,000	>5.5	<6,000	Mild	Non-aggressive
5,000-10,000	1,000-3,000	4.5-5.5	6,000-12,000	Moderate	Mild
10,000-20,000	3,000-10,000	4-4.5	12,000-30,000	Severe	Moderate
>20,000	>10,000	<4	>30,000	Very severe	Severe
† Soil condition A –High permeability soils (eg sands and gravels) which are in groundwater ‡ Soil condition B – low permeability soils (eg silts and clays) or all soils above groundwater					

Any concrete exposed to aggressive conditions (e.g. piles) should have a characteristic concrete strength and reinforcement cover as recommended in Table 6.4.3 of the AS2159-:2009.

Durability Of Steel Piles

The AS2159-2009 exposure classification for steel piles in soil is reproduced in the following table:

Exposure Conditions				Exposure Classifications	
pH	Chlorides		Resistivity (ohm.cm)	Soil Conditions A†	Soil Conditions B‡
	In Soil (ppm)	In Groundwater (ppm)			
>5	<5,000	<1,000	>5,000	Non-aggressive	Non-aggressive
4-5	5,000-20,000	1,000-10,000	2,000-5,000	Mild	Non-aggressive
3-4	20,000-50,000	10,000-20,000	1,000-2,000	Moderate	Mild
<3	>50,000	>20,000	<1,000	Severe	Moderate
† Soil condition A –High permeability soils (eg sands and gravels) which are in groundwater ‡ Soil condition B – low permeability soils (eg silts and clays) or all soils above groundwater					

Any steel exposed to aggressive conditions (e.g. piles) should have a characteristic corrosion allowances as recommended in Table 6.5.3 of the AS2159-2009.

7.3 Evaluation of Soil Analysis Data and Contaminant Threshold Concentrations

Assessment of the soil analytical data using the soil contaminant threshold concentrations has been undertaken in accordance with the methodology outlined in the NEPM 1999 Schedule 7(a).

The following criteria have been adopted for assessment of the analytical data:

- For a site to be considered suitable for the proposed land use each individual contaminant concentration should be less than the SAC; and
- Where the concentration of each contaminant is less than the SAC in all samples, the suitability of the site for the proposed use may be assessed based solely on individual analytical results.

Where contamination results exceed the SAC, a method of remediating the site is to physically and selectively remove the contamination hotspots from the site. This process should be continued until statistical analysis of the data meets the SAC. Validation of the remediated site is generally required to demonstrate that the site is suitable for the proposed land use.

7.4 Dam Water Contaminant Trigger Values

For the purposes of this assessment we have assumed that the dam water is a collection of water that will eventually infiltrate into the groundwater.

Groundwater resources in NSW are managed and regulated by environmental and planning legislation which include the POEO Act 1997, EP&AA 1979 and the *Water Management Act* (2000[34]).

In 2000, Australian and New Zealand Environment Conservation Council (ANZECC) released the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (2000[35]) which superseded the previous guideline documents.

The ANZECC 2000 guidelines include a complete framework for the development of appropriate guidelines for aquifer assessment. The above guidelines provide water quality parameters at the point of use including aquatic ecosystems (fresh and marine waters), drinking water, industrial and agricultural/irrigation uses.

[34] *Water Management Act*, NSW Government, 2000 (Water Act 2000)

[35] *Australian and New Zealand Guidelines for Fresh and Marine Water Quality,* ANZECC, 2000 (ANZECC 2000)

The National Health and Medical Research Council (NHMRC) released the *Australian Drinking Water Guidelines* (2004[36]). These guidelines are predominantly used to assess drinking water quality and have been referenced in some cases.

The appropriate settings for current and potential uses of groundwater should be identified in establishing applicable groundwater trigger values:

- raw drinking water source;
- agricultural use – stock watering;
- agricultural and domestic use – irrigation;
- protection of aquatic ecosystems – freshwater; and
- protection of aquatic ecosystems – marine.

The presence of elevated contaminant concentrations in groundwater triggers further investigation of aquifer conditions to assess the source(s) of contamination and the lateral and vertical extent of the contamination.

Guidance on the remediation and management of contaminated groundwater is presented in the document *NSW DECCW Guidelines for the Assessment and Management of Groundwater Contamination (2007[37])*.

7.4.1 Petroleum Hydrocarbons in Groundwater

In the absence of locally endorsed guidelines for petroleum hydrocarbon compounds in water, the 'intervention value' concentration for mineral oil specified in the *Circular on Target Values and Intervention Values for Soil Remediation* (2000[38]) has been adopted as the trigger value for TPH (C_{10}-C_{36} fractions only).

It is noted that these guidelines have not been endorsed by NSW OEH and are used only as a preliminary screening tool.

7.4.2 Hardness Modified Trigger Values (HMTVs)

Water hardness can affect the bioavailability of metals/metalloids in fresh water. Consequently, Section 3.4.3.2 of the ANZECC 2000 guidelines includes algorithms to derive hardness modified trigger values (HMTVs) for metals/metalloid concentrations in

[36] *Australian Drinking Water Guidelines*, National Health and Medical Research Council, 2004 (NHMRC 2004)

[37] *Guidelines for the Assessment and Management of Groundwater Contamination,* NSW DECCW, 2007 (Groundwater Contamination Guidelines 2007)

[38] *Circular on Target Values and Intervention Values for Soil Remediation,* Ministry of Housing, Spatial Planning and Environment, 2000 (Dutch Guidelines 2000)

fresh water. The calculations for the HMTVs are included in Appendix E and have been included in the SAC table below.

7.4.3 Site Assessment Criteria (SAC) for Groundwater Contaminants

The fresh groundwater trigger values have been adopted along with other guideline values for this investigation as outlined in the table:

Contaminant	Units	Fresh Water Criteria[1]	Hardness Modified Trigger Values	Drinking Water Criteria[2]	USEPA[3]
Metals					
Arsenic (total)[6]	µg/L	24	-	7	-
Cadmium	µg/L	0.2	0.4	2	-
Chromium (III)	µg/L	3.3[a]	1.9	50	-
Copper	µg/L	1.4	2.8	2000	-
Lead	µg/L	3.4	9.4	10	-
Mercury	µg/L	0.6	-	1	-
Nickel	µg/L	11	21.8	20	-
Zinc	µg/L	8	15.8	3000[d]	-
Petroleum Hydrocarbons					
TPH C_{10}-C_{36}	µg/L	600[b]	-	nsl	-
Benzene	µg/L	950[a]	-	1	-
Toluene	µg/L	180[a]	-	800	-
Ethylbenzene	µg/L	80[a]	-	300	-
o-Xylene	µg/L	350[a]	-	nsl	-
m + p Xylene	µg/L	75[a*]	-	nsl	-
PAHs					
Naphthalene	µg/L	16[a]	-	nsl	0.14
Anthracene	µg/L	0.01[c]	-	nsl	11000
Phenanthrene	µg/L	0.6[c]	-	nsl	-
Fluoranthene	µg/L	1[c]	-	nsl	1500
Benzo(a)pyrene	µg/L	0.1[c]	-	0.01	-
PCBs					
Aroclor 1016	µg/L	nsl	-	nsl	nsl
Aroclor 1221	µg/L	nsl	-	nsl	nsl
Others					
Oil and grease	mg/L	10 [e]	-	-	-
pH	-	6.5 – 8.5[i]	-	6.5 – 8.5[d]	nsl
EC	mS/cm	nsl	-	nsl	nsl

Notes:

[1] 95% Trigger Values for Fresh Water (ANZECC 2000)

[2] Australian Drinking Water Guidelines (NHMRC 2004)

[3] Due to the absence of locally endorsed criteria, the USEPA Region 9 PRGs for Tap water have been adopted

[6] The Arsenic (III) trigger value has been quoted

[a] Low or Moderate Reliability Trigger Values have been quoted (ANZECC 2000)

[b] In the absence of locally endorsed guidelines, the Dutch investigation levels have been quoted

[c] 99% trigger values have been adopted due to the potential for bioaccumulation effects

[d] The aesthetic guideline concentration has been quoted

[e] NSW EPA (DECCW) Guidelines for Assessing Service Station Sites (1994)

[a*] Low or Moderate Reliability Trigger Values (ANZECC 2000) for m-Xylenes have been quoted. We note that m-Xylene guideline value is 75μg/L and the p-Xylene guideline value is 200μg/L. However, these two isomers cannot currently be distinguished analytically

nsl – No set limit

8 ASSESSMENT PLAN

8.1 Soil Sampling Density

The *NSW EPA Contaminated Sites Sampling Design Guidelines* (1995[39]) for contaminated site investigations state that samples should be obtained from a minimum of 53 evenly spaced sampling points for a site of this size (approximately 46,000m^2).

Samples were obtained from 25 sampling locations for this investigation. This density is approximately 47% of the minimum sampling density.

The boreholes were drilled on a systematic sampling plan with a spacing of up to 60m between sampling points. A systematic sampling plan was considered most appropriate for this investigation as:

- no specific potential contaminant sources were identified by the available site history; and
- the distribution of contamination is expected to be associated with imported potentially contaminated fill material and is therefore likely to be random.

The sampling density was higher in the vicinity of the existing service station and shopping centre as EIS understand this is the area to be developed first.

Sampling was not undertaken beneath the existing buildings at the site as access was not possible during the field investigation.

8.2 Dam Water Sampling

Grab water samples were obtained from two dams (D1 and D2) in the east section of the site. D2 is located beyond the east site boundary for the purposes of this assessment but within the lot boundary. The location of the dams is shown on Figure 2.

8.3 Data Quality Objectives (DQOs)

The DQOs for the assessment were developed with reference to the US EPA document *Data Quality Objectives Process for Hazardous Waste Site Investigations* (2000[40]). The document includes seven steps as follows:

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[39] *Contaminated Sites Sampling Design Guidelines,* NSW EPA, 1995 (EPA Sampling Design Guidelines 1995)

[40] *Data Quality Objectives Process for Hazardous Waste Site Investigations,* US EPA, *2000* (US EPA 2000)

1. State the problem
2. Identify the decision
3. Identify inputs into the decision
4. Study Boundaries
5. Develop a Decision Rule
6. Specify Limits on Decision Errors
7. Optimise the Design for Obtaining data

Field investigations are undertaken generally in accordance with EIS sampling protocols outlined in Appendix D.

8.4 Data Quality Indicators (DQIs) and Quality Assurance

The validation, as part of the DQOs, involves the technical review of the data using defined QA Assessment Criteria. The success of the DQIs is based on assessment of the data set as a whole and not on individual acceptance or exceedance within the data set.

Review of QA criteria was based on laboratory data including surrogate recovery, repeat analysis, laboratory control sample (LCS), matrix spikes and method blanks.

Field QA/QC included collection and analysis of the following for the contaminants of concern:

- approximately 10% of field soil samples as intra-laboratory duplicates;
- field blank samples; and
- soil trip spike sample.

Success of field DQIs is based on the following criteria:

- Relative percentage differences (RPDs) were calculated for the intra-laboratory duplicates. The RPD was calculated as the absolute value of the difference between the initial and repeat result divided by the average value, expressed as a percentage. The following acceptance criteria were used to assess the RPD results:
  - For results that were greater than 10 times the Practical Quantitation Limit (PQL) RPDs less than 50% were considered acceptable.
  - For results that were between 5 and 10 times PQL RPDs less than 75% were considered acceptable.
  - For results that were less than 5 times the PQL RPDs less than 100% were considered acceptable.
- Acceptable concentrations in blank samples.

9 INVESTIGATION PROCEDURE

9.1 Soil Sampling Methods

Subsurface investigation was undertaken using a four-wheel-drive (4wd) mounted hydraulically push tube rig. Soil samples were obtained from disposable polyethylene push tube samplers.

Soil and rock samples were obtained at various depths, based on observations made during the field investigation. During sampling, soil at selected depths was split into initial and duplicate samples for QA/QC assessment.

All samples were placed in glass jars with plastic caps and teflon seals with minimal headspace. Samples for asbestos analysis were placed in zip-lock plastic bags. Sampling personnel used disposable nitrile gloves during sampling activities.

Samples for salinity analysis were placed in plastic bags with ties.

During the investigation, soil samples were preserved by immediate storage in an insulated sample container with ice in accordance with AS 4482.1-2005[41] and AS 4482.2-1999[42] as summarised in the following table:

Analyte	Preservation	Storage
Heavy metals	Unpreserved glass jar with Teflon lined lid	Store at <4°, analysis within 28 days (mercury and Cr[VI]) and 180 days (other metals).
VOCs (TPH/BTEX)		Store at <4°, nil headspace, extract within 14 days, analysis within forty days
PAHs, OCP, OPP & PCBs		
Asbestos	Sealed plastic bag	None

The samples were labelled with the job number, sampling location, sampling depth and date. All samples were recorded on the borehole logs presented in Appendix A and on the laboratory chain of custody (COC) record presented in Appendix B.

On completion of the fieldwork, the samples were delivered in the insulated sample container to a NATA registered laboratory for analysis under standard COC procedures. Detailed EIS field sampling protocols are included in Appendix D.

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[41] *Guide to the Investigation and Sampling of sites with Potentially Contaminated Soil,* Standards Australia, 2005 (AS 2005)

[42] *Guide to the Sampling and Investigation of Potentially Contaminated Soil Part2: Volatile Substances,* Standards Australia, 1999 (AS 1999)

9.2 Photoionisation Detector (PID) Screening

A portable PID was used to screen the samples for the presence of volatile organic compounds (VOCs) and to assist with selection of samples for laboratory hydrocarbon (TPH/BTEX) analysis.

The sensitivity of the PID is dependent on the organic compound and varies for different mixtures of hydrocarbons. Some compounds give relatively high readings and some can be undetectable even though present in identical concentrations. The portable PID is best used semi-quantitatively to compare samples contaminated by the same hydrocarbon source.

The PID is calibrated before use by measurement of an isobutylene standard gas. All the PID measurements are quoted as parts per million (ppm) isobutylene equivalents.

PID screening of detectable volatile organic compounds (VOCs) was undertaken on soil samples using the soil sample headspace method. VOC data was obtained from partly filled zip-lock plastic bags following equilibration of the headspace gases. The PID headspace data is presented on the COC documents.

9.3 Dam Water Sampling

Water grab samples were obtained from the dams using new disposable polyethylene bailers.

Duplicate samples were obtained by alternate filling of sample containers. This technique was adopted to minimise disturbance of the samples and loss of volatile contaminants associated with mixing of liquids in secondary containers, etc.

The samples were preserved in accordance with water sampling requirements detailed in NEPM 1999 and placed in an insulated container with ice. During the investigation, groundwater samples were preserved by immediate storage in an insulated sample container with ice in accordance with AS/NZS 5667.1:1998[43] as summarised in the following table:

[43] *Water Quality – Part 1: Sampling, Guidance on the Design of Sampling Programs, Sampling Techniques and the Preservation and Handling of Samples,* Standards Australia, 1998 (AS/NZS 5667.1:1998)

Analyte	Preservation	Storage Period
Heavy metals	45μm Filter, acidify with nitric acid to pH 1-2.	Store at <4°, analysis within 30 days
VOCs (TPH)	Zero headspace, teflon seal	Store at <4°, analysis within 7 days
VOCs (BTEX + Light TPH)	Zero headspace, Teflon seal, acidify with HCl to pH 1-2.	Store at <4°, analysis within 7 days
sVOCs (PAHs)	nil	Store at <4°, analysis within 7 days

On completion of the fieldwork, the samples were delivered in the insulated sample container to a NATA registered laboratory for analysis under standard chain of custody procedures.

9.4 Laboratory Analysis

Laboratory analysis was undertaken by Envirolab Services Pty Ltd (NATA Accreditation No. 2901).

9.4.1 Soil Samples

Soil samples were analysed using the following analytical methods detailed in Schedule B(3) of NEPM (1999[44]):

- Heavy metals – Nitric acid digestion. Analysis by ICP/AES;
- Low level mercury – cold vapour AAS;
- OC and OP pesticides and PCBs – Extracted with dichloromethane/acetone. Analysis by GC/ECD;
- PAHs – Soil extracted with dichloromethane/acetone. Analysis by GC/MS;
- TPH (volatile) – Soil extracted with methanol. Analysis by P&T GC/MS;
- TPH – Soil extracted with dichloromethane/acetone. Analysis by GC/FID;
- BTEX – Soil extracted with methanol. Analysis by P&T GC/MS; and
- Asbestos – Polarizing light microscopy.

Toxicity characteristic leaching procedure (TCLP) leachates were prepared by rotating soil samples in a mild acid solution for 18 hours (NSW EPA WD-3 Method). Leachates were analysed using the analytical procedures outlined above.

[44] *Guideline on Laboratory Analysis of Potentially Contaminated Soils*, Schedule B(3), NEPM, 1999 (Schedule B(3))

For the preliminary salinity assessment, selected soil samples were analysed for salinity characteristics using the following laboratory techniques:

- pH – measured using a 1:5 soil: demineralised water solution;
- Electrical Conductivity – measured using a 1:5 soil: water extraction using a conductivity cell and dedicated meter;
- Cation Exchange Capacity and Exchangeable Cations (Ca, Mg, K and Na) – Saturation with silver-thiourea followed by determination of Na, K, Ca and Mg using flame AAS;
- Chloride – Ion Chromatography; and
- Sulphate – Ion Chromatography.

9.4.2 Groundwater Samples

Groundwater samples were analysed using the following analytical methods endorsed by the NSW DECCW (EPA) (Schedule B(3) does not apply to water samples):

- Heavy metals – Direct injection. Analysis by ICP-AES;
- Low level mercury – Direct injection. Analysis by flow injection AAS;
- OC and OP pesticides and PCBs – GC/ECD;
- PAHs – Triple solvent (dichloromethane) extraction. Analysis by GC/MS;
- TPH (volatile) – P&T. Analysis by GC/MS;
- TPH – Solvent (dichloromethane) extraction. Analysis GC/FID;
- BTEX – Direct P&T. Analysis by GC/MS;
- Oil & Grease – Gravimetric. Hexane Extractable;
- pH – measured using pH meter and electrode in accordance with APHA 20th ED, 4500-H+); and
- Electrical Conductivity – measured using a conductivity cell and dedicated meter in accordance with APHA2510 20th ED and Rayment & Higginson.

10 RESULTS OF INVESTIGATION

10.1 Subsurface Conditions

Borehole locations are shown on Figure 2. For details of the subsurface soil profile reference should be made to the borehole logs in Appendix A. A summary of the subsurface conditions encountered in the boreholes is presented below:

Pavement

Concrete, approximately 120mm to 190mm thick, was encountered at the surface in BH1 and BH3 to BH9 inclusive.

Fill

Silty clay fill material was typically encountered at the surface or beneath the pavement in boreholes drilled in the vicinity of the existing shopping centre (BH1 to BH11. A shallow sandy gravel profile was encountered beneath the pavement in BH8 (road base) and a shallow silty sand profile was encountered at the surface in BH10. The fill in this area extended to depths of approximately 0.4m to 1.7m and was typically shallowest (approximately 0.5m) in the west section.

The fill across the remainder of the site typically consisted of silty sandy clay and silty sand at the surface which was typically less than 0.5m deep. Deeper silty clay fill was encountered in BH15 and BH16 (drilled in the filled area south of the shopping centre) that extended to depths of approximately 1.2m to 2m. Deeper silty sand fill was encountered to approximately 1m in BH25.

The fill material contained inclusions of igneous, ironstone, quartz and shale gravel, ash, roots and root fibres.

Natural Soils

Silty clay or silty sandy clay was encountered beneath the fill in all boreholes and extended to the termination of all boreholes, except BH1, BH2, BH4, BH5 and BH15, at a maximum depth of approximately 3m. The natural soil was typically grey or brown with red or orange mottling and traces of ironstone gravel, roots and root fibres.

Bedrock

Shale was encountered beneath the natural soil in BH1, BH2, BH4, BH5 and BH15 and extended to the termination of these boreholes at a maximum depth

of approximately 2.6m. Push tube refusal was encountered at the base of several other boreholes on inferred shale bedrock.

Groundwater

Immediate groundwater seepage was encountered at depths of approximately 0.35m in BH13 and 1.5m in BH25. The seepage in BH13 was approximately at the fill-natural soil interface. The seepage in BH25 was approximately 50mm off the base of the borehole.

10.2 Laboratory Results

The laboratory reports are presented in Appendix B. The results have been assessed against the SAC adopted for this investigation.

10.2.1 Environmental Site Assessment - Soil Samples

The soil laboratory results are presented in Table B. The results of the analyses are summarised below.

Heavy Metals

Twenty nine fill and four natural soil samples were analysed for heavy metals. The results of the analyses were below the SAC.

Waste Classification:

The results of all analyses were less than the CT1 and SCC1 criteria outlined in the Waste Classification Guidelines 2009.

Petroleum Hydrocarbons (TPH) and Monocyclic Aromatic Hydrocarbons (BTEX)

PID soil sample headspace readings were generally zero ppm equivalent isobutylene. These results indicate a lack of PID detectable volatile organic contaminants (VOCs). The PID readings for the fill and natural samples from BH4 were 250ppm and 2.1ppm, respectively, and the reading from the BH23 (0.6-0.9m) was 76ppm. These results indicate the potential presence of PID detectable VOCs in these samples.

Eleven fill and nine natural soil samples were analysed for TPH and BTEX compounds. The results of the analyses were below the SAC.

Waste Classification:

The results of all analyses were less than the relevant CT1 and SCC1 criteria outlined in the Waste Classification Guidelines 2009.

Polycyclic Aromatic Hydrocarbons (PAHs)

Twenty nine fill and four natural soil samples were analysed for a range of PAHs including Benzo(a)pyrene. The total PAH and benzo(a)pyrene results of 103.3mg/kg and 9.5mg/kg, respectively, in the BH22 (0-0.35m) sample were above the SAC of 100mg/kg and 5mg/kg, respectively. The remaining results of the analyses were less than the SAC.

Waste Classification:

The total benzo(a)pyrene result in the BH22 (0-0.35m) sample exceeded the CT1 criterion of 0.8mg/kg. The results of the remaining analyses were less than the relevant CT1 criterion and all results were less than the SCC1 criteria outlined in the Waste Classification Guidelines 2009.

A TCLP leachate was prepared from the BH22 (0-0.35m) sample and analysed for PAHs. The benzo(a)pyrene result was less than the TCLP1 criterion.

Organochlorine (OCPs) and Organophosphorous (OPPs) Pesticides

Eighteen fill and three natural soil samples were analysed for a range of OCPs and OPPs. The results of the analyses were below the laboratory PQL and less than the SAC.

Waste Classification:

The results of all analyses were less than the SCC1 criteria outlined in the Waste Classification Guidelines 2009.

Polychlorinated Biphenyls (PCBs)

Eighteen fill and three natural soil samples were analysed for a range of PCBs. The results of the analyses were below the laboratory PQL and less than the SAC.

Waste Classification:

The results of all analyses were less than the SCC1 criteria outlined in the Waste Classification Guidelines 2009.

Asbestos

Twenty one fill soil samples were screened for the presence of asbestos fibres. The results of the analyses indicated that asbestos fibres were not encountered within the samples and no respirable fibres were detected.

10.2.2 Preliminary Salinity Assessment

The laboratory analysis results for the soil samples are summarised in Table G to Table K inclusive and analysis reports are presented in Appendix B. The results of the analyses are summarised below. For comparison of the results, reference should be made to the "Site Assessment Criteria for Salinity Characteristics" section earlier in this report.

Electrical Conductivity (EC) and Extract Electrical Conductivity (ECe)

Five fill samples and fifteen selected natural soil samples were analysed for electrical conductivity (EC). The EC results for the samples ranged from 0.030dS/m in the BH21 (0.5-1m) sample to 0.32dS/m in the BH15 (0.6-0.8m) sample.

The EC values were converted to extract electrical conductivity (ECe) values by multiplying the EC results by the soil texture conversion factors presented in DLWC (2002). The ECe results for the samples ranged from 0dS/m in several samples to 3dS/m in the BH15 (0.6-0.8m) fill sample. The majority of sample results were less than 2dS/m and were considered to be non-saline. Only the ECe result of 3dS/m in the BH15 (0.6-0.8m) sample was greater than 2dS/m and was within the slightly saline range of 2ds/m to 4dS/m.

pH

Five fill samples and fifteen selected natural soil samples were analysed for pH. The results of the analysis ranged from pH 4.1 in the BH4 (1.2-1.5m) and BH13 (1.2-1.5m) samples to pH 8.6 in the BH15 (0.6-0.8m) sample. The majority of results were between 4.5 and 5.5 and only two results were less than pH 4.5. No distinct depth distribution pattern was observed with regard to pH.

Cation Exchange Capacity (CEC)

Three fill samples and six selected natural soil samples were analysed for Cation Exchange Capacity (CEC) including exchangeable sodium (Na), potassium (K), calcium (Ca) and magnesium (Mg). The results of the analysis for the samples were as follows:

- CEC – ranged from <1meq/100g to 9.8meq/100g;
- Exchangeable Na – ranged from <0.01meq/100g to 4.6meq/100g;
- Exchangeable K – ranged from 0.07meq/100g to 0.37meq/100g;
- Exchangeable Ca – ranged from 0.46meq/100g to 4.9meq/100g; and
- Exchangeable Mg – ranged from 0.05meq/100g to 1.3meq/100g.

The exchangeable sodium (Na) percentage (ESP) calculated for the samples ranged from 1.7% to 13.27%. The ESP results from the BH20 (0.8-1.1m) and

BH25 (1.3-1.55m) samples were less than 5%. The remaining results were between 5% and 15%.

Sulphate and Chloride

Three fill samples and six selected natural soil samples were analysed for sulphate and chloride. The sulphate results ranged from 4mg/kg to 160mg/kg. The chloride results ranged from 11mg/kg to 130mg/kg.

Resistivity

Five fill samples and fifteen selected natural soil samples were analysed for EC, the results of which were used to calculate resistivity. All the resistivity results were greater than 2000ohm.cm and were considered to indicate generally non-aggressive soils.

10.2.3 Environmental Site Assessment - Water Samples

The dam water laboratory results are presented in Table C. The results of the analysis are summarised below:

Heavy Metals

Two dam water samples were analysed for heavy metals. The results of the analyses were below the SAC.

Petroleum Hydrocarbons (TPH) and Monocyclic Aromatic Hydrocarbons (BTEX)

Two dam water samples were analysed for TPH and BTEX compounds. The results of the analyses were below the SAC.

Polycyclic Aromatic Hydrocarbons (PAHs)

Two dam water samples were analysed for a range of PAHs including Benzo(a)pyrene. The results of the analyses were below the laboratory PQL and less than the SAC. EIS note the PQL for some individual PAHs were above the SAC.

Organochlorine (OCPs) and Organophosphorous (OPPs) Pesticides

Two dam water samples were analysed for a range of OCPs and OPPs. The results of the analyses were below the laboratory PQL.

Polychlorinated Biphenyls (PCBs)

Two dam water samples were analysed for a range of PCBs. The results of the analyses were below the laboratory PQL.

Other Parameters

Two water samples were analysed for pH, EC and hardness. The results were as follows:

- pH was 5.9 and 6.6;
- EC was 280μS/cm and 570μS/cm; and
- Hardness was 24$CaCO_3$/L and 110mg$CaCO_3$/L

11 ASSESSMENT OF ANALYTICAL QA/QC

The DQOs and DQIs established for the investigation have been assessed in this section of the report. The assessment includes a review of the laboratory QA/QC procedure to assess whether the sample data is reliable.

The laboratory reports for this investigation have been checked and issued as final by:

- Envirolab Services Pty Ltd
  NATA Accreditation No. 2901
  Report numbers: 57899, 57899-A and 57900

The RPD results for the field QA/QC duplicate samples are summarised in Tables D and E. An assessment of the DQIs adopted for this investigation is summarised in the following table. A brief explanation of the individual DQI is presented in Appendix D.

DQO	Number of Samples	DQI
Precision:		
Intra-laboratory duplicate Sample Reference: Dup 2 is a duplicate of soil sample BH5 (0.2-0.5m) Dup 6 is a duplicate of soil sample BH6 (0.2-0.4m) Dup 9 is a duplicate of soil sample BH5 (0-0.3m) Dup A is a duplicate of groundwater sample D1	Soil: 3 Groundwater: 1	The intra-laboratory RPD values indicated that field precision was acceptable.
Field Blank FB1 was a sand field blank 30/7/11	Soil: 1	The field blank was found to be free of analyte concentrations above the PQLs.
Trip Spike TS1 was a soil trip spike 29/7/11	Soil: 1	Trip spike recovery values were within acceptable limits.
Laboratory duplicate RPD values	Soil: 9 Groundwater: 1	Laboratory duplicate RPD results for the soil/groundwater analysis were generally within the acceptance criteria adopted by the laboratory/laboratories. Values for individual heavy metals outside the acceptable limits were attributed 'the inhomogeneous nature of the sample/s'. As both the initial results and the duplicate results were less than the SAC these results are not considered to have had an adverse impact on the data set at a whole.
Accuracy:		
Surrogate Spikes	All organic analytes	Laboratory accuracy was good and that no outliers were reported.
Matrix Spike	Soil: 3	Laboratory accuracy was good and that no outliers were reported.
Laboratory Control Sample (LCS)	Soil: 4	Laboratory accuracy was good and that no outliers were reported.
Representativeness:		
Samples extracted and analysed within holding time	All Samples	All samples were extracted and analysed within the appropriate holding times outlined in the investigation procedure.
Analysis of Laboratory Blanks	Soil: 2	All laboratory blanks were found to be free of analyte concentrations above the PQLs.
Comparability:		
EIS sampling protocols	All Samples	Sampling was undertaken in accordance with the EIS sampling protocols outlined in Appendix D
Standard laboratory analytical methods used	All Samples	All Samples

Samples obtained by qualified staff	All Samples	All Samples
Completeness:		
Documentation (including site notes, borehole logs and COC etc) was correctly maintained	All Samples	All Samples
Samples obtained were analysed for the contaminants of concern	All Samples	All Samples
Appropriate analytical methods used by the laboratory.	All Samples	All Samples

12 DISCUSSION

The environmental site assessment undertaken for the proposed commercial/retail development was designed to assess the suitability of the site for the proposed land use and assess the salinity conditions at the site.

12.1 Summary of Soil Contamination Conditions

Soil samples obtained for the investigation were analysed for the potential contaminants of concern identified at the site.

Elevated concentrations of PAHs were encountered in the fill material at BH22, located to the east of the house. EIS consider that the PAH contamination is likely to be associated with ash in the fill material. Historical information indicated that this area was formerly occupied by a dam that has been subsequently filled. Further investigation will be required to better assess the nature and extent of this contamination. As the area is grassed and based on the contaminant exposure pathway (inhalation and ingestion), EIS consider that the PAH contamination poses a low risk to human health in its current form.

Elevated concentrations of contaminants were not encountered in the remaining soil samples analysed for the investigation. All results were below the site assessment criteria (SAC).

Based on the results, EIS are of the opinion that the potential for significant widespread soil contamination at the site is relatively low.

Petroleum Hydrocarbon (TPH) contamination is known to exist beneath the canopy footprint (IT Environmental 2005). EIS sampled from boreholes drilled around the service station. No TPH contamination was detected in the EIS boreholes, however VOCs were detected in the BH4 (located immediately south of the service station) samples using a photo-ionisation detector. Based on these results, EIS consider the potential for significant migration of contamination through soils to be low. Further assessment should be undertaken in the vicinity of BH4 to better assess the VOC detections in the BH4 samples.

12.1.1 PPILs

The results of the analyses were all less than the PPILs. The PPIL criteria are principally concerned with phytotoxicity (i.e. adverse effects on plant growth in established and proposed areas of landscaping) and are described in NEPM 1999 as

"*somewhat arbitrary*", as the effect of these compounds on plant growth will depend on the soil and plant type.

12.1.2 Asbestos in Soil

Asbestos was not detected above the reporting limit in the soil samples analysed for the investigation. EIS consider the potential for significant, widespread asbestos contamination to be low.

12.2 Waste Classification

12.2.1 Classification of Fill Soils

Based on the results of the assessment, the fill material is classified as 'General Solid Waste (non-putrescible)' according to the criteria outlined in Waste Classification Guidelines 2009.

The material should be disposed of to a suitably licensed NSW OEH landfill. Due to the contaminants encountered in the fill material in BH22, this fill material is not considered suitable for reuse on site and should be disposed of to a suitably licensed NSW OEH landfill only.

12.2.2 Classification of Natural Soil and Bedrock

The natural silty clay/silty sandy clay and underlying shale bedrock at the site is considered to be virgin excavated natural material (VENM). The material is considered suitable for re-use on-site, or alternatively, the information included in this report may be used to assess whether the material is suitable for beneficial reuse at another site as fill material. Where doubt exists about the difference between fill and VENM material an environmental/geotechnical engineer should be contacted.

This classification is not applicable to natural soil beneath the canopy of the service station as these soils are known to be contaminated with TPH.

VENM must not be mixed with any fill material (including building rubble) as this will invalidate the VENM classification.

In the event the natural soils require disposal to a NSW OEH licensed landfill, the material can be disposed as 'General Solid Waste (non-putrescible)'.

12.3 Preliminary Salinity Assessment

The preliminary salinity assessment included a review of the salinity hazard map for western Sydney and laboratory analyses of selected soil samples for pH, EC, ECe, CEC, sulphate and chloride. Interpretation of the results with reference to the information presented in Section 7.2.5 of this report has indicated the following:

- The majority of soils are considered to be non-saline, however, one fill sample was found to be slightly saline;
- The ESP% calculated for the fill and natural soil samples indicated that the soils are generally sodic and are considered to be moderately dispersive;
- The pH results for the soil samples ranged from pH 4.1 to pH 8.6. Two samples recorded pH results less than 4.5 and were considered to be moderately aggressive to concrete foundations. The majority of sample results ranged from 4.5 to 5.5 and were considered to be mildly aggressive to concrete foundations. All samples were considered to be non-aggressive to steel structures;
- The sulphate results for the soil samples ranged from 4mg/kg to 160mg/kg and were considered to be non-aggressive towards concrete foundations;
- The chloride results for the soil samples ranged from 11mg/kg to 130mg/kg and were considered to be non-aggressive towards steel piles; and
- The resistivity results were all above 2,000ohm.cm and were considered to be non-aggressive to steel piles.

These results indicate that the majority of fill and natural soils at the site are non-saline and generally non-aggressive to structures. A small number of results indicate slightly saline and mildly to moderately aggressive conditions.

Based on the proposed development details provided, EIS consider that no detailed salinity management plan is necessary for the proposed development. Use of the NSW Government/Landcom Blue Book, *Managing Urban Stormwater – Soil and Construction (2004, 4th Ed*[45]*),* as a guide to prepare soil and water management plans. The approved plan and subsequent works are to be supervised by appropriately qualified experienced personnel.

The following salinity management procedures should be considered:

12.3.1 Soil Dispersivity

Based on the sodicity results, the soils at the site are considered to be dispersive. Dispersive soils are commonly associated with the following soil behaviour:

[45] *Managing Urban Stormwater – Soil and Construction*, NSW Government/Landcom, 2004 (4th Ed) (Blue Book 2004)

- Sediment loss to streams;
- Susceptibility to tunnelling or piping through earth dams, levees and poorly backfilled trenches etc;
- Limited ability to hold water within detention ponds/dams etc unless appropriately engineered; and
- Soil softening when saturated.

Gypsum and/or lime should be applied to exposed surfaces during construction and site development phases to treat the sodic conditions especially in the event that the soil surface is to remain exposed for extended periods of time. The addition of gypsum and/or lime to exposed subsoils during earthworks will increase the proportion of exchangeable calcium in the soil and reduce the degree of sodicity (and thereby dispersivity) in areas where cut faces will be exposed to surface water run-off etc. The amount of lime/gypsum to be added will vary with the soil and tests should be undertaken prior to, and during, the proposed earthworks to assess the appropriate quantity of lime/gypsum.

12.3.2 Soil Aggressivity

Some soils at the site were found to be slightly acidic. These conditions (pH less than 5.5) are mildly aggressive to concrete foundations.

In designing for durability, reference should be made to concrete strength and cover requirements listed in AS2159-2009. Care should be taken to check that the infrastructure design process considers the existing patterns of surface and subsurface water movement through the site during both dry and wet periods. Construction of infrastructure, which may cause an increase in areas of surficial water logging through poor surface drainage management or a rising water table condition at the site is highly undesirable.

In the absence of endorsed recommendations for buildings in saline environments, reference is made to the publication CCAA 2005. The guide provides recommendations on the minimum concrete grade/strength required for saline soil conditions encountered at the site.

12.3.3 Groundwater Management

Although groundwater is unlikely to be disturbed due to the on-grade nature of the proposed development, planning and design should involve management of factors that could lead to a rise in the groundwater table level. Such measures include reducing the

importation of potable water to the site, reduction of irrigation requirements and avoiding the use of infiltration pits to disperse surface water.

Groundwater maintenance activities associated with the proposed landscaped areas will tend to increase groundwater recharge. Subsoil drains should be installed in these areas so as to avoid the recharge of groundwater resources, reduce the potential for water logging and also increase the potential for on-site water re-cycling. Alternatively, low maintenance species of vegetation could be used in landscaped areas to reduce watering requirements.

12.4 Summary of Groundwater Conditions

Immediate groundwater seepage was encountered at depths of approximately 0.35m in BH13 and 1.5m in BH25. The seepage in BH13 was approximately at the fill-natural soil interface and was considered by a localised, perched water table. The seepage in BH25 was approximately 50mm off the base of the borehole and was considered to be a perched water table associated with underlying bedrock. A nearby (former) creek may have influenced the groundwater in BH25.

The Petrolink 2011 assessment of the groundwater in the vicinity of the service station encountered elevated concentrations of TPH in the groundwater in two monitoring wells. As the monitoring wells were not developed prior to samples Petrolink considered that contamination may have accumulated in the wells. Petrolink concluded that GWMW1 and GWMW4 should be '*purged and allowed to re-charge with groundwater and then fresh samples be taken for analysis to determine current conditions as opposed to accumulation*'. EIS consider that all wells at the site should be developed and re-sampled using low-flow equipment. Following receipt of the results, a remedial strategy may be required for impacted groundwater at the site.

A detailed assessment of the groundwater conditions was outside the scope of this investigation. However, based on the results of the investigation, EIS consider the potential for groundwater contamination across the majority of site to be very low for the following reasons:

- Elevated concentrations of contaminants, except PAHs, were not detected in the fill or natural soils at the site; and
- PAH compounds associated with ash contaminated fill material are generally considered to be bound tightly in a relatively insoluble matrix. Significant migration of PAHs from this material is unlikely.

12.5 Dam Water Conditions

Water samples obtained from the two large dams on the site were analysed for the potential contaminants of concern identified at the site.

Elevated concentrations of contaminants were not encountered in the water samples analysed for the investigation. All results were below the SAC.

Based on the results of the assessment, EIS consider that the potential for significant, contamination of water in the dams is relatively low.

Dewatering of the dams is likely to be required prior to commencement of construction works at the site. Additional testing should be undertaken to confirm suitable disposal option, however, based on available data EIS consider that spraying the water over the site surface is likely to be suitable disposal option.

12.6 Conclusion

Based on the scope of work undertaken for this assessment EIS consider that the site can be made suitable for the proposed development provided that the following recommendations are implemented:

- Additional assessment of the nature and extent of the PAH contaminated fill material east of the house;
- Additional assessment immediately south of the service station in the vicinity of BH4 for VOCs;
- Additional assessment of groundwater conditions in the vicinity of the service station;
- If groundwater contamination is encountered a remediation action plan (RAP) should be prepared for the proposed development. In the event that the contamination can be managed without remediation, an Environmental Management Plan (EMP) should be prepared for the service station site;
- Prepare an appropriate occupational health and safety plan for the contaminants encountered at this site; and
- Undertake inspections during demolition and excavation works to assess any unexpected conditions or subsurface facilities that may be discovered between investigation locations. This should facilitate appropriate adjustment of the works programme and schedule in relation to the changed site conditions. Inspections should be undertaken by experienced environmental personnel.

EIS note the requirement to obtain groundwater samples from at least three locations around UPSS every 6 months throughout continued operation.

12.7 Regulatory Requirement

The requirement to report to the OEH under Section 60 and *Guidelines on the Duty to Report Contamination*[46] under the CLM Amendment Act 2008 should be assessed once the results of the additional investigation works have been reviewed and a remedial strategy has been selected.

Please note that in the event the recommendations for additional work and remediation are not undertaken, there may be justification to report to the OEH. EIS can be contacted for further advice regarding notification.

[46] *Guidelines on the Duty to Report Contamination*, NSW Government Legislation, 2008 (Duty to Report Contamination 2008)

13 LIMITATIONS

The boreholes drilled for the investigation have enabled an assessment to be made of the existence of significant, large quantities of contaminated soils. The conclusions based on this investigation are that, while major contamination of the site is not apparent, problems may be encountered with smaller scale features between boreholes. EIS adopts no responsibility whatsoever for any problems such as underground storage tanks, buried items or contaminated material that may be encountered between sampling locations at the site. The proposed construction activities at the site should be planned on this basis, and any unexpected problem areas that are encountered between boreholes should be immediately inspected by experienced environmental personnel. This should ensure that such problems are dealt with in an appropriate manner, with minimal disruption to the project timetable and budget.

The conclusions developed in this report are based on site conditions which existed at the time of the site assessment and the scope of work outlined previously in this report. They are based on investigation of conditions at specific locations, chosen to be as representative as possible under the given circumstances, and visual observations of the site and vicinity, together with the interpretation of available historical information and documents reviewed as described in this report.

The investigation for this assessment and preparation of this report have been undertaken in accordance with accepted practice for environmental consultants, with reference to applicable environmental regulatory authority and industry standards, guidelines and the assessment criteria outlined previously in this report.

Where information has been provided by third parties, EIS has not undertaken any verification process, except where specifically stated.

EIS has not undertaken any assessment of off-site areas that may be potential contamination sources or may have been impacted by site contamination.

Subsurface soil and rock conditions encountered between investigation locations may be found to be different from those expected. Groundwater conditions may also vary, especially after climatic changes.

Previous use of this site may have involved excavation for the foundations of buildings, services, and similar facilities. In addition, unrecorded excavation and burial of material may have occurred on the site. Backfilling of excavations could have been undertaken

with potentially contaminated material that may be discovered in discrete, isolated locations across the site during construction work.

EIS accept no responsibility for potentially asbestos containing materials that may exist at the site. These materials may be associated with demolition of pre-1990 constructed buildings or fill material at the site.

EIS have not and will not make any determination regarding finances associated with the site.

Changes in the proposed or current site use may result in remediation or further investigation being required at the site.

During construction at the site, soil, fill and any unsuspected materials that are encountered should be monitored by qualified environmental and geotechnical engineers to confirm assumptions made on the basis of the limited investigation data, and possible changes in site level and other conditions since the investigation. Soil materials considered to be suitable from a geotechnical point of view may be unsatisfactory from a soil contamination viewpoint, and vice versa.

This report has been prepared for the particular project described and no responsibility is accepted for the use of any part of this report in any other context or for any other purpose. Copyright in this report is the property of EIS. EIS has used a degree of care, skill and diligence normally exercised by consulting engineers in similar circumstances and locality. No other warranty expressed or implied is made or intended. Subject to payment of all fees due for the investigation, the client alone shall have a licence to use this report.

Should you require any further information regarding the above, please do not hesitate to contact us.

Yours faithfully
For and on behalf of
ENVIRONMENTAL INVESTIGATION SERVICES

Todd Hore
Senior Environmental Engineer

Adrian Kingswell
Senior Associate

ABBREVIATIONS

AAS	Atomic Absorption Spectrometry
AGST	Above Ground Storage Tank
AHD	Australian Height Datum
ANZECC	Australian and New Zealand Environment Conservation Council
ASS	Acid Sulfate Soil
B(a)P	Benzo(a)pyrene
BH	Borehole
BTEX	Benzene, Toluene, Ethyl benzene, Xylene
COC	Chain of Custody documentation
CLM	Contaminated Land Management
DECCW	Department of Environment, Climate Change and Water (formerly DECC, DEC and EPA)
DNR	NSW Department of Natural Resources (now split between DWE and DECCW)
DWE	NSW Department of Water and Energy
DP	Deposited Plan
DQO	Data Quality Objective
EC	Electrical Conductivity
EPA NSW	Environment Protection Authority, New South Wales (now part of DECCW)
GC-ECD	Gas Chromatograph-Electron Capture Detector
GC-FID	Gas Chromatograph-Flame Ionisation Detector
GC-MS	Gas Chromatograph-Mass Spectrometer
HIL	Health Based Investigation Level
HM	Heavy Metals
ICP-AES	Inductively Couple Plasma – Atomic Emission Spectra
NATA	National Association of Testing Authorities, Australia
NEPC	National Environmental Protection Council
NHMRC	National Health and Medical Research Council
OEH	Office of Environment and Heritage
OCPs	Organochlorine Pesticides
OHS (OH&S)	Occupational Health and Safety
PAH	Polycyclic Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
PID	Photo-ionisation Detector
PPIL	Provisional Phyto-toxicity Investigation Levels
PQL	Practical Quantitation Limit
P&T	Purge & Trap
RAP	Remedial Action Plan
QA/QC	Quality Assurance and Quality Control
RPD	Relative Percentage Difference
SAC	Site Assessment Criteria
SEPP	State Environmental Planning Policy
sPOCAS	suspension Peroxide Oxidation Combined Acidity and Sulfate
SPT	Standard Penetration Test
SWL	Standing Water Level
TCLP	Toxicity Characteristic Leaching Procedure
TP	Test Pit
TPH	Total Petroleum Hydrocarbons
USEPA	United States Environmental Protection Agency
UCL	Upper Confidence Limit
UST	Underground Storage Tank
VOC	Volatile Organic Compounds

IMPORTANT INFORMATION ABOUT THE SITE ASSESSMENT REPORT

These notes have been prepared by EIS to assist with the assessment and interpretation of this report.

An Environmental Assessment Report is Based on a Unique Set of Project Specific Factors:

This report has been prepared in response to specific project requirements as stated in the EIS proposal document which may have been limited by instructions from the client. This report should be reviewed, and if necessary, revised if any of the following occur:

- the proposed land use is altered;
- the defined subject site is increased or sub-divided;
- the proposed development details including size, configuration, location, orientation of the structures are modified;
- the proposed development levels are altered, eg addition of basement levels; or
- ownership of the site changes.

EIS/J&K will not accept any responsibility whatsoever for situations where one or more of the above factors have changed since completion of the assessment. If the subject site is sold, ownership of the assessment report should be transferred by EIS to the new site owners who will be informed of the conditions and limitations under which the assessment was undertaken. No person should apply an assessment for any purpose other than that originally intended without first conferring with the consultant.

Changes in Subsurface Conditions

Subsurface conditions are influenced by natural geological and hydrogeological process and human activities. Groundwater conditions are likely to vary over time with changes in climatic conditions and human activities within the catchment (eg. water extraction for irrigation or industrial uses, subsurface waste water disposal, construction related dewatering). Soil and groundwater contaminant concentrations may also vary over time through contaminant migration, natural attenuation of organic contaminants, ongoing contaminating activities and placement or removal of fill material. The conclusions of an assessment report may have been affected by the above factors if a significant period of time has elapsed prior to commencement of the proposed development.

This Assessment is Based on Professional Interpretations of Factual Data

Site assessments identify actual subsurface conditions at the actual sampling locations at the time of the investigation. Data obtained from the sampling and subsequent laboratory analyses, available site history information and published regional information is interpreted by geologists, engineers or environmental scientists and opinions are drawn about the overall subsurface conditions, the nature and extent of contamination, the likely impact on the proposed development and appropriate remediation measures.

Actual conditions may differ from those inferred, because no professional, no matter how qualified, and no subsurface exploration program, no matter how comprehensive, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than an assessment indicates. Actual conditions in areas not sampled may differ from predictions. Nothing can be done to prevent the unanticipated, but steps can be taken to help minimise the impact. For this reason, site owners should retain the services of their consultants throughout the development stage of the project, to identify variances, conduct additional tests which may be needed, and to recommend solutions to problems encountered on site.

Environmental Site Assessment Limitations

Although information provided by an environmental site assessment can reduce exposure to the risk of the presence of contamination, no environmental site assessment can eliminate the risk. Even a rigorous professional assessment may not detect all contamination on a site. Contaminants may be present in areas that were not surveyed or sampled, or may migrate to areas which showed no signs of contamination when sampled. Contaminant analysis cannot possibly cover every type of contaminant which may occur; only the most likely contaminants are screened.

Misinterpretation of Environmental Site Assessments by Design Professionals

Costly problems can occur when other design professionals develop plans based on misinterpretation of an environmental assessment report. To minimise problems associated with misinterpretations, the environmental consultant should be retained to work with appropriate professionals to explain relevant findings and to review the adequacy of plans and specifications relevant to contamination issues.

Logs Should not be Separated from the Environmental Assessment Report

Borehole and test pit logs are prepared by environmental scientists, engineers or geologists based upon interpretation of field conditions and laboratory evaluation of field samples. Logs are normally provided in our reports and these should not be re-drawn for inclusion in site remediation or other design drawings, as subtle but significant drafting errors or omissions may occur in the transfer process. Photographic reproduction can eliminate this problems, however contractors can still misinterpret the

logs during bid preparation if separated from the text of the assessment. If this occurs, delays, disputes and unanticipated costs may result. In all cases it is necessary to refer to the test of the report to obtain a proper understanding of the assessment. Please note that logs with the 'Environmental Log' header are not suitable for geotechnical purposes as they have not been peer reviewed by a Senior Geotechnical Engineer.

To reduce the likelihood of borehole and test pit log misinterpretation, the complete assessment should be available to persons or organisations involved in the project, such as contractors, for their use. Denial of such access and disclaiming responsibility for the accuracy of subsurface information does not insulate an owner from the attendant liability. It is critical that the site owner provides all available site information to persons and organisations such as contractors.

Read Responsibility Clauses Closely

Because an environmental site assessment is based extensively on judgement and opinion, it is necessarily less exact than other disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, model clauses have been developed for use in written transmittals. These are definitive clauses designed to indicate consultant responsibility. Their use helps all parties involved recognise individual responsibilities and formulate appropriate action. Some of these definitive clauses are likely to appear in the environmental site assessment, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to any questions.

TABLE A - 2
CHEMICAL CONTAMINANT CRITERIA FOR WASTE CLASSIFICATION
Waste Classification Guidelines. Part 1: Classifying Waste DECC (now OEH) NSW July 2009

GENERAL SOLID WASTE	RESTRICTED SOLID WASTE	HAZARDOUS WASTE
IF SCC ≤ CT1, TCLP NOT NEEDED TO CLASSIFY AS GENERAL SOLID WASTE	IF SCC ≤ CT2, TCLP NOT NEEDED TO CLASSIFY AS RESTRICTED SOLID WASTE	IF SCC > CT2, TCLP NOT NEEDED TO CLASSIFY AS HAZARDOUS WASTE
IF TCLP ≤ TCLP1 AND SCC ≤ SCC1 TREAT AS GENERAL SOLID WASTE	IF TCLP ≤ TCLP2 AND SCC ≤ SCC2 TREAT AS RESTRICTED SOLID WASTE	IF TCLP > TCLP2 AND/OR SCC > SCC2 TREAT AS HAZARDOUS WASTE

	GENERAL SOLID WASTE			RESTRICTED SOLID WASTE		
CONTAMINANT	CT1 (mg/kg)	TCLP1 (mg/L)	SCC1 (mg/kg)	CT2 (mg/kg)	TCLP2 (mg/L)	SCC2 (mg/kg)
Arsenic	100	5	500	400	20	2,000
Beryllium	20	1.0	100	80	4	400
Cadmium	20	1.0	100	80	4	400
Chromium VI	100	5	1,900	400	20	7,600
Cyanide (total)	320	16	5,900	1280	64	23,600
Cyanide (Amenable)	70	3.5	300	280	14	1,200
Fluoride	3,000	150	10,000	12,000	600	40,000
Lead	100	5	1,500	400	20	6,000
Mercury	4	0.2	50	16	0.8	200
Molybdenum	100	5	1,000	400	20	4,000
Nickel	40	2	1,050	160	8	4,200
Selenium	20	1	50	80	4	200
Silver	100	5.0	180	400	20	720
Benzene	10	0.5	18	40	2	72
Toluene	288	14.4	518	1,152	57.6	2,073
Ethylbenzene	600	30	1,080	2,400	120	4,320
Total xylenes	1,000	50	1,800	4,000	200	7,200
Total petroleum hydrocarbons (C6-C9)	-	-	650	-	-	2,600
Total petroleum hydrocarbons (C10-C36) (C10-C14, C15-C28, C29-C36)	-	-	10,000	-	-	40,000
Benzo(a)pyrene	0.8	0.04	10	3.2	0.16	23
Polycyclic aromatic hydrocarbons (Total)	-	-	200	-	-	800
Polychlorinated biphenyls	-	-	<50	-	-	<50
Phenol (nonhalogenated)	288	14.4	518	1,152	57.6	2,073
Scheduled chemicals	-	-	<50	-	-	<50

NOTE:
SCC – Specific Contaminant Concentration
CT – Contaminant Threshold
TCLP – Toxicity Characteristics Leaching Procedure

TABLE B
SUMMARY OF LABORATORY RESULTS
SOIL ASSESSMENT
All data in mg/kg unless stated otherwise

ANALYTE			HEAVY METALS								PAHs		ORGANOCHLORINE PESTICIDES				OP PESTICIDES	PCBs	PETROLEUM HYDROCARBONS									PID VALUES	ASBESTOS FIBRES
																			Petroleum Hydrocarbons					Benzene	Toluene	Ethyl benzene	Total Xylenes		
			Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	Total PAHs	B(a)P	Aldrin & Dieldrin	Chlordane	DDT, DDD & DDE	Heptachlor			C_6-C_9	C_{10}-C_{14}	C_{15}-C_{28}	C_{29}-C_{36}	C_{10} - C_{36}						
PQL - Envirolab Services			4	0.5	1	1	1	0.1	1	1	-	0.05	0.1	0.1	0.1	0.1	0.1	0.1	25	50	100	100	250	0.5	0.5	1	3		100
Site Assessment Criteria ^			500 *	100 *	60% *	5000 *	1500 *	75 *	3000 *	35000 *	100 *	5 *	50 *	250 *	1000 *	50 *	0.1 ^^	50 *	65 *	nsl	nsl	nsl	1000 *	1 *	1.4 *	3.1 *	14 *		100^^
PPILs			20 **	3 **	400 **	100 **	600 **	1 **	60 **	200 **	nsl	nsl	nsl	nsl	nsl	nsl	nsl	nsl	nsl	nsl	nsl	nsl	nsl	nsl	nsl	nsl	nsl		-
General Solid Waste CT1+			100	20	100	nsl	100	4	40	nsl	nsl	0.8	nsl					nsl	nsl	nsl			nsl	10	288	600	1000	-	-
General Solid Waste SCC1+			500	100	1900	nsl	1500	50	1050	nsl	200	10	50					50	650	nsl			10000	18	518	1080	1800	-	-
Sample Reference	**Sample Depth**	**Sample Description**																											
BH1	0.2-0.5	Fill: silty clay	11	0.5	28	16	25	LPQL	5	19	LPQL	LPQL	NA	NA	NA	NA	NA	NA	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	0	LPQL
BH1	1-1.1	Silty clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	0	
BH2	0-0.3	Fill: silty clay	6	0.8	14	18	23	LPQL	5	30	LPQL	LPQL	NA	NA	NA	NA	NA	NA	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	0	LPQL
BH2	1.2-1.4	Fill: silty clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	0	
BH3	0.2-0.4	Fill: silty clay	7	LPQL	24	13	24	LPQL	4	12	LPQL	LPQL	NA	NA	NA	NA	NA	NA	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	0	LPQL
BH3	0.5-0.8	Silty clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	0	
BH4	0.2-0.5	Fill: silty clay	9	0.6	28	11	25	LPQL	4	21	LPQL	LPQL	NA	NA	NA	NA	NA	NA	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	250	LPQL
BH4	0.6-0.9	Silty clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	2.1	
BH5	0.2-0.5	Fill: silty clay	14	LPQL	24	20	18	LPQL	8	37	LPQL	LPQL	NA	NA	NA	NA	NA	NA	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	0	
BH5	0.8-1	Fill: silty clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	LPQL
BH5	1.3-1.5	Silty clay	9	LPQL	26	15	23	LPQL	3	8	LPQL	LPQL	NA	NA	NA	NA	NA	NA	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	0	
BH5	1.7-1.8	Silty clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	
BH6	0.2-0.4	Fill: silty clay	6	1.2	20	9	13	LPQL	5	22	LPQL	LPQL	NA	NA	NA	NA	NA	NA	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	0	LPQL
BH6	0.6-0.9	Silty clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	0	
BH7	0.2-0.5	Fill: silty clay	5	LPQL	5	20	21	LPQL	2	18	LPQL	LPQL	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	LPQL
BH7	0.7-0.9	Silty clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	0	
BH8	0.15-0.3	Fill: silty clay	10	LPQL	25	14	21	LPQL	6	18	LPQL	LPQL	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	LPQL
BH8	1.3-1.45	Silty clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	0	
BH9	0.2-0.5	Fill: silty clay	7	LPQL	22	19	29	LPQL	4	19	LPQL	LPQL	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	LPQL
BH10	0-0.15	Fill: silty sand	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	LPQL
BH10	0.5-0.8	Fill: silty clay	9	LPQL	23	5	22	LPQL	4	9	LPQL	LPQL	NA	NA	NA	NA	NA	NA	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	0	
BH10	1.4-1.7	Silty clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	0	
BH11	0-0.3	Fill: silty clay	6	LPQL	19	10	19	LPQL	5	17	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	0	LPQL
BH11	1-1.2	Fill: shale gravel	7	LPQL	6	10	10	LPQL	6	7	LPQL	LPQL	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	
BH11	1.3-1.5	Fill: silty clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	0	LPQL
BH11	1.7-1.8	Silty clay	9	0.5	32	15	21	LPQL	3	5	LPQL	LPQL	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	
BH12	0-0.3	Fill: silty sandy clay	9	0.6	52	5	22	LPQL	4	9	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	
BH13	0-0.3	Fill: silty sand	8	LPQL	30	4	15	LPQL	3	12	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	LPQL
BH14	0-0.3	Fill: silty sand	LPQL	LPQL	15	1	11	LPQL	2	7	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	
BH15	0-0.1	Fill: gravelly sand	LPQL	LPQL	5	14	13	LPQL	3	18	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	
BH15	0.1-0.5	Fill: silty clay	6	LPQL	15	21	17	LPQL	10	38	LPQL	LPQL	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	LPQL
BH16	0-0.15	Fill: silty sand	6	LPQL	28	91	10	LPQL	22	38	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	LPQL
BH16	0.5-0.7	Fill: silty clay	5	LPQL	13	9	18	LPQL	6	20	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	LPQL
BH16	1.2-1.5	Fill: silty clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	0	
BH16	1.8-2	Fill: silty clay	LPQL	LPQL	46	42	14	LPQL	18	34	5.24	0.24	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	LPQL
BH16	2.7-3	Silty clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	
BH17	0-0.15	Fill: silty sand	7	LPQL	27	7	19	LPQL	3	8	0.3	<0.05	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	LPQL
BH18	0-0.25	Fill: silty sandy clay	8	0.5	37	9	21	LPQL	4	9	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	
BH19	0-0.12	Fill: silty sandy clay	7	LPQL	32	2	15	LPQL	3	6	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	LPQL
BH19	0.3-0.6	Silty sandy clay	5	LPQL	29	1	13	LPQL	3	2	LPQL	LPQL	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	
BH20	0-0.3	Fill: silty sand	4	LPQL	19	7	12	LPQL	3	10	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	
BH21	0-0.2	Fill: silty sand	9	0.5	31	8	28	LPQL	3	11	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	LPQL
BH22	0-0.35	Fill: silty sandy clay	7	LPQL	24	11	23	LPQL	4	16	**103.3**	**9.5**	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	
BH23	0-0.15	Fill: silty sandy clay	12	0.8	33	18	52	LPQL	8	160	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	
BH23	0.6-0.9	Silty sandy clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	76	
BH24	0-0.35	Fill: silty sand	LPQL	LPQL	20	4	13	LPQL	3	6	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	LPQL
BH24	0.6-0.9	Silty sandy clay	8	0.8	41	LPQL	18	LPQL	3	2	LPQL	LPQL	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	
BH25	0-03	Fill: silty sand	5	LPQL	21	9	13	LPQL	3	9	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	
Total Number of samples			33	33	33	33	33	33	33	33	33	32	21	21	21	21	21	21	20	20	20	20	20	20	20	20	20	48	21
Maximum Value			14	1.2	52	91	52	LPQL	22	160	103.3	9.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	250	nc

EXPLANATION:

^ Site Assessment Criteria: Guideline concentrations adopted for the investigation as outlined below:
* National Environment Protection (Assessment of Site Contamination) Measure 1999 (NEPC Guidelines)
Health Investigation Levels (HIL) - Column F, Commercial/Industrial
** Provisional Phyto-toxicity Investigation Levels (PPILs)
# NSW DECC Guidelines for Assessing Service Station Sites (1994)
^^ In the absence of Australian guidelines, the laboratory PQL has been adopted as the site assessment criteria
+ NSW DECCW Waste Classification Guidelines (2009)

Concentration above the Site Assessment Criteria **VALUE**
Concentration above PPILs **VALUE**

ABBREVIATIONS:

PAHs: Polycyclic Aromatic Hydrocarbons
B(a)P: Benzo(a)pyrene
PQL: Practical Quantitation Limit
LPQL: Less than PQL
OP: Organophosphorus Pesticides
PID: Photoionisation Detector
PCBs: Polychlorinated Biphenyls
UCL: Upper Level Confidence Limit on Mean Value
na: Not Analysed
nc: Not Calculated
nsl: No Set Limit

TABLE C
DAM WATER MONITORING ANALYSIS
All results in µg/L unless stated otherwise.

ANALYTE	PQL Envirolab Services	SAC ANZECC 2000 Fresh Waters[1]	SAC US EPA[3]	SAC HMTV[4]	SAC Drinking Water[2]	SAMPLES D1	SAMPLES D2
Inorganic Compounds and Parameters							
Oil and Grease (mg/L)	5	10[e]	nsl	-	nsl	LPQL	LPQL
pH	0.1	6.5 - 8.5[f]	nsl	-	6.5 - 8.5[d]	5.9	6.6
Electrical Conductivity (mS/cm)	0.001	nsl	nsl	-	nsl	280	570
Hardness (mgCaCo3/L)	1	nsl	nsl	-	200[d]	24	110
Heavy Metals (NOTE: INCLUDE HARDNESS MODIFIED TRIGGER VALUES)							
Arsenic (As lll)	1	24	-	-	7	LPQL	LPQL
Cadmium	0.1	0.2	-	0.4	2	LPQL	LPQL
Chromium (Total)	1	3.3[a]	-	1.9	50	LPQL	LPQL
Copper	1	1.4	-	2.8	2000	LPQL	LPQL
Lead	1	3.4	-	9.4	10	LPQL	LPQL
Mercury (inorganic)	0.5	0.6	-	-	1	LPQL	LPQL
Nickel	1	11	-	21.8	20	LPQL	LPQL
Zinc	1	8	-	15.8	3000[d]	4	4
Petroleum Hydrocarbons							
Hydrocarbons C6-C9	10	nsl	-	-	nsl	LPQL	LPQL
Hydrocarbons C10-C14	50	nsl	-	-	nsl	LPQL	LPQL
Hydrocarbons C15-C28	100	nsl	-	-	nsl	LPQL	LPQL
Hydrocarbons C29-C36	100	nsl	-	-	nsl	LPQL	LPQL
Total Hydrocarbons C10-C36	-	600[b]	-	-	nsl	LPQL	LPQL
BTEX							
Benzene	1	950[a]	-	-	1	LPQL	LPQL
Toluene	1	180[a]	-	-	800	LPQL	LPQL
Ethylbenzene	1	80[a]	-	-	300	LPQL	LPQL
m+p-xylene	2	75[a*]	-	-	nsl	LPQL	LPQL
o-xylene	1	350[a]	-	-	nsl	LPQL	LPQL
Polycyclic Aromatic Hydrocarbons (PAHs)							
Naphthalene	1	16[a]	0.14	-	nsl	LPQL	LPQL
Phenanthrene	1	0.6[c]	nsl	-	nsl	LPQL	LPQL
Anthracene	1	0.01[c]	11000	-	nsl	LPQL	LPQL
Fluoranthene	1	1[c]	1500	-	nsl	LPQL	LPQL
Benzo(a)pyrene	1	0.1[c]	-	-	0.01	LPQL	LPQL
Organochlorine Pesticides (OCPs)							
Aldrin	0.2	0.001[a]	-	-	0.3	LPQL	LPQL
Chlordane	0.2	0.03[c]	-	-	1	LPQL	LPQL
DDE	0.2	0.03[a]	nsl	-	nsl	LPQL	LPQL
DDT	0.2	0.006[c]	-	-	20	LPQL	LPQL
Dieldrin	0.2	0.01[a]	-	-	0.3	LPQL	LPQL
Endosulfan	0.2	0.03[c]	-	-	1	LPQL	LPQL
Endrin	0.2	0.01[c]	11	-	nsl	LPQL	LPQL
Heptachlor	0.2	0.01[c]	-	-	0.3	LPQL	LPQL
Methoxychlor	0.2	0.005[c]	-	-	300	LPQL	LPQL
Organophosphorus Pesticides (OPPs)							
Total	0.2	nsl	nsl	-	nsl	LPQL	LPQL
Polychlorinated Biphenyls (PCBs)							
Total	0.2	nsl	nsl	-	nsl	LPQL	LPQL

EXPLANATION:

1 - ANZECC Australian Water Quality Guidelines for Fresh Waters, 2000 - Trigger Values for protection of 95% of species
2 - NHMRC Australian Drinking Water Guidelines (2004)
3 - In the absence of Australian guidelines, the USEPA (2010) Region 9 Screening Levels for tapwater have been adopted as a preliminary screening tool
4 - Hardness Modified Trigger Values

a - In the absence of a high reliability guideline concentration, the moderate or low reliability guideline concentration has been quoted
b - In the absence of locally endorsed guidelines, the Dutch intervention levels (Ministry of Housing and the Environment 2000) have been quoted
c - 99% trigger values adopted due to the potential for bioaccumulation effects
d - In the absence of a health guideline the aesthetic guideline concentration has been quoted
e - NSW EPA (DECCW) Guidelines for Assessing Service Station Sites (1994)
f - ANZECC Australian Water Quality Guidelines for Fresh and Marine Waters, 2000 - Level for NSW Lowland Rivers.
a* - Guideline value adopted for m-Xylene. We note that the m-Xylene guideline value is 75ug/L and the p-Xylene guideline value is 200ug/L.
However these two isomers cannot be distinguished analytically. Therefore EIS have adopted the more conservative guideline value

Concentration above the SAC	**VALUE**
Concentration above Drinking Water Guidelines	***VALUE***

ABBREVIATIONS:

na: Not Analysed
nsl: No Set Limit
PQL: Practical Quantitation Limit
LPQL: Less than Practical Quantitation Limit
ALPQL: All results less than the PQL
(-) : Not Applicable

TABLE D
LABORATORY DUPLICATE RESULTS - SOIL
QA/QC - RELATIVE PERCENTAGE DIFFERENCES
All data in mg/kg unless stated otherwise

ANALYTE		HEAVY METALS								PAHs													
		As	Cd	Cr	Cu	Pb	Hg	Ni	Zn	Nap	Acenaphty	Acenaphte	Fluo	Phen	Anth	Fluoro	Pyr	B(a)A	Chy	B(b+k)F	B(a)P	I(123-cd)	D(ah)A	B(ghi)P
PQL - Envirolab Services		4	0.5	1	1	1	0.1	1	1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.05	0.1	0.1	0.1
PQL - NMI		0.5	0.5	0.5	0.5	0.5	0.2	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1	0.5	0.5	0.5	0.5
PQL - SGS		3	0.3	0.3	0.5	1	0.05	0.5	0.5	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.20	0.05	0.10	0.10	0.10
Intra-laboratory Soil Duplicate Results - Envirolab Report Number 57899																								
Initial Sample Ref	BH5 (0.2-0.5m)	14	LPQL	24	20	18	LPQL	8	37	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL
Duplicate Sample Ref	Dup 2	10	LPQL	20	19	20	LPQL	8	29	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL
Mean Value		12	LPQL	22	19.5	19	LPQL	8	33	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL
RPD Value		33	NC	18	5	11	NC	0	24	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Intra-laboratory Soil Duplicate Results - Envirolab Report Number 57899																								
Initial Sample Ref	BH6 (0.2-0.4m)	6	1.2	20	9	13	LPQL	5	22	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL
Duplicate Sample Ref	Dup 6	5	2.7	16	11	12	LPQL	6	26	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL
Mean Value		5.5	1.95	18	10	12.5	LPQL	5.5	24	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL
RPD Value		18	77	22	20	8	NC	18	17	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Intra-laboratory Soil Duplicate Results - Envirolab Report Number 57899																								
Initial Sample Ref	BH14 (0-0.3m)	LPQL	LPQL	15	1	11	LPQL	2	7	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL
Duplicate Sample Ref	Dup 9	4	LPQL	14	1	11	LPQL	2	6	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL
Mean Value		3	LPQL	14.5	1	11	LPQL	2	6.5	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL
RPD Value		67	NC	7	0	0	NC	0	15	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC

EXPLANATION:

The RPD value is calculated as the absolute value of the difference between the initial and repeat results divided by the average value expressed as a percentage. The following acceptance criteria will be used to assess the RPD results:

- Results > 10 times PQL = RPD value < 50% are acceptable
- Results between 5 & 10 time PQL = RPD value < 75% are acceptable
- Results < 5 times PQL = RPD value < 100% are acceptable

RPD Results Above the Acceptance Criteria **VALUE**

ABBREVIATIONS:

PQL: Practical Quantitation Limit
LPQL: Less than PQL
(-) : Not Analysed
nc: Not Calculated
OPP: Organophosphorus Pesticides
OCP: Organochlorine Pesticides
PCBs: Polychlorinated Biphenyls
RPD: Relative Percentage Difference
PAHs: Polycyclic Aromatic Hydrocarbons
Nap: Naphthalene
Acenaphty: Acenapthylene
Acenaphte: Acenaphthene
Fluo: Fluorene
Phen: Phenanthrene
Anth: Anthracene
Fluoro: Fluoranthene
Pyr: Pyrene
B(a)A: Benzo(a)anthracene
Chy: Chrysene
B(a+k)F: Benzo(a+k)fluoranthene
B(a)P: Benzo(a)pyrene
I(123-cd): Indeno(123-cd)pyrene
D(ah)A: Dibenzo(ah)anthracene
B(ghi)P: Benzo(ghi)perylene
As: Arsenic
Cd: Cadmium
Cr: Chromium
Cu: Copper
Pb: Lead
Hg: Mercury
Ni: Nickel
Zn: Zinc

TABLE E
GROUNDWATER INTRA-LABORATORY DUPLICATE RESULTS
QA/QC - RELATIVE PERCENTAGE DIFFERENCES
All results in µg/L unless stated otherwise

SAMPLE	ANALYSIS	Envirolab PQL	INITIAL	REPEAT	MEAN	RPD %
Intra-laboratory	C_6-C_9 TPH	10	LPQL	LPQL	LPQL	NC
Water	C_{10}-C_{14} TPH	50	LPQL	LPQL	LPQL	NC
sample ID = D1	C_{15}-C_{28} TPH	100	LPQL	LPQL	LPQL	NC
Dup ID = Dup A	C_{29}-C_{36} TPH	100	LPQL	LPQL	LPQL	NC
	Benzene	1	LPQL	LPQL	LPQL	NC
Envirolab Report: 57900	Toluene	1	LPQL	LPQL	LPQL	NC
	Ethylbenzene	1	LPQL	LPQL	LPQL	NC
	Total Xylenes	1	LPQL	LPQL	LPQL	NC

EXPLANATION:

The RPD value is calculated as the absolute value of the difference between the initial and repeat results divided by the average value expressed as a percentage. The following acceptance criteria will be used to assess the RPD results:

- Results > 10 times PQL = RPD value < 50% are acceptable
- Results between 5 & 10 time PQL = RPD value < 75% are acceptable
- Results < 5 times PQL = RPD value < 100% are acceptable

RPD Results Above the Acceptance Criteria **VALUE**

ABBREVIATIONS:

PQL: Practical Quantitation Limit
LPQL: Less than PQL
NA: Not Analysed
NC: Not Calculated

TABLE F
LABORATORY RESULTS
QA/QC - TRIP SPIKES, TRIP BLANKS AND RINSATES
All data in mg/kg unless stated otherwise

ANALYTE			PETROLEUM HYDROCARBONS					
			um Hydroc C_6-C_9	Benzene	Toluene	Ethyl benzene	m+p Xylene	o-Xylenes
PQL - Soil			25	0.5	0.5	1	2	1
PQL - Water			0.01	0.001	0.001	0.001	0.002	0.001
Date	**Report**	**Sample ref**	**Trip Spikes**					
29/06/2011	57899	Trip Spike 1[S]	-	115%	115%	115%	115%	115%
			Trip Blanks					
30/06/2011	57899	FB 1[S]	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL

EXPLANATION:

[S] Sample type (sand)

BTEX concentrations in trip spikes are presented as % recovery

ABBREVIATIONS:

PQL: Practical Quantitation Limit

LPQL: Less than PQL

(-) : Not Applicable / Not Analysed

TABLE G
SUMMARY OF LABORATORY RESULTS
SOIL CHEMISTRY - EC and ECe

Borehole Number	Sample Depth (m)	Sample Description	EC (µS/cm)	ECe (dS/m)	Salinity Class ^
BH4	0.2-0.3	LIGHT CLAY	63	1	NON SALINE
BH4	1.2-1.5	CLAY LOAM	60	1	NON SALINE
BH9	0.8-1	MEDIUM CLAY	42	0	NON SALINE
BH9	1.1-1.3	LIGHT MEDIUM CLAY	43	0	NON SALINE
BH11	1.5-1.7	LIGHT CLAY	73	1	NON SALINE
BH11	1.8-2	LIGHT CLAY	51	0	NON SALINE
BH13	0.6-0.8	MEDIUM CLAY	89	1	NON SALINE
BH13	1.2-1.5	LIGHT MEDIUM CLAY	67	1	NON SALINE
BH15	0.6-0.8	LIGHT CLAY	320	3	SLIGHTLY SALINE
BH15	1.5-1.7	CLAY LOAM	71	1	NON SALINE
BH18	0.25-0.5	LIGHT MEDIUM CLAY	65	1	NON SALINE
BH18	0.8-1.1	MEDIUM CLAY	49	0	NON SALINE
BH20	0.8-1.1	CLAY LOAM	93	1	NON SALINE
BH20	1.3-1.5	MEDIUM CLAY	61	0	NON SALINE
BH21	0.5-1	MEDIUM CLAY	30	0	NON SALINE
BH21	1.3-1.5	LIGHT CLAY	34	0	NON SALINE
BH23	0.3-0.6	MEDIUM CLAY	52	0	NON SALINE
BH23	1.2-1.5	MEDIUM CLAY	32	0	NON SALINE
BH25	0.3-0.6	CLAY LOAM	210	2	NON SALINE
BH25	1.3-1.55	MEDIUM CLAY	49	0	NON SALINE
Total Number of Samples			20	20	-
Minimum Value			30	0	-
Maximum Value			320	3	-

Explanation

^ Salinity Class has been adopted from '*Site Investigations for Urban Salinity*' DLWC (now DECCW) 2002.

ECe Values (dS/m)
<2
2 to 4
4 to 8
8 to 16
>16

Salinity Class
Non-Saline
Slightly Saline
Moderately Saline
Very Saline
Highly Saline

Abbreviations

EC - Electrical Conductivity
ECe - Extract Electrical Conductivity

TABLE H
SUMMARY OF RESISTIVITY RESULTS

Borehole Number	Sample Depth (m)	Sample Description	EC (µS/cm)	Resistivity ^ (ohm.cm)
BH4	0.2-0.3	LIGHT CLAY	63	15873
BH4	1.2-1.5	CLAY LOAM	60	16667
BH9	0.8-1	MEDIUM CLAY	42	23810
BH9	1.1-1.3	LIGHT MEDIUM CLAY	43	23256
BH11	1.5-1.7	LIGHT CLAY	73	13699
BH11	1.8-2	LIGHT CLAY	51	19608
BH13	0.6-0.8	MEDIUM CLAY	89	11236
BH13	1.2-1.5	LIGHT MEDIUM CLAY	67	14925
BH15	0.6-0.8	LIGHT CLAY	320	3125
BH15	1.5-1.7	CLAY LOAM	71	14085
BH18	0.25-0.5	LIGHT MEDIUM CLAY	65	15385
BH18	0.8-1.1	MEDIUM CLAY	49	20408
BH20	0.8-1.1	CLAY LOAM	93	10753
BH20	1.3-1.5	MEDIUM CLAY	61	16393
BH21	0.5-1	MEDIUM CLAY	30	33333
BH21	1.3-1.5	LIGHT CLAY	5	200000
BH23	0.3-0.6	MEDIUM CLAY	52	19231
BH23	1.2-1.5	MEDIUM CLAY	32	31250
BH25	0.3-0.6	CLAY LOAM	210	4762
BH25	1.3-1.55	MEDIUM CLAY	49	20408
Total Number of Samples			20	20
Minimum Value			5	3125
Maximum Value			320	200000

Explanation

^ Resistivity values have been calculated from the laboratory EC values
Classification derived from the Australian Standard 2159-2009 Piling Design and Installation (Table 6.5.2 [A] & [C])
Table 6.5.2 [A] recommends using a Moderate Exposure Classification for Steel Piles in Fresh Water - Soft Running Water
Classification is based on soil condition 'B' - low permeability soils (e.g. silts & clays) or all soils above groundwater

Resistivity Values (ohm.cm)	**Classification for Steel Piles**
>5,000	**Non-Aggressive**
2,000 - 5,000	**Non-Aggressive**
1,000 - 2,000	**Mildly Aggressive**
<1,000	**Moderately Aggressive**

Abbreviations

EC - Electrical Conductivity

TABLE I
SUMMARY OF LABORATORY RESULTS
SOIL CHEMISTRY - pH

Borehole Number	Sample Depth (m)	Sample Description	pH	Classification for Concrete Piles ^	Classification for Steel Piles ^
BH4	0.2-0.3	LIGHT CLAY	5.3	Non-aggressive	Non-aggressive
BH4	1.2-1.5	CLAY LOAM	4.1	Moderately Aggressive	Non-aggressive
BH9	0.8-1	MEDIUM CLAY	5	Mildly Aggressive	Non-aggressive
BH9	1.1-1.3	LIGHT MEDIUM CLAY	4.9	Mildly Aggressive	Non-aggressive
BH11	1.5-1.7	LIGHT CLAY	6	Non-aggressive	Non-aggressive
BH11	1.8-2	LIGHT CLAY	4.9	Mildly Aggressive	Non-aggressive
BH13	0.6-0.8	MEDIUM CLAY	4.6	Mildly Aggressive	Non-aggressive
BH13	1.2-1.5	LIGHT MEDIUM CLAY	4.1	Moderately Aggressive	Non-aggressive
BH15	0.6-0.8	LIGHT CLAY	8.6	Non-aggressive	Non-aggressive
BH15	1.5-1.7	CLAY LOAM	4.6	Mildly Aggressive	Non-aggressive
BH18	0.25-0.5	LIGHT MEDIUM CLAY	5.4	Mildly Aggressive	Non-aggressive
BH18	0.8-1.1	MEDIUM CLAY	4.8	Mildly Aggressive	Non-aggressive
BH20	0.8-1.1	CLAY LOAM	5.3	Mildly Aggressive	Non-aggressive
BH20	1.3-1.5	MEDIUM CLAY	5.2	Mildly Aggressive	Non-aggressive
BH21	0.5-1	MEDIUM CLAY	5	Mildly Aggressive	Non-aggressive
BH21	1.3-1.5	LIGHT CLAY	4.9	Mildly Aggressive	Non-aggressive
BH23	0.3-0.6	MEDIUM CLAY	5.4	Mildly Aggressive	Non-aggressive
BH23	1.2-1.5	MEDIUM CLAY	4.7	Mildly Aggressive	Non-aggressive
BH25	0.3-0.6	CLAY LOAM	5.1	Mildly Aggressive	Non-aggressive
BH25	1.3-1.55	MEDIUM CLAY	5.3	Mildly Aggressive	Non-aggressive
Total Number of Samples			20	-	-
Minimum Value			4.1	-	-
Maximum Value			8.6	-	-

Explanation

^ pH Classification derived from the Australian Standard 2159-2009 Piling Design and Installation (Tables 6.4.2 [C] & 6.5.2 [C])
Table 6.5.2 [A] recommends using a Moderate Exposure Classification for Steel Piles in Fresh Water - Soft Running Water
Classification is based on soil condition 'B' - low permeability soils (e.g. silts & clays) or all soils above groundwater

pH Value	Classification for Concrete Piles
>5.5	Non-Aggressive
4.5 - 5.5	Mildly Aggressive
4 - 4.5	Moderately Aggressive
<4	Severely Aggressive

pH Value	Classification for Steel Piles
>5	Non-Aggressive
4.0 - 5.0	Non-Aggressive
3.0 - 4.0	Mildly Aggressive
<3	Moderately Aggressive

TABLE J
SUMMARY OF LABORATORY RESULTS
SOIL CHEMISTRY - SULPHATE & CHLORIDES

Borehole Number	Sample Depth (m)	Sample Description	Sulphate ^ (mg/kg)	Chloride ^ (mg/kg)
BH4	0.2-0.3	LIGHT CLAY		
BH4	1.2-1.5	CLAY LOAM	25	12
BH9	0.8-1	MEDIUM CLAY	<10	16
BH11	1.8-2	LIGHT CLAY	24	12
BH13	0.6-0.8	MEDIUM CLAY	<10	64
BH15	0.6-0.8	LIGHT CLAY	160	130
BH18	0.8-1.1	MEDIUM CLAY	<10	43
BH20	0.8-1.1	CLAY LOAM	18	64
BH21	0.5-1	MEDIUM CLAY	4	11
BH23	1.2-1.5	MEDIUM CLAY	8	18
BH25	1.3-1.55	MEDIUM CLAY	5	37
Total Number of Samples			10	10
Minimum Value			4	11
Maximum Value			160	130

Explanation

^ Classification derived from the Australian Standard 2159-2009 Piling Design and Installation (Tables 6.4.2 [C] & 6.5.2 [C])
Table 6.5.2 [A] recommends using a Moderate Exposure Classification for Steel Piles in Fresh Water - Soft Running Water
Classification is based on soil condition 'B' - low permeability soils (e.g. silts & clays) or all soils above groundwater

Sulphate Values	Classification for Concrete Piles	Chloride Values	Classification for Steel Piles
<5,000	Non-Aggressive	<5,000	Non-Aggressive
5,000 - 10,000	Mildly Aggressive	5,000 - 20,000	Non-Aggressive
10,000 - 20,000	Moderately Aggressive	20,000 - 50,000	Mildly Aggressive
>20,000	Severely Aggressive	>50,000	Moderately Aggressive

TABLE K
SUMMARY OF LABORATORY RESULTS
SOIL CHEMISTRY - CEC & ESP

Borehole Number	Sample Depth (m)	Sample Description	Total CEC	Ca	K	Mg	Na	ESP ^ %
				(meq/100g)				
BH4	1.2-1.5	CLAY LOAM	1.8	0.04	0.16	1.3	0.22	12.2
BH9	0.8-1	MEDIUM CLAY	5.6	0.24	0.37	4.6	0.39	7.0
BH11	1.8-2	LIGHT CLAY	4.4	0.48	0.19	3.5	0.22	5.0
BH13	0.6-0.8	MEDIUM CLAY	4.4	0.11	0.13	3.9	0.25	5.7
BH15	0.6-0.8	LIGHT CLAY	9.8	4.6	0.18	3.8	1.3	13.3
BH18	0.8-1.1	MEDIUM CLAY	1.9	0.064	0.092	1.6	0.15	7.9
BH20	0.8-1.1	CLAY LOAM	3.1	1.3	0.28	1.5	0.054	1.7
BH21	0.5-1	MEDIUM CLAY	4.3	0.052	0.19	3.8	0.27	6.3
BH23	1.2-1.5	MEDIUM CLAY	<1	<0.01	0.068	0.46	0.076	7.6
BH25	1.3-1.55	MEDIUM CLAY	5.2	0.055	0.086	4.9	0.19	3.7
Total Number of Samples			10	10	10	10	10	10
Minimum Value			<1	<0.01	0.07	0.46	0.05	1.74
Maximum Value			9.80	4.60	0.37	4.90	1.30	13.27

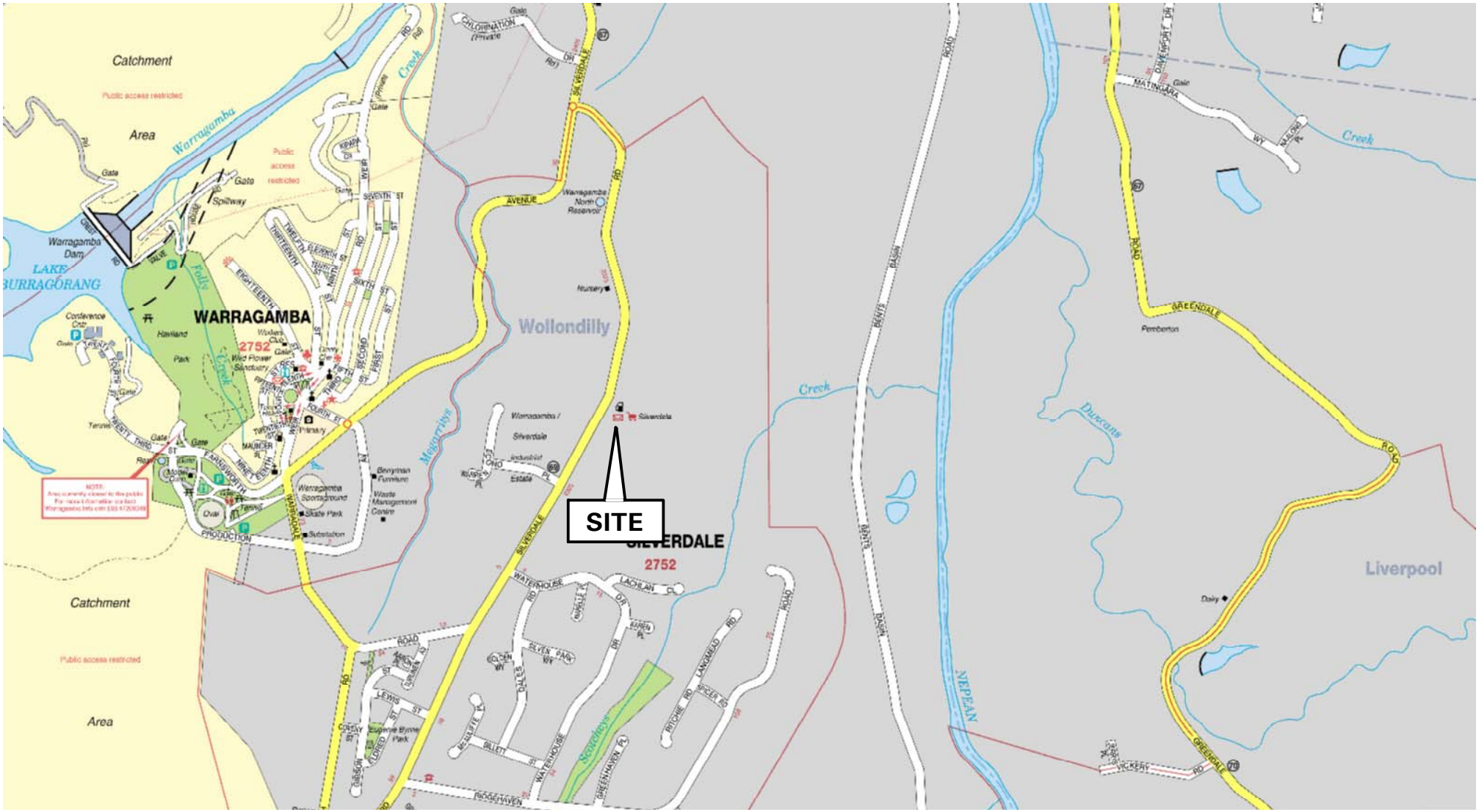
Explanation

^ Sodicity rating has been adopted from the publication *'Site Investigations for Urban Salinity' DLWC (now DECCW)* 2002.

ESP Value	Sodicity Rating
< 5%	Non-Sodic
5% to 15%	Sodic
> 15%	Highly Sodic

Abbreviation

CEC: Cation Exchange Capacity
ESP: Exchangeable Sodium Percentage (Each Na/CEC)
Mg: Exchangeable Magnesium
Na: Exchangeable Sodium
K: Exchangeable Potassium
Ca: Exchangeable Calcium



NOTES:
Figure 1 has been recreated from UBD on disc (version 5.0). Figure is not to scale.

UBD Map ref: 241 L8

Reference should be made to the report text for a full understanding of this plan.

ENVIRONMENTAL INVESTIGATION SERVICES	Project Number: **E25004KH**	Title: **SITE LOCATION PLAN**
	Figure: **1**	Address: **2316-2320 SILVERDALE ROAD, SILVERDALE, NSW**

LEGEND:

- Approximate site boundary
- BH1 (0.2) Borehole location, number and depth of fill (m)

NOTES:
Figure 2 has been recreated from a Google Earth Pro image

The borehole locations presented on this plan have been established from site measurements only and should not be construed as survey points.

Reference should be made to the report text for a full understanding of this plan.

Contamination Data Key:
All soil sample depth references are in metres and contamination data is in mg/kg

Approximate Scale (m): 0 15 30 45 60 75

ENVIRONMENTAL INVESTIGATION SERVICES

Project Number:	Title:
E25004KH	BOREHOLE LOCATION PLAN
Figure: 2	Address: 2316-2320 SILVERDALE ROAD, SILVERDALE, NSW

APPENDIX A

(Borehole Logs and Geotechnical Explanatory Notes)

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. 1 1/1

Environmental logs are not to be used for geotechnical purposes

Client: B & M LOPREIATO

Project: PROPOSED COMMERCIAL/RETAIL DEVELOPMENT

Location: 2316-2320 SILVERDALE ROAD, SILVERDALE, NSW

Job No. E25004KH **Method:** EZIPROBE **R.L. Surface:** N/A

Date: 29-6-11 **Datum:**

Logged/Checked by: T.H./

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION						0			CONCRETE: 180mm.t				
								-	FILL: Silty clay, medium to high plasticity, dark grey, trace of ironstone gravel, root fibres and ash.	MC≈PL	-	-	
						0.5		CH	SILTY CLAY: high plasticity, light grey mottled orange, trace of ironstone gravel.	MC≈PL	-	-	
						1			as above, but with ironstone gravel bands.				
								-	SHALE: light grey.	XW	EL	-	
									END OF BOREHOLE AT 1.2m				REFUSAL
						1.5							
						2							
						2.5							
						3							
						3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. 2 1/1

Environmental logs are not to be used for geotechnical purposes

Client: B & M LOPREIATO

Project: PROPOSED COMMERCIAL/RETAIL DEVELOPMENT

Location: 2316-2320 SILVERDALE ROAD, SILVERDALE, NSW

Job No. E25004KH **Method:** EZIPROBE **R.L. Surface:** N/A

Date: 29-6-11 **Datum:**

Logged/Checked by: T.H./BV

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION						0			FILL: Silty clay, medium plasticity, brown, trace of igneous and ironstone gravel, ash and root fibres.	MC≈PL			GRASS COVER
						0.5			FILL: Sandy clay, medium plasticity, light brown, with sandstone gravel.	MC < PL			
						1			FILL: Silty clay, medium to high plasticity, dark brown, trace of ash and root fibres.	MC≈PL			
						1.5		CL	SILTY CLAY: medium plasticity, red brown, with ironstone gravel, trace of sand.	MC≈PL	-	-	
						2			SILTY CLAY: light brown mottled orange and red, trace of ironstone gravel.				
						2.5		-	as above, but light grey mottled red and orange.				
									SHALE: light grey.	XW	EL	-	
						3			END OF BOREHOLE AT 2.6m				PUSH TUBE REFUSAL
						3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. 3 1/1

Environmental logs are not to be used for geotechnical purposes

Client: B & M LOPREIATO

Project: PROPOSED COMMERCIAL/RETAIL DEVELOPMENT

Location: 2316-2320 SILVERDALE ROAD, SILVERDALE, NSW

Job No. E25004KH **Method:** EZIPROBE **R.L. Surface:** N/A

Date: 29-6-11 **Datum:**

Logged/Checked by: T.H./

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION						0			CONCRETE: 150mm.t				
								-	FILL: Silty clay, medium to high plasticity, dark grey, with igneous and quartz gravel, trace of ash.	MC≈PL	-	-	
						0.5		CH	SILTY CLAY: high plasticity, light brown mottled orange, trace of ironstone gravel.	MC≈PL	-	-	
						1			as above, but light grey mottled orange and red.				
						1.5			END OF BOREHOLE AT 1.45m				PUSH TUBE REFUSAL ON INFERRED SHALE BEDROCK
						2							
						2.5							
						3							
						3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. 4 1/1

Environmental logs are not to be used for geotechnical purposes

Client: B & M LOPREIATO

Project: PROPOSED COMMERCIAL/RETAIL DEVELOPMENT

Location: 2316-2320 SILVERDALE ROAD, SILVERDALE, NSW

Job No. E25004KH **Method:** EZIPROBE **R.L. Surface:** N/A

Date: 29-6-11 **Datum:**

Logged/Checked by: T.H./

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION						0			CONCRETE: 130mm.t				
								-	FILL: Silty clay, medium to high plasticity, dark grey and brown, trace of igneous and ironstone gravel and ash.	MC≈PL	-	-	
						0.5		CH	SILTY CLAY: high plasticity, light brown mottled orange, trace of ironstone gravel.	MC≈PL	-	-	
						1			as above, but light grey mottled orange.				
						1.5			SILTY CLAY: low to medium plasticity, red brown and grey, with ironstone gravel bands.	MC<PL			
						2		-	SHALE: light grey.	XW	EL	-	
						2.5			END OF BOREHOLE AT 2.3m				PUSH TUBE REFUSAL ON INFERRED SHALE BEDROCK
						3							
						3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

EIS

ENVIRONMENTAL LOG

Borehole No. 5 1/1

Environmental logs are not to be used for geotechnical purposes

Client: B & M LOPREIATO

Project: PROPOSED COMMERCIAL/RETAIL DEVELOPMENT

Location: 2316-2320 SILVERDALE ROAD, SILVERDALE, NSW

Job No. E25004KH **Method:** EZIPROBE **R.L. Surface:** N/A

Date: 29-6-11 **Datum:**

Logged/Checked by: T.H./AM

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION						0			CONCRETE: 160mm.t				
								-	FILL: Silty clay, medium to high plasticity, brown and grey, trace of igneous, ironstone and sandstone gravel, slag and ash.	MC≈PL	-	-	
						0.5			FILL: Silty clay, medium to high plasticity, dark grey, trace of ironstone gravel, ash and root fibres.				
						1							
								CH	SILTY CLAY: high plasticity, light brown mottled orange, trace of ironstone gravel.	MC<PL	-	-	
						1.5			as above, but light grey mottled orange				
								-	SHALE: light grey.	XW	EL	-	
						2			END OF BOREHOLE AT 1.9m				
						2.5							
						3							
						3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. 6 1/1

Environmental logs are not to be used for geotechnical purposes

Client: B & M LOPREIATO

Project: PROPOSED COMMERCIAL/RETAIL DEVELOPMENT

Location: 2316-2320 SILVERDALE ROAD, SILVERDALE, NSW

Job No. E25004KH **Method:** EZIPROBE **R.L. Surface:** N/A

Date: 30-6-11 **Datum:**

Logged/Checked by: M.D./

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION						0			CONCRETE: 165mm.t				GRASS COVER
								-	FILL: Silty sandy clay, fine to medium grained, light brown, trace of igneous, ironstone and quartz gravel.	M	-	-	
						0.5		CL-CH	SILTY CLAY: medium to high plasticity, light brown mottled orange, trace of ironstone gravel and root fibres.	MC<PL	-	-	
						1		CH	SILTY CLAY: high plasticity, grey mottled orange, trace of ironstone gravel.				
									as above, but with ironstone bands and shale gravel.				
						1.5			END OF BOREHOLE AT 1.5m				EZIPROBE REFUSAL
						2							
						2.5							
						3							
						3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. 7 1/1

Environmental logs are not to be used for geotechnical purposes

Client: B & M LOPREIATO

Project: PROPOSED COMMERCIAL/RETAIL DEVELOPMENT

Location: 2316-2320 SILVERDALE ROAD, SILVERDALE, NSW

Job No. E25004KH **Method:** EZIPROBE **R.L. Surface:** N/A

Date: 29-6-11 **Datum:**

Logged/Checked by: T.H./

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION						0			CONCRETE: 190mm.t				
								-	FILL: Clayey sand, medium to coarse grained, light brown, with igneous gravel.	M MC≈PL	-	-	
						0.5			FILL: Silty clay, medium plasticity, light grey and dark grey, with ironstone and shale gravel.				
								CH	SILTY CLAY: high plasticity, light brown mottled red, trace of ironstone gravel and roots.	MC≈PL	-	-	ROOTS AT SURFACE OF NATURAL SOIL BURNT
						1							
						1.5			END OF BOREHOLE AT 1.5m				
						2							
						2.5							
						3							
						3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. 8 1/1

Environmental logs are not to be used for geotechnical purposes

Client: B & M LOPREIATO

Project: PROPOSED COMMERCIAL/RETAIL DEVELOPMENT

Location: 2316-2320 SILVERDALE ROAD, SILVERDALE, NSW

Job No. E25004KH **Method:** EZIPROBE **R.L. Surface:** N/A

Date: 29-6-11 **Datum:**

Logged/Checked by: T.H./JDK

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION						0			CONCRETE: 120mm.t				
								-	FILL: Sandy gravel, fine to medium grained, sub rounded igneous gravel.	M	-	-	
						0.5			FILL: Silty clay, medium to high plasticity, brown, with igneous gravel and ash.				
								CH	SILTY CLAY: high plasticity, light brown mottled orange, trace of ironstone gravel.	MC<PL	-	-	
						1							
						1.5			END OF BOREHOLE AT 1.45m				PUSH TUBE REFUSAL
						2							
						2.5							
						3							
						3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. 9 1/1

Environmental logs are not to be used for geotechnical purposes

Client: B & M LOPREIATO

Project: PROPOSED COMMERCIAL/RETAIL DEVELOPMENT

Location: 2316-2320 SILVERDALE ROAD, SILVERDALE, NSW

Job No. E25004KH **Method:** EZIPROBE **R.L. Surface:** N/A

Date: 29-6-11 **Datum:**

Logged/Checked by: T.H./

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION						0			CONCRETE: 170mm.t				
								-	FILL: Silty clay, medium to high plasticity, brown, trace of ironstone gravel, ash and root fibres.	MC≈PL	-	-	
						0.5		CH	SILTY CLAY: high plasticity, light brown mottled orange, trace of ironstone gravel and ash.	MC≈PL	-	-	
						1			as above, but light grey, with ironstone gravel bands.				
									END OF BOREHOLE AT 1.3m				PUSH TUBE REFUSAL ON INFERRED SHALE BEDROCK
						1.5							
						2							
						2.5							
						3							
						3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. 10 1/1

Environmental logs are not to be used for geotechnical purposes

Client: B & M LOPREIATO

Project: PROPOSED COMMERCIAL/RETAIL DEVELOPMENT

Location: 2316-2320 SILVERDALE ROAD, SILVERDALE, NSW

Job No. E25004KH **Method:** EZIPROBE **R.L. Surface:** N/A

Date: 29-6-11 **Datum:**

Logged/Checked by: T.H./

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION						0			FILL: Silty sand, fine to medium grained, brown and light brown, trace of igneous, ironstone and quartz gravel.	M MC<PL			GRASS COVER
						0.5			FILL: Silty clay, high plasticity, brown, ironstone gravel, trace of shale gravel, ash and root fibres.				
						1							
						1.5		CH	SILTY CLAY: high plasticity, light brown mottled orange, trace of ironstone gravel.	MC≈PL	-	-	
						2							
									END OF BOREHOLE AT 2.1m				PUSH TUBE REFUSAL ON INFERRED SHALE BEDROCK
						2.5							
						3							
						3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. 11 1/1

Environmental logs are not to be used for geotechnical purposes

Client: B & M LOPREIATO

Project: PROPOSED COMMERCIAL/RETAIL DEVELOPMENT

Location: 2316-2320 SILVERDALE ROAD, SILVERDALE, NSW

Job No. E25004KH **Method:** EZIPROBE **R.L. Surface:** N/A

Date: 29-6-11 **Datum:**

Logged/Checked by: T.H./

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION						0			FILL: Silty clay, medium to high plasticity, brown, trace of igneous and ironstone gravel, ash and root fibres.	MC≈PL			GRASS COVER
						0.5			FILL: Shale gravel, fine to medium grained sub angular, grey.	D			
						1			FILL: Silty clay, medium plasticity, light brown, trace of ironstone gravel, sand and root fibres.				
						1.5		CH	SILTY CLAY: high plasticity, light brown mottled orange, trace of ironstone gravel.	MC<PL	-	-	
						2			as above, but light grey mottled orange.				
									END OF BOREHOLE AT 2.3m				PUSH TUBE REFUSAL ON INFERRED SHALE BEDROCK
						2.5							
						3							
						3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. 12 1/1

Environmental logs are not to be used for geotechnical purposes

Client: B & M LOPREIATO

Project: PROPOSED COMMERCIAL/RETAIL DEVELOPMENT

Location: 2316-2320 SILVERDALE ROAD, SILVERDALE, NSW

Job No. E25004KH **Method:** EZIPROBE **R.L. Surface:** N/A

Date: 30-6-11 **Datum:**

Logged/Checked by: M.D./

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION						0			FILL: Silty sandy clay, low plasticity, dark brown, trace of igneous gravel, ash and root fibres.	MC > PL			GRASS COVER
						0.5		CL	SILTY SANDY CLAY: low plasticity, brown, trace of ironstone gravel.	MC≈PL	-	-	
						1			SILTY SANDY CLAY: low plasticity, light brown mottled orange brown, with ironstone banding.	MC < PL			
									END OF BOREHOLE AT 1.35m				EZIPROBE REFUSAL
						1.5							
						2							
						2.5							
						3							
						3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

EIS

ENVIRONMENTAL LOG

Borehole No. 13 1/1

Environmental logs are not to be used for geotechnical purposes

Client: B & M LOPREIATO

Project: PROPOSED COMMERCIAL/RETAIL DEVELOPMENT

Location: 2316-2320 SILVERDALE ROAD, SILVERDALE, NSW

Job No. E25004KH **Method:** EZIPROBE **R.L. Surface:** N/A

Date: 30-6-11 **Datum:**

Logged/Checked by: M.D./

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
						0			FILL/TOPSOIL: Silty sand, fine to medium grained, dark brown, trace of ironstone gravel and root fibres.	M			GRASS COVER
▶								CL	SILTY SANDY CLAY: low plasticity, brown, trace of root fibres.	MC > PL	-	-	
						0.5			SILTY SANDY CLAY: low plasticity, light brown mottled brown and orange, with ironstone banding.	MC < PL			
						1			as above, but brown mottled orange and grey.				
						1.5			END OF BOREHOLE AT 1.5m				EZIPROBE REFUSAL
						2							
						2.5							
						3							
						3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. 14 1/1

Environmental logs are not to be used for geotechnical purposes

Client: B & M LOPREIATO

Project: PROPOSED COMMERCIAL/RETAIL DEVELOPMENT

Location: 2316-2320 SILVERDALE ROAD, SILVERDALE, NSW

Job No. E25004KH **Method:** EZIPROBE **R.L. Surface:** N/A

Date: 30-6-11 **Datum:**

Logged/Checked by: M.D./AK

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION						0			FILL: Silty sand, fine to medium grained, brown, trace of ironstone gravel, ash and root fibres.	D			GRASS COVER
						0.5		CL	SILTY SANDY CLAY: low plasticity, brown mottled light brown and orange, with ironstone banding.	MC≈PL	-	-	
						1			as above, but grey mottled light brown and orange.				
						1.5			END OF BOREHOLE AT 1.65m				EZIPROBE REFUSAL ON INFERRED BEDROCK
						2							
						2.5							
						3							
						3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

EIS

ENVIRONMENTAL LOG

Borehole No. 15 1/1

Environmental logs are not to be used for geotechnical purposes

Client: B & M LOPREIATO

Project: PROPOSED COMMERCIAL/RETAIL DEVELOPMENT

Location: 2316-2320 SILVERDALE ROAD, SILVERDALE, NSW

Job No. E25004KH **Method:** EZIPROBE **R.L. Surface:** N/A

Date: 29-6-11 **Datum:**

Logged/Checked by: T.H./DW

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION						0			FILL: Gravelly sand, fine to medium grained, light brown, igneous gravel and ash.	D MC<PL			GRAVEL COVER
						0.5			FILL: Silty clay, medium plasticity, brown, trace of igneous and ironstone gravel.				
						1			as above, but trace of shale gravel.				
						1.5		CH	SILTY CLAY: high plasticity, light brown mottled orange, trace of ironstone gravel.	MC<PL	-	-	
						2			as above, but light grey mottled orange.				
						2.5		-	SHALE: light grey.	XW	EL	-	
						3			END OF BOREHOLE AT 2.5m				PUSH TUBE REFUSAL
						3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. 16 1/1

Environmental logs are not to be used for geotechnical purposes

Client: B & M LOPREIATO

Project: PROPOSED COMMERCIAL/RETAIL DEVELOPMENT

Location: 2316-2320 SILVERDALE ROAD, SILVERDALE, NSW

Job No. E25004KH **Method:** EZIPROBE **R.L. Surface:** N/A

Date: 29-6-11 **Datum:**

Logged/Checked by: T.H./

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION						0			FILL: Silty sand, fine to medium grained, brown, trace of concrete fragments, ironstone gravel, ash and root fibres.	M			GRASS COVER
						0.5			FILL: Silty clay, medium to high plasticity, brown, with sand, trace of sandstone and igneous gravel.	MC≈PL			
									FILL: Silty clay, medium to high plasticity, trace of igneous and shale gravel and ash.				
						1							
						1.5							
						2		CL	SILTY CLAY: medium plasticity, grey brown, trace of ash and root fibres.	MC≈PL	-	-	
						2.5		CH	SILTY CLAY: high plasticity, light brown mottled orange, trace of ironstone gravel.				
						3			END OF BOREHOLE AT 3.0m				
						3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. 17 1/1

Environmental logs are not to be used for geotechnical purposes

Client: B & M LOPREIATO

Project: PROPOSED COMMERCIAL/RETAIL DEVELOPMENT

Location: 2316-2320 SILVERDALE ROAD, SILVERDALE, NSW

Job No. E25004KH **Method:** EZIPROBE **R.L. Surface:** N/A

Date: 30-6-11 **Datum:**

Logged/Checked by: M.D./

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION						0			FILL/TOPSOIL: Silty sand, fine to medium grained, dark brown, trace of ironstone gravel, ash and root fibres.	M			GRASS COVER
								CL	SILTY SANDY CLAY: low to medium plasticity, brown, trace of ironstone gravel and root fibres.	MC≈PL			
						0.5			SILTY SANDY CLAY: low to medium plasticity, brown mottled orange and grey, with ironstone banding.				
						1			as above, but brown mottled orange and grey.	MC<PL			
						1.5			END OF BOREHOLE AT 1.4m				PUSH TUBE REFUSAL ON INFERRED BEDROCK
						2							
						2.5							
						3							
						3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. 18 1/1

Environmental logs are not to be used for geotechnical purposes

Client: B & M LOPREIATO

Project: PROPOSED COMMERCIAL/RETAIL DEVELOPMENT

Location: 2316-2320 SILVERDALE ROAD, SILVERDALE, NSW

Job No. E25004KH **Method:** EZIPROBE **R.L. Surface:** N/A

Date: 30-6-11 **Datum:**

Logged/Checked by: M.D./

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION						0			FILL/TOPSOIL: Silty sandy clay, low plasticity, dark brown, trace of ironstone gravel and ash.	MC < PL			GRASS COVER
						0.5		CL	SILTY SANDY CLAY: low to medium plasticity, light brown mottled orange, trace of ironstone gravel.	MC≈PL	-	-	
						1			as above, but with ironstone banding.				
									END OF BOREHOLE AT 1.1m				PUSH TUBE REFUSAL
						1.5							
						2							
						2.5							
						3							
						3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. 19 1/1

Environmental logs are not to be used for geotechnical purposes

Client: B & M LOPREIATO

Project: PROPOSED COMMERCIAL/RETAIL DEVELOPMENT

Location: 2316-2320 SILVERDALE ROAD, SILVERDALE, NSW

Job No. E25004KH **Method:** EZIPROBE **R.L. Surface:** N/A

Date: 30-6-11 **Datum:**

Logged/Checked by: M.D./

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION						0			FILL: Silty sandy clay, low plasticity, brown, trace of ironstone cobbles and gravel, ash and root fibres.	MC≈PL			GRASS COVER
								CL	SILTY SANDY CLAY: low plasticity, brown, trace of roots.	MC≈PL	-	-	
						0.5			as above, but with ironstone banding.	MC<PL			
									END OF BOREHOLE AT 0.9m				PUSH TUBE REFUSAL ON INFERRED BEDROCK
						1							
						1.5							
						2							
						2.5							
						3							
						3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. 20 1/1

Environmental logs are not to be used for geotechnical purposes

Client: B & M LOPREIATO

Project: PROPOSED COMMERCIAL/RETAIL DEVELOPMENT

Location: 2316-2320 SILVERDALE ROAD, SILVERDALE, NSW

Job No. E25004KH **Method:** EZIPROBE **R.L. Surface:** N/A

Date: 30-6-11 **Datum:**

Logged/Checked by: M.D./

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION	■		■			0			FILL/TOPSOIL: Silty sand, fine to medium grained, brown, trace of ironstone gravel and root fibres.	D			GRASS COVER
						0.5		SM	SILTY SAND: fine to medium grained, brown, trace of ironstone gravel.				
	■		■	■		1		CL	SILTY CLAY: low plasticity, brown mottled light brown and orange, with ironstone gravel.	MC≈PL	-	-	
						1.5			END OF BOREHOLE AT 1.5m				PUSH TUBE REFUSAL
						2							
						2.5							
						3							
						3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. 21 1/1

Environmental logs are not to be used for geotechnical purposes

Client: B & M LOPREIATO

Project: PROPOSED COMMERCIAL/RETAIL DEVELOPMENT

Location: 2316-2320 SILVERDALE ROAD, SILVERDALE, NSW

Job No. E25004KH **Method:** EZIPROBE **R.L. Surface:** N/A

Date: 30-6-11 **Datum:**

Logged/Checked by: M.D./

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION						0			FILL: Silty sand, fine to medium grained, dark brown, trace of ironstone gravel, ash and root fibres.	D-M			GRASS COVER
								CL	SILTY SANDY CLAY: medium plasticity, light brown mottled orange, trace of ironstone gravel.	MC<PL	-	-	
						0.5							
						1							
								CL-CH	SILTY CLAY: medium to high plasticity, grey mottled light brown and orange, trace of ironstone gravel.				
									as above, but grey, with ironstone bands.				
						1.5			END OF BOREHOLE AT 1.5m				PUSH TUBE REFUSAL
						2							
						2.5							
						3							
						3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. 22 1/1

Environmental logs are not to be used for geotechnical purposes

Client: B & M LOPREIATO

Project: PROPOSED COMMERCIAL/RETAIL DEVELOPMENT

Location: 2316-2320 SILVERDALE ROAD, SILVERDALE, NSW

Job No. E25004KH **Method:** EZIPROBE **R.L. Surface:** N/A

Date: 30-6-11 **Datum:**

Logged/Checked by: M.D./

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION						0			FILL: Silty sandy clay, low plasticity, brown, trace of igneous, ironstone and shale gravel, ash and root fibres.	MC≈PL			GRASS COVER
						0.5		CL	SILTY SANDY CLAY: low to medium plasticity, brown mottled orange, trace of ironstone gravel and root fibres.	MC≈PL	-	-	
						1			as above, but brown mottled orange and grey, ironstone bands and without roots.	MC<PL			
									END OF BOREHOLE AT 1.35m				PUSH TUBE REFUSAL
						1.5							
						2							
						2.5							
						3							
						3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. 23 1/1

Environmental logs are not to be used for geotechnical purposes

Client: B & M LOPREIATO

Project: PROPOSED COMMERCIAL/RETAIL DEVELOPMENT

Location: 2316-2320 SILVERDALE ROAD, SILVERDALE, NSW

Job No. E25004KH **Method:** EZIPROBE **R.L. Surface:** N/A

Date: 30-6-11 **Datum:**

Logged/Checked by: M.D./

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION	■		■			0			FILL/TOPSOIL: Silty sandy clay, low plasticity, dark brown, trace of ironstone gravel, ash and root fibres.	MC≈PL			GRASS COVER
				■		0.5		CL	SILTY SANDY CLAY: low plasticity, brown, trace of ironstone gravel.	MC≈PL	-	-	
	■	■	■			1			SILTY SANDY CLAY: low plasticity, brown mottled orange and red, with ironstone bands.	MC<PL			
				■		1.5			END OF BOREHOLE AT 1.5m				PUSH TUBE REFUSAL ON INFERRED BEDROCK
						2							
						2.5							
						3							
						3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

ENVIRONMENTAL LOG

Borehole No. 24 1/1

Environmental logs are not to be used for geotechnical purposes

Client: B & M LOPREIATO

Project: PROPOSED COMMERCIAL/RETAIL DEVELOPMENT

Location: 2316-2320 SILVERDALE ROAD, SILVERDALE, NSW

Job No. E25004KH **Method:** EZIPROBE **R.L. Surface:** N/A

Date: 30-6-11 **Datum:**

Logged/Checked by: M.D./

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION						0			FILL/TOPSOIL: Silty sand, dark brown, trace of ironstone gravel, ash and root fibres.	MC≈PL			GRASS COVER
						0.5		CL	SILTY SANDY CLAY: low to medium plasticity, brown mottled orange grey, with ironstone banding.	MC≈PL	-	-	
									END OF BOREHOLE AT 0.9m				PUSH TUBE REFUSAL
						1							
						1.5							
						2							
						2.5							
						3							
						3.5							

ENVIRONMENTAL INVESTIGATION SERVICES

CONSULTING ENVIRONMENTAL ENGINEERS

EIS

ENVIRONMENTAL LOG

Borehole No. 25 1/1

Environmental logs are not to be used for geotechnical purposes

Client: B & M LOPREIATO

Project: PROPOSED COMMERCIAL/RETAIL DEVELOPMENT

Location: 2316-2320 SILVERDALE ROAD, SILVERDALE, NSW

Job No. E25004KH **Method:** EZIPROBE **R.L. Surface:** N/A

Date: 30-6-11 **Datum:**

Logged/Checked by: M.D./

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES ASB	SAMPLES SAL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	■	■	■			0			FILL: Silty sand, fine to medium grained, brown, trace of ironstone gravel, ash and root fibres.	D-M			GRASS COVER
				■		0.5			as above, but dark brown and trace of organic matter.	M			
	■	■	■			1		CL	SILTY SANDY CLAY: low plasticity, light brown mottled orange, trace of ironstone gravel and root fibres.	MC≈PL	-	-	
				■		1.5			SILTY SANDY CLAY: low plasticity, brown mottled light brown and orange, with ironstone banding.				
									END OF BOREHOLE AT 1.55m				PUSH TUBE REFUSAL
						2							
						2.5							
						3							
						3.5							

Jeffery and Katauskas Pty Ltd
CONSULTING GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
ABN 17 003 550 801

REPORT EXPLANATION NOTES

INTRODUCTION

These notes have been provided to amplify the geotechnical report in regard to classification methods, field procedures and certain matters relating to the Comments and Recommendations section. Not all notes are necessarily relevant to all reports.

The ground is a product of continuing natural and man-made processes and therefore exhibits a variety of characteristics and properties which vary from place to place and can change with time. Geotechnical engineering involves gathering and assimilating limited facts about these characteristics and properties in order to understand or predict the behaviour of the ground on a particular site under certain conditions. This report may contain such facts obtained by inspection, excavation, probing, sampling, testing or other means of investigation. If so, they are directly relevant only to the ground at the place where and time when the investigation was carried out.

DESCRIPTION AND CLASSIFICATION METHODS

The methods of description and classification of soils and rocks used in this report are based on Australian Standard 1726, the SAA Site Investigation Code. In general, descriptions cover the following properties – soil or rock type, colour, structure, strength or density, and inclusions. Identification and classification of soil and rock involves judgement and the Company infers accuracy only to the extent that is common in current geotechnical practice.

Soil types are described according to the predominating particle size and behaviour as set out in the attached Unified Soil Classification Table qualified by the grading of other particles present (eg sandy clay) as set out below:

Soil Classification	Particle Size
Clay	less than 0.002mm
Silt	0.002 to 0.06mm
Sand	0.06 to 2mm
Gravel	2 to 60mm

Non-cohesive soils are classified on the basis of relative density, generally from the results of Standard Penetration Test (SPT) as below:

Relative Density	SPT 'N' Value (blows/300mm)
Very loose	less than 4
Loose	4 – 10
Medium dense	10 – 30
Dense	30 – 50
Very Dense	greater than 50

Cohesive soils are classified on the basis of strength (consistency) either by use of hand penetrometer, laboratory testing or engineering examination. The strength terms are defined as follows.

Classification	Unconfined Compressive Strength kPa
Very Soft	less than 25
Soft	25 – 50
Firm	50 – 100
Stiff	100 – 200
Very Stiff	200 – 400
Hard	Greater than 400
Friable	Strength not attainable – soil crumbles

Rock types are classified by their geological names, together with descriptive terms regarding weathering, strength, defects, etc. Where relevant, further information regarding rock classification is given in the text of the report. In the Sydney Basin, 'Shale' is used to describe thinly bedded to laminated siltstone.

SAMPLING

Sampling is carried out during drilling or from other excavations to allow engineering examination (and laboratory testing where required) of the soil or rock.

Disturbed samples taken during drilling provide information on plasticity, grain size, colour, moisture content, minor constituents and, depending upon the degree of disturbance, some information on strength and structure. Bulk samples are similar but of greater volume required for some test procedures.

Undisturbed samples are taken by pushing a thin-walled sample tube, usually 50mm diameter (known as a U50), into the soil and withdrawing it with a sample of the soil contained in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

Details of the type and method of sampling used are given on the attached logs.

INVESTIGATION METHODS

The following is a brief summary of investigation methods currently adopted by the Company and some comments on their use and application. All except test pits, hand auger drilling and portable dynamic cone penetrometers require the use of a mechanical drilling rig which is commonly mounted on a truck chassis.

Test Pits: These are normally excavated with a backhoe or a tracked excavator, allowing close examination of the insitu soils if it is safe to descend into the pit. The depth of penetration is limited to about 3m for a backhoe and up to 6m for an excavator. Limitations of test pits are the problems associated with disturbance and difficulty of reinstatement and the consequent effects on close-by structures. Care must be taken if construction is to be carried out near test pit locations to either properly recompact the backfill during construction or to design and construct the structure so as not to be adversely affected by poorly compacted backfill at the test pit location.

Hand Auger Drilling: A borehole of 50mm to 100mm diameter is advanced by manually operated equipment. Premature refusal of the hand augers can occur on a variety of materials such as hard clay, gravel or ironstone, and does not necessarily indicate rock level.

Continuous Spiral Flight Augers: The borehole is advanced using 75mm to 115mm diameter continuous spiral flight augers, which are withdrawn at intervals to allow sampling and insitu testing. This is a relatively economical means of drilling in clays and in sands above the water table. Samples are returned to the surface by the flights or may be collected after withdrawal of the auger flights, but they can be very disturbed and layers may become mixed. Information from the auger sampling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively lower reliability due to mixing or softening of samples by groundwater, or uncertainties as to the original depth of the samples. Augering below the groundwater table is of even lesser reliability than augering above the water table.

Rock Augering: Use can be made of a Tungsten Carbide (TC) bit for auger drilling into rock to indicate rock quality and continuity by variation in drilling resistance and from examination of recovered rock fragments. This method of investigation is quick and relatively inexpensive but provides only an indication of the likely rock strength and predicted values may be in error by a strength order. Where rock strengths may have a significant impact on construction feasibility or costs, then further investigation by means of cored boreholes may be warranted.

Wash Boring: The borehole is usually advanced by a rotary bit, with water being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from "feel" and rate of penetration.

Mud Stabilised Drilling: Either Wash Boring or Continuous Core Drilling can use drilling mud as a circulating fluid to stabilise the borehole. The term 'mud' encompasses a range of products ranging from bentonite to polymers such as Revert or Biogel. The mud tends to mask the cuttings and reliable identification is only possible from intermittent intact sampling (eg from SPT and U50 samples) or from rock coring, etc.

Continuous Core Drilling: A continuous core sample is obtained using a diamond tipped core barrel. Provided full core recovery is achieved (which is not always possible in very low strength rocks and granular soils), this technique provides a very reliable (but relatively expensive) method of investigation. In rocks, an NMLC triple tube core barrel, which gives a core of about 50mm diameter, is usually used with water flush. The length of core recovered is compared to the length drilled and any length not recovered is shown as CORE LOSS. The location of losses are determined on site by the supervising engineer; where the location is uncertain, the loss is placed at the top end of the drill run.

Standard Penetration Tests: Standard Penetration Tests (SPT) are used mainly in non-cohesive soils, but can also be used in cohesive soils as a means of indicating density or strength and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289, "Methods of Testing Soils for Engineering Purposes" – Test F3.1.

The test is carried out in a borehole by driving a 50mm diameter split sample tube with a tapered shoe, under the impact of a 63kg hammer with a free fall of 760mm. It is normal for the tube to be driven in three successive 150mm increments and the 'N' value is taken as the number of blows for the last 300mm. In dense sands, very hard clays or weak rock, the full 450mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form:

- In the case where full penetration is obtained with successive blow counts for each 150mm of, say, 4, 6 and 7 blows, as

  N = 13
  4, 6, 7

- In a case where the test is discontinued short of full penetration, say after 15 blows for the first 150mm and 30 blows for the next 40mm, as

  N>30
  15, 30/40mm

The results of the test can be related empirically to the engineering properties of the soil.

Occasionally, the drop hammer is used to drive 50mm diameter thin walled sample tubes (U50) in clays. In such circumstances, the test results are shown on the borehole logs in brackets.

A modification to the SPT test is where the same driving system is used with a solid 60° tipped steel cone of the same diameter as the SPT hollow sampler. The solid cone can be continuously driven for some distance in soft clays or loose sands, or may be used where damage would otherwise occur to the SPT. The results of this Solid Cone Penetration Test (SCPT) are shown as "N_c" on the borehole logs, together with the number of blows per 150mm penetration.

Static Cone Penetrometer Testing and Interpretation: Cone penetrometer testing (sometimes referred to as a Dutch Cone) described in this report has been carried out using an Electronic Friction Cone Penetrometer (EFCP). The test is described in Australian Standard 1289, Test F5.1.

In the tests, a 35mm diameter rod with a conical tip is pushed continuously into the soil, the reaction being provided by a specially designed truck or rig which is fitted with an hydraulic ram system. Measurements are made of the end bearing resistance on the cone and the frictional resistance on a separate 134mm long sleeve, immediately behind the cone. Transducers in the tip of the assembly are electrically connected by wires passing through the centre of the push rods to an amplifier and recorder unit mounted on the control truck.

As penetration occurs (at a rate of approximately 20mm per second) the information is output as incremental digital records every 10mm. The results given in this report have been plotted from the digital data.

The information provided on the charts comprise:

- Cone resistance – the actual end bearing force divided by the cross sectional area of the cone – expressed in MPa.
- Sleeve friction – the frictional force on the sleeve divided by the surface area – expressed in kPa.
- Friction ratio – the ratio of sleeve friction to cone resistance, expressed as a percentage.

The ratios of the sleeve resistance to cone resistance will vary with the type of soil encountered, with higher relative friction in clays than in sands. Friction ratios of 1% to 2% are commonly encountered in sands and occasionally very soft clays, rising to 4% to 10% in stiff clays and peats. Soil descriptions based on cone resistance and friction ratios are only inferred and must not be considered as exact.

Correlations between EFCP and SPT values can be developed for both sands and clays but may be site specific.

Interpretation of EFCP values can be made to empirically derive modulus or compressibility values to allow calculation of foundation settlements.

Stratification can be inferred from the cone and friction traces and from experience and information from nearby boreholes etc. Where shown, this information is presented for general guidance, but must be regarded as interpretive. The test method provides a continuous profile of engineering properties but, where precise information on soil classification is required, direct drilling and sampling may be preferable.

Portable Dynamic Cone Penetrometers: Portable Dynamic Cone Penetrometer (DCP) tests are carried out by driving a rod into the ground with a sliding hammer and counting the blows for successive 100mm increments of penetration.

Two relatively similar tests are used:

- Cone penetrometer (commonly known as the Scala Penetrometer) – a 16mm rod with a 20mm diameter cone end is driven with a 9kg hammer dropping 510mm (AS1289, Test F3.2). The test was developed initially for pavement subgrade investigations, and correlations of the test results with California Bearing Ratio have been published by various Road Authorities.
- Perth sand penetrometer – a 16mm diameter flat ended rod is driven with a 9kg hammer, dropping 600mm (AS1289, Test F3.3). This test was developed for testing the density of sands (originating in Perth) and is mainly used in granular soils and filling.

LOGS

The borehole or test pit logs presented herein are an engineering and/or geological interpretation of the sub-surface conditions, and their reliability will depend to some extent on the frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will enable the most reliable assessment, but is not always practicable or possible to justify on economic grounds. In any case, the boreholes or test pits represent only a very small sample of the total subsurface conditions.

The attached explanatory notes define the terms and symbols used in preparation of the logs.

Interpretation of the information shown on the logs, and its application to design and construction, should therefore take into account the spacing of boreholes or test pits, the method of drilling or excavation, the frequency of sampling and testing and the possibility of other than "straight line" variations between the boreholes or test pits. Subsurface conditions between boreholes or test pits may vary significantly from conditions encountered at the borehole or test pit locations.

GROUNDWATER

Where groundwater levels are measured in boreholes, there are several potential problems:

- Although groundwater may be present, in low permeability soils it may enter the hole slowly or perhaps not at all during the time it is left open.
- A localised perched water table may lead to an erroneous indication of the true water table.
- Water table levels will vary from time to time with seasons or recent weather changes and may not be the same at the time of construction.
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must be washed out of the hole or 'reverted' chemically if water observations are to be made.

More reliable measurements can be made by installing standpipes which are read after stabilising at intervals ranging from several days to perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from perched water tables or surface water.

FILL

The presence of fill materials can often be determined only by the inclusion of foreign objects (eg bricks, steel etc) or by distinctly unusual colour, texture or fabric. Identification of the extent of fill materials will also depend on investigation methods and frequency. Where natural soils similar to those at the site are used for fill, it may be difficult with limited testing and sampling to reliably determine the extent of the fill.

The presence of fill materials is usually regarded with caution as the possible variation in density, strength and material type is much greater than with natural soil deposits. Consequently, there is an increased risk of adverse engineering characteristics or behaviour. If the volume and quality of fill is of importance to a project, then frequent test pit excavations are preferable to boreholes.

LABORATORY TESTING

Laboratory testing is normally carried out in accordance with Australian Standard 1289 *'Methods of Testing Soil for Engineering Purposes'*. Details of the test procedure used are given on the individual report forms.

ENGINEERING REPORTS

Engineering reports are prepared by qualified personnel and are based on the information obtained and on current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal (eg. a three storey building) the information and interpretation may not be relevant if the design proposal is changed (eg to a twenty storey building). If this happens, the company will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical aspects and recommendations or suggestions for design and construction. However, the Company cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions – the potential for this will be partially dependent on borehole spacing and sampling frequency as well as investigation technique.
- Changes in policy or interpretation of policy by statutory authorities.
- The actions of persons or contractors responding to commercial pressures.

If these occur, the company will be pleased to assist with investigation or advice to resolve any problems occurring.

SITE ANOMALIES

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, the company requests that it immediately be notified. Most problems are much more readily resolved when conditions are exposed that at some later stage, well after the event.

REPRODUCTION OF INFORMATION FOR CONTRACTUAL PURPOSES

Attention is drawn to the document *'Guidelines for the Provision of Geotechnical Information in Tender Documents'*, published by the Institution of Engineers, Australia. Where information obtained from this investigation is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. The company would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

REVIEW OF DESIGN

Where major civil or structural developments are proposed or where only a limited investigation has been completed or where the geotechnical conditions/ constraints are quite complex, it is prudent to have a joint design review which involves a senior geotechnical engineer.

SITE INSPECTION

The company will always be pleased to provide engineering inspection services for geotechnical aspects of work to which this report is related.

Requirements could range from:

i) a site visit to confirm that conditions exposed are no worse than those interpreted, to

ii) a visit to assist the contractor or other site personnel in identifying various soil/rock types such as appropriate footing or pier founding depths, or

iii) full time engineering presence on site.

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GRAPHIC LOG SYMBOLS FOR SOILS AND ROCKS

SOIL


FILL


TOPSOIL


CLAY (CL, CH)


SILT (ML, MH)


SAND (SP, SW)


GRAVEL (GP, GW)


SANDY CLAY (CL, CH)


SILTY CLAY (CL, CH)


CLAYEY SAND (SC)


SILTY SAND (SM)


GRAVELLY CLAY (CL, CH)


CLAYEY GRAVEL (GC)


SANDY SILT (ML)


PEAT AND ORGANIC SOILS

ROCK


CONGLOMERATE


SANDSTONE


SHALE


SILTSTONE, MUDSTONE, CLAYSTONE


LIMESTONE


PHYLLITE, SCHIST


TUFF


GRANITE, GABBRO


DOLERITE, DIORITE


BASALT, ANDESITE


QUARTZITE

DEFECTS AND INCLUSIONS


CLAY SEAM


SHEARED OR CRUSHED SEAM


BRECCIATED OR SHATTERED SEAM/ZONE


IRONSTONE GRAVEL


ORGANIC MATERIAL

OTHER MATERIALS


CONCRETE


BITUMINOUS CONCRETE, COAL


COLLUVIUM

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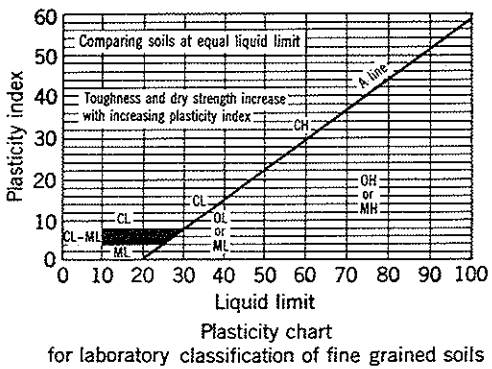
UNIFIED SOIL CLASSIFICATION TABLE

Field Identification Procedures (Excluding particles larger than 75 μm and basing fractions on estimated weights)						Group Symbols [a]	Typical Names	Information Required for Describing Soils	Laboratory Classification Criteria
Coarse-grained soils: More than half of material is *larger* than 75 μm sieve size[b] (The 75 μm sieve size is about the smallest particle visible to naked eye)	Gravels: More than half of coarse fraction is larger than 4 mm sieve size	Clean gravels (little or no fines)	Wide range in grain size and substantial amounts of all intermediate particle sizes			*GW*	Well graded gravels, gravel-sand mixtures, little or no fines	Give typical name; indicate approximate percentages of sand and gravel; maximum size; angularity, surface condition, and hardness of the coarse grains; local or geologic name and other pertinent descriptive information; and symbols in parentheses For undisturbed soils add information on stratification, degree of compactness, cementation, moisture conditions and drainage characteristics Example: *Silty sand*, gravelly; about 20% hard, angular gravel particles 12 mm maximum size; rounded and subangular sand grains coarse to fine, about 15% non-plastic fines with low dry strength; well compacted and moist in place; alluvial sand; (*SM*)	Use grain size curve in identifying the fractions as given under field identification Determine percentages of gravel and sand from grain size curve Depending on percentage of fines (fraction smaller than 75 μm sieve size) coarse grained soils are classified as follows: Less than 5% *GW, GP, SW, SP* More than 12% *GM, GC, SM, SC* 5% to 12% *Borderline* cases requiring use of dual symbols $C_U = \frac{D_{60}}{D_{10}}$ Greater than 4 $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3 Not meeting all gradation requirements for *GW* Atterberg limits below "A" line, or *PI* less than 4 — Above "A" line with *PI* between 4 and 7 are *borderline* cases requiring use of dual symbols Atterberg limits above "A" line, with *PI* greater than 7
			Predominantly one size or a range of sizes with some intermediate sizes missing			*GP*	Poorly graded gravels, gravel-sand mixtures, little or no fines		
		Gravels with fines (appreciable amount of fines)	Nonplastic fines (for identification procedures see *ML* below)			*GM*	Silty gravels, poorly graded gravel-sand-silt mixtures		
			Plastic fines (for identification procedures, see *CL* below)			*GC*	Clayey gravels, poorly graded gravel-sand-clay mixtures		
	Sands: More than half of coarse fraction is smaller than 4 mm sieve size	Clean sands (little or no fines)	Wide range in grain sizes and substantial amounts of all intermediate particle sizes			*SW*	Well graded sands, gravelly sands, little or no fines		$C_U = \frac{D_{60}}{D_{10}}$ Greater than 6 $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3 Not meeting all gradation requirements for *SW* Atterberg limits below "A" line or *PI* less than 5 — Above "A" line with *PI* between 4 and 7 are *borderline* cases requiring use of dual symbols Atterberg limits below "A" line with *PI* greater than 7
			Predominantly one size or a range of sizes with some intermediate sizes missing			*SP*	Poorly graded sands, gravelly sands, little or no fines		
		Sands with fines (appreciable amount of fines)	Nonplastic fines (for identification procedures, see *ML* below)			*SM*	Silty sands, poorly graded sand-silt mixtures		
			Plastic fines (for identification procedures, see *CL* below)			*SC*	Clayey sands, poorly graded sand-clay mixtures		
Fine-grained soils: More than half of material is *smaller* than 75 μm sieve size	Identification Procedures on Fraction Smaller than 380 μm Sieve Size								
	Silts and clays: liquid limit less than 50		Dry Strength (crushing characteristics)	Dilatancy (reaction to shaking)	Toughness (consistency near plastic limit)				
			None to slight	Quick to slow	None	*ML*	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands with slight plasticity	Give typical name; indicate degree and character of plasticity, amount and maximum size of coarse grains; colour in wet condition, odour if any, local or geologic name, and other pertinent descriptive information, and symbol in parentheses For undisturbed soils add information on structure, stratification, consistency in undisturbed and remoulded states, moisture and drainage conditions Example: *Clayey silt*, brown; slightly plastic; small percentage of fine sand; numerous vertical root holes; firm and dry in place; loess; (*ML*)	
			Medium to high	None to very slow	Medium	*CL*	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays		
			Slight to medium	Slow	Slight	*OL*	Organic silts and organic silt-clays of low plasticity		
	Silts and clays: liquid limit greater than 50		Slight to medium	Slow to none	Slight to medium	*MH*	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts		
			High to very high	None	High	*CH*	Inorganic clays of high plasticity, fat clays		
			Medium to high	None to very slow	Slight to medium	*OH*	Organic clays of medium to high plasticity		
Highly Organic Soils			Readily identified by colour, odour, spongy feel and frequently by fibrous texture			*Pt*	Peat and other highly organic soils		



Plasticity chart
for laboratory classification of fine grained soils

NOTE: 1) Soils possessing characteristics of two groups are designated by combinations of group symbols (e.g. GW-GC, well graded gravel-sand mixture with clay fines).

2) Soils with liquid limits of the order of 35 to 50 may be visually classified as being of medium plasticity.

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LOG SYMBOLS

LOG COLUMN	SYMBOL	DEFINITION
Groundwater Record		Standing water level. Time delay following completion of drilling may be shown.
		Extent of borehole collapse shortly after drilling.
		Groundwater seepage into borehole or excavation noted during drilling or excavation.
Samples	ES	Soil sample taken over depth indicated, for environmental analysis.
	U50	Undisturbed 50mm diameter tube sample taken over depth indicated.
	DB	Bulk disturbed sample taken over depth indicated.
	DS	Small disturbed bag sample taken over depth indicated.
	ASB	Soil sample taken over depth indicated, for asbestos screening.
	ASS	Soil sample taken over depth indicated, for acid sulfate soil analysis.
	SAL	Soil sample taken over depth indicated, for salinity analysis.
Field Tests	N = 17 4, 7, 10	Standard Penetration Test (SPT) performed between depths indicated by lines. Individual figures show blows per 150mm penetration. 'R' as noted below.
	N_c = 5 7 3R	Solid Cone Penetration Test (SCPT) performed between depths indicated by lines. Individual figures show blows per 150mm penetration for 60 degree solid cone driven by SPT hammer. 'R' refers to apparent hammer refusal within the corresponding 150mm depth increment.
	VNS = 25	Vane shear reading in kPa of Undrained Shear Strength.
	PID = 100	Photoionisation detector reading in ppm (Soil sample headspace test).
Moisture Condition (Cohesive Soils)	MC > PL	Moisture content estimated to be greater than plastic limit.
	MC ≈ PL	Moisture content estimated to be approximately equal to plastic limit.
	MC < PL	Moisture content estimated to be less than plastic limit.
(Cohesionless Soils)	D	DRY - runs freely through fingers.
	M	MOIST - does not run freely but no free water visible on soil surface.
	W	WET - free water visible on soil surface.
Strength (Consistency) Cohesive Soils	VS	VERY SOFT - Unconfined compressive strength less than 25kPa
	S	SOFT - Unconfined compressive strength 25-50kPa
	F	FIRM - Unconfined compressive strength 50-100kPa
	St	STIFF - Unconfined compressive strength 100-200kPa
	VSt	VERY STIFF - Unconfined compressive strength 200-400kPa
	H	HARD - Unconfined compressive strength greater than 400kPa
	( )	Bracketed symbol indicates estimated consistency based on tactile examination or other tests.
Density Index/ Relative Density (Cohesionless Soils)		**Density Index (I_D) Range (%)** / **SPT 'N' Value Range (Blows/300mm)**
	VL	Very Loose - <15 - 0-4
	L	Loose - 15-35 - 4-10
	MD	Medium Dense - 35-65 - 10-30
	D	Dense - 65-85 - 30-50
	VD	Very Dense - >85 - >50
	( )	Bracketed symbol indicates estimated density based on ease of drilling or other tests.
Hand Penetrometer Readings	300 250	Numbers indicate individual test results in kPa on representative undisturbed material unless noted otherwise.
Remarks	'V' bit	Hardened steel 'V' shaped bit.
	'TC' bit	Tungsten carbide wing bit.
	T 60	Penetration of auger string in mm under static load of rig applied by drill head hydraulics without rotation of augers.

Ref: Standard Sheets/Log Symbols
November 2007

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CONSULTING GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

ABN 17 003 550 801

LOG SYMBOLS

ROCK MATERIAL WEATHERING CLASSIFICATION

TERM	SYMBOL	DEFINITION
Residual Soil	RS	Soil developed on extremely weathered rock; the mass structure and substance fabric are no longer evident; there is a large change in volume but the soil has not been significantly transported.
Extremely weathered rock	XW	Rock is weathered to such an extent that it has "soil" properties, ie it either disintegrates or can be remoulded, in water.
Distinctly weathered rock	DW	Rock strength usually changed by weathering. The rock may be highly discoloured, usually by ironstaining. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores.
Slightly weathered rock	SW	Rock is slightly discoloured but shows little or no change of strength from fresh rock.
Fresh rock	FR	Rock shows no sign of decomposition or staining.

ROCK STRENGTH

Rock strength is defined by the Point Load Strength Index (Is 50) and refers to the strength of the rock substance in the direction normal to the bedding. The test procedure is described by the International Journal of Rock Mechanics, Mining, Science and Geomechanics. Abstract Volume 22, No 2, 1985.

TERM	SYMBOL	Is (50) MPa	FIELD GUIDE
Extremely Low:	EL	0.03	Easily remoulded by hand to a material with soil properties.
Very Low:	VL	0.1	May be crumbled in the hand. Sandstone is "sugary" and friable.
Low:	L	0.3	A piece of core 150mm long x 50mm dia. may be broken by hand and easily scored with a knife. Sharp edges of core may be friable and break during handling.
Medium Strength:	M	1	A piece of core 150mm long x 50mm dia. can be broken by hand with difficulty. Readily scored with knife.
High:	H	3	A piece of core 150mm long x 50mm dia. core cannot be broken by hand, can be slightly scratched or scored with knife; rock rings under hammer.
Very High:	VH	10	A piece of core 150mm long x 50mm dia. may be broken with hand-held pick after more than one blow. Cannot be scratched with pen knife; rock rings under hammer.
Extremely High:	EH		A piece of core 150mm long x 50mm dia. is very difficult to break with hand-held hammer. Rings when struck with a hammer.

ABBREVIATIONS USED IN DEFECT DESCRIPTION

ABBREVIATION	DESCRIPTION	NOTES
Be	Bedding Plane Parting	Defect orientations measured relative to the normal to the long core axis (ie relative to horizontal for vertical holes)
CS	Clay Seam	
J	Joint	
P	Planar	
Un	Undulating	
S	Smooth	
R	Rough	
IS	Ironstained	
XWS	Extremely Weathered Seam	
Cr	Crushed Seam	
60t	Thickness of defect in millimetres	

APPENDIX B

(Laboratory Reports and Chain of Custody Documents)

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
enquiries@envirolabservices.com.au
www.envirolabservices.com.au

CERTIFICATE OF ANALYSIS 57899

Client:
Environmental Investigation Services
PO Box 976
North Ryde BC
NSW 1670

Attention: Todd Hore

Sample log in details:

Your Reference:	**E25004KH, Silverdale**		
No. of samples:	106 Soils		
Date samples received / completed instructions received	01/07/11	/	01/07/11

Analysis Details:
Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	8/07/11	/	8/07/11
Date of Preliminary Report:	Not issued		

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vTRH & BTEX in Soil						
Our Reference:	UNITS	57899-1	57899-3	57899-4	57899-6	57899-9
Your Reference	----------	BH1	BH1	BH2	BH2	BH3
Depth	----------	0.2-0.5	1-1.1	0-0.3	1.2-1.4	0.2-0.4
Date Sampled		29/06/2011	29/06/2011	29/06/2011	29/06/2011	29/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011
Date analysed	-	05/07/2011	05/07/2011	05/07/2011	05/07/2011	05/07/2011
vTRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	89	103	105	104	102

vTRH & BTEX in Soil						
Our Reference:	UNITS	57899-10	57899-11	57899-13	57899-16	57899-18
Your Reference	----------	BH3	BH4	BH4	BH5	BH5
Depth	----------	0.5-0.8	0.2-0.5	0.6-0.9	0.2-0.5	1.3-1.5
Date Sampled		29/06/2011	29/06/2011	29/06/2011	29/06/2011	29/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011
Date analysed	-	05/07/2011	05/07/2011	05/07/2011	05/07/2011	05/07/2011
vTRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	102	106	105	98	103

vTRH & BTEX in Soil						
Our Reference:	UNITS	57899-20	57899-21	57899-25	57899-28	57899-34
Your Reference	----------	BH6	BH6	BH7	BH8	BH10
Depth	----------	0.2-0.4	0.6-0.9	0.7-0.9	1.3-1.45	0.5-0.8
Date Sampled		30/06/2011	30/06/2011	29/06/2011	29/06/2011	29/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011
Date analysed	-	05/07/2011	05/07/2011	05/07/2011	05/07/2011	05/07/2011
vTRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	103	96	103	107	102

vTRH & BTEX in Soil						
Our Reference:	UNITS	57899-35	57899-36	57899-38	57899-61	57899-87
Your Reference	----------	BH10	BH11	BH11	BH16	BH23
Depth	----------	1.4-1.7	0-0.3	1.3-1.5	1.2-1.5	0.6-0.9
Date Sampled		29/06/2011	29/06/2011	29/06/2011	29/06/2011	30/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011
Date analysed	-	05/07/2011	05/07/2011	05/07/2011	05/07/2011	05/07/2011
vTRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	120	98	102	98	98

vTRH & BTEX in Soil			
Our Reference:	UNITS	57899-105	57899-106
Your Reference	----------	TS 1	FB 1
Depth	----------	-	-
Date Sampled		29/06/2011	30/06/2011
Type of sample		Soil	Soil
Date extracted	-	04/07/2011	04/07/2011
Date analysed	-	05/07/2011	05/07/2011
vTRH C_6 - C_9	mg/kg	[NA]	<25
Benzene	mg/kg	115%	<0.2
Toluene	mg/kg	115%	<0.5
Ethylbenzene	mg/kg	115%	<1
m+p-xylene	mg/kg	115%	<2
o-Xylene	mg/kg	115%	<1
Surrogate aaa-Trifluorotoluene	%	117	100

sTRH in Soil (C10-C36)						
Our Reference:	UNITS	57899-1	57899-3	57899-4	57899-6	57899-9
Your Reference	----------	BH1	BH1	BH2	BH2	BH3
Depth	----------	0.2-0.5	1-1.1	0-0.3	1.2-1.4	0.2-0.4
Date Sampled		29/06/2011	29/06/2011	29/06/2011	29/06/2011	29/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011
Date analysed	-	05/05/2011	05/05/2011	05/05/2011	05/05/2011	05/05/2011
$TRHC_{10}$ - C_{14}	mg/kg	<50	<50	<50	<50	<50
$TRHC_{15}$ - C_{28}	mg/kg	<100	<100	<100	<100	<100
$TRHC_{29}$ - C_{36}	mg/kg	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	87	83	87	83	84

sTRH in Soil (C10-C36)						
Our Reference:	UNITS	57899-10	57899-11	57899-13	57899-16	57899-18
Your Reference	----------	BH3	BH4	BH4	BH5	BH5
Depth	----------	0.5-0.8	0.2-0.5	0.6-0.9	0.2-0.5	1.3-1.5
Date Sampled		29/06/2011	29/06/2011	29/06/2011	29/06/2011	29/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011
Date analysed	-	05/05/2011	05/05/2011	05/05/2011	05/05/2011	05/05/2011
$TRHC_{10}$ - C_{14}	mg/kg	<50	<50	<50	<50	<50
$TRHC_{15}$ - C_{28}	mg/kg	<100	<100	<100	<100	<100
$TRHC_{29}$ - C_{36}	mg/kg	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	83	83	81	82	82

sTRH in Soil (C10-C36)						
Our Reference:	UNITS	57899-20	57899-21	57899-25	57899-28	57899-34
Your Reference	----------	BH6	BH6	BH7	BH8	BH10
Depth	----------	0.2-0.4	0.6-0.9	0.7-0.9	1.3-1.45	0.5-0.8
Date Sampled		30/06/2011	30/06/2011	29/06/2011	29/06/2011	29/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011
Date analysed	-	05/05/2011	05/05/2011	05/05/2011	05/05/2011	05/05/2011
$TRHC_{10}$ - C_{14}	mg/kg	<50	<50	<50	<50	<50
$TRHC_{15}$ - C_{28}	mg/kg	<100	<100	<100	<100	<100
$TRHC_{29}$ - C_{36}	mg/kg	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	82	81	80	81	82

sTRH in Soil (C10-C36)						
Our Reference:	UNITS	57899-35	57899-36	57899-38	57899-61	57899-87
Your Reference	----------	BH10	BH11	BH11	BH16	BH23
Depth	----------	1.4-1.7	0-0.3	1.3-1.5	1.2-1.5	0.6-0.9
Date Sampled		29/06/2011	29/06/2011	29/06/2011	29/06/2011	30/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011
Date analysed	-	05/05/2011	05/05/2011	05/05/2011	05/05/2011	05/05/2011
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	<50	<50	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	<100	<100	<100	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	<100	<100	<100	<100	<100
Surrogate o-Terphenyl	%	79	81	79	81	81

PAHs in Soil						
Our Reference:	UNITS	57899-1	57899-4	57899-9	57899-11	57899-16
Your Reference	----------	BH1	BH2	BH3	BH4	BH5
Depth	----------	0.2-0.5	0-0.3	0.2-0.4	0.2-0.5	0.2-0.5
Date Sampled		29/06/2011	29/06/2011	29/06/2011	29/06/2011	29/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011
Date analysed	-	06/07/2011	06/07/2011	06/07/2011	06/07/2011	06/07/2011
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate p-Terphenyl-d_{14}	%	97	96	102	100	98

PAHs in Soil						
Our Reference:	UNITS	57899-18	57899-20	57899-24	57899-26	57899-29
Your Reference	----------	BH5	BH6	BH7	BH8	BH9
Depth	----------	1.3-1.5	0.2-0.4	0.2-0.5	0.15-0.3	0.2-0.5
Date Sampled		29/06/2011	30/06/2011	29/06/2011	29/06/2011	29/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011
Date analysed	-	06/07/2011	06/07/2011	06/07/2011	06/07/2011	06/07/2011
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate p-Terphenyl-d_{14}	%	102	116	106	109	108

PAHs in Soil						
Our Reference:	UNITS	57899-34	57899-36	57899-37	57899-40	57899-42
Your Reference	----------	BH10	BH11	BH11	BH11	BH12
Depth	----------	0.5-0.8	0-0.3	1-1.2	1.7-1.8	0-0.3
Date Sampled		29/06/2011	29/06/2011	29/06/2011	29/06/2011	29/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011
Date analysed	-	06/07/2011	08/07/2011	08/07/2011	08/07/2011	08/07/2011
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate p-Terphenyl-d_{14}	%	110	116	110	109	113

PAHs in Soil						
Our Reference:	UNITS	57899-45	57899-50	57899-52	57899-53	57899-58
Your Reference	----------	BH13	BH14	BH15	BH15	BH16
Depth	----------	0-0.3	0-0.3	0-0.1	0.1-0.5	0-0.15
Date Sampled		30/06/2011	30/06/2011	29/06/2011	29/06/2011	29/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011
Date analysed	-	08/07/2011	08/07/2011	08/07/2011	08/07/2011	08/07/2011
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate p-Terphenyl-d_{14}	%	110	114	112	113	115

PAHs in Soil						
Our Reference:	UNITS	57899-60	57899-62	57899-64	57899-67	57899-71
Your Reference	----------	BH16	BH16	BH17	BH18	BH19
Depth	----------	0.5-0.7	1.8-2	0-0.15	0-0.25	0-0.12
Date Sampled		29/06/2011	29/06/2011	30/06/2011	30/06/2011	30/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011
Date analysed	-	08/07/2011	08/07/2011	08/07/2011	08/07/2011	08/07/2011
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	0.3	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	1.5	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	0.2	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	0.7	0.2	<0.1	<0.1
Pyrene	mg/kg	<0.1	1.0	0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	0.3	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	0.3	<0.1	<0.1	<0.1
Benzo(b+k)fluoranthene	mg/kg	<0.2	0.4	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	0.24	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	0.2	<0.1	<0.1	<0.1
Surrogate p-Terphenyl-d_{14}	%	102	105	113	108	111

PAHs in Soil						
Our Reference:	UNITS	57899-72	57899-73	57899-77	57899-82	57899-85
Your Reference	----------	BH19	BH20	BH21	BH22	BH23
Depth	----------	0.3-0.6	0-0.3	0-0.2	0-035	0-0.15
Date Sampled		30/06/2011	30/06/2011	30/06/2011	30/06/2011	30/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011
Date analysed	-	08/07/2011	08/07/2011	08/07/2011	08/07/2011	08/07/2011
Naphthalene	mg/kg	<0.1	<0.1	<0.1	0.4	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	2.6	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	0.3	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	0.7	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	13	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	3.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	18	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	16	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	7.9	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	7.6	<0.1
Benzo(b+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	13	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	9.5	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	5.4	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	0.8	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	5.0	<0.1
Surrogate p-Terphenyl-d_{14}	%	110	107	107	104	109

PAHs in Soil						
Our Reference:	UNITS	57899-89	57899-90	57899-91	57899-96	57899-100
Your Reference	----------	BH24	BH24	BH25	Dup 2	Dup 6
Depth	----------	0-0.35	0.6-0.9	0-03	-	-
Date Sampled		30/06/2011	30/06/2011	30/06/2011	29/06/2011	30/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011
Date analysed	-	08/07/2011	08/07/2011	08/07/2011	08/07/2011	08/07/2011
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate p-Terphenyl-d_{14}	%	111	110	110	106	111

PAHs in Soil		
Our Reference:	UNITS	57899-103
Your Reference	----------	Dup 9
Depth	----------	-
Date Sampled		30/06/2011
Type of sample		Soil
Date extracted	-	04/07/2011
Date analysed	-	08/07/2011
Naphthalene	mg/kg	<0.1
Acenaphthylene	mg/kg	<0.1
Acenaphthene	mg/kg	<0.1
Fluorene	mg/kg	<0.1
Phenanthrene	mg/kg	<0.1
Anthracene	mg/kg	<0.1
Fluoranthene	mg/kg	<0.1
Pyrene	mg/kg	<0.1
Benzo(a)anthracene	mg/kg	<0.1
Chrysene	mg/kg	<0.1
Benzo(b+k)fluoranthene	mg/kg	<0.2
Benzo(a)pyrene	mg/kg	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1
Surrogate p-Terphenyl-d_{14}	%	109

Acid Extractable metals in soil						
Our Reference:	UNITS	57899-1	57899-4	57899-9	57899-11	57899-16
Your Reference	----------	BH1	BH2	BH3	BH4	BH5
Depth	----------	0.2-0.5	0-0.3	0.2-0.4	0.2-0.5	0.2-0.5
Date Sampled		29/06/2011	29/06/2011	29/06/2011	29/06/2011	29/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011
Date analysed	-	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011
Arsenic	mg/kg	11	6	7	9	14
Cadmium	mg/kg	0.5	0.8	<0.5	0.6	<0.5
Chromium	mg/kg	28	14	24	28	24
Copper	mg/kg	16	18	13	11	20
Lead	mg/kg	25	23	24	25	18
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	5	5	4	4	8
Zinc	mg/kg	19	30	12	21	37

Acid Extractable metals in soil						
Our Reference:	UNITS	57899-18	57899-20	57899-24	57899-26	57899-29
Your Reference	----------	BH5	BH6	BH7	BH8	BH9
Depth	----------	1.3-1.5	0.2-0.4	0.2-0.5	0.15-0.3	0.2-0.5
Date Sampled		29/06/2011	30/06/2011	29/06/2011	29/06/2011	29/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011
Date analysed	-	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011
Arsenic	mg/kg	9	6	5	10	7
Cadmium	mg/kg	<0.5	1.2	<0.5	<0.5	<0.5
Chromium	mg/kg	26	20	5	25	22
Copper	mg/kg	15	9	20	14	19
Lead	mg/kg	23	13	21	21	29
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	3	5	2	6	4
Zinc	mg/kg	8	22	18	18	19

Acid Extractable metals in soil						
Our Reference:	UNITS	57899-34	57899-36	57899-37	57899-40	57899-42
Your Reference	----------	BH10	BH11	BH11	BH11	BH12
Depth	----------	0.5-0.8	0-0.3	1-1.2	1.7-1.8	0-0.3
Date Sampled		29/06/2011	29/06/2011	29/06/2011	29/06/2011	29/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011
Date analysed	-	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011
Arsenic	mg/kg	9	6	7	9	9
Cadmium	mg/kg	<0.5	<0.5	<0.5	0.5	0.6
Chromium	mg/kg	23	19	6	32	52
Copper	mg/kg	5	10	10	15	5
Lead	mg/kg	22	19	10	21	22
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	4	5	6	3	4
Zinc	mg/kg	9	17	7	5	9

Acid Extractable metals in soil						
Our Reference:	UNITS	57899-45	57899-50	57899-52	57899-53	57899-58
Your Reference	----------	BH13	BH14	BH15	BH15	BH16
Depth	----------	0-0.3	0-0.3	0-0.1	0.1-0.5	0-0.15
Date Sampled		30/06/2011	30/06/2011	29/06/2011	29/06/2011	29/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011
Date analysed	-	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011
Arsenic	mg/kg	8	<4	<4	6	6
Cadmium	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	mg/kg	30	15	5	15	28
Copper	mg/kg	4	1	14	21	91
Lead	mg/kg	15	11	13	17	10
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	3	2	3	10	22
Zinc	mg/kg	12	7	18	38	38

Acid Extractable metals in soil						
Our Reference:	UNITS	57899-60	57899-62	57899-64	57899-67	57899-71
Your Reference	----------	BH16	BH16	BH17	BH18	BH19
Depth	----------	0.5-0.7	1.8-2	0-0.15	0-0.25	0-0.12
Date Sampled		29/06/2011	29/06/2011	30/06/2011	30/06/2011	30/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011
Date analysed	-	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011
Arsenic	mg/kg	5	<4	7	8	7
Cadmium	mg/kg	<0.5	<0.5	<0.5	0.5	<0.5
Chromium	mg/kg	13	46	27	37	32
Copper	mg/kg	9	42	7	9	2
Lead	mg/kg	18	14	19	21	15
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	6	18	3	4	3
Zinc	mg/kg	20	34	8	9	6

Acid Extractable metals in soil						
Our Reference:	UNITS	57899-72	57899-73	57899-77	57899-82	57899-85
Your Reference	----------	BH19	BH20	BH21	BH22	BH23
Depth	----------	0.3-0.6	0-0.3	0-0.2	0-035	0-0.15
Date Sampled		30/06/2011	30/06/2011	30/06/2011	30/06/2011	30/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011
Date analysed	-	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011
Arsenic	mg/kg	5	4	9	7	12
Cadmium	mg/kg	<0.5	<0.5	0.5	<0.5	0.8
Chromium	mg/kg	29	19	31	24	33
Copper	mg/kg	1	7	8	11	18
Lead	mg/kg	13	12	28	23	52
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	3	3	3	4	8
Zinc	mg/kg	2	10	11	16	160

Acid Extractable metals in soil						
Our Reference:	UNITS	57899-89	57899-90	57899-91	57899-96	57899-100
Your Reference	----------	BH24	BH24	BH25	Dup 2	Dup 6
Depth	----------	0-0.35	0.6-0.9	0-03	-	-
Date Sampled		30/06/2011	30/06/2011	30/06/2011	29/06/2011	30/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011
Date analysed	-	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011
Arsenic	mg/kg	<4	8	5	10	5
Cadmium	mg/kg	<0.5	0.8	<0.5	<0.5	2.7
Chromium	mg/kg	20	41	21	20	16
Copper	mg/kg	4	<1	9	19	11
Lead	mg/kg	13	18	13	20	12
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	3	3	3	8	6
Zinc	mg/kg	6	2	9	29	26

Acid Extractable metals in soil		
Our Reference:	UNITS	57899-103
Your Reference	----------	Dup 9
Depth	----------	-
Date Sampled		30/06/2011
Type of sample		Soil
Date digested	-	04/07/2011
Date analysed	-	04/07/2011
Arsenic	mg/kg	4
Cadmium	mg/kg	<0.5
Chromium	mg/kg	14
Copper	mg/kg	1
Lead	mg/kg	11
Mercury	mg/kg	<0.1
Nickel	mg/kg	2
Zinc	mg/kg	6

Moisture						
Our Reference:	UNITS	57899-1	57899-3	57899-4	57899-6	57899-9
Your Reference	----------	BH1	BH1	BH2	BH2	BH3
Depth	----------	0.2-0.5	1-1.1	0-0.3	1.2-1.4	0.2-0.4
Date Sampled		29/06/2011	29/06/2011	29/06/2011	29/06/2011	29/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	4/07/2011	4/07/2011	4/07/2011	4/07/2011	4/07/2011
Date analysed	-	5/07/2011	5/07/2011	5/07/2011	5/07/2011	5/07/2011
Moisture	%	26	9.7	16	23	22

Moisture						
Our Reference:	UNITS	57899-10	57899-11	57899-13	57899-16	57899-18
Your Reference	----------	BH3	BH4	BH4	BH5	BH5
Depth	----------	0.5-0.8	0.2-0.5	0.6-0.9	0.2-0.5	1.3-1.5
Date Sampled		29/06/2011	29/06/2011	29/06/2011	29/06/2011	29/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	4/07/2011	4/07/2011	4/07/2011	4/07/2011	4/07/2011
Date analysed	-	5/07/2011	5/07/2011	5/07/2011	5/07/2011	5/07/2011
Moisture	%	24	16	24	19	21

Moisture						
Our Reference:	UNITS	57899-19	57899-20	57899-21	57899-24	57899-25
Your Reference	----------	BH5	BH6	BH6	BH7	BH7
Depth	----------	1.7-1.8	0.2-0.4	0.6-0.9	0.2-0.5	0.7-0.9
Date Sampled		29/06/2011	30/06/2011	30/06/2011	29/06/2011	29/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	4/07/2011	4/07/2011	4/07/2011	4/07/2011	4/07/2011
Date analysed	-	5/07/2011	5/07/2011	5/07/2011	5/07/2011	5/07/2011
Moisture	%	17	16	25	14	25

Moisture						
Our Reference:	UNITS	57899-26	57899-28	57899-29	57899-33	57899-34
Your Reference	----------	BH8	BH8	BH9	BH10	BH10
Depth	----------	0.15-0.3	1.3-1.45	0.2-0.5	0-0.15	0.5-0.8
Date Sampled		29/06/2011	29/06/2011	29/06/2011	29/06/2011	29/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	4/07/2011	4/07/2011	4/07/2011	4/07/2011	4/07/2011
Date analysed	-	5/07/2011	5/07/2011	5/07/2011	5/07/2011	5/07/2011
Moisture	%	18	14	20	8.6	19

Moisture						
Our Reference:	UNITS	57899-35	57899-36	57899-37	57899-38	57899-40
Your Reference	----------	BH10	BH11	BH11	BH11	BH11
Depth	----------	1.4-1.7	0-0.3	1-1.2	1.3-1.5	1.7-1.8
Date Sampled		29/06/2011	29/06/2011	29/06/2011	29/06/2011	29/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	4/07/2011	4/07/2011	4/07/2011	4/07/2011	4/07/2011
Date analysed	-	5/07/2011	5/07/2011	5/07/2011	5/07/2011	5/07/2011
Moisture	%	25	14	8.7	19	26

Moisture						
Our Reference:	UNITS	57899-42	57899-45	57899-50	57899-52	57899-53
Your Reference	----------	BH12	BH13	BH14	BH15	BH15
Depth	----------	0-0.3	0-0.3	0-0.3	0-0.1	0.1-0.5
Date Sampled		29/06/2011	30/06/2011	30/06/2011	29/06/2011	29/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	4/07/2011	4/07/2011	4/07/2011	4/07/2011	4/07/2011
Date analysed	-	5/07/2011	5/07/2011	5/07/2011	5/07/2011	5/07/2011
Moisture	%	19	18	11	5.4	10

Moisture						
Our Reference:	UNITS	57899-58	57899-60	57899-61	57899-62	57899-63
Your Reference	----------	BH16	BH16	BH16	BH16	BH16
Depth	----------	0-0.15	0.5-0.7	1.2-1.5	1.8-2	2.7-3
Date Sampled		29/06/2011	29/06/2011	29/06/2011	29/06/2011	29/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	4/07/2011	4/07/2011	4/07/2011	4/07/2011	4/07/2011
Date analysed	-	5/07/2011	5/07/2011	5/07/2011	5/07/2011	5/07/2011
Moisture	%	9.8	15	13	12	24

Moisture						
Our Reference:	UNITS	57899-64	57899-67	57899-71	57899-72	57899-73
Your Reference	----------	BH17	BH18	BH19	BH19	BH20
Depth	----------	0-0.15	0-0.25	0-0.12	0.3-0.6	0-0.3
Date Sampled		30/06/2011	30/06/2011	30/06/2011	30/06/2011	30/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	4/07/2011	4/07/2011	4/07/2011	4/07/2011	4/07/2011
Date analysed	-	5/07/2011	5/07/2011	5/07/2011	5/07/2011	5/07/2011
Moisture	%	21	26	12	15	11

Moisture						
Our Reference:	UNITS	57899-77	57899-82	57899-85	57899-87	57899-89
Your Reference	----------	BH21	BH22	BH23	BH23	BH24
Depth	----------	0-0.2	0-035	0-0.15	0.6-0.9	0-0.35
Date Sampled		30/06/2011	30/06/2011	30/06/2011	30/06/2011	30/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	4/07/2011	4/07/2011	4/07/2011	4/07/2011	4/07/2011
Date analysed	-	5/07/2011	5/07/2011	5/07/2011	5/07/2011	5/07/2011
Moisture	%	20	20	21	20	18

Moisture						
Our Reference:	UNITS	57899-90	57899-91	57899-96	57899-100	57899-103
Your Reference	----------	BH24	BH25	Dup 2	Dup 6	Dup 9
Depth	----------	0.6-0.9	0-03	-	-	-
Date Sampled		30/06/2011	30/06/2011	29/06/2011	30/06/2011	30/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	4/07/2011	4/07/2011	4/07/2011	4/07/2011	4/07/2011
Date analysed	-	5/07/2011	5/07/2011	5/07/2011	5/07/2011	5/07/2011
Moisture	%	22	10	16	19	10

Moisture		
Our Reference:	UNITS	57899-106
Your Reference	----------	FB 1
Depth	----------	-
Date Sampled		30/06/2011
Type of sample		Soil
Date prepared	-	4/07/2011
Date analysed	-	5/07/2011
Moisture	%	12

Organochlorine Pesticides in soil						
Our Reference:	UNITS	57899-19	57899-21	57899-33	57899-36	57899-38
Your Reference	----------	BH5	BH6	BH10	BH11	BH11
Depth	----------	1.7-1.8	0.6-0.9	0-0.15	0-0.3	1.3-1.5
Date Sampled		29/06/2011	30/06/2011	29/06/2011	29/06/2011	29/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011
Date analysed	-	07/07/2011	07/07/2011	07/07/2011	07/07/2011	07/07/2011
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	95	96	92	95	94

Organochlorine Pesticides in soil						
Our Reference:	UNITS	57899-42	57899-45	57899-50	57899-52	57899-58
Your Reference	----------	BH12	BH13	BH14	BH15	BH16
Depth	----------	0-0.3	0-0.3	0-0.3	0-0.1	0-0.15
Date Sampled		29/06/2011	30/06/2011	30/06/2011	29/06/2011	29/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011
Date analysed	-	07/07/2011	07/07/2011	07/07/2011	07/07/2011	07/07/2011
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	90	89	89	74	90

Organochlorine Pesticides in soil						
Our Reference:	UNITS	57899-60	57899-63	57899-64	57899-67	57899-71
Your Reference	----------	BH16	BH16	BH17	BH18	BH19
Depth	----------	0.5-0.7	2.7-3	0-0.15	0-0.25	0-0.12
Date Sampled		29/06/2011	29/06/2011	30/06/2011	30/06/2011	30/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011
Date analysed	-	07/07/2011	07/07/2011	07/07/2011	07/07/2011	07/07/2011
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	92	93	94	96	94

Organochlorine Pesticides in soil						
Our Reference:	UNITS	57899-73	57899-77	57899-82	57899-85	57899-89
Your Reference	----------	BH20	BH21	BH22	BH23	BH24
Depth	----------	0-0.3	0-0.2	0-035	0-0.15	0-0.35
Date Sampled		30/06/2011	30/06/2011	30/06/2011	30/06/2011	30/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011
Date analysed	-	07/07/2011	07/07/2011	07/07/2011	07/07/2011	07/07/2011
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	95	96	97	93	96

Organochlorine Pesticides in soil		
Our Reference:	UNITS	57899-91
Your Reference	----------	BH25
Depth	----------	0-03
Date Sampled		30/06/2011
Type of sample		Soil
Date extracted	-	04/07/2011
Date analysed	-	07/07/2011
HCB	mg/kg	<0.1
alpha-BHC	mg/kg	<0.1
gamma-BHC	mg/kg	<0.1
beta-BHC	mg/kg	<0.1
Heptachlor	mg/kg	<0.1
delta-BHC	mg/kg	<0.1
Aldrin	mg/kg	<0.1
Heptachlor Epoxide	mg/kg	<0.1
gamma-Chlordane	mg/kg	<0.1
alpha-chlordane	mg/kg	<0.1
Endosulfan I	mg/kg	<0.1
pp-DDE	mg/kg	<0.1
Dieldrin	mg/kg	<0.1
Endrin	mg/kg	<0.1
pp-DDD	mg/kg	<0.1
Endosulfan II	mg/kg	<0.1
pp-DDT	mg/kg	<0.1
Endrin Aldehyde	mg/kg	<0.1
Endosulfan Sulphate	mg/kg	<0.1
Methoxychlor	mg/kg	<0.1
Surrogate TCLMX	%	95

Organophosphorus Pesticides						
Our Reference:	UNITS	57899-19	57899-21	57899-33	57899-36	57899-38
Your Reference	----------	BH5	BH6	BH10	BH11	BH11
Depth	----------	1.7-1.8	0.6-0.9	0-0.15	0-0.3	1.3-1.5
Date Sampled		29/06/2011	30/06/2011	29/06/2011	29/06/2011	29/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011
Date analysed	-	07/07/2011	07/07/2011	07/07/2011	07/07/2011	07/07/2011
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	95	96	92	95	94

Organophosphorus Pesticides						
Our Reference:	UNITS	57899-42	57899-45	57899-50	57899-52	57899-58
Your Reference	----------	BH12	BH13	BH14	BH15	BH16
Depth	----------	0-0.3	0-0.3	0-0.3	0-0.1	0-0.15
Date Sampled		29/06/2011	30/06/2011	30/06/2011	29/06/2011	29/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011
Date analysed	-	07/07/2011	07/07/2011	07/07/2011	07/07/2011	07/07/2011
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	90	69	89	74	90

Organophosphorus Pesticides						
Our Reference:	UNITS	57899-60	57899-63	57899-64	57899-67	57899-71
Your Reference	----------	BH16	BH16	BH17	BH18	BH19
Depth	----------	0.5-0.7	2.7-3	0-0.15	0-0.25	0-0.12
Date Sampled		29/06/2011	29/06/2011	30/06/2011	30/06/2011	30/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011
Date analysed	-	07/07/2011	07/07/2011	07/07/2011	07/07/2011	07/07/2011
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	92	93	94	96	94

Organophosphorus Pesticides						
Our Reference:	UNITS	57899-73	57899-77	57899-82	57899-85	57899-89
Your Reference	----------	BH20	BH21	BH22	BH23	BH24
Depth	----------	0-0.3	0-0.2	0-035	0-0.15	0-0.35
Date Sampled		30/06/2011	30/06/2011	30/06/2011	30/06/2011	30/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011
Date analysed	-	07/07/2011	07/07/2011	07/07/2011	07/07/2011	07/07/2011
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	95	96	97	93	96

Organophosphorus Pesticides		
Our Reference:	UNITS	57899-91
Your Reference	----------	BH25
Depth	----------	0-03
Date Sampled		30/06/2011
Type of sample		Soil
Date extracted	-	04/07/2011
Date analysed	-	07/07/2011
Diazinon	mg/kg	<0.1
Dimethoate	mg/kg	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1
Ronnel	mg/kg	<0.1
Chlorpyriphos	mg/kg	<0.1
Fenitrothion	mg/kg	<0.1
Bromophos-ethyl	mg/kg	<0.1
Ethion	mg/kg	<0.1
Surrogate TCLMX	%	95

PCBs in Soil						
Our Reference:	UNITS	57899-19	57899-21	57899-33	57899-36	57899-38
Your Reference	----------	BH5	BH6	BH10	BH11	BH11
Depth	----------	1.7-1.8	0.6-0.9	0-0.15	0-0.3	1.3-1.5
Date Sampled		29/06/2011	30/06/2011	29/06/2011	29/06/2011	29/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011
Date analysed	-	07/07/2011	07/07/2011	07/07/2011	07/07/2011	07/07/2011
Arochlor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1221*	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	95	96	92	95	94

PCBs in Soil						
Our Reference:	UNITS	57899-42	57899-45	57899-50	57899-52	57899-58
Your Reference	----------	BH12	BH13	BH14	BH15	BH16
Depth	----------	0-0.3	0-0.3	0-0.3	0-0.1	0-0.15
Date Sampled		29/06/2011	30/06/2011	30/06/2011	29/06/2011	29/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011
Date analysed	-	07/07/2011	07/07/2011	07/07/2011	07/07/2011	07/07/2011
Arochlor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1221*	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	90	69	89	74	90

PCBs in Soil						
Our Reference:	UNITS	57899-60	57899-63	57899-64	57899-67	57899-71
Your Reference	----------	BH16	BH16	BH17	BH18	BH19
Depth	----------	0.5-0.7	2.7-3	0-0.15	0-0.25	0-0.12
Date Sampled		29/06/2011	29/06/2011	30/06/2011	30/06/2011	30/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011
Date analysed	-	07/07/2011	07/07/2011	07/07/2011	07/07/2011	07/07/2011
Arochlor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1221*	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	92	93	94	96	94

PCBs in Soil						
Our Reference:	UNITS	57899-73	57899-77	57899-82	57899-85	57899-89
Your Reference	----------	BH20	BH21	BH22	BH23	BH24
Depth	----------	0-0.3	0-0.2	0-035	0-0.15	0-0.35
Date Sampled		30/06/2011	30/06/2011	30/06/2011	30/06/2011	30/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	04/07/2011	04/07/2011	04/07/2011	04/07/2011	04/07/2011
Date analysed	-	07/07/2011	07/07/2011	07/07/2011	07/07/2011	07/07/2011
Arochlor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1221*	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	95	96	97	93	96

PCBs in Soil		
Our Reference:	UNITS	57899-91
Your Reference	----------	BH25
Depth	----------	0-03
Date Sampled		30/06/2011
Type of sample		Soil
Date extracted	-	04/07/2011
Date analysed	-	07/07/2011
Arochlor 1016	mg/kg	<0.1
Arochlor 1221*	mg/kg	<0.1
Arochlor 1232	mg/kg	<0.1
Arochlor 1242	mg/kg	<0.1
Arochlor 1248	mg/kg	<0.1
Arochlor 1254	mg/kg	<0.1
Arochlor 1260	mg/kg	<0.1
Surrogate TCLMX	%	95

Miscellaneous Inorg - soil						
Our Reference:	UNITS	57899-12	57899-14	57899-31	57899-32	57899-39
Your Reference	----------	BH4	BH4	BH9	BH9	BH11
Depth	----------	0.2-0.3	1.2-1.5	0.8-1	1.1-1.3	1.5-1.7
Date Sampled		29/06/2011	29/06/2011	29/06/2011	29/06/2011	29/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	5/7/2011	5/7/2011	5/7/2011	5/7/2011	5/7/2011
Date analysed	-	5/7/2011	5/7/2011	5/7/2011	5/7/2011	5/7/2011
pH 1:5 soil:water	pH Units	5.3	4.1	5.0	4.9	6.0
Chloride, Cl 1:5 soil:water	mg/kg	[NA]	12	16	[NA]	[NA]
Sulphate, SO4 1:5 soil:water	mg/kg	[NA]	25	<10	[NA]	[NA]

Miscellaneous Inorg - soil						
Our Reference:	UNITS	57899-41	57899-47	57899-49	57899-54	57899-56
Your Reference	----------	BH11	BH13	BH13	BH15	BH15
Depth	----------	1.8-2	0.6-0.8	1.2-1.5	0.6-0.8	1.5-1.7
Date Sampled		29/06/2011	30/06/2011	30/06/2011	29/06/2011	29/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	5/7/2011	5/7/2011	5/7/2011	5/7/2011	5/7/2011
Date analysed	-	5/7/2011	5/7/2011	5/7/2011	5/7/2011	5/7/2011
pH 1:5 soil:water	pH Units	4.9	4.6	4.1	8.6	4.6
Chloride, Cl 1:5 soil:water	mg/kg	12	64	[NA]	130	[NA]
Sulphate, SO4 1:5 soil:water	mg/kg	24	<10	[NA]	160	[NA]

Miscellaneous Inorg - soil						
Our Reference:	UNITS	57899-68	57899-70	57899-74	57899-76	57899-79
Your Reference	----------	BH18	BH18	BH20	BH20	BH21
Depth	----------	0.25-0.5	0.8-1.1	0.8-1.1	1.3-1.5	0.5-1
Date Sampled		30/06/2011	30/06/2011	30/06/2011	30/06/2011	30/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	5/7/2011	5/7/2011	5/7/2011	5/7/2011	5/7/2011
Date analysed	-	5/7/2011	5/7/2011	5/7/2011	5/7/2011	5/7/2011
pH 1:5 soil:water	pH Units	5.4	4.8	5.3	5.2	5.0
Chloride, Cl 1:5 soil:water	mg/kg	[NA]	43	64	[NA]	11
Sulphate, SO4 1:5 soil:water	mg/kg	[NA]	<10	18	[NA]	4

Miscellaneous Inorg - soil						
Our Reference:	UNITS	57899-81	57899-86	57899-88	57899-92	57899-94
Your Reference	----------	BH21	BH23	BH23	BH25	BH25
Depth	----------	1.3-1.5	0.3-0.6	1.2-1.5	0.3-0.6	1.3-1.55
Date Sampled		30/06/2011	30/06/2011	30/06/2011	30/06/2011	30/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	5/7/2011	5/7/2011	5/7/2011	5/7/2011	5/7/2011
Date analysed	-	5/7/2011	5/7/2011	5/7/2011	5/7/2011	5/7/2011
pH 1:5 soil:water	pH Units	4.9	5.4	4.7	5.1	5.3
Chloride, Cl 1:5 soil:water	mg/kg	[NA]	[NA]	18	[NA]	37
Sulphate, SO4 1:5 soil:water	mg/kg	[NA]	[NA]	8	[NA]	5

Texture and Salinity						
Our Reference:	UNITS	57899-12	57899-14	57899-31	57899-32	57899-39
Your Reference	----------	BH4	BH4	BH9	BH9	BH11
Depth	----------	0.2-0.3	1.2-1.5	0.8-1	1.1-1.3	1.5-1.7
Date Sampled		29/06/2011	29/06/2011	29/06/2011	29/06/2011	29/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Electrical Conductivity 1:5 soil:water	µS/cm	63	60	42	43	73
Texture Value		8.5	9.0	7.0	8.0	8.5
Texture	-	LIGHT CLAY	CLAY LOAM	MEDIUM CLAY	LIGHT MEDIUM CLAY	LIGHT CLAY
ECe	dS/m	1.0	1.0	0	0	1.0
Class	-	NON SALINE	NON SALINE	NON SALINE	NON SALINE	NON SALINE

Texture and Salinity						
Our Reference:	UNITS	57899-41	57899-47	57899-49	57899-54	57899-56
Your Reference	----------	BH11	BH13	BH13	BH15	BH15
Depth	----------	1.8-2	0.6-0.8	1.2-1.5	0.6-0.8	1.5-1.7
Date Sampled		29/06/2011	30/06/2011	30/06/2011	29/06/2011	29/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Electrical Conductivity 1:5 soil:water	µS/cm	51	89	67	320	71
Texture Value		8.5	7.0	8.0	8.5	9.0
Texture	-	LIGHT CLAY	MEDIUM CLAY	LIGHT MEDIUM CLAY	LIGHT CLAY	CLAY LOAM
ECe	dS/m	0	1.0	1.0	3.0	1.0
Class	-	NON SALINE	NON SALINE	NON SALINE	SLIGHTLY SALINE	NON SALINE

Texture and Salinity						
Our Reference:	UNITS	57899-68	57899-70	57899-74	57899-76	57899-79
Your Reference	----------	BH18	BH18	BH20	BH20	BH21
Depth	----------	0.25-0.5	0.8-1.1	0.8-1.1	1.3-1.5	0.5-1
Date Sampled		30/06/2011	30/06/2011	30/06/2011	30/06/2011	30/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Electrical Conductivity 1:5 soil:water	µS/cm	65	49	93	61	30
Texture Value		8.0	7.0	9.0	7.0	7.0
Texture	-	LIGHT MEDIUM CLAY	MEDIUM CLAY	CLAY LOAM	MEDIUM CLAY	MEDIUM CLAY
ECe	dS/m	1.0	0	1.0	0	0
Class	-	NON SALINE	NON SALINE	NON SALINE	NON SALINE	NON SALINE

Texture and Salinity						
Our Reference:	UNITS	57899-81	57899-86	57899-88	57899-92	57899-94
Your Reference	----------	BH21	BH23	BH23	BH25	BH25
Depth	----------	1.3-1.5	0.3-0.6	1.2-1.5	0.3-0.6	1.3-1.55
Date Sampled		30/06/2011	30/06/2011	30/06/2011	30/06/2011	30/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Electrical Conductivity 1:5 soil:water	µS/cm	34	52	32	210	49
Texture Value		8.5	7.0	7.0	9.0	7.0
Texture	-	LIGHT CLAY	MEDIUM CLAY	MEDIUM CLAY	CLAY LOAM	MEDIUM CLAY
ECe	dS/m	0	0	0	2.0	0
Class	-	NON SALINE	NON SALINE	NON SALINE	NON SALINE	NON SALINE

ESP/CEC						
Our Reference:	UNITS	57899-14	57899-31	57899-41	57899-47	57899-54
Your Reference	----------	BH4	BH9	BH11	BH13	BH15
Depth	----------	1.2-1.5	0.8-1	1.8-2	0.6-0.8	0.6-0.8
Date Sampled		29/06/2011	29/06/2011	29/06/2011	30/06/2011	29/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Exchangeable Ca	meq/100g	0.040	0.24	0.48	0.11	4.6
Exchangeable K	meq/100g	0.16	0.37	0.19	0.13	0.18
Exchangeable Mg	meq/100g	1.3	4.6	3.5	3.9	3.8
Exchangeable Na	meq/100g	0.22	0.39	0.22	0.25	1.3
Cation Exchange Capacity	meq/100g	1.8	5.6	4.4	4.4	9.8

ESP/CEC						
Our Reference:	UNITS	57899-70	57899-74	57899-79	57899-88	57899-94
Your Reference	----------	BH18	BH20	BH21	BH23	BH25
Depth	----------	0.8-1.1	0.8-1.1	0.5-1	1.2-1.5	1.3-1.55
Date Sampled		30/06/2011	30/06/2011	30/06/2011	30/06/2011	30/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Exchangeable Ca	meq/100g	0.064	1.3	0.052	<0.01	0.055
Exchangeable K	meq/100g	0.092	0.28	0.19	0.068	0.086
Exchangeable Mg	meq/100g	1.6	1.5	3.8	0.46	4.9
Exchangeable Na	meq/100g	0.15	0.054	0.27	0.076	0.19
Cation Exchange Capacity	meq/100g	1.9	3.1	4.3	<1.0	5.2

Asbestos ID - soils						
Our Reference:	UNITS	57899-1	57899-4	57899-9	57899-11	57899-17
Your Reference	----------	BH1	BH2	BH3	BH4	BH5
Depth	----------	0.2-0.5	0-0.3	0.2-0.4	0.2-0.5	0.8-1
Date Sampled		29/06/2011	29/06/2011	29/06/2011	29/06/2011	29/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	06/07/2011	06/07/2011	06/07/2011	06/07/2011	06/07/2011
Sample mass tested	g	Approx 40g	Approx 40g	Approx 40g	Approx 40g	Approx 40g
Sample Description	-	Soil & rocks	Soil & rocks	Soil & rocks	Soil & rocks	Soil & rocks
Asbestos ID in soil	-	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg
Trace Analysis	-	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected

Asbestos ID - soils						
Our Reference:	UNITS	57899-20	57899-24	57899-26	57899-29	57899-33
Your Reference	----------	BH6	BH7	BH8	BH9	BH10
Depth	----------	0.2-0.4	0.2-0.5	0.15-0.3	0.2-0.5	0-0.15
Date Sampled		30/06/2011	29/06/2011	29/06/2011	29/06/2011	29/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	06/07/2011	06/07/2011	06/07/2011	06/07/2011	06/07/2011
Sample mass tested	g	Approx 40g	Approx 40g	Approx 40g	Approx 40g	Approx 40g
Sample Description	-	Soil & rocks	Soil & rocks	Soil & rocks	Soil & rocks	Soil & rocks
Asbestos ID in soil	-	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg
Trace Analysis	-	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected

Asbestos ID - soils						
Our Reference:	UNITS	57899-36	57899-38	57899-45	57899-53	57899-58
Your Reference	----------	BH11	BH11	BH13	BH15	BH16
Depth	----------	0-0.3	1.3-1.5	0-0.3	0.1-0.5	0-0.15
Date Sampled		29/06/2011	29/06/2011	30/06/2011	29/06/2011	29/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	06/07/2011	06/07/2011	06/07/2011	06/07/2011	06/07/2011
Sample mass tested	g	Approx 40g	Approx 40g	Approx 40g	Approx 40g	Approx 40g
Sample Description	-	Soil & rocks	Soil & rocks	Soil & rocks	Soil & rocks	Soil & rocks
Asbestos ID in soil	-	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg
Trace Analysis	-	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected

Asbestos ID - soils						
Our Reference:	UNITS	57899-60	57899-62	57899-64	57899-71	57899-77
Your Reference	----------	BH16	BH16	BH17	BH19	BH21
Depth	----------	0.5-0.7	1.8-2	0-0.15	0-0.12	0-0.2
Date Sampled		29/06/2011	29/06/2011	30/06/2011	30/06/2011	30/06/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	06/07/2011	06/07/2011	06/07/2011	06/07/2011	06/07/2011
Sample mass tested	g	Approx 40g	Approx 40g	Approx 40g	Approx 40g	Approx 40g
Sample Description	-	Soil & rocks	Soil & rocks	Soil & rocks	Soil & rocks	Soil & rocks
Asbestos ID in soil	-	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg
Trace Analysis	-	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected

Asbestos ID - soils		
Our Reference:	UNITS	57899-89
Your Reference	----------	BH24
Depth	----------	0-0.35
Date Sampled		30/06/2011
Type of sample		Soil
Date analysed	-	06/07/2011
Sample mass tested	g	Approx 40g
Sample Description	-	Soil & rocks
Asbestos ID in soil	-	No asbestos found at reporting limit of 0.1g/kg
Trace Analysis	-	Respirable fibres not detected

Method ID	Methodology Summary
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID.
Org-012 subset	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Inorg-008	Moisture content determined by heating at 105 deg C for a minimum of 4 hours.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-008	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA 21st ED, 4500-H+.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA 21st ED, 4110-B.
Inorg-002	Conductivity and Salinity - measured using a conductivity cell and dedicated meter, in accordance with APHA 21st ED 2510 and Rayment & Higginson.
Metals-009	Determination of exchangeable cations and cation exchange capacity in soil based on Rayment and Lyons 2011.
AS4964-2004	Asbestos ID - Qualitative identification of asbestos type fibres in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques.

QUALITY CONTROL vTRH & BTEX in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base || Duplicate || %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			04/07/2011	57899-1	04/07/2011 || 04/07/2011	LCS-6	04/07/2011
Date analysed	-			05/07/2011	57899-1	05/07/2011 || 05/07/2011	LCS-6	05/07/2011
vTRH C_6 - C_9	mg/kg	25	Org-016	<25	57899-1	<25 || <25	LCS-6	94%
Benzene	mg/kg	0.2	Org-016	<0.2	57899-1	<0.2 || <0.2	LCS-6	99%
Toluene	mg/kg	0.5	Org-016	<0.5	57899-1	<0.5 || <0.5	LCS-6	96%
Ethylbenzene	mg/kg	1	Org-016	<1	57899-1	<1 || <1	LCS-6	95%
m+p-xylene	mg/kg	2	Org-016	<2	57899-1	<2 || <2	LCS-6	91%
o-Xylene	mg/kg	1	Org-016	<1	57899-1	<1 || <1	LCS-6	94%
Surrogate aaa-Trifluorotoluene	%		Org-016	111	57899-1	89 || 102 || RPD: 14	LCS-6	108%
QUALITY CONTROL sTRH in Soil (C10-C36)	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base || Duplicate || %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			04/07/2011	57899-1	04/07/2011 || 04/07/2011	LCS-6	04/07/2011
Date analysed	-			05/07/2011	57899-1	05/05/2011 || 05/05/2011	LCS-6	05/07/2011
TRH C_{10} - C_{14}	mg/kg	50	Org-003	<50	57899-1	<50 || <50	LCS-6	71%
TRH C_{15} - C_{28}	mg/kg	100	Org-003	<100	57899-1	<100 || <100	LCS-6	78%
TRH C_{29} - C_{36}	mg/kg	100	Org-003	<100	57899-1	<100 || <100	LCS-6	81%
Surrogate o-Terphenyl	%		Org-003	86	57899-1	87 || 84 || RPD: 4	LCS-6	79%
QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base || Duplicate || %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			04/07/2011	57899-1	04/07/2011 || 04/07/2011	LCS-6	04/07/2011
Date analysed	-			06/07/2011	57899-1	06/07/2011 || 06/07/2011	LCS-6	06/07/2011
Naphthalene	mg/kg	0.1	Org-012 subset	<0.1	57899-1	<0.1 || <0.1	LCS-6	93%
Acenaphthylene	mg/kg	0.1	Org-012 subset	<0.1	57899-1	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	0.1	Org-012 subset	<0.1	57899-1	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	0.1	Org-012 subset	<0.1	57899-1	<0.1 || <0.1	LCS-6	118%
Phenanthrene	mg/kg	0.1	Org-012 subset	<0.1	57899-1	<0.1 || <0.1	LCS-6	112%
Anthracene	mg/kg	0.1	Org-012 subset	<0.1	57899-1	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	0.1	Org-012 subset	<0.1	57899-1	<0.1 || <0.1	LCS-6	105%
Pyrene	mg/kg	0.1	Org-012 subset	<0.1	57899-1	<0.1 || <0.1	LCS-6	119%
Benzo(a)anthracene	mg/kg	0.1	Org-012 subset	<0.1	57899-1	<0.1 || <0.1	[NR]	[NR]

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Chrysene	mg/kg	0.1	Org-012 subset	<0.1	57899-1	<0.1 || <0.1	LCS-6	113%
Benzo(b+k)fluoranthene	mg/kg	0.2	Org-012 subset	<0.2	57899-1	<0.2 || <0.2	[NR]	[NR]
Benzo(a)pyrene	mg/kg	0.05	Org-012 subset	<0.05	57899-1	<0.05 || <0.05	LCS-6	127%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012 subset	<0.1	57899-1	<0.1 || <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012 subset	<0.1	57899-1	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012 subset	<0.1	57899-1	<0.1 || <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d_{14}	%		Org-012 subset	116	57899-1	97 || 97 || RPD: 0	LCS-6	112%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date digested	-			04/07/2011	57899-1	04/07/2011 || 04/07/2011	LCS-1	04/07/2011
Date analysed	-			04/07/2011	57899-1	04/07/2011 || 04/07/2011	LCS-1	04/07/2011
Arsenic	mg/kg	4	Metals-020 ICP-AES	<4	57899-1	11 || 6 || RPD: 59	LCS-1	95%
Cadmium	mg/kg	0.5	Metals-020 ICP-AES	<0.5	57899-1	0.5 || <0.5	LCS-1	97%
Chromium	mg/kg	1	Metals-020 ICP-AES	<1	57899-1	28 || 21 || RPD: 29	LCS-1	96%
Copper	mg/kg	1	Metals-020 ICP-AES	<1	57899-1	16 || 15 || RPD: 6	LCS-1	96%
Lead	mg/kg	1	Metals-020 ICP-AES	<1	57899-1	25 || 23 || RPD: 8	LCS-1	94%
Mercury	mg/kg	0.1	Metals-021 CV-AAS	<0.1	57899-1	<0.1 || <0.1	LCS-1	107%
Nickel	mg/kg	1	Metals-020 ICP-AES	<1	57899-1	5 || 5 || RPD: 0	LCS-1	97%
Zinc	mg/kg	1	Metals-020 ICP-AES	<1	57899-1	19 || 15 || RPD: 24	LCS-1	96%

QUALITY CONTROL Moisture	UNITS	PQL	METHOD	Blank
Date prepared	-			04/07/2011
Date analysed	-			05/07/2011
Moisture	%	0.1	Inorg-008	<0.1

QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			04/07/2011	57899-19	04/07/2011 || 04/07/2011	LCS-6	04/07/2011
Date analysed	-			07/07/2011	57899-19	07/07/2011 || 07/07/2011	LCS-6	07/07/2011
HCB	mg/kg	0.1	Org-005	<0.1	57899-19	<0.1 || <0.1	[NR]	[NR]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	57899-19	<0.1 || <0.1	LCS-6	97%
gamma-BHC	mg/kg	0.1	Org-005	<0.1	57899-19	<0.1 || <0.1	[NR]	[NR]
beta-BHC	mg/kg	0.1	Org-005	<0.1	57899-19	<0.1 || <0.1	LCS-6	94%
Heptachlor	mg/kg	0.1	Org-005	<0.1	57899-19	<0.1 || <0.1	LCS-6	87%
delta-BHC	mg/kg	0.1	Org-005	<0.1	57899-19	<0.1 || <0.1	[NR]	[NR]
Aldrin	mg/kg	0.1	Org-005	<0.1	57899-19	<0.1 || <0.1	LCS-6	91%
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	57899-19	<0.1 || <0.1	LCS-6	96%
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	57899-19	<0.1 || <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	57899-19	<0.1 || <0.1	[NR]	[NR]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	57899-19	<0.1 || <0.1	[NR]	[NR]
pp-DDE	mg/kg	0.1	Org-005	<0.1	57899-19	<0.1 || <0.1	LCS-6	100%
Dieldrin	mg/kg	0.1	Org-005	<0.1	57899-19	<0.1 || <0.1	LCS-6	93%
Endrin	mg/kg	0.1	Org-005	<0.1	57899-19	<0.1 || <0.1	LCS-6	93%
pp-DDD	mg/kg	0.1	Org-005	<0.1	57899-19	<0.1 || <0.1	LCS-6	101%
Endosulfan II	mg/kg	0.1	Org-005	<0.1	57899-19	<0.1 || <0.1	[NR]	[NR]
pp-DDT	mg/kg	0.1	Org-005	<0.1	57899-19	<0.1 || <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	57899-19	<0.1 || <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	57899-19	<0.1 || <0.1	LCS-6	79%
Methoxychlor	mg/kg	0.1	Org-005	<0.1	57899-19	<0.1 || <0.1	[NR]	[NR]
Surrogate TCLMX	%		Org-005	97	57899-19	95 || 96 || RPD: 1	LCS-6	92%

QUALITY CONTROL Organophosphorus Pesticides	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			04/07/2011	57899-19	04/07/2011 || 04/07/2011	LCS-6	04/07/2011
Date analysed	-			07/07/2011	57899-19	07/07/2011 || 07/07/2011	LCS-6	07/07/2011
Diazinon	mg/kg	0.1	Org-008	<0.1	57899-19	<0.1 || <0.1	[NR]	[NR]
Dimethoate	mg/kg	0.1	Org-008	<0.1	57899-19	<0.1 || <0.1	[NR]	[NR]
Chlorpyriphos-methyl	mg/kg	0.1	Org-008	<0.1	57899-19	<0.1 || <0.1	[NR]	[NR]
Ronnel	mg/kg	0.1	Org-008	<0.1	57899-19	<0.1 || <0.1	[NR]	[NR]
Chlorpyriphos	mg/kg	0.1	Org-008	<0.1	57899-19	<0.1 || <0.1	LCS-6	74%
Fenitrothion	mg/kg	0.1	Org-008	<0.1	57899-19	<0.1 || <0.1	LCS-6	67%
Bromophos-ethyl	mg/kg	0.1	Org-008	<0.1	57899-19	<0.1 || <0.1	[NR]	[NR]
Ethion	mg/kg	0.1	Org-008	<0.1	57899-19	<0.1 || <0.1	LCS-6	64%
Surrogate TCLMX	%		Org-008	97	57899-19	95 || 96 || RPD: 1	LCS-6	75%

QUALITY CONTROL PCBs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			04/07/2011	57899-19	04/07/2011 || 04/07/2011	LCS-6	04/07/2011
Date analysed	-			07/07/2011	57899-19	07/07/2011 || 07/07/2011	LCS-6	07/07/2011
Arochlor 1016	mg/kg	0.1	Org-006	<0.1	57899-19	<0.1 || <0.1	[NR]	[NR]
Arochlor 1221*	mg/kg	0.1	Org-006	<0.1	57899-19	<0.1 || <0.1	[NR]	[NR]
Arochlor 1232	mg/kg	0.1	Org-006	<0.1	57899-19	<0.1 || <0.1	[NR]	[NR]
Arochlor 1242	mg/kg	0.1	Org-006	<0.1	57899-19	<0.1 || <0.1	[NR]	[NR]
Arochlor 1248	mg/kg	0.1	Org-006	<0.1	57899-19	<0.1 || <0.1	[NR]	[NR]
Arochlor 1254	mg/kg	0.1	Org-006	<0.1	57899-19	<0.1 || <0.1	LCS-6	82%
Arochlor 1260	mg/kg	0.1	Org-006	<0.1	57899-19	<0.1 || <0.1	[NR]	[NR]
Surrogate TCLMX	%		Org-006	97	57899-19	95 || 96 || RPD: 1	LCS-6	63%

QUALITY CONTROL Miscellaneous Inorg - soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			5/7/2011	57899-14	5/7/2011 || 5/7/2011	LCS-1	5/7/2011
Date analysed	-			5/7/2011	57899-14	5/7/2011 || 5/7/2011	LCS-1	5/7/2011
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	57899-14	4.1 || 4.5 || RPD: 9	LCS-1	102%
Chloride, Cl 1:5 soil:water	mg/kg	2	Inorg-081	<2	57899-14	12 || 11 || RPD: 9	LCS-1	102%
Sulphate, SO4 1:5 soil:water	mg/kg	2	Inorg-081	<2	57899-14	25 || 23 || RPD: 8	LCS-1	108%

QUALITY CONTROL Texture and Salinity	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Electrical Conductivity 1:5 soil:water	µS/cm	1	Inorg-002	<1	57899-14	60 || 56 || RPD: 7	LCS-1	107%
Texture Value			Inorg-002	[NT]	57899-14	9.0 || [N/T]	[NR]	[NR]
ECe	dS/m	0		0	57899-14	1.0 || [N/T]	[NR]	[NR]
Class	-			[NT]	57899-14	NON SALINE || [N/T]	[NR]	[NR]

QUALITY CONTROL ESP/CEC	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Exchangeable Ca	meq/100 g	0.01	Metals-009	<0.01	57899-94	0.055 || 0.059 || RPD: 7	LCS-1	98%
Exchangeable K	meq/100 g	0.01	Metals-009	<0.01	57899-94	0.086 || 0.089 || RPD: 3	LCS-1	96%
Exchangeable Mg	meq/100 g	0.01	Metals-009	<0.01	57899-94	4.9 || 5.3 || RPD: 8	LCS-1	96%
Exchangeable Na	meq/100 g	0.01	Metals-009	<0.01	57899-94	0.19 || 0.21 || RPD: 10	LCS-1	94%
Cation Exchange Capacity	meq/100 g	1	Metals-009	<1.0	57899-94	5.2 || 5.6 || RPD: 7	[NR]	[NR]

QUALITY CONTROL Asbestos ID - soils	UNITS	PQL	METHOD	Blank
Date analysed	-			[NT]

QUALITY CONTROL vTRH & BTEX in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	57899-34	04/07/2011 || 04/07/2011	57899-36	04/07/2011
Date analysed	-	57899-34	05/07/2011 || 05/07/2011	57899-36	05/07/2011
vTRH C_6 - C_9	mg/kg	57899-34	<25 || <25	57899-36	96%
Benzene	mg/kg	57899-34	<0.2 || <0.2	57899-36	100%
Toluene	mg/kg	57899-34	<0.5 || <0.5	57899-36	97%
Ethylbenzene	mg/kg	57899-34	<1 || <1	57899-36	96%
m+p-xylene	mg/kg	57899-34	<2 || <2	57899-36	93%
o-Xylene	mg/kg	57899-34	<1 || <1	57899-36	97%
Surrogate aaa-Trifluorotoluene	%	57899-34	102 || 96 || RPD: 6	57899-36	103%

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QUALITY CONTROL sTRH in Soil (C10-C36)	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	57899-34	04/07/2011 || 04/07/2011	57899-36	04/07/2011
Date analysed	-	57899-34	05/05/2011 || 05/05/2011	57899-36	05/07/2011
TRHC$_{10}$ - C$_{14}$	mg/kg	57899-34	<50 || <50	57899-36	84%
TRHC$_{15}$ - C$_{28}$	mg/kg	57899-34	<100 || <100	57899-36	94%
TRHC$_{29}$ - C$_{36}$	mg/kg	57899-34	<100 || <100	57899-36	71%
Surrogate o-Terphenyl	%	57899-34	82 || 81 || RPD: 1	57899-36	98%
QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	57899-34	04/07/2011 || 04/07/2011	LCS-7	04/07/2011
Date analysed	-	57899-34	06/07/2011 || 06/07/2011	LCS-7	08/07/2011
Naphthalene	mg/kg	57899-34	<0.1 || <0.1	LCS-7	90%
Acenaphthylene	mg/kg	57899-34	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	57899-34	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	57899-34	<0.1 || <0.1	LCS-7	112%
Phenanthrene	mg/kg	57899-34	<0.1 || <0.1	LCS-7	105%
Anthracene	mg/kg	57899-34	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	57899-34	<0.1 || <0.1	LCS-7	96%
Pyrene	mg/kg	57899-34	<0.1 || <0.1	LCS-7	111%
Benzo(a)anthracene	mg/kg	57899-34	<0.1 || <0.1	[NR]	[NR]
Chrysene	mg/kg	57899-34	<0.1 || <0.1	LCS-7	106%
Benzo(b+k)fluoranthene	mg/kg	57899-34	<0.2 || <0.2	[NR]	[NR]
Benzo(a)pyrene	mg/kg	57899-34	<0.05 || <0.05	LCS-7	110%
Indeno(1,2,3-c,d)pyrene	mg/kg	57899-34	<0.1 || <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	57899-34	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	57899-34	<0.1 || <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d$_{14}$	%	57899-34	110 || 110 || RPD: 0	LCS-7	107%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date digested	-	57899-34	04/07/2011 || 04/07/2011	LCS-2	04/07/2011
Date analysed	-	57899-34	04/07/2011 || 04/07/2011	LCS-2	04/07/2011
Arsenic	mg/kg	57899-34	9 || 9 || RPD: 0	LCS-2	100%
Cadmium	mg/kg	57899-34	<0.5 || <0.5	LCS-2	101%
Chromium	mg/kg	57899-34	23 || 21 || RPD: 9	LCS-2	100%
Copper	mg/kg	57899-34	5 || 11 || RPD: 75	LCS-2	100%
Lead	mg/kg	57899-34	22 || 21 || RPD: 5	LCS-2	97%
Mercury	mg/kg	57899-34	<0.1 || <0.1	LCS-2	104%
Nickel	mg/kg	57899-34	4 || 7 || RPD: 55	LCS-2	100%
Zinc	mg/kg	57899-34	9 || 17 || RPD: 62	LCS-2	99%
QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	57899-63	04/07/2011 || 04/07/2011	57899-36	04/07/2011
Date analysed	-	57899-63	07/07/2011 || 07/07/2011	57899-36	07/07/2011
HCB	mg/kg	57899-63	<0.1 || <0.1	[NR]	[NR]
alpha-BHC	mg/kg	57899-63	<0.1 || <0.1	57899-36	94%
gamma-BHC	mg/kg	57899-63	<0.1 || <0.1	[NR]	[NR]
beta-BHC	mg/kg	57899-63	<0.1 || <0.1	57899-36	90%
Heptachlor	mg/kg	57899-63	<0.1 || <0.1	57899-36	87%
delta-BHC	mg/kg	57899-63	<0.1 || <0.1	[NR]	[NR]
Aldrin	mg/kg	57899-63	<0.1 || <0.1	57899-36	88%
Heptachlor Epoxide	mg/kg	57899-63	<0.1 || <0.1	57899-36	93%
gamma-Chlordane	mg/kg	57899-63	<0.1 || <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	57899-63	<0.1 || <0.1	[NR]	[NR]
Endosulfan I	mg/kg	57899-63	<0.1 || <0.1	[NR]	[NR]
pp-DDE	mg/kg	57899-63	<0.1 || <0.1	57899-36	96%
Dieldrin	mg/kg	57899-63	<0.1 || <0.1	57899-36	90%
Endrin	mg/kg	57899-63	<0.1 || <0.1	57899-36	93%
pp-DDD	mg/kg	57899-63	<0.1 || <0.1	57899-36	97%
Endosulfan II	mg/kg	57899-63	<0.1 || <0.1	[NR]	[NR]
pp-DDT	mg/kg	57899-63	<0.1 || <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	57899-63	<0.1 || <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	57899-63	<0.1 || <0.1	57899-36	78%
Methoxychlor	mg/kg	57899-63	<0.1 || <0.1	[NR]	[NR]
Surrogate TCLMX	%	57899-63	93 || 94 || RPD: 1	57899-36	94%

QUALITY CONTROL Organophosphorus Pesticides	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	57899-63	04/07/2011 || 04/07/2011	57899-36	04/07/2011
Date analysed	-	57899-63	07/07/2011 || 07/07/2011	57899-36	07/07/2011
Diazinon	mg/kg	57899-63	<0.1 || <0.1	[NR]	[NR]
Dimethoate	mg/kg	57899-63	<0.1 || <0.1	[NR]	[NR]
Chlorpyriphos-methyl	mg/kg	57899-63	<0.1 || <0.1	[NR]	[NR]
Ronnel	mg/kg	57899-63	<0.1 || <0.1	[NR]	[NR]
Chlorpyriphos	mg/kg	57899-63	<0.1 || <0.1	57899-36	95%
Fenitrothion	mg/kg	57899-63	<0.1 || <0.1	57899-36	85%
Bromophos-ethyl	mg/kg	57899-63	<0.1 || <0.1	[NR]	[NR]
Ethion	mg/kg	57899-63	<0.1 || <0.1	57899-36	84%
Surrogate TCLMX	%	57899-63	93 || 94 || RPD: 1	57899-36	92%
QUALITY CONTROL PCBs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	57899-63	04/07/2011 || 04/07/2011	57899-36	04/07/2011
Date analysed	-	57899-63	07/07/2011 || 07/07/2011	57899-36	07/07/2011
Arochlor 1016	mg/kg	57899-63	<0.1 || <0.1	[NR]	[NR]
Arochlor 1221*	mg/kg	57899-63	<0.1 || <0.1	[NR]	[NR]
Arochlor 1232	mg/kg	57899-63	<0.1 || <0.1	[NR]	[NR]
Arochlor 1242	mg/kg	57899-63	<0.1 || <0.1	[NR]	[NR]
Arochlor 1248	mg/kg	57899-63	<0.1 || <0.1	[NR]	[NR]
Arochlor 1254	mg/kg	57899-63	<0.1 || <0.1	57899-36	100%
Arochlor 1260	mg/kg	57899-63	<0.1 || <0.1	[NR]	[NR]
Surrogate TCLMX	%	57899-63	93 || 94 || RPD: 1	57899-36	78%
QUALITY CONTROL Miscellaneous Inorg - soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	57899-70	5/7/2011 || 5/7/2011	LCS-2	5/7/2011
Date analysed	-	57899-70	5/7/2011 || 5/7/2011	LCS-2	5/7/2011
pH 1:5 soil:water	pH Units	57899-70	4.8 || 4.8 || RPD: 0	LCS-2	102%
Chloride, Cl 1:5 soil:water	mg/kg	57899-70	43 || 42 || RPD: 2	[NR]	[NR]
Sulphate, SO4 1:5 soil:water	mg/kg	57899-70	<10 || <10	[NR]	[NR]
QUALITY CONTROL Texture and Salinity	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Electrical Conductivity 1:5 soil:water	µS/cm	[NT]	[NT]	LCS-2	107%
Texture Value		[NT]	[NT]	[NR]	[NR]
ECe	dS/m	[NT]	[NT]	[NR]	[NR]
Class	-	[NT]	[NT]	[NR]	[NR]

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QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	57899-50	04/07/2011 || 04/07/2011	57899-36	04/07/2011
Date analysed	-	57899-50	08/07/2011 || 08/07/2011	57899-36	08/07/2011
Naphthalene	mg/kg	57899-50	<0.1 || <0.1	57899-36	94%
Acenaphthylene	mg/kg	57899-50	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	57899-50	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	57899-50	<0.1 || <0.1	57899-36	112%
Phenanthrene	mg/kg	57899-50	<0.1 || <0.1	57899-36	109%
Anthracene	mg/kg	57899-50	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	57899-50	<0.1 || <0.1	57899-36	104%
Pyrene	mg/kg	57899-50	<0.1 || <0.1	57899-36	113%
Benzo(a)anthracene	mg/kg	57899-50	<0.1 || <0.1	[NR]	[NR]
Chrysene	mg/kg	57899-50	<0.1 || <0.1	57899-36	107%
Benzo(b+k)fluoranthene	mg/kg	57899-50	<0.2 || <0.2	[NR]	[NR]
Benzo(a)pyrene	mg/kg	57899-50	<0.05 || <0.05	57899-36	106%
Indeno(1,2,3-c,d)pyrene	mg/kg	57899-50	<0.1 || <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	57899-50	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	57899-50	<0.1 || <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d_{14}	%	57899-50	114 || 97 || RPD: 16	57899-36	109%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date digested	-	57899-100	04/07/2011 || 04/07/2011	57899-36	04/07/2011
Date analysed	-	57899-100	04/07/2011 || 04/07/2011	57899-36	04/07/2011
Arsenic	mg/kg	57899-100	5 || 5 || RPD: 0	57899-36	97%
Cadmium	mg/kg	57899-100	2.7 || 2.0 || RPD: 30	57899-36	92%
Chromium	mg/kg	57899-100	16 || 24 || RPD: 40	57899-36	94%
Copper	mg/kg	57899-100	11 || 10 || RPD: 10	57899-36	99%
Lead	mg/kg	57899-100	12 || 15 || RPD: 22	57899-36	88%
Mercury	mg/kg	57899-100	<0.1 || <0.1	57899-36	107%
Nickel	mg/kg	57899-100	6 || 7 || RPD: 15	57899-36	93%
Zinc	mg/kg	57899-100	26 || 26 || RPD: 0	57899-36	88%

QUALITY CONTROL Miscellaneous Inorg - soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	[NT]	[NT]	57899-31	5/7/2011
Date analysed	-	[NT]	[NT]	57899-31	5/7/2011
pH 1:5 soil:water	pH Units	[NT]	[NT]	[NR]	[NR]
Chloride, Cl 1:5 soil:water	mg/kg	[NT]	[NT]	57899-31	86%
Sulphate, SO4 1:5 soil:water	mg/kg	[NT]	[NT]	57899-31	#
QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	57899-100	04/07/2011 || 04/07/2011	57899-96	04/07/2011
Date analysed	-	57899-100	08/07/2011 || 08/07/2011	57899-96	08/07/2011
Naphthalene	mg/kg	57899-100	<0.1 || <0.1	57899-96	61%
Acenaphthylene	mg/kg	57899-100	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	57899-100	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	57899-100	<0.1 || <0.1	57899-96	114%
Phenanthrene	mg/kg	57899-100	<0.1 || <0.1	57899-96	106%
Anthracene	mg/kg	57899-100	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	57899-100	<0.1 || <0.1	57899-96	100%
Pyrene	mg/kg	57899-100	<0.1 || <0.1	57899-96	113%
Benzo(a)anthracene	mg/kg	57899-100	<0.1 || <0.1	[NR]	[NR]
Chrysene	mg/kg	57899-100	<0.1 || <0.1	57899-96	109%
Benzo(b+k)fluoranthene	mg/kg	57899-100	<0.2 || <0.2	[NR]	[NR]
Benzo(a)pyrene	mg/kg	57899-100	<0.05 || <0.05	57899-96	113%
Indeno(1,2,3-c,d)pyrene	mg/kg	57899-100	<0.1 || <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	57899-100	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	57899-100	<0.1 || <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d_{14}	%	57899-100	111 || 107 || RPD: 4	57899-96	103%

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QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date digested	-	[NT]	[NT]	57899-96	04/07/2011
Date analysed	-	[NT]	[NT]	57899-96	04/07/2011
Arsenic	mg/kg	[NT]	[NT]	57899-96	96%
Cadmium	mg/kg	[NT]	[NT]	57899-96	87%
Chromium	mg/kg	[NT]	[NT]	57899-96	96%
Copper	mg/kg	[NT]	[NT]	57899-96	100%
Lead	mg/kg	[NT]	[NT]	57899-96	82%
Mercury	mg/kg	[NT]	[NT]	57899-96	104%
Nickel	mg/kg	[NT]	[NT]	57899-96	90%
Zinc	mg/kg	[NT]	[NT]	57899-96	94%

Report Comments:

Acid Extractable Metals in Soil:The RPD for duplicate results is accepted due to the inhomogeneous nature of the sample/s.

Sulphate:PQL raised due to sample matrix.

Sulphate:# Percent recovery not available due to sample matrix.

Asbestos ID was analysed by Approved Identifier: Paul Ching
Asbestos ID was authorised by Approved Signatory: Paul Ching

INS: Insufficient sample for this test
NA: Test not required
<: Less than
PQL: Practical Quantitation Limit
RPD: Relative Percent Difference
>: Greater than
NT: Not tested
NA: Test not required
LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batched of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes and LCS: Generally 70-130% for inorganics/metals; 60-140% for organics and 10-140% for SVOC and speciated phenols is acceptable.

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
enquiries@envirolabservices.com.au
www.envirolabservices.com.au

SAMPLE RECEIPT ADVICE

Client:

Environmental Investigation Services
PO Box 976
North Ryde BC NSW 1670

ph: 02 9888 5000
Fax: 02 9888 5001

Attention: Todd Hore

Sample log in details:

Your reference:	**E25004KH, Silverdale**
Envirolab Reference:	**57899**
Date received:	01/07/11
Date results expected to be reported:	**8/07/11**

Samples received in appropriate condition for analysis:	YES
No. of samples provided	106 Soils
Turnaround time requested:	Standard
Temperature on receipt	Cool
Cooling Method:	Ice

Comments:

Samples will be held for 1 month for water samples and 2 months for soil samples from date of receipt of samples.

Contact details:

Please direct any queries to Aileen Hie or Jacinta Hurst
ph: 02 9910 6200 fax: 02 9910 6201
email: ahie@envirolabservices.com.au or jhurst@envirolabservices.com.au

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 99106200

SAMPLE AND CHAIN OF CUSTODY FORM

TO:
Envirolab Services Pty Ltd
12 Ashley Street
Chatswood NSW 2067
Phone: (02) 99106200
Fax: (02) 99106201

Attention: Aileen

Job No: 57899
Date Received: 1/7/11
Time Received: 4:45pm
Received by: MP
Temp: Cool/Ambient
Cooling: Icepack
Security: Intact/Broken/None

ELS Job Number: E25004KH

Date Results Required: standard turnaround

Sheet 1 /

FROM:
Environmental Investigation Services
Rear 115 Wicks Road
Macquarie Park NSW 2113
Phone: (02) 9888 5000
Fax: (02) 9888 5004

Contact: Todd Hore

Project: Proposed Commercial/Retail Development
Location: Silverdale
Sampler: TH/MD

Sample Preservation:
In esky on ice

Tests Required

Date Sampled	Lab Ref:	Borehole/ Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 3	Combo 6a	Combo 13	8 Metals	TPH	BTEX	PAHs	OCP/OPP/ PCBs	Asbestos	pH, EC, Ece	CEC	Chloride, Sulphate
29/06/2011	1	BH1	0.2-0.5	Glass jar + Asb Bag	0	Fill	X								X			
29/06/2011	2	BH1	0.6-0.8	Glass jar + Asb Bag	0	Natural												
29/06/2011	3	BH1	1-1.1	Glass jar	0	Natural					X	X						
29/06/2011	4	BH2	0-0.3	Glass jar + Asb Bag	0	Fill	X								X			
29/06/2011	5	BH2	0.6-0.8	Glass jar + Asb Bag	0	Fill												
29/06/2011	6	BH2	1.2-1.4	Glass jar + Asb Bag	0	Fill					X	X						
29/06/2011	7	BH2	1.4-1.6	Glass jar + Asb Bag	0	Natural												
29/06/2011	8	BH2	1.6-1.8	Glass jar + Asb Bag	0	Natural												
29/06/2011	9	BH3	0.2-0.4	Glass jar + Asb Bag	0	Fill	X								X			
29/06/2011	10	BH3	0.5-0.8	Glass jar + Asb Bag	0	Natural					X	X						
29/06/2011	11	BH4	0.2-0.5	Glass jar + Asb Bag	2.50	Fill	X								X			
29/06/2011	12	BH4	0.3-0.2	Plastic Bag	2.1	Fill										X		
29/06/2011	13	BH4	0.6-0.9	Glass jar + Asb Bag	2.1	Natural					X	X						
29/06/2011	14	BH4	1.2-1.5	Plastic Bag	-	Natural										X	X	X
29/06/2011	15	BH4	1.8-2	Plastic Bag	-	Natural												
29/06/2011	16	BH5	0.2-0.5	Glass jar + Asb Bag	0	Fill	X											
29/06/2011	17	BH5	0.8-1	Glass jar + Asb Bag	0	Fill									X			
29/06/2011	18	BH5	1.3-1.5	Glass jar + Asb Bag	0	Natural	X											
29/06/2011	19	BH5	1.7-1.8	Glass jar + Asb Bag	0	Natural								X				
30/06/2011	20	BH6	0.2-0.4	Glass jar + Asb Bag	0	Fill	X								X			
30/06/2011	21	BH6	0.6-0.9	Glass jar + Asb Bag	0	Natural					X	X		X				
30/06/2011	22	BH6	1-1.2	Glass jar + Asb Bag	0	Natural												
30/06/2011	23	BH6	1.2-1.5	Glass jar + Asb Bag	0	Natural												
29/06/2011	24	BH7	0.2-0.5	Glass jar + Asb Bag	0	Fill				X			X		X			
29/06/2011	25	BH7	0.7-0.9	Glass jar + Asb Bag	0	Natural					X	X						

Remarks (comments/detection limits required):

Relinquished By:	Date:	Time:	Received By:	
	1/7/11	12pm	Morgan Philp 1/7/11	4:45pm

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
Envirolab Services Pty Ltd 12 Ashley Street Chatswood NSW 2067 Phone: (02) 99106200 Fax: (02) 99106201 Attention: Aileen	EIS Job Number: E25004KH Date Results Required: standard turnaround Sheet 2 /	Environmental Investigation Services Rear 115 Wicks Road Macquarie Park NSW 2113 Phone: (02) 9888 5000 Fax: (02) 9888 5004 Contact: Todd Hore

Project: Proposed Commercial/Retail Development
Location: Silverdale
Sampler: TH/MD

Sample Preservation: In esky on ice

Tests Required

Date Sampled	Lab Ref:	Borehole/ Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 19	Combo 6a	Combo 13	8 Metals	TPH	BTEX	PAHs	OCP/OPP/ PCBs	Asbestos	pH, EC, Ece	CEC	Chloride, Sulphate
29/06/2011	26	BH8	0.15-0.3	Glass jar + Asb Bag	0	Fill				X			X		X			
29/06/2011	27	BH8	0.8-1	Glass jar + Asb Bag	0	Natural												
29/06/2011	28	BH8	1.3-1.45	Glass jar	0	Natural					X	X						
29/06/2011	29	BH9	0.2-0.5	Glass jar + Asb Bag	0	Fill				X			X		X			
29/06/2011	30	BH9	0.6-0.8	Glass jar + Asb Bag	0	Natural												
29/06/2011	31	BH9	0.8-1	Plastic Bag	-	Natural										X	X	X
29/06/2011	32	BH9	1.1-1.3	Plastic Bag	-	Natural										X		
29/06/2011	33	BH10	0-0.15	Glass jar + Asb Bag	0	Fill								X	X			
29/06/2011	34	BH10	0.5-0.8	Glass jar + Asb Bag	0	Fill	X											
29/06/2011	35	BH10	1.4-1.7	Glass jar + Asb Bag	0	Natural					X	X						
29/06/2011	36	BH11	0-0.3	Glass jar + Asb Bag	0	Fill		X							X			
29/06/2011	37	BH11	1-1.2	Glass jar + Asb Bag	0	Fill				X			X					
29/06/2011	38	BH11	1.3-1.5	Glass jar + Asb Bag	0	Fill					X	X		X	X			
29/06/2011	39	BH11	1.5-1.7	Plastic Bag	-	Fill										X		
29/06/2011	40	BH11	1.7-1.8	Glass jar + Asb Bag	0	Natural				X			X					
29/06/2011	41	BH11	1.8-2	Plastic Bag	-	Natural										X	X	X
29/06/2011	42	BH12	0-0.3	Glass jar + Asb Bag	0	Fill				X			X	X				
29/06/2011	43	BH12	0.5-0.8	Glass jar + Asb Bag	0	Natural												
29/06/2011	44	BH12	1.1-1.35	Glass jar + Asb Bag	0	Natural												
30/06/2011	45	BH13	0-0.3	Glass jar + Asb Bag	0	Fill				X			X	X	X			
30/06/2011	46	BH13	0.3-0.5	Glass jar + Asb Bag	0	Natural												
30/06/2011	47	BH13	0.6-0.8	Plastic Bag	[illegible]	Natural										X	X	X
30/06/2011	48	BH13	1-1.2	Glass jar + Asb Bag	0	Natural												
30/06/2011	49	BH13	1.2-1.5	Plastic Bag	-	Natural										X		
30/06/2011	50	BH14	0-0.3	Glass jar + Asb Bag	0	Fill				X			X	X				

Remarks (comments/detection limits required):

Relinquished By:	Date:	Time:	Received By:	
[signature]	1/7/11	12pm	Morgan Philp 1/7/11	4:45pm

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
Envirolab Services Pty Ltd 12 Ashley Street Chatswood NSW 2067 Phone: (02) 99106200 Fax: (02) 99106201 Attention: Aileen	EIS Job Number: E25004KH Date Results Required: standard turnaround Sheet 3/	Environmental Investigation Services ar 115 Wicks Road acquarie Park NSW 2113 Phone: (02) 9888 5000 Fax: (02) 9888 5004 Contact: Todd Hore

Project: Proposed Commercial/Retail Development
Location: Silverdale
Sampler: TH/MD

Sample Preservation: In esky on ice

Tests Required

Date Sampled	Lab Ref:	Borehole/ Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 6	Combo 6a	Combo 13	8 Metals	TPH	BTEX	PAHs	OCP/OPP/ PCBs	Asbestos	pH, EC, Ece	CEC	Chloride, Sulphate
30/06/2011	S1	BH14	0.5-0.8	Glass jar + Asb Bag	0	Natural												
29/06/2011	S2	BH15	0-0.1	Glass jar + Asb Bag	0	Fill				X			X	X				
29/06/2011	S3	BH15	0.1-0.5	Glass jar + Asb Bag	0	Fill				X			X		X			
29/06/2011	S4	BH15	0.6-0.8	Plastic Bag	–	Fill										X	X	X
29/06/2011	S5	BH15	1.2-1.5	Glass jar + Asb Bag	0	Natural												
29/06/2011	S6	BH15	1.5-1.7	Plastic Bag	–	Natural										X		
29/06/2011	S7	BH15	1.9-2.1	Plastic Bag	–	Natural												
29/06/2011	S8	BH16	0-0.15	Glass jar + Asb Bag	0	Fill				X			X	X	X			
29/06/2011	S9	BH16	0.2-0.4	Glass jar + Asb Bag	0	Fill												
29/06/2011	60	BH16	0.5-0.7	Glass jar + Asb Bag	0	Fill				X			X	X	X			
29/06/2011	61	BH16	1.2-1.5	Glass jar + Asb Bag	0	Fill					X	X						
29/06/2011	62	BH16	1.8-2	Glass jar + Asb Bag	0	Fill				X			X		X			
29/06/2011	63	BH16	2.7-3	Glass jar + Asb Bag	0	Natural								X				
30/06/2011	64	BH17	0-0.15	Glass jar + Asb Bag	0	Fill				X			X	X	X			
30/06/2011	65	BH17	0.3-0.6	Glass jar + Asb Bag	0	Natural												
30/06/2011	66	BH17	0.6-0.9	Glass jar + Asb Bag	0	Natural												
30/06/2011	67	BH18	0-0.25	Glass jar + Asb Bag	0	Fill				X			X	X				
30/06/2011	68	BH18	0.25-0.5	Plastic Bag	–	Fill										X		
30/06/2011	69	BH18	0.6-0.8	Glass jar + Asb Bag	0	Natural												
30/06/2011	70	BH18	0.8-1.1	Plastic Bag	–	Natural										X	X	X
30/06/2011	71	BH19	0-0.12	Glass jar + Asb Bag	0	Fill				X			X	X	X			
30/06/2011	72	BH19	0.3-0.6	Glass jar + Asb Bag	0	Natural				X			X					
30/06/2011	73	BH20	0-0.3	Glass jar + Asb Bag	0	Fill				X			X	X				
30/06/2011	74	BH20	0.8-1.1	Plastic Bag	–	Natural										X	X	X
30/06/2011	75	BH20	1.1-1.3	Glass jar + Asb Bag	0	Natural												

Remarks (comments/detection limits required):

Relinquished By:	Date:	Time:	Received By:	
	1/7/11	12pm	Morgan Philp	1/7/11 4:45pm

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
Envirolab Services Pty Ltd 12 Ashley Street Chatswood NSW 2067 Phone: (02) 99106200 Fax: (02) 99106201 Attention: Aileen	EIS Job Number: E25004KH Date Results Required: standard turnaround Sheet 4/	Environmental Investigation Services Rear 115 Wicks Road Macquarie Park NSW 2113 Phone: (02) 9888 5000 Fax: (02) 9888 5004 Contact: Todd Hore

Project: Proposed Commercial/Retail Development
Location: Silverdale
Sampler: TH/MD

Tests Required

Sample Preservation: In esky on ice

Date Sampled	Lab Ref:	Borehole/ Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 6	Combo 6a	Combo 13	8 Metals	TPH	BTEX	PAHs	OCP/OPP/ PCBs	Asbestos	pH, EC, Ece	CEC	Chloride, Sulphate
30/06/2011	76	BH20	1.3-1.5	Plastic Bag	–	Natural										X		
30/06/2011	77	BH21	0-0.2	Glass jar + Asb Bag	0	Fill				X			X	X	X			
30/06/2011	78	BH21	0.3-0.5	Glass jar + Asb Bag	0	Natural												
30/06/2011	79	BH21	~~0.5~~ 0.6-1	Plastic Bag	–	Natural										X	X	X
30/06/2011	80	BH21	1-1.2	Glass jar + Asb Bag	0	Natural												
30/06/2011	81	BH21	1.3-1.5	Plastic Bag	–	Natural										X		
30/06/2011	82	BH22	0-0.35	Glass jar + Asb Bag	0	Fill				X			X	X				
30/06/2011	83	BH22	0.6-0.9	Glass jar + Asb Bag	0	Natural												
30/06/2011	84	BH22	1-1.35	Glass jar + Asb Bag	0	Natural												
30/06/2011	85	BH23	0-0.15	Glass jar + Asb Bag	0	Fill				X			X	X				
30/06/2011	86	BH23	0.3-0.6	Plastic Bag	–	Natural										X		
30/06/2011	87	BH23	0.6-0.9	Glass jar + Asb Bag + plastic bag	10	Natural					X	X						
X2 30/06/2011	88	BH23	1.2-1.5	Plastic Bag	–	Natural										X	X	X
30/06/2011	89	BH24	0-0.35	Glass jar + Asb Bag	0	Fill				X			X	X	X			
30/06/2011	90	BH24	0.6-0.9	Glass jar + Asb Bag	0	Natural				X			X					
30/06/2011	91	BH25	0-0.3	Glass jar + Asb Bag	0	Fill				X			X	X				
30/06/2011	92	BH25	0.3-0.6	Plastic Bag	–	Fill										X		
30/06/2011	93	BH25	1-1.2	Glass jar + Asb Bag	0	Natural												
30/06/2011	94	BH25	1.3-1.55	Plastic Bag	–	Natural										X	X	X
29/06/2011	95	Dup 1		Glass jar	0	Soil												
29/06/2011	96	Dup 2		Glass jar	0	Soil				X			X					
29/06/2011	97	Dup 3	~~2~~	Glass jar	2.1	Soil												
29/06/2011	98	Dup 4		Glass jar	0	Soil												
29/06/2011	99	Dup 5		Glass jar	0	Soil												
30/06/2011	100	Dup 6		Glass jar	0	Soil				X			X					

Remarks (comments/detection limits required):

Relinquished By:	Date:	Time:	Received By:	
Hore	1/7/11	12pm	Morgan Philp	1/7/11 4:45pm

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
Envirolab Services Pty Ltd 12 Ashley Street Chatswood NSW 2067 Phone: (02) 99106200 Fax: (02) 99106201 Attention: Aileen	EIS Job Number: E25004KH Date Results Required: standard turnaround Sheet 5/	Environmental Investigation Services Rear 115 Wicks Road Macquarie Park NSW 2113 Phone: (02) 9888 5000 Fax: (02) 9888 5004 Contact: Todd Hore

Project: Proposed Commercial/Retail Development
Location: Silverdale
Sampler: TH/MD

Sample Preservation: In esky on ice

Tests Required

Date Sampled	Lab Ref:	Borehole/ Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 6	Combo 6a	Combo 13	8 Metals	TPH	BTEX	PAHs	OCP/OPP/ PCBs	Asbestos	pH, EC, Ece	CEC	Chloride, Sulphate
30/06/2011	101	Dup 7		Glass jar	0	Soil												
30/06/2011	102	Dup 8		Glass jar	0	Soil												
30/06/2011	103	Dup 9		Glass jar	0	Soil				X			X					
30/06/2011	104	Dup 10		Glass jar	0	Soil												
29/06/2011	105	TS1		Glass jar	-	Soil						X						
30/06/2011	106	FB1		Glass jar	0	Soil						X						
30/06/2011				Glass jar + Asb Bag														
30/06/2011				Glass jar + Asb Bag														
30/06/2011				Glass jar + Asb Bag														
30/06/2011				Glass jar + Asb Bag														
30/06/2011				Plastic Bag														
30/06/2011				Glass jar + Asb Bag														
30/06/2011				Plastic Bag														
30/06/2011				Glass jar + Asb Bag														
30/06/2011				Glass jar + Asb Bag														
30/06/2011				Glass jar + Asb Bag														
30/06/2011				Plastic Bag														
30/06/2011				Glass jar + Asb Bag														
30/06/2011				Plastic Bag														
29/06/2011				Glass jar + Asb Bag														
29/06/2011				Glass jar + Asb Bag														
29/06/2011				Glass jar + Asb Bag														
29/06/2011				Glass jar + Asb Bag														
29/06/2011				Glass jar + Asb Bag														
30/06/2011				Glass jar + Asb Bag														

Remarks (comments/detection limits required):

Relinquished By:	Date:	Time:	Received By:	
[signature]	1/7/11	12pm	Morgan Philp	1/7/11 4:45pm

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
enquiries@envirolabservices.com.au
www.envirolabservices.com.au

CERTIFICATE OF ANALYSIS 57899-A

Client:
Environmental Investigation Services
PO Box 976
North Ryde BC
NSW 1670

Attention: Todd Hore

Sample log in details:

Your Reference:	**E25004KH, Silverdale**
No. of samples:	Additional testing on 1 soil
Date samples received / completed instructions received	01/07/11 / 08/07/11

Analysis Details:
Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	15/07/11 / 15/07/11
Date of Preliminary Report:	Not issued

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Accredited for compliance with ISO/IEC 17025. **Tests not covered by NATA are denoted with *.**

Results Approved By:

Nancy Zhang
Chemist

PAHs in TCLP (USEPA 1311)		
Our Reference:	UNITS	57899-A-82
Your Reference	----------	BH22
Depth	----------	0-035
Date Sampled		30/06/2011
Type of sample		Soil
pH of soil for fluid# determ.	pH units	7.0
pH of soil for fluid # determ. (acid)	pH units	1.5
Extraction fluid used	-	1
pH of final Leachate	pH units	5.0
Date extracted	-	13/07/2011
Date analysed	-	15/07/2011
Naphthalene in TCLP	mg/L	<0.001
Acenaphthylene in TCLP	mg/L	<0.001
Acenaphthene in TCLP	mg/L	<0.001
Fluorene in TCLP	mg/L	<0.001
Phenanthrene in TCLP	mg/L	<0.001
Anthracene in TCLP	mg/L	<0.001
Fluoranthene in TCLP	mg/L	<0.001
Pyrene in TCLP	mg/L	<0.001
Benzo(a)anthracene in TCLP	mg/L	<0.001
Chrysene in TCLP	mg/L	<0.001
Benzo(b+k)fluoranthene in TCLP	mg/L	<0.002
Benzo(a)pyrene in TCLP	mg/L	<0.001
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	<0.001
Dibenzo(a,h)anthracene in TCLP	mg/L	<0.001
Benzo(g,h,i)perylene in TCLP	mg/L	<0.001
Surrogate p-Terphenyl-d_{14}	%	108

Method ID	Methodology Summary
Inorg-004	Toxicity Characteristic Leaching Procedure (TCLP) using AS 4439 and USEPA 1311.
EXTRACT.7	Toxicity Characteristic Leaching Procedure (TCLP).
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA 21st ED, 4500-H+.
Org-012 subset	Leachates are extracted with Dichloromethane and analysed by GC-MS.
Org-012 subset	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.

Client Reference: E25004KH, Silverdale

QUALITY CONTROL PAHs in TCLP (USEPA 1311)	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			13/07/2011	[NT]	[NT]	LCS-W1	13/07/2011
Date analysed	-			15/07/2011	[NT]	[NT]	LCS-W1	15/07/2011
Naphthalene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	86%
Acenaphthylene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Acenaphthene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Fluorene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	123%
Phenanthrene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	98%
Anthracene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Fluoranthene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	93%
Pyrene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	101%
Benzo(a)anthracene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Chrysene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	111%
Benzo(b+k)fluoranthene in TCLP	mg/L	0.002	Org-012 subset	<0.002	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	LCS-W1	113%
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene in TCLP	mg/L	0.001	Org-012 subset	<0.001	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d_{14}	%		Org-012	93	[NT]	[NT]	LCS-W1	60%

Report Comments:

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NA: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batched of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes and LCS: Generally 70-130% for inorganics/metals; 60-140% for organics and 10-140% for SVOC and speciated phenols is acceptable.

Aileen Hie

From: Todd Hore [thore@jkgroup.net.au]
Sent: Friday, 8 July 2011 04:14 PM
To: Aileen Hie
Subject: 57899

EIS

ENVIRONMENTAL INVESTIGATION SERVICES

A division of Jeffery & Katauskas Pty Ltd
ABN 17 003 550 801

Aileen,
Please schedule the following additional analysis for EIS project E25004KH, Silverdale:

- 57899-82 – TCLP + PAHs

Please undertake the above on a standard turnaround.

57899-A
due 15/7/11
std T/A.

Regards,
For and on behalf of
ENVIRONMENTAL INVESTIGATION SERVICES

Todd Hore
Senior Environmental Engineer

115 Wicks Road, Macquarie Park, NSW, 2113
PO Box 976, North Ryde BC, NSW, 1670
Tel: 02 9888 5000
Fax: 02 9888 5004
email: thore@jkgroup.net.au
Web: www.jkgroup.net.au

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
enquiries@envirolabservices.com.au
www.envirolabservices.com.au

CERTIFICATE OF ANALYSIS 57900

Client:
Environmental Investigation Services
PO Box 976
North Ryde BC
NSW 1670

Attention: Todd Hore

Sample log in details:

Your Reference:	**E25004KH, Silverdale**
No. of samples:	3 Waters
Date samples received / completed instructions received	01/07/11 / 01/07/11

Analysis Details:
Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	8/07/11 / 8/07/11
Date of Preliminary Report:	Not issued

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Accredited for compliance with ISO/IEC 17025. **Tests not covered by NATA are denoted with *.**

Results Approved By:

Nancy Zhang
Chemist

Rhian Morgan
Reporting Supervisor

Nick Sarlamis
Inorganics Supervisor

Jeremy Faircloth
Chemist

vTRH & BTEX in Water				
Our Reference:	UNITS	57900-1	57900-2	57900-3
Your Reference	----------	D1	D2	Dup A
Date Sampled	----------	29/06/2011	30/06/2011	29/06/2011
Type of sample		Water	Water	Water
Date extracted	-	04/07/2011	04/07/2011	04/07/2011
Date analysed	-	04/07/2011	04/07/2011	04/07/2011
TRH C_6 - C_9	µg/L	<10	<10	<10
Benzene	µg/L	<1	<1	<1
Toluene	µg/L	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1
m+p-xylene	µg/L	<2	<2	<2
o-xylene	µg/L	<1	<1	<1
Surrogate Dibromofluoromethane	%	113	107	110
Surrogate toluene-d8	%	95	100	97
Surrogate 4-BFB	%	102	106	102

sTRH in Water (C10-C36)				
Our Reference:	UNITS	57900-1	57900-2	57900-3
Your Reference	----------	D1	D2	Dup A
Date Sampled	----------	29/06/2011	30/06/2011	29/06/2011
Type of sample		Water	Water	Water
Date extracted	-	04/07/2011	04/07/2011	04/07/2011
Date analysed	-	05/07/2011	05/07/2011	05/07/2011
$TRHC_{10}$ - C_{14}	µg/L	<50	<50	<50
$TRHC_{15}$ - C_{28}	µg/L	<100	<100	<100
$TRHC_{29}$ - C_{36}	µg/L	<100	<100	<100
Surrogate o-Terphenyl	%	85	93	85

PAHs in Water Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	57900-1 D1 29/06/2011 Water	57900-2 D2 30/06/2011 Water
Date extracted	-	04/07/2011	04/07/2011
Date analysed	-	07/07/2011	07/07/2011
Naphthalene	µg/L	<1	<1
Acenaphthylene	µg/L	<1	<1
Acenaphthene	µg/L	<1	<1
Fluorene	µg/L	<1	<1
Phenanthrene	µg/L	<1	<1
Anthracene	µg/L	<1	<1
Fluoranthene	µg/L	<1	<1
Pyrene	µg/L	<1	<1
Benzo(a)anthracene	µg/L	<1	<1
Chrysene	µg/L	<1	<1
Benzo(b+k)fluoranthene	µg/L	<2	<2
Benzo(a)pyrene	µg/L	<1	<1
Indeno(1,2,3-c,d)pyrene	µg/L	<1	<1
Dibenzo(a,h)anthracene	µg/L	<1	<1
Benzo(g,h,i)perylene	µg/L	<1	<1
Surrogate p-Terphenyl-d_{14}	%	117	122

OCP in water Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	57900-1 D1 29/06/2011 Water	57900-2 D2 30/06/2011 Water
Date extracted	-	04/07/2011	04/07/2011
Date analysed	-	04/07/2011	04/07/2011
HCB	µg/L	<0.2	<0.2
alpha-BHC	µg/L	<0.2	<0.2
gamma-BHC	µg/L	<0.2	<0.2
beta-BHC	µg/L	<0.2	<0.2
Heptachlor	µg/L	<0.2	<0.2
delta-BHC	µg/L	<0.2	<0.2
Aldrin	µg/L	<0.2	<0.2
Heptachlor Epoxide	µg/L	<0.2	<0.2
gamma-Chlordane	µg/L	<0.2	<0.2
alpha-Chlordane	µg/L	<0.2	<0.2
Endosulfan I	µg/L	<0.2	<0.2
pp-DDE	µg/L	<0.2	<0.2
Dieldrin	µg/L	<0.2	<0.2
Endrin	µg/L	<0.2	<0.2
pp-DDD	µg/L	<0.2	<0.2
Endosulfan II	µg/L	<0.2	<0.2
pp-DDT	µg/L	<0.2	<0.2
Endrin Aldehyde	µg/L	<0.2	<0.2
Endosulfan Sulphate	µg/L	<0.2	<0.2
Methoxychlor	µg/L	<0.2	<0.2
Surrogate TCLMX	%	80	85

OP Pesticides in water			
Our Reference:	UNITS	57900-1	57900-2
Your Reference	----------	D1	D2
Date Sampled	----------	29/06/2011	30/06/2011
Type of sample		Water	Water
Date extracted	-	04/07/2011	04/07/2011
Date analysed	-	04/07/2011	04/07/2011
Diazinon	µg/L	<0.2	<0.2
Dimethoate	µg/L	<0.2	<0.2
Chlorpyriphos-methyl	µg/L	<0.2	<0.2
Ronnel	µg/L	<0.2	<0.2
Chlorpyriphos	µg/L	<0.2	<0.2
Fenitrothion	µg/L	<0.2	<0.2
Bromophos ethyl	µg/L	<0.2	<0.2
Ethion	µg/L	<0.2	<0.2
Surrogate TCLMX	%	80	85

PCBs in Water			
Our Reference:	UNITS	57900-1	57900-2
Your Reference	----------	D1	D2
Date Sampled	----------	29/06/2011	30/06/2011
Type of sample		Water	Water
Date extracted	-	04/07/2011	04/07/2011
Date analysed	-	04/07/2011	04/07/2011
Arochlor 1016	µg/L	<2	<2
Arochlor 1221*	µg/L	<2	<2
Arochlor 1232	µg/L	<2	<2
Arochlor 1242	µg/L	<2	<2
Arochlor 1248	µg/L	<2	<2
Arochlor 1254	µg/L	<2	<2
Arochlor 1260	µg/L	<2	<2
Surrogate TCLMX	%	80	85

HM in water - dissolved Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	57900-1 D1 29/06/2011 Water	57900-2 D2 30/06/2011 Water
Date prepared	-	04/07/2011	04/07/2011
Date analysed	-	04/07/2011	04/07/2011
Arsenic-Dissolved	µg/L	<1	<1
Cadmium-Dissolved	µg/L	<0.1	<0.1
Chromium-Dissolved	µg/L	<1	<1
Copper-Dissolved	µg/L	<1	<1
Lead-Dissolved	µg/L	<1	<1
Mercury-Dissolved	µg/L	<0.1	<0.1
Nickel-Dissolved	µg/L	<1	<1
Zinc-Dissolved	µg/L	4	4

Miscellaneous Inorganics			
Our Reference:	UNITS	57900-1	57900-2
Your Reference	----------	D1	D2
Date Sampled	----------	29/06/2011	30/06/2011
Type of sample		Water	Water
Date prepared	-	4/7/2011	4/7/2011
Date analysed	-	4/7/2011	4/7/2011
pH	pH Units	5.9	6.6
Electrical Conductivity	µS/cm	280	570
Hardness	mgCaCO3 /L	24	110
Calcium - Dissolved	mg/L	2.8	21
Magnesium - Dissolved	mg/L	4.2	13
Oil & Grease (LLE)	mg/L	<5	<5

Method ID	Methodology Summary
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID.
Org-012 subset	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-008	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Metals-022 ICP-MS	Determination of various metals by ICP-MS.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA 21st ED, 4500-H+.
Inorg-002	Conductivity and Salinity - measured using a conductivity cell and dedicated meter, in accordance with APHA 21st ED 2510 and Rayment & Higginson.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Inorg-003	Oil & Grease - determine gravimetrically following extraction with Hexane, in accordance with APHA 21st ED, 5220-B.

QUALITY CONTROL vTRH & BTEX in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base || Duplicate || %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			04/07/2011	[NT]	[NT]	LCS-W1	04/07/2011
Date analysed	-			04/07/2011	[NT]	[NT]	LCS-W1	04/07/2011
$TRHC_6$ - C_9	µg/L	10	Org-016	<10	[NT]	[NT]	LCS-W1	105%
Benzene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W1	103%
Toluene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W1	106%
Ethylbenzene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W1	108%
m+p-xylene	µg/L	2	Org-016	<2	[NT]	[NT]	LCS-W1	104%
o-xylene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W1	103%
Surrogate Dibromofluoromethane	%		Org-016	112	[NT]	[NT]	LCS-W1	113%
Surrogate toluene-d8	%		Org-016	101	[NT]	[NT]	LCS-W1	98%
Surrogate 4-BFB	%		Org-016	98	[NT]	[NT]	LCS-W1	99%
QUALITY CONTROL sTRH in Water (C10-C36)	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base || Duplicate || %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			04/07/2011	57900-1	04/07/2011 || 04/07/2011	LCS-W2	04/07/2011
Date analysed	-			05/07/2011	57900-1	05/07/2011 || 05/07/2011	LCS-W2	05/07/2011
$TRHC_{10}$ - C_{14}	µg/L	50	Org-003	<50	57900-1	<50 || <50	LCS-W2	85%
$TRHC_{15}$ - C_{28}	µg/L	100	Org-003	<100	57900-1	<100 || 100	LCS-W2	99%
$TRHC_{29}$ - C_{36}	µg/L	100	Org-003	<100	57900-1	<100 || <100	LCS-W2	107%
Surrogate o-Terphenyl	%		Org-003	111	57900-1	85 || 84 || RPD: 1	LCS-W2	119%
QUALITY CONTROL PAHs in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base || Duplicate || %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			04/07/2011	57900-1	04/07/2011 || 04/07/2011	LCS-W1	04/07/2011
Date analysed	-			07/07/2011	57900-1	07/07/2011 || 07/07/2011	LCS-W1	07/07/2011
Naphthalene	µg/L	1	Org-012 subset	<1	57900-1	<1 || <1	LCS-W1	97%
Acenaphthylene	µg/L	1	Org-012 subset	<1	57900-1	<1 || <1	[NR]	[NR]
Acenaphthene	µg/L	1	Org-012 subset	<1	57900-1	<1 || <1	[NR]	[NR]
Fluorene	µg/L	1	Org-012 subset	<1	57900-1	<1 || <1	LCS-W1	115%
Phenanthrene	µg/L	1	Org-012 subset	<1	57900-1	<1 || <1	LCS-W1	104%
Anthracene	µg/L	1	Org-012 subset	<1	57900-1	<1 || <1	[NR]	[NR]
Fluoranthene	µg/L	1	Org-012 subset	<1	57900-1	<1 || <1	LCS-W1	98%

QUALITY CONTROL PAHs in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Pyrene	µg/L	1	Org-012 subset	<1	57900-1	<1 || <1	LCS-W1	106%
Benzo(a)anthracene	µg/L	1	Org-012 subset	<1	57900-1	<1 || <1	[NR]	[NR]
Chrysene	µg/L	1	Org-012 subset	<1	57900-1	<1 || <1	LCS-W1	109%
Benzo(b+k)fluoranthene	µg/L	2	Org-012 subset	<2	57900-1	<2 || <2	[NR]	[NR]
Benzo(a)pyrene	µg/L	1	Org-012 subset	<1	57900-1	<1 || <1	LCS-W1	109%
Indeno(1,2,3-c,d)pyrene	µg/L	1	Org-012 subset	<1	57900-1	<1 || <1	[NR]	[NR]
Dibenzo(a,h)anthracene	µg/L	1	Org-012 subset	<1	57900-1	<1 || <1	[NR]	[NR]
Benzo(g,h,i)perylene	µg/L	1	Org-012 subset	<1	57900-1	<1 || <1	[NR]	[NR]
Surrogate p-Terphenyl-d_{14}	%		Org-012 subset	110	57900-1	117 || 111 || RPD: 5	LCS-W1	122%

QUALITY CONTROL OCP in water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			04/07/2011	57900-1	04/07/2011 || 04/07/2011	LCS-W1	04/07/2011
Date analysed	-			04/07/2011	57900-1	04/07/2011 || 04/07/2011	LCS-W1	04/07/2011
HCB	µg/L	0.2	Org-005	<0.2	57900-1	<0.2 || <0.2	[NR]	[NR]
alpha-BHC	µg/L	0.2	Org-005	<0.2	57900-1	<0.2 || <0.2	LCS-W1	86%
gamma-BHC	µg/L	0.2	Org-005	<0.2	57900-1	<0.2 || <0.2	[NR]	[NR]
beta-BHC	µg/L	0.2	Org-005	<0.2	57900-1	<0.2 || <0.2	LCS-W1	87%
Heptachlor	µg/L	0.2	Org-005	<0.2	57900-1	<0.2 || <0.2	LCS-W1	83%
delta-BHC	µg/L	0.2	Org-005	<0.2	57900-1	<0.2 || <0.2	[NR]	[NR]
Aldrin	µg/L	0.2	Org-005	<0.2	57900-1	<0.2 || <0.2	LCS-W1	76%
Heptachlor Epoxide	µg/L	0.2	Org-005	<0.2	57900-1	<0.2 || <0.2	LCS-W1	86%
gamma-Chlordane	µg/L	0.2	Org-005	<0.2	57900-1	<0.2 || <0.2	[NR]	[NR]
alpha-Chlordane	µg/L	0.2	Org-005	<0.2	57900-1	<0.2 || <0.2	[NR]	[NR]
Endosulfan I	µg/L	0.2	Org-005	<0.2	57900-1	<0.2 || <0.2	[NR]	[NR]
pp-DDE	µg/L	0.2	Org-005	<0.2	57900-1	<0.2 || <0.2	LCS-W1	91%
Dieldrin	µg/L	0.2	Org-005	<0.2	57900-1	<0.2 || <0.2	LCS-W1	93%
Endrin	µg/L	0.2	Org-005	<0.2	57900-1	<0.2 || <0.2	LCS-W1	87%
pp-DDD	µg/L	0.2	Org-005	<0.2	57900-1	<0.2 || <0.2	LCS-W1	85%
Endosulfan II	µg/L	0.2	Org-005	<0.2	57900-1	<0.2 || <0.2	[NR]	[NR]
pp-DDT	µg/L	0.2	Org-005	<0.2	57900-1	<0.2 || <0.2	[NR]	[NR]
Endrin Aldehyde	µg/L	0.2	Org-005	<0.2	57900-1	<0.2 || <0.2	[NR]	[NR]
Endosulfan Sulphate	µg/L	0.2	Org-005	<0.2	57900-1	<0.2 || <0.2	LCS-W1	70%
Methoxychlor	µg/L	0.2	Org-005	<0.2	57900-1	<0.2 || <0.2	[NR]	[NR]
Surrogate TCLMX	%		Org-005	92	57900-1	80 || 78 || RPD: 3	LCS-W1	83%

QUALITY CONTROL OP Pesticides in water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			04/07/2011	57900-1	04/07/2011 || 04/07/2011	LCS-W1	04/07/2011
Date analysed	-			04/07/2011	57900-1	04/07/2011 || 04/07/2011	LCS-W1	04/07/2011
Diazinon	µg/L	0.2	Org-008	<0.2	57900-1	<0.2 || <0.2	[NR]	[NR]
Dimethoate	µg/L	0.2	Org-008	<0.2	57900-1	<0.2 || <0.2	[NR]	[NR]
Chlorpyriphos-methyl	µg/L	0.2	Org-008	<0.2	57900-1	<0.2 || <0.2	[NR]	[NR]
Ronnel	µg/L	0.2	Org-008	<0.2	57900-1	<0.2 || <0.2	[NR]	[NR]
Chlorpyriphos	µg/L	0.2	Org-008	<0.2	57900-1	<0.2 || <0.2	LCS-W1	94%
Fenitrothion	µg/L	0.2	Org-008	<0.2	57900-1	<0.2 || <0.2	LCS-W1	89%
Bromophos ethyl	µg/L	0.2	Org-008	<0.2	57900-1	<0.2 || <0.2	[NR]	[NR]
Ethion	µg/L	0.2	Org-008	<0.2	57900-1	<0.2 || <0.2	LCS-W1	95%
Surrogate TCLMX	%		Org-008	92	57900-1	80 || 78 || RPD: 3	LCS-W1	92%

QUALITY CONTROL PCBs in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			04/07/2011	57900-1	04/07/2011 || 04/07/2011	LCS-W1	04/07/2011
Date analysed	-			04/07/2011	57900-1	04/07/2011 || 04/07/2011	LCS-W1	04/07/2011
Arochlor 1016	µg/L	2	Org-006	<2	57900-1	<2 || <2	[NR]	[NR]
Arochlor 1221*	µg/L	2	Org-006	<2	57900-1	<2 || <2	[NR]	[NR]
Arochlor 1232	µg/L	2	Org-006	<2	57900-1	<2 || <2	[NR]	[NR]
Arochlor 1242	µg/L	2	Org-006	<2	57900-1	<2 || <2	[NR]	[NR]
Arochlor 1248	µg/L	2	Org-006	<2	57900-1	<2 || <2	[NR]	[NR]
Arochlor 1254	µg/L	2	Org-006	<2	57900-1	<2 || <2	LCS-W1	96%
Arochlor 1260	µg/L	2	Org-006	<2	57900-1	<2 || <2	[NR]	[NR]
Surrogate TCLMX	%		Org-006	92	57900-1	80 || 78 || RPD: 3	LCS-W1	86%

QUALITY CONTROL HM in water - dissolved	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			04/07/2011	57900-1	04/07/2011 || 04/07/2011	57900-2	04/07/2011
Date analysed	-			04/07/2011	57900-1	04/07/2011 || 04/07/2011	57900-2	04/07/2011
Arsenic-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	57900-1	<1 || <1	57900-2	95%
Cadmium-Dissolved	µg/L	0.1	Metals-022 ICP-MS	<0.1	57900-1	<0.1 || <0.1	57900-2	97%
Chromium-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	57900-1	<1 || <1	57900-2	98%
Copper-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	57900-1	<1 || <1	57900-2	92%
Lead-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	57900-1	<1 || <1	57900-2	89%
Mercury-Dissolved	µg/L	0.1	Metals-021 CV-AAS	<0.1	57900-1	<0.1 || <0.1	57900-2	88%

Client Reference: E25004KH, Silverdale

QUALITY CONTROL HM in water - dissolved	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Nickel-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	57900-1	<1 || <1	57900-2	93%
Zinc-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	57900-1	4 || 4 || RPD: 0	57900-2	89%

QUALITY CONTROL Miscellaneous Inorganics	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			4/7/2011	57900-1	4/7/2011 || 4/7/2011	LCS-W1	4/7/2011
Date analysed	-			4/7/2011	57900-1	4/7/2011 || 4/7/2011	LCS-W1	4/7/2011
pH	pH Units		Inorg-001	[NT]	57900-1	5.9 || 5.9 || RPD: 0	LCS-W1	101%
Electrical Conductivity	µS/cm	1	Inorg-002	<1	57900-1	280 || 280 || RPD: 0	LCS-W1	106%
Hardness	mgCaCO3/L	3		3.0	57900-1	24 || 25 || RPD: 4	[NR]	[NR]
Calcium - Dissolved	mg/L	0.5	Metals-020 ICP-AES	<0.5	57900-1	2.8 || 2.8 || RPD: 0	LCS-W1	88%
Magnesium - Dissolved	mg/L	0.5	Metals-020 ICP-AES	<0.5	57900-1	4.2 || 4.3 || RPD: 2	LCS-W1	90%
Oil & Grease (LLE)	mg/L	5	Inorg-003	<5	57900-1	<5 || [N/T]	LCS-W1	85%

QUALITY CONTROL Miscellaneous Inorganics	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	[NT]	[NT]	57900-2	05/07/2011
Date analysed	-	[NT]	[NT]	57900-2	05/07/2011
pH	pH Units	[NT]	[NT]	[NR]	[NR]
Electrical Conductivity	µS/cm	[NT]	[NT]	[NR]	[NR]
Hardness	mgCaCO3/L	[NT]	[NT]	[NR]	[NR]
Calcium - Dissolved	mg/L	[NT]	[NT]	57900-2	90%
Magnesium - Dissolved	mg/L	[NT]	[NT]	57900-2	80%
Oil & Grease (LLE)	mg/L	[NT]	[NT]	[NR]	[NR]

Report Comments:

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NA: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batched of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes and LCS: Generally 70-130% for inorganics/metals; 60-140% for organics and 10-140% for SVOC and speciated phenols is acceptable.

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
enquiries@envirolabservices.com.au
www.envirolabservices.com.au

SAMPLE RECEIPT ADVICE

Client:

Environmental Investigation Services
PO Box 976
North Ryde BC NSW 1670

ph: 02 9888 5000
Fax: 02 9888 5001

Attention: Todd Hore

Sample log in details:

Your reference:	**E25004KH, Silverdale**
Envirolab Reference:	**57900**
Date received:	01/07/11
Date results expected to be reported:	**8/07/11**

Samples received in appropriate condition for analysis:	YES
No. of samples provided	3 Waters
Turnaround time requested:	Standard
Temperature on receipt	Cool
Cooling Method:	Ice

Comments:

Samples will be held for 1 month for water samples and 2 months for soil samples from date of receipt of samples.

Contact details:

Please direct any queries to Aileen Hie or Jacinta Hurst
ph: 02 9910 6200 fax: 02 9910 6201
email: ahie@envirolabservices.com.au or jhurst@envirolabservices.com.au

TO:
Envirolab Services Pty Ltd
12 Ashley St, Chatswood 2067

Phone: (02) 9910 6200
Fax: (02) 9910 6201

Attention: Aileen

Date Results Required: standard turnaround

SAMPLE AND CHAIN OF CUSTODY FORM

EIS Job Number: E25004KH

Sheet 1 / 1

FROM:
Environmental Investigation Services

Rear 115 Wicks Road
Macquarie Park NSW 2113

Phone: (02) 9888 5000
Fax: (02) 9888 5004

Contact: Todd Hore

Project: Proposed Commercial/Retail Development
Location: Silverdale
Sampler: TH/MD

Sample Preservation:
In esky on ice

	Date Sampled	Time Sampled	Location	Sample/ Borehole Number	Sample Container	PID (ppm/ Odour)	Sample Description	Tests Required: Combo 6	Heavy metals	TPH/BTEX	VOCs	Oil & Grease	pH / EC / Hardness				Comments/Detection Limits Required
1	29/6/11			D1	1L Amber Bottle 2 BTEX Vials HDPE Plastic Bottle		Water	X				X	X				
2	30/6/11			D2	1L Amber Bottle 2 BTEX Vials HDPE Plastic Bottle		Water	X				X	X				
3	29/6/11			Dup A	1L Amber Bottle 2 BTEX Vials		Water			X							

ENVIROLAB
Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 57900
Date Received: 1/7
Time Received: 16:45
Received by: AW
Temp: Cool/Ambient
Cooling: Icepack
Security: Intact/Broken/None

Relinquished By:	Date: 1/7/11	Received By: Alex W 1/7 16:45
Hore	Time: 12pm	
Relinquished By:	Date:	Received By:
	Time:	

Remarks:

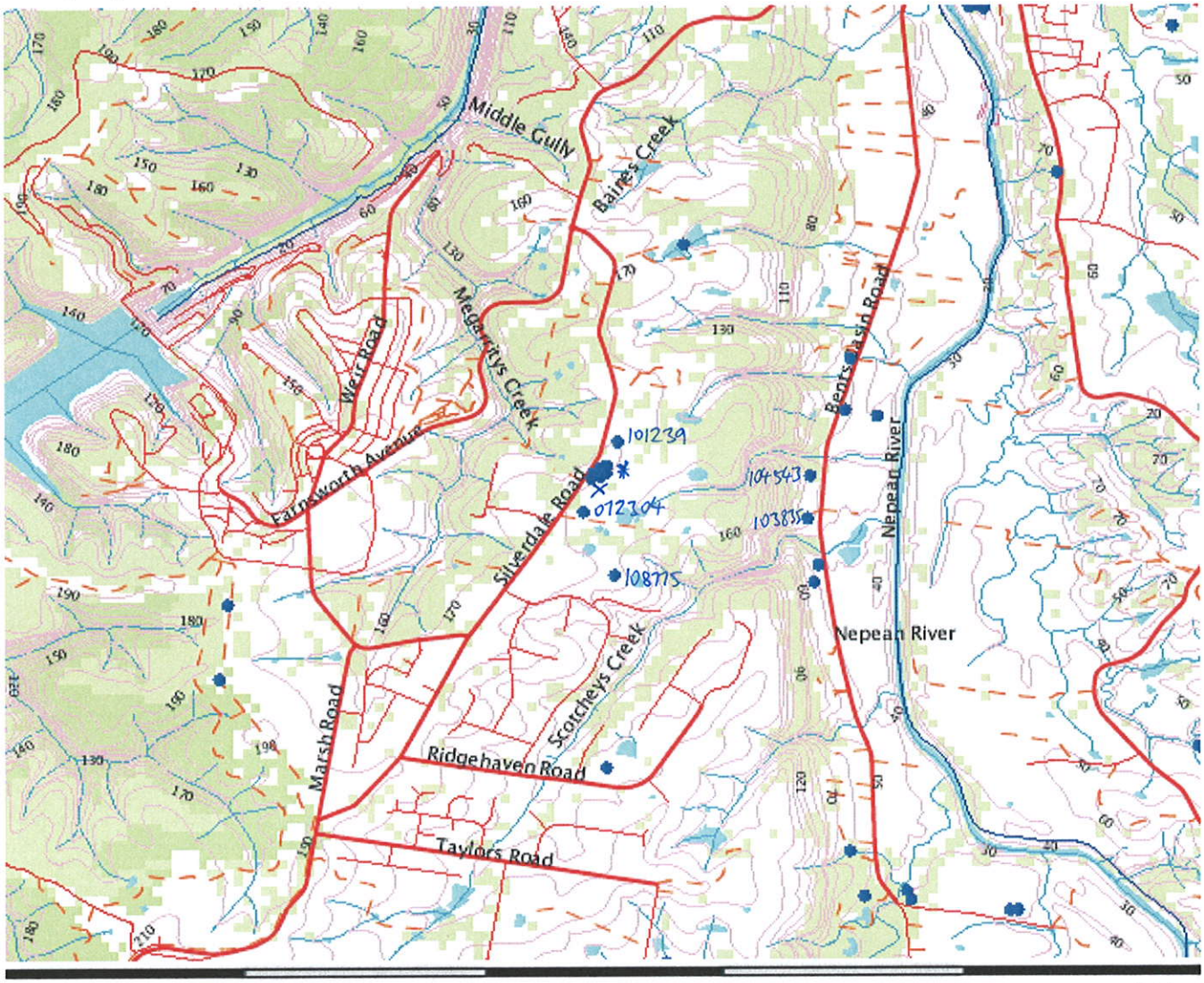
All analysis PQLs to ANZECC (2000) Detection Limits Please

APPENDIX C

(Site History Documents – Groundwater Bore Records)

E25004KH, Silverdale

Map created with NSW Natural Resource Atlas - http://www.nratlas.nsw.gov.au
Tuesday, July 26, 2011



0 5 Km

Legend

Symbol	Layer	Custodian
●	Groundwater Bores	* GW 109736 - 109743
	Catchment Management Authority boundaries	
	Major rivers	
Primary/arterial road Motorway/freeway Railway Runway Contour Background	Topographic base map	

Groundwater Works Summary

For information on the meaning of fields please see Glossary
Document Generated on Tuesday, July 26, 2011

Print Report

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

Work Requested -- GW109736

Works Details (top)

GROUNDWATER NUMBER	GW109736
LIC-NUM	10BL163467
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Bore
WORK-STATUS	
CONSTRUCTION-METHOD	Hand Auger
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2003-08-11
FINAL-DEPTH (metres)	9.00
DRILLED-DEPTH (metres)	9.00
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	MOBIL OIL
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	2.00
SALINITY	
YIELD	

Site Details (top)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6247404.00
EASTING	279803.00
LATITUDE	33 53' 27"

LONGITUDE	150 37' 8"
GS-MAP	
AMG-ZONE	56
COORD-SOURCE	
REMARK	

Form-A (top)

COUNTY	CAMDEN
PARISH	WARRAGAMBA
PORTION-LOT-DP	19 1015250

Licensed (top)

COUNTY	CAMDEN
PARISH	WARRAGAMBA
PORTION-LOT-DP	19 1015250

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		Hole	Hole	0.00	1.00	50			Hand Auger
1		Hole	Hole	1.00	9.00	150			Rotary Air
1	1	Casing	PVC Class 18	0.00	4.50	50			Screwed; Seated on Bottom
1	1	Opening	Slots - Vertical	4.50	9.00	50			PVC Class 18; Stamped; SL: 4.5mm; A: 4mm
1		Annulus	Waterworn/Rounded	0.00	0.00				Graded; GS: 0-2mm

Water Bearing Zones (top)

FROM-DEPTH (metres)	TO-DEPTH (metres)	THICKNESS (metres)	ROCK-CAT-DESC	S-W-L	D-D-L	YIELD	TEST-HOLE-DEPTH (metres)	DURATION	SALINITY
0.00	6.50	6.50		2.00					

Drillers Log (top)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	1.50	1.50	FILL.SILTY CLAY,GRAVEL		

1.50	7.00	5.50	WEATHERED SHALE
7.00	9.00	2.00	SANDSTONE

Groundwater Works Summary

For information on the meaning of fields please see Glossary
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Print Report

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

Work Requested -- GW109737

Works Details (top)

GROUNDWATER NUMBER	GW109737
LIC-NUM	10BL163467
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Bore
WORK-STATUS	
CONSTRUCTION-METHOD	Hand Auger
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2003-08-11
FINAL-DEPTH (metres)	7.00
DRILLED-DEPTH (metres)	7.00
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	MOBIL OIL
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	2.30
SALINITY	
YIELD	

Site Details (top)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6247433.00
EASTING	279807.00
LATITUDE	33 53' 26"

LONGITUDE	150 37' 8"
GS-MAP	
AMG-ZONE	56
COORD-SOURCE	
REMARK	

Form-A (top)

COUNTY	CAMDEN
PARISH	WARRAGAMBA
PORTION-LOT-DP	19 1015250

Licensed (top)

COUNTY	CAMDEN
PARISH	WARRAGAMBA
PORTION-LOT-DP	19 1015250

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		Hole	Hole	0.00	1.00	50			Hand Auger
1		Hole	Hole	1.00	7.00	150			Rotary Air
1	1	Casing	PVC Class 18	0.00	2.50	50			Screwed; Seated on Bottom
1	1	Opening	Slots - Vertical	2.50	7.00	50			PVC Class 18; Stamped; SL: 4.5mm; A: 4mm

Water Bearing Zones (top)

FROM-DEPTH (metres)	TO-DEPTH (metres)	THICKNESS (metres)	ROCK-CAT-DESC	S-W-L	D-D-L	YIELD	TEST-HOLE-DEPTH (metres)	DURATION	SALINITY
0.00	4.50	4.50		2.30					

Drillers Log (top)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	1.50	1.50	FILL.SILTY CLAY		
1.50	7.00	5.50	WEATHERED SHALE		

Groundwater Works Summary

For information on the meaning of fields please see Glossary
Document Generated on Tuesday, July 26, 2011

Print Report

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

Work Requested -- GW109738

Works Details (top)

GROUNDWATER NUMBER	GW 109738
LIC-NUM	10BL163467
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Bore
WORK-STATUS	
CONSTRUCTION-METHOD	Hand Auger
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2003-08-11
FINAL-DEPTH (metres)	7.00
DRILLED-DEPTH (metres)	7.00
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	MOBIL OIL
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	2.50
SALINITY	
YIELD	

Site Details (top)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6247449.00
EASTING	279799.00
LATITUDE	33 53' 25"

LONGITUDE	150 37' 8"
GS-MAP	
AMG-ZONE	56
COORD-SOURCE	
REMARK	

Form-A (top)

COUNTY	CAMDEN
PARISH	WARRAGAMBA
PORTION-LOT-DP	19 1015250

Licensed (top)

COUNTY	CAMDEN
PARISH	WARRAGAMBA
PORTION-LOT-DP	19 1015250

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		Hole	Hole	0.00	1.00	50			Hand Auger
1		Hole	Hole	1.00	7.00	150			Rotary Air
1	1	Casing	PVC Class 18	0.00	2.50	50			Screwed; Seated on Bottom
1	1	Opening	Slots - Vertical	2.50	7.00	50			PVC Class 18; Stamped; SL: 4.5mm; A: 4mm

Water Bearing Zones (top)

FROM-DEPTH (metres)	TO-DEPTH (metres)	THICKNESS (metres)	ROCK-CAT-DESC	S-W-L	D-D-L	YIELD	TEST-HOLE-DEPTH (metres)	DURATION	SALINITY
0.00	4.50	4.50		2.50					

Drillers Log (top)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	2.00	2.00	FILL, SILTY CLAY,SANDY CLAY		
2.00	7.00	5.00	WEATHERED SHALE		

Groundwater Works Summary

For information on the meaning of fields please see Glossary
Document Generated on Tuesday, July 26, 2011

Print Report

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

Work Requested -- GW109739

Works Details (top)

GROUNDWATER NUMBER	GW 109739
LIC-NUM	10BL163467
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Bore
WORK-STATUS	
CONSTRUCTION-METHOD	Hand Auger
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2003-08-11
FINAL-DEPTH (metres)	7.00
DRILLED-DEPTH (metres)	7.00
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	MOBIL OIL
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	1.80
SALINITY	
YIELD	

Site Details (top)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6247408.00
EASTING	279778.00
LATITUDE	33 53' 27"

LONGITUDE	150 37' 7"
GS-MAP	
AMG-ZONE	56
COORD-SOURCE	
REMARK	

Form-A (top)

COUNTY	CAMDEN
PARISH	WARRAGAMBA
PORTION-LOT-DP	19 1015250

Licensed (top)

COUNTY	CAMDEN
PARISH	WARRAGAMBA
PORTION-LOT-DP	19 1015250

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		Hole	Hole	0.00	1.00	50			Hand Auger
1		Hole	Hole	1.00	7.00	150			Rotary Air
1	1	Casing	PVC Class 18	0.00	1.50	50			Screwed; Seated on Bottom
1	1	Opening	Slots - Vertical	1.50	7.00	50			PVC Class 18; Stamped; SL: 5.5mm; A: 4mm
1		Annulus	Waterworn/Rounded	0.00	0.00				Graded; GS: 0-2mm

Water Bearing Zones (top)

FROM-DEPTH (metres)	TO-DEPTH (metres)	THICKNESS (metres)	ROCK-CAT-DESC	S-W-L	D-D-L	YIELD	TEST-HOLE-DEPTH (metres)	DURATION	SALINITY
0.00	4.50	4.50		1.80					

Drillers Log (top)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	1.00	1.00	FILL,SILTY CLAY		

1.00	7.00	6.00	WEATHERED SHALE

Groundwater Works Summary

For information on the meaning of fields please see Glossary
Document Generated on Tuesday, July 26, 2011

Print Report

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

Work Requested -- GW109740

Works Details (top)

GROUNDWATER NUMBER	GW 109740
LIC-NUM	10BL163467
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Bore
WORK-STATUS	
CONSTRUCTION-METHOD	Hand Auger
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2003-08-11
FINAL-DEPTH (metres)	7.30
DRILLED-DEPTH (metres)	7.30
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	MOBIL OIL
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	2.10
SALINITY	
YIELD	

Site Details (top)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6247425.00
EASTING	279830.00
LATITUDE	33 53' 26"

LONGITUDE	150 37' 9"
GS-MAP	
AMG-ZONE	56
COORD-SOURCE	
REMARK	

Form-A (top)

COUNTY	CAMDEN
PARISH	WARRAGAMBA
PORTION-LOT-DP	19 1015250

Licensed (top)

COUNTY	CAMDEN
PARISH	WARRAGAMBA
PORTION-LOT-DP	19 1015250

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		Hole	Hole	0.00	1.00	50			Hand Auger
1		Hole	Hole	1.00	7.30	150			Rotary Air
1	1	Casing	PVC Class 18	0.00	1.30	50			Screwed; Seated on Bottom
1	1	Opening	Slots - Vertical	1.30	7.30	50			PVC Class 18; Stamped; SL: 6mm; A: 4mm
1		Annulus	Waterworn/Rounded	0.00	0.00				Graded; GS: 0-2mm

Water Bearing Zones (top)

FROM-DEPTH (metres)	TO-DEPTH (metres)	THICKNESS (metres)	ROCK-CAT-DESC	S-W-L	D-D-L	YIELD	TEST-HOLE-DEPTH (metres)	DURATION	SALINITY
0.00	4.50	4.50		2.10					

Drillers Log (top)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	1.00	1.00	FILL,SILTY CLAY, SANDY		

1.00	7.30	6.30	WEATHERED SHALE

Groundwater Works Summary

For information on the meaning of fields please see Glossary
Document Generated on Tuesday, July 26, 2011

Print Report

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

Work Requested -- GW109741

Works Details (top)

GROUNDWATER NUMBER	GW109741
LIC-NUM	10BL163467
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Bore
WORK-STATUS	
CONSTRUCTION-METHOD	Hand Auger
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2003-08-11
FINAL-DEPTH (metres)	7.00
DRILLED-DEPTH (metres)	7.00
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	MOBIL OIL
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	2.50
SALINITY	
YIELD	

Site Details (top)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6247464.00
EASTING	279832.00
LATITUDE	33 53' 25"

LONGITUDE	150 37' 9"
GS-MAP	
AMG-ZONE	56
COORD-SOURCE	
REMARK	

Form-A (top)

COUNTY	CAMDEN
PARISH	WARRAGAMBA
PORTION-LOT-DP	19 1015250

Licensed (top)

COUNTY	CAMDEN
PARISH	WARRAGAMBA
PORTION-LOT-DP	19 1015250

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		Hole	Hole	0.00	1.00	50			Hand Auger
1		Hole	Hole	1.00	7.00	150			Rotary Air
1	1	Casing	PVC Class 18	0.00	2.00	50			Screwed; Seated on Bottom
1	1	Opening	Slots - Vertical	2.00	7.00	50			PVC Class 18; Stamped; SL: 5mm; A: 4mm
1		Annulus	Waterworn/Rounded	0.00	0.00				Graded; GS: 0-2mm

Water Bearing Zones (top)

FROM-DEPTH (metres)	TO-DEPTH (metres)	THICKNESS (metres)	ROCK-CAT-DESC	S-W-L	D-D-L	YIELD	TEST-HOLE-DEPTH (metres)	DURATION	SALINITY
0.00	4.50	4.50		2.50					

Drillers Log (top)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	2.00	2.00	FILL,GRAVELLY CLAYEY SILT		

2.00	7.00	5.00	WEATHERED SHALE

Groundwater Works Summary

For information on the meaning of fields please see Glossary
Document Generated on Tuesday, July 26, 2011

Print Report

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

Work Requested -- GW109742

Works Details (top)

GROUNDWATER NUMBER	GW 109742
LIC-NUM	10BL163467
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Bore
WORK-STATUS	
CONSTRUCTION-METHOD	Hand Auger
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2003-08-11
FINAL-DEPTH (metres)	6.90
DRILLED-DEPTH (metres)	6.90
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	MOBIL OIL
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	2.50
SALINITY	
YIELD	

Site Details (top)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6247420.00
EASTING	279771.00
LATITUDE	33 53' 26"

LONGITUDE	150 37' 7"
GS-MAP	
AMG-ZONE	56
COORD-SOURCE	
REMARK	

Form-A (top)

COUNTY	CAMDEN
PARISH	WARRAGAMBA
PORTION-LOT-DP	19 1015250

Licensed (top)

COUNTY	CAMDEN
PARISH	WARRAGAMBA
PORTION-LOT-DP	19 1015250

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		Hole	Hole	0.00	1.00	50			Hand Auger
1		Hole	Hole	1.00	4.00	150			Auger - Solid Flight
1		Hole	Hole	4.00	6.90	150			Rotary Air
1	1	Casing	PVC Class 18	0.00	0.90	50			Screwed; Seated on Bottom
1	1	Opening	Slots - Vertical	0.90	6.90	50			PVC Class 18; Stamped; SL: 6mm; A: 4mm
1		Annulus	Waterworn/Rounded	0.00	0.00				Graded; GS: 0-2mm

Water Bearing Zones (top)

FROM-DEPTH (metres)	TO-DEPTH (metres)	THICKNESS (metres)	ROCK-CAT-DESC	S-W-L	D-D-L	YIELD	TEST-HOLE-DEPTH (metres)	DURATION	SALINITY
0.00	5.50	5.50		2.50					

Drillers Log (top)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	0.20	0.20	TOPSOIL		
0.20	3.00	2.80	SILTY CLAY		
3.00	6.90	3.90	WEATHERED SHALE		

Groundwater Works Summary

For information on the meaning of fields please see Glossary
Document Generated on Tuesday, July 26, 2011

Print Report

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

Work Requested -- GW109743

Works Details (top)

GROUNDWATER NUMBER	GW109743
LIC-NUM	10BL163467
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Bore
WORK-STATUS	
CONSTRUCTION-METHOD	Hand Auger
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2003-08-11
FINAL-DEPTH (metres)	7.00
DRILLED-DEPTH (metres)	7.00
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	MOBIL OIL
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	2.20
SALINITY	
YIELD	

Site Details (top)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6247391.00
EASTING	279761.00
LATITUDE	33 53' 27"

LONGITUDE	150 37' 6"
GS-MAP	
AMG-ZONE	56
COORD-SOURCE	
REMARK	

Form-A (top)

COUNTY	CAMDEN
PARISH	WARRAGAMBA
PORTION-LOT-DP	19 1015250

Licensed (top)

COUNTY	CAMDEN
PARISH	WARRAGAMBA
PORTION-LOT-DP	19 1015250

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		Hole	Hole	0.00	1.00	50			Hand Auger
1		Hole	Hole	1.00	4.00	150			Auger - Solid Flight
1		Hole	Hole	4.00	7.00	150			Rotary Air
1	1	Casing	PVC Class 18	0.00	1.00	50			Screwed; Seated on Bottom
1	1	Opening	Slots - Vertical	1.00	7.00	50			PVC Class 18; Stamped; SL: 6mm; A: 4mm
1		Annulus	Waterworn/Rounded	0.00	0.00				Graded; GS: 0-2mm

Water Bearing Zones (top)

FROM-DEPTH (metres)	TO-DEPTH (metres)	THICKNESS (metres)	ROCK-CAT-DESC	S-W-L	D-D-L	YIELD	TEST-HOLE-DEPTH (metres)	DURATION	SALINITY
0.00	5.50	5.50		2.20					

Drillers Log (top)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	0.50	0.50	FILL,CLAY,SAND		
0.50	3.00	2.50	SILTY CLAY		
3.00	7.00	4.00	WEATHERED SHALE		

Groundwater Works Summary

For information on the meaning of fields please see Glossary
Document Generated on Tuesday, July 26, 2011

Print Report

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

Work Requested -- GW072304

Works Details (top)

GROUNDWATER NUMBER	GW072304
LIC-NUM	
AUTHORISED-PURPOSES	
INTENDED-PURPOSES	DOMESTIC
WORK-TYPE	Bore open thru rock
WORK-STATUS	(Unknown)
CONSTRUCTION-METHOD	Rotary Air
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	1994-12-16
FINAL-DEPTH (metres)	162.50
DRILLED-DEPTH (metres)	129.90
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	
GWMA	
GW-ZONE	
STANDING-WATER-LEVEL	
SALINITY	
YIELD	

Site Details (top)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	212 - HAWKESBURY RIVER
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6247196.00
EASTING	279727.00
LATITUDE	33 53' 33"

LONGITUDE	150 37' 5"
GS-MAP	
AMG-ZONE	56
COORD-SOURCE	GD.,ACC.GIS
REMARK	

Form-A (top)

COUNTY	CAMDEN
PARISH	WARRAGAMBA
PORTION-LOT-DP	L10 DP38123

Licensed (top)

no details

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	Steel	-0.50	5.50	168			Driven into Hole

Water Bearing Zones (top)

FROM-DEPTH (metres)	TO-DEPTH (metres)	THICKNESS (metres)	ROCK-CAT-DESC	S-W-L	D-D-L	YIELD	TEST-HOLE-DEPTH (metres)	DURATION	SALINITY
125.70	126.20	0.50	Fractured			0.30			0-500 ppm
153.60	154.10	0.50	Fractured			0.50			0-500 ppm
158.20	158.50	0.30				1.20			0-500 ppm

Drillers Log (top)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	0.40	0.40	Topsoil		
0.40	2.80	2.40	Red Clay		
2.80	23.10	20.30	Soft Brown Sandstone		
23.10	44.30	21.20	L/grey Med Grain S/stone Clay Matrix		
44.30	45.80	1.50	Grey M/grain S/stone Quartz Matrix		
45.80	88.30	42.50	Light Grey Med Grain Sdsn		
88.30	90.20	1.90	Quartz		
90.20	96.00	5.80	Light Grey Med Grain Sdsn		

96.00	96.70	0.70	Shale/quartz Cross Bed
96.70	106.60	9.90	Hard Dark Grey Shale
106.60	114.60	8.00	Light Grey Med Grain S/stone
114.60	126.20	11.60	Quartz
126.20	129.90	3.70	Light Grey Med Grained S/stone
129.90	133.80	3.90	Quartz
133.80	141.60	7.80	Light Grey Med Grained S/stone
141.60	141.90	0.30	Quartz
141.90	153.30	11.40	Light Grey Med Grain S/stone
153.30	154.10	0.80	Quartz
154.10	158.20	4.10	Light Grey Med Grain S/stone
158.20	158.50	0.30	Fractured Zone
158.50	162.50	4.00	Light Grey Med Grain S/stone

Groundwater Works Summary

For information on the meaning of fields please see Glossary
Document Generated on Tuesday, July 26, 2011

Print Report

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

Work Requested -- GW108775

Works Details (top)

GROUNDWATER NUMBER	GW108775
LIC-NUM	10BL601041
AUTHORISED-PURPOSES	DOMESTIC STOCK
INTENDED-PURPOSES	DOMESTIC STOCK
WORK-TYPE	Bore
WORK-STATUS	Supply Obtained
CONSTRUCTION-METHOD	Down Hole Hammer
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2008-04-17
FINAL-DEPTH (metres)	180.00
DRILLED-DEPTH (metres)	180.00
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	MIFSUD
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	120.00
SALINITY	210.00
YIELD	2.70

Site Details (top)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6246836.00
EASTING	279882.00
LATITUDE	33 53' 45"

LONGITUDE	150 37' 11"
GS-MAP	
AMG-ZONE	56
COORD-SOURCE	GIS - Geographic Information System
REMARK	

Form-A (top)

COUNTY	CAMDEN
PARISH	WARRAGAMBA
PORTION-LOT-DP	122//747833

Licensed (top)

COUNTY	CAMDEN
PARISH	WARRAGAMBA
PORTION-LOT-DP	122 747833

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		Hole	Hole	0.00	42.00	170			Down Hole Hammer
1		Hole	Hole	42.00	180.00	140			Down Hole Hammer
1	1	Casing	PVC Class 9	-0.50	42.00	140			Glued; Driven into Hole; Open End

Water Bearing Zones (top)

FROM-DEPTH (metres)	TO-DEPTH (metres)	THICKNESS (metres)	ROCK-CAT-DESC	S-W-L	D-D-L	YIELD	TEST-HOLE-DEPTH (metres)	DURATION	SALINITY
160.00	161.00	1.00				0.90		0.50	
165.00	166.00	1.00		120.00		1.80		0.50	

Drillers Log (top)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	8.00	8.00	SHALE		
8.00	30.00	22.00	SANDSTONE		

30.00	33.00	3.00	SHALE
33.00	174.00	141.00	SANDSTONE
174.00	177.00	3.00	SHALE
177.00	180.00	3.00	SANDSTONE

Groundwater Works Summary

For information on the meaning of fields please see Glossary
Document Generated on Tuesday, July 26, 2011

Print Report

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

Work Requested -- GW101239

Works Details (top)

GROUNDWATER NUMBER	GW 101239
LIC-NUM	10BL158334
AUTHORISED-PURPOSES	DOMESTIC STOCK
INTENDED-PURPOSES	DOMESTIC STOCK
WORK-TYPE	Bore
WORK-STATUS	(Unknown)
CONSTRUCTION-METHOD	Rotary Air
OWNER-TYPE	
COMMENCE-DATE	
COMPLETION-DATE	1998-02-03
FINAL-DEPTH (metres)	180.00
DRILLED-DEPTH (metres)	180.00
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	N/A
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	114.00
SALINITY	134.00
YIELD	1.50

Site Details (top)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6247603.00
EASTING	279882.00
LATITUDE	33 53' 20"

LONGITUDE	150 37' 11"
GS-MAP	
AMG-ZONE	56
COORD-SOURCE	
REMARK	

Form-A (top)

COUNTY	CAMDEN
PARISH	WARRAGAMBA
PORTION-LOT-DP	LOT7 DP38123

Licensed (top)

COUNTY	CAMDEN
PARISH	WARRAGAMBA
PORTION-LOT-DP	7 38123

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	Stainless Steel	-0.60	5.40	168.3	158.7		C: 0-5.4m; Driven into Hole; Plug
1	1	Casing	PVC Class 12	-0.60	59.40	139.7			Suspended in Clamps

Water Bearing Zones (top)

FROM-DEPTH (metres)	TO-DEPTH (metres)	THICKNESS (metres)	ROCK-CAT-DESC	S-W-L	D-D-L	YIELD	TEST-HOLE-DEPTH (metres)	DURATION	SALINITY
127.00	136.50	9.50				0.20	138.00	0.25	134.00
151.50	154.50	3.00				0.50	156.00	0.25	121.00
161.60	180.00	18.40				1.50	180.00	0.50	134.00

Drillers Log (top)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	2.50	2.50	clay loam overburden		
2.50	14.60	12.10	brown, coarse grained sandstone		
14.60	15.20	0.60	sandstone/clay		

15.20	39.50	24.30	sandstone, medium grained, brown
39.50	41.00	1.50	sandstone, coarse grain, light brown
41.00	47.00	6.00	quartz
47.00	51.00	4.00	ironstone
51.00	52.50	1.50	quartz and clay
52.50	54.00	1.50	sandstone and clay
54.00	69.00	15.00	sandstone, medium grained, grey
69.00	70.50	1.50	sandstone and quartz
70.50	88.50	18.00	sandstone, medium grained, red
88.50	97.20	8.70	quartz
97.20	106.20	9.00	sandstone and quartz matrix
106.20	113.00	6.80	sandstone, medium grain, light grey
113.00	116.20	3.20	quartz
116.20	118.00	1.80	sandstone, finegrained, grey
118.00	124.50	6.50	sandstone, fine grained, dark grey
124.50	127.00	2.50	sandstone and quartz
127.00	136.50	9.50	quartz (water bearing)
136.50	137.50	1.00	sandstone, medium grained, grey
137.50	146.00	8.50	sandstone, finegrained, dark grey
146.00	151.50	5.50	sandstone, medium grained, light grey
151.50	154.50	3.00	quartz (water bearing)
154.50	161.00	6.50	quartz and sandstone (water bearing)
161.00	161.60	0.60	quartz sand
161.60	180.00	18.40	sandstone and fine quartz

Groundwater Works Summary

For information on the meaning of fields please see Glossary
Document Generated on Tuesday, July 26, 2011

Print Report

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

Work Requested -- GW104543

Works Details (top)

GROUNDWATER NUMBER	GW104543
LIC-NUM	10BL160818
AUTHORISED-PURPOSES	DOMESTIC STOCK
INTENDED-PURPOSES	DOMESTIC STOCK
WORK-TYPE	Bore
WORK-STATUS	Supply Obtained
CONSTRUCTION-METHOD	Rotary
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	1998-06-09
FINAL-DEPTH (metres)	42.70
DRILLED-DEPTH (metres)	42.70
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	N/A
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	6.00
SALINITY	
YIELD	7.00

Site Details (top)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	212 - HAWKESBURY RIVER
AREA-DISTRICT	
CMA-MAP	9030-3S
GRID-ZONE	56/1
SCALE	1:25,000
ELEVATION	
ELEVATION-SOURCE	(Unknown)
NORTHING	6247429.00
EASTING	280808.00
LATITUDE	33 53' 27"

LONGITUDE	150 37' 47"
GS-MAP	
AMG-ZONE	56
COORD-SOURCE	
REMARK	

Form-A (top)

COUNTY	CAMDEN
PARISH	WARRAGAMBA
PORTION-LOT-DP	LT2 DP1000201

Licensed (top)

COUNTY	CAMDEN
PARISH	WARRAGAMBA
PORTION-LOT-DP	2 1000201

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		Hole	Hole	0.00	15.00	230			Rotary Air
1		Hole	Hole	15.00	43.00	165			Down Hole Hammer
1	1	Casing	Steel	0.30	15.00	177	169		Welded; Seated on Bottom
1	1	Casing	PVC Class 9	0.30	43.00	140	122		Glued
1	1	Opening	Slots - Vertical	25.00	42.00	140			PVC Class 9; Sawn; SL: 300mm; A: 4mm

Water Bearing Zones (top)

FROM-DEPTH (metres)	TO-DEPTH (metres)	THICKNESS (metres)	ROCK-CAT-DESC	S-W-L	D-D-L	YIELD	TEST-HOLE-DEPTH (metres)	DURATION	SALINITY
30.00	32.00	2.00		6.00	34.00	2.00	34.00	0.50	
36.00	37.00	1.00		6.00		7.00	42.00	1.00	

Drillers Log (top)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	14.00	14.00	CLAY/SAND		

14.00	26.00	12.00	GREY SHALE
26.00	42.70	16.70	SANDSTONE

Groundwater Works Summary

For information on the meaning of fields please see Glossary
Document Generated on Tuesday, July 26, 2011

Print Report

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

Work Requested -- GW103835

Works Details (top)

GROUNDWATER NUMBER	GW103835
LIC-NUM	10BL158593
AUTHORISED-PURPOSES	DOMESTIC FARMING STOCK
INTENDED-PURPOSES	DOMESTIC FARMING STOCK
WORK-TYPE	Bore
WORK-STATUS	Supply Obtained
CONSTRUCTION-METHOD	Rotary
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	1998-04-30
FINAL-DEPTH (metres)	48.80
DRILLED-DEPTH (metres)	49.00
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	N/A
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	9.00
SALINITY	
YIELD	5.00

Site Details (top)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6247182.00
EASTING	280802.00
LATITUDE	33 53' 35"

LONGITUDE	150 37' 47"
GS-MAP	
AMG-ZONE	56
COORD-SOURCE	Map Interpretation
REMARK	

Form-A (top)

COUNTY	CAMDEN
PARISH	WARRAGAMBA
PORTION-LOT-DP	LOT1 DP1000201

Licensed (top)

COUNTY	CAMDEN
PARISH	WARRAGAMBA
PORTION-LOT-DP	LOT4 DP787314

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		Hole	Hole	0.00	12.00	230			Rotary Air
1		Hole	Hole	12.00	49.00	165			Down Hole Hammer
1	1	Casing	PVC Class 9	0.40	12.00	177	169		Seated on Bottom
1	1	Casing	PVC Class 9	0.40	49.00	140			Glued; Seated on Bottom
1	1	Opening	Slots - Vertical	30.00	48.00	140			PVC Class 9; SL: 300mm; A: 3mm

Water Bearing Zones (top)

FROM-DEPTH (metres)	TO-DEPTH (metres)	THICKNESS (metres)	ROCK-CAT-DESC	S-W-L	D-D-L	YIELD	TEST-HOLE-DEPTH (metres)	DURATION	SALINITY
35.00	36.00	1.00		9.00		1.10	37.00	0.50	
41.00	42.00	1.00		9.00		4.90	48.00	1.00	

Drillers Log (top)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	5.00	5.00	SAND AND SANDSTONE		

5.00	11.00	6.00	CLAY
11.00	17.00	6.00	BROWN SHALE
17.00	35.00	18.00	BLUE SHALE
35.00	49.00	14.00	SANDSTONE

(Site History Documents – Historical Land Title Records)

TH

28 JUN 2011

ADVANCE LEGAL SEARCHERS PTY LTD

(ACN 147 943 842)
ABN 82 147 943 842

P.O. Box 149
Yagoona NSW 2199

Telephone: +612 9754 1590
Mobile: 0412 169 809
Facsimile: +612 9754 1364
Email: alsearch@optusnet.com.au

24th June, 2011

ENVIRONMENTAL INVESTIGATION SERVICES
PO BOX 976,
NORTH RYDE BC NSW 1670

Attention: Todd Hore,

RE: **2316 – 2320 Silverdale Road, Silverdale**
Job No. E25004KH

Note 1: **Lot 199 DP 1092447**
Note 2: **Lot 200 DP 1092447**

Note 1

Current Search

Folio Identifier 199/1092447 (title attached)
DP 1092447 (plan attached)
Dated 23rd June, 2011
Registered Proprietor:
BRUNO LOPREIATO
MARIA LOPREIATO

Title Tree
Lot 199 DP 1092447

Folio Identifier 199/1092447

/ \

(a) **(b)**

Folio Identifier 19/1015250 Folio Identifier 20/1015250

/ \ Folio Identifier 9/38123

(ai) **(aii)** CTVol 15325 Fol 100

F/I 9/38123 F/I 1/519533 CTVol 8248 Fol 250

CTVol 15325 Fol 100 CTVol 15468 Fol 173 PA 41614

CTVol 8248 Fol 250 CA 13582 Conv Bk 2514 No. 510

PA 41614 Conv Bk 3676 No. 174 Conv Bk 2115 No. 446

Conv Bk 2514 No. 510 Conv Bk 3572 No. 279 Conv Bk 2053 No. 97

Conv Bk 2115 No. 446 Conv Bk 2797 No. 914 PA 37043

Conv Bk 2053 No. 97 Conv Bk 2147 No. 293 Conv Bk 1920 No. 622

PA 30743 Conv Bk 2093 No. 783 Conv Bk 1595 No. 288

Conv Bk 1920 No. 622 Conv Bk 1920 No. 622

Conv Bk 1595 No. 288 Conv Bk 1595 No. 288

*** *** ***

Summary of proprietor(s)
Lot 199 DP 1092447

Year	Proprietor
	(Lot 199 DP 1092447)
2006 – todate	Bruno Lopreiato Maria Lopreiato
(2006 – todate)	*(various commercial leases shown on folio identifier 199/102447)*
(2006 – 2009)	*(various commercial leases shown on historical search Identifier 199/1092447)*

See Notes (a) & (b)

Note (a)

	(Lot 19 DP 1015250)
2000 - 2006	Bruno Lopreiato Maria Lopreiato
2000 – 2000	Rita Petrous

See Notes (ai) & (aii)

Note (ai)

	(Lot 9 DP 38123)
1988 – 2000	Rita Petrous
	(Lot 9 DP 38123 – CTVol 15325 Fol 100)
1987 – 1988	Rita Petrous
1985 – 1987	Arthur Frederick Brighton
	(Lot 9 DP 1123 – Area 20 Acres 0 Roods 32 ¼ Perches – CTVol 8248 Fol 250)
1963 – 1985	Arthur Frederick Brighton, independent means
1961 – 1963	Margaret Carter, widow
	(Lot 9 DP 1123 – Area 20 Acres 0 Roods 32 ¼ Perches – Conv Bk 2514 No. 510)
1960 – 1961	Margaret Carter, widow
1960 – 1960	Lawrence Leonard Stewart, carpenter
	(Lot 9 DP 1123 – Area 20 Acres 0 Roods 32 ¼ Perches – Conv Bk 2115 No. 446 and Conv Bk 2053 No. 97)
1948 – 1960	Lawrence Leonard Stewart, carpenter
	(Part of Portion 9 Parish of Warragamba and other lands – Area 340 Acres 1 Rood 15 Perches – Conv Bk 1920 No. 622)
1930 – 1948	John Reginald Hamilton, farmer
	(That piece or parcel of land, County of Camden, Parish of Mulgoa Forest – Area 997 Acres – Conv Bk 1595 No. 288)
1917 – 1930	William Wentworth Victor Hamilton) Executors of the Estate of Sidney Tozer Peryman) John Subridge Hamilton
1917 – 1917	John Subridge Hamilton

*****

Note (aii)

	(Lot 1 DP 519533)
1988 – 2000	Bruno Lopreiato Maria Lopreiato
(1999 – 2000)	*(various leases shown on historical search identifier 1/519533)*
	(Lot 1 DP 519533 – CTVol 15468 Fol 173)
1986 – 1988	Bruno Lopreiato Maria Lopreiato
	(Lot 1 DP 519533 – Area 1 Acre 2 Roods – Conv Bk 3676 No. 174)
1986 – 1986	Bruno Lopreiato Maria Lopreiato
	(Lot 1 DP 519533 – Area 1 Acre 2 Roods – Conv Bk 3572 No. 279)
1983 – 1986	Keith Owen Marshall, retired bank officer Anthony Keith Marshall, electrical contractor Layden Anthony Rivett, pharmaceutical salesman
	(Lot 1 DP 519533 – Area 1 Acre 2 Roods – Conv Bk 2797 No. 914)
1966 – 1983	Margaret Jessie Jenkins, married woman
	(Lot 8 DP 1123 – Conv Bk 2147 No. 293)
1950 – 1966	John Henry Platt, plumber
	(Lot 8 DP 1123 – Conv Bk 2093 No. 783)
1949 – 1950	Archie William Muir, carpenter
	(Part of Portion 9 Parish of Warragamba and other lands – Area 340 Acres 1 Rood 15 Perhes – Conv Bk 1920 Fol 622)
1932 – 1949	John Reginald Hamilton, farmer
	(That piece or parcel of land, County of Camden, Parish of Mulgoa Forest – Area 997 Acres – Conv Bk 1595 No. 288)
1917 – 1932	William Wentworth Victor Hamilton) Executors of the Estate of Sidney Tozer Peryman) John Subridge Hamilton
1917 – 1917	John Subridge Hamilton

*****

Note (b)

	(Lot 20 DP 1015250)
2000 – 2006	Bruno Lopreiato Maria Lopreiato
	(Lot 9 DP 38123)
1988 – 2000	Bruno Lopreiato Maria Lopreiato
	(Lot 9 DP 38123 – CTVol 15325 Fol 100)
1987 – 1988	Rita Petrous
1985 – 1987	Arthur Frederick Brighton
	(Lot 9 DP 1123 – Area 20 Acres 0 Roods 32 ¼ Perches – CTVol 8248 Fol 250)
1963 – 1985	Arthur Frederick Brighton, independent means
1961 – 1963	Margaret Carter, widow
	(Lot 9 DP 1123 – Area 20 Acres 0 Roods 32 ¼ Perches – Conv Bk 2514 No. 510)
1960 – 1961	Margaret Carter, widow
1960 – 1960	Lawrence Leonard Stewart, carpenter
	(Lot 9 DP 1123 – Area 20 Acres 0 Roods 32 ¼ Perches – Conv Bk 2115 No. 446 and Conv Bk 2053 No. 97)
1948 – 1960	Lawrence Leonard Stewart, carpenter
	(Part of Portion 9 Parish of Warragamba and other lands – Area 340 Acres 1 Rood 15 Perches – Conv Bk 1920 No. 622)
1930 – 1948	John Reginald Hamilton, farmer
	(That piece or parcel of land, County of Camden, Parish of Mulgoa Forest – Area 997 Acres – Conv Bk 1595 No. 288)
1917 – 1930	William Wentworth Victor Hamilton) Executors of the Estate of Sidney Tozer Peryman) John Subridge Hamilton
1917 – 1917	John Subridge Hamilton

*****

Note 2

Current Search

Folio Identifier Lot 200/1092447 (title attached)
DP 1092447 (plan attached)
Dated 23rd June, 2011
Registered Proprietor:
BRUNO LOPREIATO
MARIA LOPREIATO

Title Tree
Lot 200 DP 1092447

Folio Identifier 200/1092447

Folio Identifier 20/1015250

Folio Identifier 9/38123

Certificate of Title Volume 15325 Folio 100

Certificate of Title Volume 8248 Folio 250

PA 41614

Conveyance Book 2514 No. 510

Conveyance Book 2115 No. 446

Conveyance Book 2053 No. 97

PA 37043

Conveyance Book 1920 No. 622

Conveyance Book 1959 No. 288

*****

Summary of proprietor(s)
Lot 200 DP 1092447

Year	Proprietor
	(Lot 200 DP 1092447)
2006 – todate	Bruno Lopreiato Maria Lopreiato
	(Lot 20 DP 1015250)
2000 – 2006	Bruno Lopreiato Maria Lopreiato
	(Lot 9 DP 38123)
1988 – 2000	Bruno Lopreiato Maria Lopreiato
	(Lot 9 DP 38123 – CTVol 15325 Fol 100)
1987 – 1988	Rita Petrous
1985 – 1987	Arthur Frederick Brighton
	(Lot 9 DP 1123 – Area 20 Acres 0 Roods 32 ¼ Perches – CTVol 8248 Fol 250)
1963 – 1985	Arthur Frederick Brighton, independent means
1961 – 1963	Margaret Carter, widow
	(Lot 9 DP 1123 – Area 20 Acres 0 Roods 32 ¼ Perches – Conv Bk 2514 No. 510)
1960 – 1961	Margaret Carter, widow
1960 – 1960	Lawrence Leonard Stewart, carpenter
	(Lot 9 DP 1123 – Area 20 Acres 0 Roods 32 ¼ Perches – Conv Bk 2115 No. 446 and Conv Bk 2053 No. 97)
1948 – 1960	Lawrence Leonard Stewart, carpenter
	(Part of Portion 9 Parish of Warragamba and other lands – Area 340 Acres 1 Rood 15 Perches – Conv Bk 1920 No. 622)
1930 – 1948	John Reginald Hamilton, farmer
	(That piece or parcel of land, County of Camden, Parish of Mulgoa Forest – Area 997 Acres – Conv Bk 1595 No. 288)
1917 – 1930	William Wentworth Victor Hamilton) Executors of the Estate of Sidney Tozer Peryman) John Subridge Hamilton
1917 – 1917	John Subridge Hamilton

*****

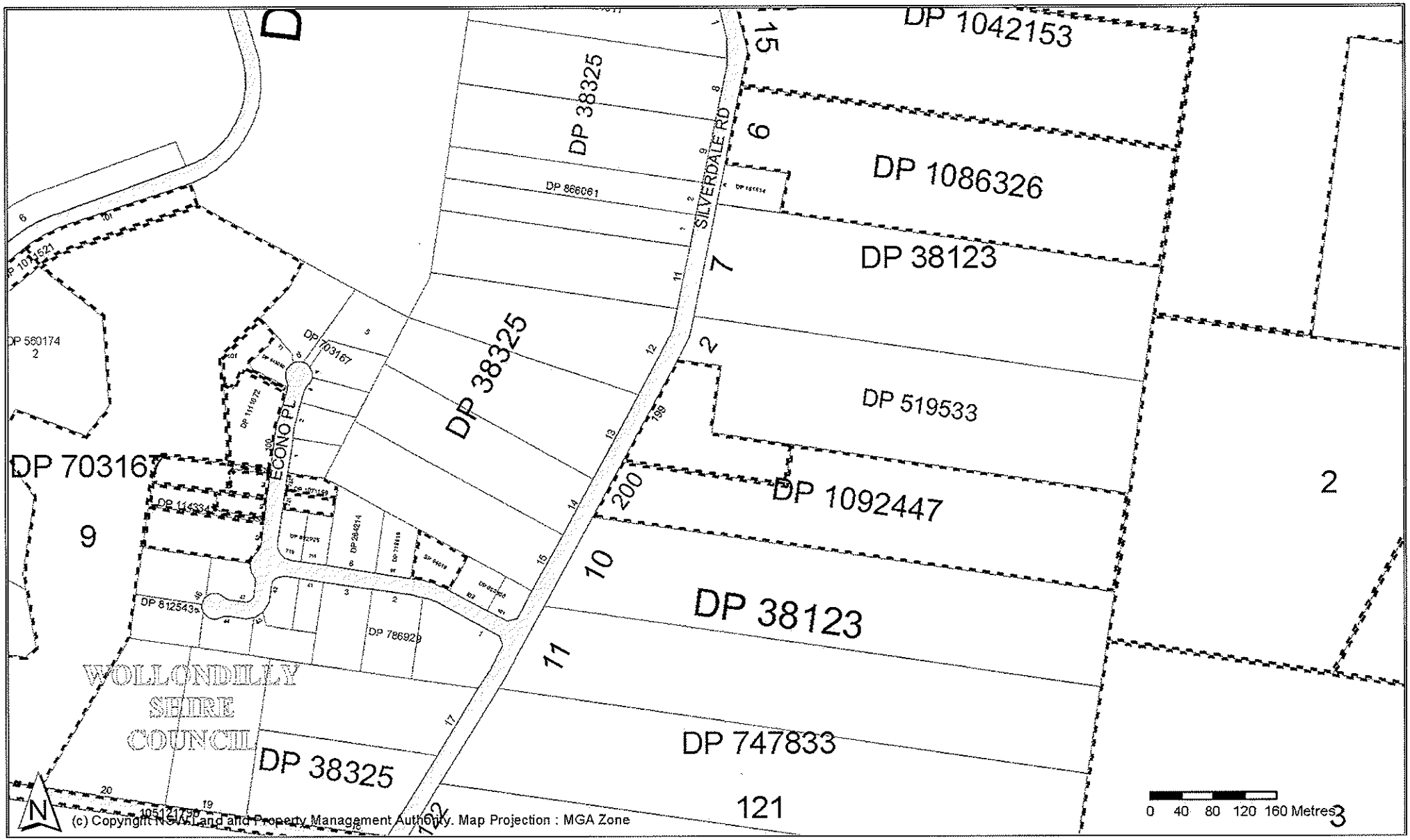
Land & Property Management Authority
Land & Property Information

Cadastral Records Enquiry Report

Ref : EIS - Silverdale

Requested Parcel : Lot 199 DP 1092447 **Identified Parcel :** Lot 199 DP 1092447

Locality : SILVERDALE **LGA :** WOLLONDILLY **Parish :** WARRAGAMBA **County :** CAMDEN



Report Generated 10:34:48 AM, 23 June, 2011

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - TITLE SEARCH

FOLIO: 199/1092447

SEARCH DATE	TIME	EDITION NO	DATE
23/6/2011	10:20 AM	4	13/10/2009

LAND

LOT 199 IN DEPOSITED PLAN 1092447
AT SILVERDALE
LOCAL GOVERNMENT AREA WOLLONDILLY
PARISH OF WARRAGAMBA COUNTY OF CAMDEN
TITLE DIAGRAM DP1092447

FIRST SCHEDULE

BRUNO LOPREIATO
MARIA LOPREIATO
AS JOINT TENANTS (T AC746390)

SECOND SCHEDULE (13 NOTIFICATIONS)

1 RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)
2 BK 2053 NO 97 COVENANT AFFECTING THE PART SHOWN SO BURDENED IN THE TITLE DIAGRAM.
3 6664005 LEASE TO ADTREE PTY LIMITED OF SHOP 4 AS SHOWN IN PLAN WITH 6664005. EXPIRES: 23/12/2004. OPTION OF RENEWAL: 5 YEARS WITH A FURTHER TWO, 5 YEAR OPTIONS.
4 6664006 LEASE TO KARIM HOLDINGS PTY LTD OF SERVICE STATION AND DRIVEWAY AS SHOWN IN PLAN WITH 6664006. EXPIRES: 25/11/2004. OPTION OF RENEWAL: 5 YEARS WITH A FURTHER TWO, 5 YEAR OPTIONS.
5 7689791 MORTGAGE TO COMMONWEALTH BANK OF AUSTRALIA OF THE PART FORMERLY IN 19/1015250
6 AA217888 LEASE TO MARINA VONCINA OF SHOP 8 & SHOP 12, 2320 SILVERDALE ROAD, SILVERDALE. EXPIRES: 31/3/2006. OPTION OF RENEWAL: 5 YEARS.
7 AA217889 LEASE TO KEVIN CLAUDE HIGGINS OF SHOP 7 & SHOP 11, 2320 SILVERDALE ROAD, SILVERDALE. EXPIRES: 31/3/2004. OPTION OF RENEWAL: 3 YEARS (WITH A FURTHER OPTION OF 3 YEARS).
8 AA651730 LEASE TO PETER JOSEPH APAP, MARYANNE APAP, SILVANA PHYLLIS SCIBERRAS & PAUL ANTHONY SCIBERRAS OF SHOP 3, 2320 SILVERDALE ROAD, SILVERDALE AS SHOWN IN PLAN WITH 6438645. EXPIRES: 31/7/2008. OPTION OF RENEWAL: 5 YEARS.
9 AB440635 LEASE TO THE WHITTAKER GROUP PTY LIMITED OF PRODUCE STORE, 2320 SILVERDALE ROAD, SILVERDALE. EXPIRES: 14/9/2009. OPTION OF RENEWAL: 3 YEARS AND ONE FURTHER

END OF PAGE 1 - CONTINUED OVER

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - TITLE SEARCH

FOLIO: 199/1092447 PAGE 2

SECOND SCHEDULE (13 NOTIFICATIONS) (CONTINUED)

OPTION OF 3 YEARS.

10 AB718672 LEASE TO KYM ISOBEL HAAK & BERDINUS HAAK OF SHOP 9, GROUND FLOOR, 2320 SILVERDALE ROAD, SILVERDALE. EXPIRES: 31/1/2006. OPTION OF RENEWAL: 3 YEARS + 3 YEARS.

11 AB718673 LEASE TO ADTREE PTY LIMITED OF SHOP 4, 2320 SILVERDALE ROAD, SLIVERDALE. EXPIRES: 23/12/2009. OPTION OF RENEWAL: 5 YEARS + 5 YEARS.

12 AC746391 MORTGAGE TO COMMONWEALTH BANK OF AUSTRALIA

13 AF41869 LEASE TO THE CHEMIST SHOP ENTERPRISES PTY LIMITED OF SHOP 1, 2320 SILVERDALE ROAD, SILVERDALE. EXPIRES: 24/2/2014. OPTION OF RENEWAL: 5 YEARS WITH A FURTHER OPTION OF 5 YEARS.

* AF70527 MORTGAGE OF LEASE AF41869 TO EXPERIEN PTY LTD

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE
23/6/2011 10:29AM

FOLIO: 199/1092447

First Title(s): OLD SYSTEM
Prior Title(s): 19-20/1015250

Recorded	Number	Type of Instrument	C.T. Issue
14/2/2006	DP1092447	DEPOSITED PLAN	FOLIO CREATED EDITION 1
3/3/2006	AC154319	TRANSFER OF LEASE	
14/12/2006	AC746390	TRANSFER	
14/12/2006	AC746391	MORTGAGE	EDITION 2
27/2/2009	AD748895	REJECTED - LEASE	
5/3/2009	AD868259	LEASE	
5/3/2009	AE63056	DETERMINATION OF LEASE	EDITION 3
11/5/2009	AE528274	REJECTED - MORTGAGE OF LEASE	
13/10/2009	AF41868	DETERMINATION OF LEASE	
13/10/2009	AF41869	LEASE	EDITION 4
27/10/2009	AF70527	MORTGAGE OF LEASE	

*** END OF SEARCH ***

Form: 01T
Licensee: Aust. Forms P/L

RELODGED
13 DEC 2006
TIME: 8-49

TRANSFER
New South Wales
Real Property Act 1900

AC746390U

PRIVACY NOTE: this information is legally required and will become part of the public record

STAMP DUTY | Office of State Revenue use only

NEW SOUTH WALES DUTY
31-01-2005 0002445303-001
SECTION 18(2)
$ **************2.00

(A) TORRENS TITLE — If appropriate, specify the part transferred
20/1015250 will be 199 in DP 1092447
NOW BEING 199/1092447

(B) LODGED BY — Delivery Box: 245 — Name, Address or DX and Telephone
LLPN:123836E
CTB
Reference (optional): 028302-TE93

CODE T TW (Sheriff)

(C) TRANSFEROR: RITA PETROVS

(D) CONSIDERATION The transferor acknowledges receipt of the consideration of $ 180,000.00 and as regards

(E) ESTATE the land specified above transfers to the transferee an estate in fee simple.

(F) SHARE TRANSFERRED: whole

(G) Encumbrances (if applicable): 1. .... 2. .... 3. ....

(H) TRANSFEREE: BRUNO LOPREIATO and MARIA LOPREIATO

(I) TENANCY: Joint Tenants

DATE 12/4/2006
dd mm yyyy

(J) I certify that the transferor, with whom I am personally acquainted or as to whose identity I am otherwise satisfied, signed this transfer in my presence.

Signature of witness: X [signature]

Name of witness: X GEOFFREY NEVILLE STEER

Address of witness: X 304/70, MT ALEXANDER RD MOONEE PONDS 3039

Certified correct for the purposes of the Real Property Act 1900 by the transferor.

Signature of transferor: X [signature] RP

I certify that the transferee, with whom I am personally acquainted or as to whose identity I am otherwise satisfied, signed this transfer in my presence.

Signature of witness:

Name of witness:

Address of witness:

Certified correct for the purposes of the Real Property Act 1900 by the transferee.

Signature of transferee: [signature]

If signed on the transferee's behalf by a solicitor or licensed conveyancer, insert the signatory's full name and capacity below:
Solicitor for Transferee
Marina Vancina

All handwriting must be in block capitals.

425B C/Bank
644B (Aitken P/L)

Film with AC746390

(1)

PITCOM PTY LIMITED
(ABN 66 003 660 419)
CONVEYANCING
LEGAL SEARCHING & REGISTRATION

16 Kent Street
REGENTS PARK NSW 2143

JOHN REESE
MOBILE 0410 507 494
CAROLYN REESE
MOBILE 0414 267 638 TEL/FAX 9702 3799

1 November 2006

LPI NSW

Dear Sir

RE B & M LOPRELATO
LOT 199 DP 1092447
FOLIO IFENTIFIER 199/1092447

We hereby authorize and direct you to release the abovmentioned title to Comonwealth Bank of Australia.

Yours faithfully
PITCOM PTY LIMITED

Carolyn Reese

Commonwealth Bank

Commonwealth Bank of Australia
ABN 48 123 123 124

Banking Services

Ground Floor
150 George Street
Parramatta
NSW 2150
Australia

GPO Box 790
Parramatta
NSW 2124

Telephone (02) 9841 6720
Facsimile (02) 9841 6734
DX 434 Sydney (2370 001)
Internet: www.commbank.com.au

Title ref is incorrect

The Director
Land and Property Information Department
1 Prince Albert Road
Queens Square
Sydney NSW 2000

6th March 2006

Re	Lopreiato
Title Reference	~~199/1015250~~ 199/1092447
Our Reference	028302-te93

Dear Sir,

CT 199/1015250

Is currently being held in dual entitlement. We the Commonwealth Bank of Australia authorise the use and delivery of the abovementioned title for a transfer to Bruno Lopreiato and Maria Lopreiato. The title is to be issued back to box 425P for collection.

Thankyou

Production Clerk

(2)

PITCOM PTY LIMITED
(ABN 66 003 660 419)
CONVEYANCING
LEGAL SEARCHING & REGISTRATION

16 Kent Street
REGENTS PARK NSW 2143

JOHN REESE
MOBILE 0410 507 494
CAROLYN REESE
MOBILE 0414 267 638 TEL/FAX 9702 3799

1 December 2006

LPI NSW

Dear Sir

RE B & M LOPREIATO
FOLIO IFENTIFIER 199/1092447
REF AC746390

We hereby authorize and direct you to register the Transfer and Mortgage and thereafter release the abovementioned title to Commonwealth Bank of Australia.

Yours faithfully
PITCOM PTY LIMITED

Carolyn Reese

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE
23/6/2011 10:36AM

FOLIO: 19/1015250

First Title(s): OLD SYSTEM
Prior Title(s): 9/38123 1/519533

Recorded	Number	Type of Instrument	C.T. Issue
27/6/2000	DP1015250	DEPOSITED PLAN	FOLIO CREATED CT NOT ISSUED
28/6/2000	6876284	TRANSFER	EDITION 1
3/10/2000	7118078	TRANSFER OF LEASE	EDITION 2
27/4/2001	7225874	REJECTED - LEASE	
7/6/2001	7673140	DEPT DEALING TO UPLIFT CT	EDITION 3
15/6/2001	7689789	DISCHARGE OF MORTGAGE	
15/6/2001	7689790	DISCHARGE OF MORTGAGE	
15/6/2001	7689791	MORTGAGE	EDITION 4
25/1/2002	8305289	DEPT DEALING TO UPLIFT CT	EDITION 5
10/7/2002	8671408	LEASE	EDITION 6
14/12/2002	9218717	TRANSFER OF LEASE	
14/12/2002	9218718	VARIATION OF LEASE	EDITION 7
5/12/2003	AA224444	DEPT DEALING TO UPLIFT CT	EDITION 8
12/3/2004	AA217890	REJECTED - LEASE	
31/3/2004	AA217888	LEASE	
31/3/2004	AA217889	LEASE	EDITION 9
11/6/2004	AA651729	DETERMINATION OF LEASE	
11/6/2004	AA651730	LEASE	
11/6/2004	AA651731	LEASE	EDITION 10
3/8/2004	AA851917	LEASE	EDITION 11
27/8/2004	AA911342	LEASE	EDITION 12
28/4/2005	AB440635	LEASE	EDITION 13
5/10/2005	AB718671	REQUEST	

END OF PAGE 1 - CONTINUED OVER

EIS - Silverdale PRINTED ON 23/6/2011

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE
23/6/2011 10:36AM

FOLIO: 19/1015250 PAGE 2

Recorded	Number	Type of Instrument	C.T. Issue
5/10/2005	AB718672	LEASE	
5/10/2005	AB718673	LEASE	EDITION 14
28/10/2005	AB873251	LEASE	EDITION 15
6/2/2006	AC12373	TRANSFER OF LEASE	
6/2/2006	AC12377	LEASE	
14/2/2006	DP1092447	DEPOSITED PLAN	FOLIO CANCELLED

*** END OF SEARCH ***

Form: 97-01T
Licence: 10V/0096/96
Edition: 9804

(1)

TRANSFER

New South Wales
Real Property Act 1900

00102604R

STAMP DUTY

Office of State Revenue use only

NEW SOUTH WALES DUTY
19-06-2000 0000336915-001
SECTION 18(2)
DUTY $ **********2.00

(A) **TORRENS TITLE**

If appropriate, specify the part or share transferred

LOT 19 DP1015250 Part formerly in LOT 9 DP 38123

(B) **LODGED BY**

LTO Box	Name, Address or DX and Telephone	CODES
	LEGALCO Vancina TEL: 283 5111 Lopreiato Reference (optional) 178E	T TS (s713) TW (Sheriff)

(C) **TRANSFEROR**

RITA PETROVS

(D) The tranferor acknowledges receipt of the consideration of $65,000.00 and as regards the land specified above transfers to the transferee an estate in fee simple.

(E) Encumbrances (if applicable): 1. 2. 3.

(F) **TRANSFEREE**

BRUNO LOPREIATO AND MARIA LOPREIATO

(G) **TENANCY:** JOINT

(H) We certify this dealing correct for the purposes of the Real Property Act 1900. **DATE:** 14/6/2000

Signed in my presence by the transferor who is personally known to me.

Signature of witness: P. Coote

Name of witness: PAM COOTE

Address of witness: 68 SILVERDALE ROAD, SILVERDALE 2752.

Signature of transferor: R Petrovs. RITA PETROVS.

Signed in my presence by the transferee who is personally known to me.

Signature of witness:

Name of witness:

Address of witness:

Signature of transferee:

If signed on the transferee's behalf by a solicitor or licensed conveyancer, show the signatory's full name and capacity below:
MARINA VONCINA, SOLICITOR

All handwriting must be in block capitals.
A set of notes on this form (97-01T-2) is available from the Land Titles Office.

Page 1 of ____
number additional pages sequentially

Checked by (LTO use):

DP1015250.

CT 425 P (produced)

Ø BRUNO LOPREIATO & MARIA LOPREIATO.

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE
23/6/2011 10:39AM

FOLIO: 9/38123

First Title(s): SEE PRIOR TITLE(S)
Prior Title(s): VOL 15325 FOL 100

Recorded	Number	Type of Instrument	C.T. Issue
21/8/1988		TITLE AUTOMATION PROJECT	LOT RECORDED FOLIO NOT CREATED
20/12/1988		CONVERTED TO COMPUTER FOLIO	FOLIO CREATED CT NOT ISSUED
27/6/2000	DP1015250	DEPOSITED PLAN	FOLIO CANCELLED

*** END OF SEARCH ***

[redacted] CERTIFICATE OF TITLE

15325100

NEW SOUTH WALES — REAL PROPERTY ACT, 1900

First Title Old System

Prior Title Vol.8248 Fol.250

Vol. 15325 Fol. 100

EDITION 1 ISSUED 4 1985

I certify that the person named in the First Schedule is the registered proprietor of an estate in fee simple (or such other estate or interest as is set out below) in the land described subject to the recordings appearing in the Second Schedule and to the provisions of the Real Property Act, 1900.

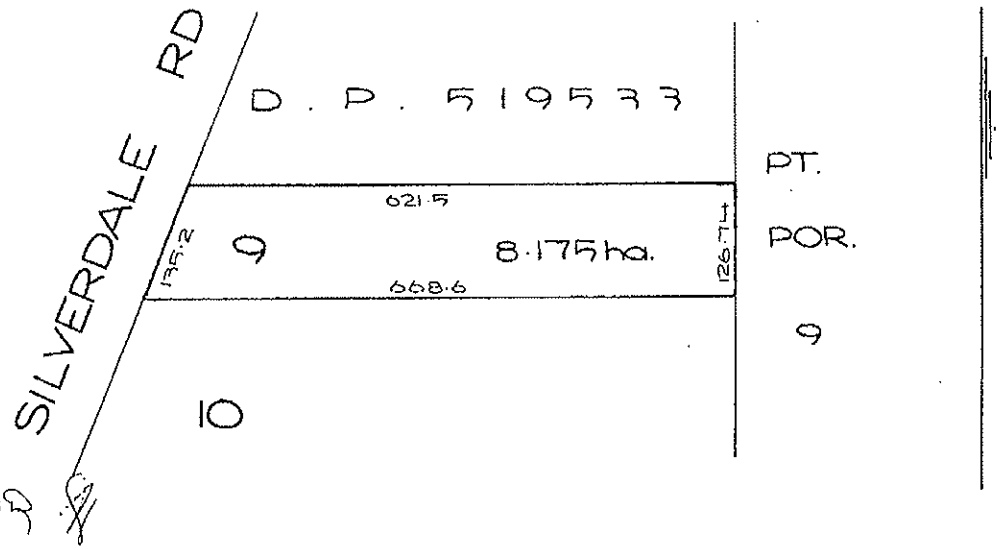
CANCELLED

Registrar General.

SEE AUTO FOLIO

PLAN SHOWING LOCATION OF LAND

LENGTHS ARE IN METRES



V5576752

LAND REFERRED TO

Lot 9 in Deposited Plan 38123 at Silverdale in the Shire of Wollondilly Parish of Warragamba County of Camden.

FIRST SCHEDULE

~~ARTHUR FREDERICK BRIGHTON~~.

SECOND SCHEDULE

GRY 1. Reservations and conditions in the Crown Grant.
CV 2. Book 2053 No.97 Covenant.

RG 2/64

Vol 15325 Fol 100

40828–4036

FIRST SCHEDULE (continued)

REGISTERED PROPRIETOR — Registrar General

Rita Petrova by Transmission W853248. Registered 7-5-1987

CANCELLED

SEE AUTO FOLIO

SECOND SCHEDULE (continued)

PARTICULARS — Registrar General — CANCELLATION

NOTATIONS AND UNREGISTERED DEALINGS

W 853248 TAR

NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR GENERAL ARE CANCELLED

Req:R364406 /Doc:CT 15325-100 CT /Rev:25-Jan-2011 /Sts:OK.SC /Prt:23-Jun-2011 10:44 /Pgs:ALL /Seq:2 of 2
Ref:ALS /Src:I

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE
23/6/2011 10:42AM

FOLIO: 1/519533

First Title(s): SEE PRIOR TITLE(S)
Prior Title(s): VOL 15468 FOL 173

Recorded	Number	Type of Instrument	C.T. Issue
28/3/1988		TITLE AUTOMATION PROJECT	LOT RECORDED FOLIO NOT CREATED
26/9/1988		CONVERTED TO COMPUTER FOLIO	FOLIO CREATED CT NOT ISSUED
24/6/1998	5077191	MORTGAGE	EDITION 1
30/3/1999	5632793	LEASE	EDITION 2
16/9/1999	6133768	LEASE	EDITION 3
21/2/2000	6438645	LEASE	EDITION 4
5/4/2000	6664005	LEASE	
5/4/2000	6664006	LEASE	EDITION 5
27/6/2000	DP1015250	DEPOSITED PLAN	FOLIO CANCELLED

*** END OF SEARCH ***

CERTIFICATE OF TITLE

15468173

NEW SOUTH WALES — REAL PROPERTY ACT, 1900

First Title Old System

Vol. 15468 Fol. 173

Prior Title CA 13582

Bk 3676 No 174

EDITION ISSUED 28 11 1986

I certify that the person named in the First Schedule is the registered proprietor of an estate in fee simple (or such other estate or interest as is set out below) in the land described subject to the recordings appearing in the Second Schedule and to the provisions of the Real Property Act, 1900.

CANCELLED

Registrar General.

SEE AUTO FOLIO

LAND REFERRED TO

S Lot 1 in DP519533 at Silverdale in the Shire of Wollondilly Parish of Warragamba County of Camden.

Title Diagram: DP519533

FIRST SCHEDULE

BRUNO LOPREIATO and MARIA LOPREIATO as Joint Tenants.

SECOND SCHEDULE

GRY 1. Reservations and conditions in the Crown Grant.
QG 2. QUALIFIED TITLE. Caution pursuant to s.28J Real Property Act, 1900.
ME 3. Book 3676 No.175P Mortgage to Commonwealth Bank of Australia.

Vol 15468 Fol 173

L.O. 55

FIRST SCHEDULE (continued)

REGISTERED PROPRIETOR | Registrar General

CANCELLED

SEE AUTO FULL

SECOND SCHEDULE (continued)

PARTICULARS | Registrar General | CANCELLATION

NOTATIONS AND UNREGISTERED DEALINGS

NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR GENERAL ARE CANCELLED

Req:R364415 /Doc:CT 15468-173 CT /Rev:21-Jan-2011 /Sts:OK.SC /Prt:23-Jun-2011 10:44 /Pgs:ALL /Seq:2 of 2
Ref:ALS /Src:T

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE
23/6/2011 10:37AM

FOLIO: 20/1015250

First Title(s): OLD SYSTEM
Prior Title(s): 9/38123

Recorded	Number	Type of Instrument	C.T. Issue
27/6/2000	DP1015250	DEPOSITED PLAN	FOLIO CREATED EDITION 1
14/2/2006	DP1092447	DEPOSITED PLAN	FOLIO CANCELLED

*** END OF SEARCH ***

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - TITLE SEARCH

FOLIO: 200/1092447

SEARCH DATE	TIME	EDITION NO	DATE
23/6/2011	10:26 AM	3	30/1/2008

LAND

LOT 200 IN DEPOSITED PLAN 1092447
AT SILVERDALE
LOCAL GOVERNMENT AREA WOLLONDILLY
PARISH OF WARRAGAMBA COUNTY OF CAMDEN
TITLE DIAGRAM DP1092447

FIRST SCHEDULE

BRUNO LOPREIATO
MARIA LOPREIATO
AS JOINT TENANTS (T AD731921)

SECOND SCHEDULE (3 NOTIFICATIONS)

1 RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)
2 BK 2053 NO 97 COVENANT
3 AD731922 MORTGAGE TO COMMONWEALTH BANK OF AUSTRALIA

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE
23/6/2011 10:31AM

FOLIO: 200/1092447

First Title(s): OLD SYSTEM
Prior Title(s): 20/1015250

Recorded	Number	Type of Instrument	C.T. Issue
14/2/2006	DP1092447	DEPOSITED PLAN	FOLIO CREATED EDITION 1
21/7/2006	AC475584	CHANGE OF NAME	
21/7/2006	AC475585	MORTGAGE	EDITION 2
30/1/2008	AD731920	DISCHARGE OF MORTGAGE	
30/1/2008	AD731921	TRANSFER	
30/1/2008	AD731922	MORTGAGE	EDITION 3

*** END OF SEARCH ***

Form: 01T
Release: 3.4
www.lands.nsw.gov.au

TRANSFER

New South Wales
Real Property Act 1900

AD731921X

PRIVACY NOTE: Section 31B of the Real Property Act 1900 (RP Act) authorises th
by this form for the establishment and maintenance of the Real Property
the Register is made available to any person for search upon payment of a fee, if any.

STAMP DUTY

Office of State Revenue use only

NEW SOUTH WALES DUTY
13-11-2007 0004686931-001
SECTION 18(2)
DUTY $ **********2.00

(A) **FOLIO OF THE REGISTER**: LOT 200 DP 1092447

(B) **LODGED BY**

Document Collection Box	Name, Address or DX, Telephone, and LLPN if any	CODES
24J	LLPN: 123836E CTB	T TW (Sheriff)
	Reference: 028 302-TE93	

(C) **TRANSFEROR**: RITA ALISE PETROVS

(D) **CONSIDERATION**: The transferor acknowledges receipt of the consideration of $ 900,000.00 and as regards

(E) **ESTATE**: the above folio of the Register transfers to the transferee an estate in fee simple

(F) **SHARE TRANSFERRED**: WHOLE

(G) Encumbrances (if applicable):

(H) **TRANSFEREE**: BRUNO LOPREIATO and MARIA LOPREIATO

(I) TENANCY: Joint Tenants

DATE DO NOT DATE

(J) I certify that the person(s) signing opposite, with whom I am personally acquainted or as to whose identity I am otherwise satisfied, signed this instrument in my presence.

Signature of witness: X

Name of witness: X CAHEEN CONSDINE
Address of witness: X LEVEL 2
7 ENGLISH ST
ESSENDON AIRPORT

Certified correct for the purposes of the Real Property Act 1900 by the transferor.

Signature of transferor: X Rita Petrovs

Certified correct for the purposes of the Real Property Act 1900 by the person whose signature appears below.

Signature:

Signatory's name: MARINA JONCINA
Signatory's capacity: Solicitor for Transferee

ALL HANDWRITING MUST BE IN BLOCK CAPITALS.
0709

DEPARTMENT OF LANDS
LAND AND PROPERTY INFORMATION DIVISION

PLAN FORM 2

Plan Drawing only to appear in this space

SIGNATURE AND SEALS ONLY.

Bruno Lopreiato

Maria Lopreiato

Rita Petrovs

Signed at ... the 25th day of May 2005 For Commonwealth Bank of Australia A.C.N. 123 123 124 by its duly appointed Attorney under Power of Attorney Book 4043 No. 618

Witness S. M...

Department of Land and Water Conservation Approval

I .... in approving this plan certify (Authorised Officer) that all necessary approvals in regard to the allocation of the land shown hereon have been given.

Signature: ....

Date: ....

File No.: ....

Office: ....

Subdivision Certificate

I hereby certify that the provisions of s.109J of the Environmental Planning and Assessment Act 1979 have been satisfied in relation to the proposed SUBDIVISION set out herein

* (insert 'subdivision' or 'new road')

* Authorised Person/~~General Manager/Accredited Certifier~~

Consent Authority: WOLLONDILLY SHIRE COUNCIL

Date of endorsement: 1st JULY 2004

Accreditation no: ....

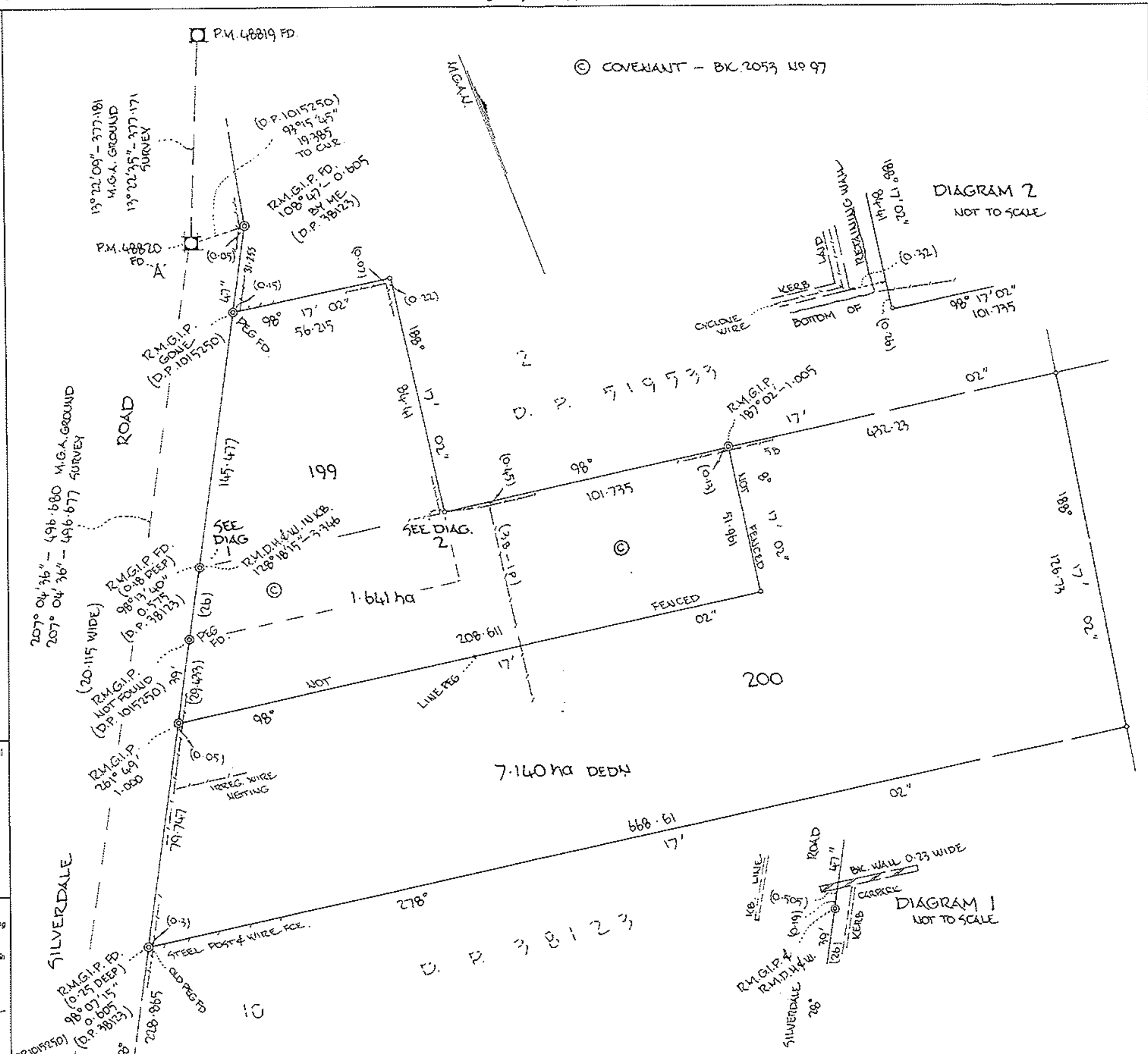
Subdivision Certificate no: 38 OF 2004

File no. I 1408-03

Note: When the plan is to be lodged electronically in Land and Property Information, it should include a signature in an electronic or digital format approved by the Registrar-General.

* Delete whichever is inapplicable

SURVEYOR'S REFERENCE: 209/04



M.G.A. CO-ORDINATES		ZONE 56	SOURCE: SCIMS APRIL 2004			
MARK	EASTING	NORTHING	A.H.D. (ACC)	CLASS	ORDER	C.S.F.
P.M. 48819	279877.232	6247873.137	165.114 (2)	B	2	1.000171
P.M. 48820	279790.004	6247506.114	167.824 (2)	B	2	1.000172
P.M. 48821	279563.885	6247063.795	171.366 (2)	B	2	1.000172

WARNING: CREASING OR FOLDING WILL LEAD TO REJECTION

DP1092447

Registered AW 14.02.2006

Title System: TORRENS

Purpose: SUBDIVISION

Ref. Map: U6445-4

Last Plan: DP 1015250

PLAN OF SUBDIVISION OF LOTS 19 AND 20 IN D.P. 1015250

Lengths are in metres. Reduction Ratio 1: 1000

L G A WOLLONDILLY

Locality: SILVERDALE

Parish: WARRAGAMBA

County: CAMDEN

~~This is sheet 1 of my plan in ... sheets.~~ (Delete if inapplicable)

Surveying Regulation 2001

I, GLENN ARTHUR MCFALL of SOUTHERN CROSS SURVEYS a surveyor registered under the Surveying Act, 2002, hereby certify that the survey represented in this plan is accurate, has been made in accordance with the Surveying Regulation, 2001 and was completed on 15TH ... 2004 ... LOT 200 COMPILED

The survey relates to BDY. ADJUSTMENT

(here specify the land actually surveyed, or specify any land shown in the plan that is not the subject of the survey)

(Signature) ... Dated: 3/6/2004

Surveyor registered under the Surveying Act, 2002

Datum Line: 'A'–'B'

Type: ~~Urban~~/Rural

Plans used in preparation of survey/compilation.

D.P. 1015250 D.P. 38123 D.P. 519533

PANEL FOR USE ONLY for statements of intention to dedicate public roads, to create public reserves, drainage reserves, easements, restrictions on the use of land or positive covenants.

*OFFICE USE ONLY

(Site History Documents – Council Records)

i_pr085 - Application Browse - Wollondilly A6 *live - 44104 - 6.2

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1 of 1

Parcel 19397 Parcel Flag Registered

H/No. / 2320 - Street Side L Address Sequence 0

Street Silverdale RD SILVERDALE

Title 1 Lot 199 Sec

DP 1092447 Entitlement 0

Application Details

Current Property ✓ Historic Properties H ✗ Both Current & Historic ✗ Line 1 of 6

Indicator	Formatted Account	Document Type	External Reference	Precis
	010.2011.00000111.001	Development Applications		Shop Fit-Out For Beauty Salon
	010.2008.00000485.001	Development Applications		Establishment of a Fitness Studio
	010.2008.00059592.001	Development Applications	AD96-08	Extension of trading hours for the fitness studio
	010.2007.00054987.001	Development Applications	D158-07	Alterations to existing Take Away and Bakery Sh
	010.2007.00059132.001	Development Applications	d146-07	Fitness Studio
	010.2006.00054092.001	Development Applications	D783-06	Land Filling Operation

i_pr085 - Application Browse - Wollondilly A6 ?live - 13708 - 6.2

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1 of 1

Parcel	17707			Parcel Flag	Historical
H/No.	/ 2320 -			Street Side	L Address Sequence
Street	Silverdale		RD	SILVERDALE	
Title	1	Lot 19	Sec		
		DP 1015250		Entitlement	0

Application Details

Current Property ✓ | Historic Properties H ✗ | Both Current & Historic ✗ | Line 1 of 10

Indicator	Formatted Account	Document Type	External Reference	Precis
	010.2006.00054369.001	Development Applications	D163-06	Commercial Car Park
	010.2004.00057882.001	Development Applications	D722-04	change of use
	010.2004.00052777.001	Development Applications	D417-04	Remove & Replace Fuel Tanks
	010.2002.00054170.001	Development Applications	D858-02	Installation of equipment for take -away shop
	010.2002.00059717.001	Development Applications	C851-02	Out Building - Flagpole
	010.2001.00060758.001	Development Applications	D1308-01	Hairdressing & Beauty Salon
	010.2001.00055257.001	Development Applications	D1147-01	Operate a Swimming Pool Supplies Retail Outlet
	010.2001.00053821.001	Development Applications	D810-01	Signage
	010.2000.00053433.001	Development Applications	D1397-00	Real Estate Office
	010.2000.00052352.001	Development Applications	D1364-00	Solicitos Office

i_pr085 - Application Browse - Wollondilly A6 *live - 35828 - 6.2

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1 of 1

Parcel 17708 Parcel Flag Historical

H/No. / 2316 - Street Side L Address Sequence

Street Silverdale RD SILVERDALE

Title 1 Lot 20 Sec

DP 1015250 Entitlement 0

Application Details

Current Property ✓ Historic Properties H ✗ Both Current & Historic ✗ Line 1 of 3

Indicator	Formatted Account	Document Type	External Reference	Precis
	010.2003.00058568.001	Development Applications	I1408-03	Boundary Adjustment
	010.2002.00058577.001	Development Applications	C786-02	Dwelling
	010.2002.00100212.001	Development Applications	S166-02	Septic Tank - Aerated

TH 25 JUL 2011

WOLLONDILLY SHIRE COUNCIL

PLANNING CERTIFICATE UNDER SECTION 149(2) & (5)

ENVIRONMENTAL PLANNING & ASSESSMENT ACT, 1979

APPLICANT: Todd Hore - Envirnomental Investigation Services
PO Box 976
NORTH RYDE BC NSW 1670

Planning Certificate No.: 20110775
Receipt No.:
Issue Date: 8 July 2011
Applicant's Reference: E25004KH
Property No.: 19398

DESCRIPTION OF PROPERTY

Address: **2316 Silverdale Road SILVERDALE 2752**
Land Description: **Lot: 200 DP: 1092447**

Notes:

The following prescribed matters may apply to the land to which this certificate relates.

Where this certificate refers to a specific allotment (or allotments) within a strata plan, the certificate is issued for the whole of the land within the strata plan, not just the specific allotment(s) referred to, and any information contained in the certificate may relate to the whole, or any part, of the strata plan.

The following information is provided pursuant to Section 149(2) of the Environmental Planning and Assessment Act 1979 as prescribed by Schedule 4 of the Environmental Planning and Assessment Regulation 2000 and is applicable as at the date of this certificate.

Information provided in this certificate should be interpreted in conjunction with the relevant plans, policies and documents held at Council. In order to obtain copies of these documents you may purchase them from Council's Administration Centre at 62-64 Menangle Street, Picton or view free of charge on Council's Website www.wollondilly.nsw.gov.au.

1. NAMES OF RELEVANT PLANNING INSTRUMENTS AND DCPS

(1) The name of each environmental planning instrument that applies to the carrying out of development on the land.

(2) The name of each proposed environmental planning instrument that will apply to the carrying out of development on the land and that is or has been the subject of community consultation or on public exhibition under the Act (unless the Director-General has notified the council that the making of the proposed instrument has been deferred indefinitely or has not been approved).

(3) The name of each development control plan that applies to the carrying out of development on the land.

(4) In this clause, proposed environmental planning instrument includes a planning proposal for a LEP or a draft environmental planning instrument.

ENVIRONMENTAL PLANNING INSTRUMENTS

Wollondilly Local Environmental Plan 2011.

Sydney Regional Environmental Plan No 20 - Hawkesbury-Nepean River (No 2 - 1997)

Sydney Regional Environmental Plan No 9 Extractive Industries (No 2 - 1995)

State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004

State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004

State Environmental Planning Policy No 6 - Number of Storeys in a Building

State Environmental Planning Policy No 21 - Caravan Parks

State Environmental Planning Policy No 22 - Shops and Commercial Premises

State Environmental Planning Policy No 30 - Intensive Agriculture

State Environmental Planning Policy No 33 - Hazardous and Offensive Development

State Environmental Planning Policy No 44 - Koala Habitat Protection
(Note: Excludes land dedicated or reserved as National Park)

State Environmental Planning Policy No 50 - Canal Estate Development

State Environmental Planning Policy No 55 - Remediation of Land

State Environmental Planning Policy No 64 - Advertising and Signage

State Environmental Planning Policy No 65 - Design Quality of Residential Flat Development

State Environmental Planning Policy (Major Development) 2005

State Environmental Planning Policy (Temporary Structures) 2007

State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007

State Environmental Planning Policy (Infrastructure) 2007

State Environmental Planning Policy (Exempt and Complying Development Codes) 2008

State Environmental Planning Policy No 62 - Sustainable Aquaculture

State Environmental Planning Policy (Affordable Rental Housing) 2009

PROPOSED ENVIRONMENTAL PLANNING INSTRUMENTS

Draft State Environmental Planning Policy (Competition) 2010

DEVELOPMENT CONTROL PLANS

Wollondilly Development Control Plan 2010

2. ZONING AND LAND USE UNDER RELEVANT LEPS

For each environmental planning instrument or proposed instrument referred to in clause 1 (other than a SEPP or proposed SEPP) that includes the land in any zone (however described):

WOLLONDILLY LOCAL ENVIRONMENTAL PLAN 2011

(a) the identity of the zone, whether by reference to a name (such as "Residential Zone" or "Heritage Area") or by reference to a number (such as "Zone No 2 (a)"),

Zone RU2 Rural Landscape

(b) the purposes for which the instrument provides that development may be carried out within the zone without the need for development consent:

Extensive agriculture; Home occupations and development listed in Schedule 2 of Wollondilly Local Environmental Plan 2011 provided it meets the criteria in that schedule

(c) the purposes for which the instrument provides that development may not be carried out within the zone except with development consent,

Agriculture; Airports; Bed and breakfast accommodation; Boat repair facilities; Boat sheds; Cellar door premises; Cemeteries; Community facilities; Crematoria; Depots; Dwelling houses; Educational establishments; Environmental facilities; Environmental protection works; Extractive industries; Farm buildings; Farm stay accommodation; Flood mitigation works; Forestry; Freight transport facilities; Funeral chapels; Funeral homes; Group homes; Home-based child care; Home businesses; Home industries; Home occupations (sex services); Hospitals; Information and education facilities; Landscape and garden supplies; Mortuaries; Places of public worship; Recreation areas; Recreation facilities (indoor); Recreation facilities (outdoor); Research stations; Restriction facilities; Roads; Roadside stalls; Rural industries; Rural supplies; Rural workers' dwellings; Secondary dwellings; Signage; Transport depots; Veterinary hospitals; Water recreation structures; Water supply systems

(d) the purposes for which the instrument provides that development is prohibited within the zone,

Stock and sale yards; Turf farming; Any other development not specified in item (b) or (c)

(e) whether any development standards applying to the land fix minimum land dimensions for the erection of a dwelling house on the land and, if so, the minimum land dimensions so fixed,

A dwelling house cannot be erected on any lot created under clause 4.2 of Wollondilly Local Environmental Plan 2011. That is, a dwelling house cannot be erected on lots less than the minimum allotment size for subdivision which have only been created for the purpose of primary production.

Reference must be made to clause 4.2 of Wollondilly Local Environmental Plan 2011 and the Lot Size Map for further information.

Wollondilly Local Environmental Plan 2011 Clause 4.2A and the Minimum Lot Size Map sets the minimum land dimensions for the erection of a dwelling house on this land as follows:

> Development consent for the purposes of the erection of a dwelling house may only be granted if no dwelling house has been erected on the land (unless the application is to replace the existing dwelling-house) and;
>
> (a) the lot is at least the minimum lot size specified for that land by the Lot Size Map being 16 hectares; or
> (b) the lot was created before this Plan commenced and on which a dwelling house was permissible immediately before that commencement; or
> (c) the lot resulted from a subdivision for which development consent (or equivalent) was granted before this Plan commenced and on which the erection of a dwelling house would have been permissible if the plan of subdivision has been registered before that commencement.

Reference must be made to Clause 4.2A of Wollondilly Local Environmental Plan 2011 and the Lot Size Map for further information.

(f) whether the land includes or comprises critical habitat,

None known

(g) whether the land is in a conservation area (however described),

The land is not located within a Heritage Conservation Area as provided by clause 5.10 and Schedule 5 of Wollondilly Local Environmental Plan 2011.

(h) whether an item of environmental heritage (however described) is situated on the land.

The land does not contain an item of environmental heritage as provided by clause 5.10 and Schedule 5 of Wollondilly Local Environmental Plan 2011.

2A. ZONING AND LAND USE UNDER STATE ENVIRONMENTAL PLANNING POLICY (SYDNEY REGION GROWTH CENTRES) 2006

This clause is not applicable to the Wollondilly Local Government Area.

3. COMPLYING DEVELOPMENT

(1) Whether or not the land is land on which complying development may be carried out under each of the codes for complying development because of the provisions of clauses 1.17A (c) and (d) and 1.19 of *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.*

(2) If complying development may not be carried out on that land because of the provisions of clauses 1.17A (c) and (d) and 1.19 of that Policy, the reasons why it may not be carried out under that clause.

THE GENERAL HOUSING CODE

Complying development MAY be carried out on the land under the General Housing Code in State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

THE RURAL HOUSING CODE

Complying development MAY be carried out on the land under the Rural Housing Code in State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

THE HOUSING ALTERATIONS CODE

Complying development MAY be carried out on the land under the Housing Alterations Code in State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

THE GENERAL DEVELOPMENT CODE

Complying development MAY be carried out on the land under the General Development Code in State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

THE GENERAL COMMERCIAL AND INDUSTRIAL CODE

Complying development MAY be carried out on the land under the General Commercial and Industrial Code in State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

THE SUBDIVISIONS CODE

Complying development MAY be carried out on the land under the Subdivisions Code in State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

THE DEMOLITION CODE

Complying development MAY be carried out on the land under the Demolition Code in State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

4. COASTAL PROTECTION

Whether or not the land is affected by the operation of section 38 or 39 of the *Coastal Protection Act* 1979, but only to the extent that the council has been notified by the Department of Services, Technology and Administration.

No

4A. CERTAIN INFORMATION RELATING TO BEACHES AND COASTS

This clause is not applicable to the Wollondilly Local Government Area.

4B. ANNUAL CHARGES UNDER LOCAL GOVERNMENT ACT 1993 FOR COASTAL PROTECTION SERVICES THAT RELATE TO EXISTING COASTAL PROTECTION WORKS

This clause is not applicable to the Wollondilly Local Government Area.

5. MINE SUBSIDENCE

Whether or not the land is proclaimed to be a mine subsidence district within the meaning of section 15 of the *Mine Subsidence Compensation Act* 1961.

The land is not in a Mine Subsidence District.

6. ROAD WIDENING AND ROAD REALIGNMENT

Whether or not the land is affected by any road widening or road realignment under:

(a) Division 2 or Part 3 of the *Roads Act* 1993, or

(b) Any environmental planning instrument, or

(c) Any resolution of the council.

No

7. COUNCIL AND OTHER PUBLIC AUTHORITY POLICIES ON HAZARD RISK RESTRICTIONS

Whether or not the land is affected by a policy:

(a) Adopted by the council, or

(b) Adopted by any other public authority and notified to the council for the express purpose of its adoption by that authority being referred to in planning certificates issued by the council,

that restricts the development of the land because of the likelihood of land slip, bushfire, tidal inundation, subsidence, acid sulphate soils or any other risk (other than flooding).

No

7A. FLOOD RELATED DEVELOPMENT CONTROLS INFORMATION

(1) Whether or not development on that land or part of the land for the purposes of dwelling houses, dual occupancies, multi dwelling housing or residential flat buildings (not including development for the purposes of group homes or seniors housing) is subject to flood related development controls.

No

(2) Whether or not development on that land or part of the land for any other purpose is subject to flood related development controls.

No

(3) Words and expressions in this clause have the same meanings as in the instrument set out in the Schedule to the Standard Instrument (Local Environmental Plans) Order 2006.

8. LAND RESERVED FOR ACQUISITION

Whether or not any environmental planning instrument or proposed environmental planning instrument referred to in clause 1 makes provision in relation to the acquisition of the land by a public authority, as referred to in section 27 of the Act.

Wollondilly Local Environmental Plan 2011 does not provide for the acquisition of the subject land by a public authority as referred to in section 27 of the Act.

9. CONTRIBUTIONS PLANS

The name of each contributions plan applying to the land.

Wollondilly Development Contribution Plan 2010 applies to the land.

9A. BIODIVERSITY CERTIFIED LAND

If the land is biodiversity certified land (within the meaning of Part 7AA of the *Threatened Species Conservation Act 1995*), a statement to that effect.

The land is not biodiversity certified land (within the meaning of Part 7AA of the Threatened Species Conservation Act 1995).

10. BIOBANKING AGREEMENTS

If the land is land to which a biobanking agreement under Part 7A of the *Threatened Species Conservation Act 1995* relates, a statement to that effect (but only if the council has been notified of the existence of the agreement by the Director-General of the Department of Environment, Climate Change and Water).

Council has not been notified by the Director-General of the Department of Environment, Climate Change and Water of any biobanking agreement approved under the Threatened Species Conservation Act 1995 for this land.

11. BUSH FIRE PRONE LAND

If any of the land is bush fire prone land (as defined in the Act), a statement that all or as the case may be, some of the land is bush fire prone land.

If none of the land is bush fire prone land, a statement to that effect.

The land is partially bush fire prone land as shown in Council's records. Further details of any applicable restrictions on development of the land may be obtained on application to Council.

12. PROPERTY VEGETATION PLANS

Whether or not the land is land to which a property vegetation plan under the *Native Vegetation Act 2003* applies, a statement to that effect (but only if the council has been notified of the existence of the plan by the person or body that approved the plan under the Act).

Council has not been notified of any such plan that affects this land.

13. ORDER UNDER TREES (DISPUTES BETWEEN NEIGHBOURS) ACT 2006

Whether an order has been made under the *Trees (Disputes between Neighbours) Act 2006* to carry out work in relation to a tree on the land (but only if the council has been notified of the order).

No

14. DIRECTIONS UNDER PART 3A

If there is a direction by the Minister in force under section 75P (2) (c1) of the Act that a provision of an environmental planning instrument prohibiting or restricting the carrying out of a project or a stage of a project on the land under Part 4 of the Act does not have effect, a statement to that effect identifying the provision that does not have effect.

No

15. SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR SENIORS HOUSING

If the land is land to which *State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004* applies:

(a) a statement of whether there is a current site compatibility certificate (seniors housing), of which the council is aware, in respect of proposed development on the land and, if there is a certificate, the statement is to include:

(i) the period for which the certificate is current, and
(ii) that a copy may be obtained from the head office of the Department of Planning, and

There is not a current site compatibility certificate (seniors housing) as described that applies to this land.

(b) a statement setting out any terms of a kind referred to in clause 18 (2) of that Policy that have been imposed as a condition of consent to a development application granted after 11 October 2007 in respect of the land.

There are currently no conditions of consent relating to a development application for seniors housing that apply to the land.

16. SITE COMPATIBILITY CERTIFICATES FOR INFRASTRUCTURE

A statement of whether there is a valid site compatibility certificate (infrastructure), of which the Council is aware, in respect of proposed development on the land and, if there is a certificate, that statement is to include:

(a) the period for which the certificate is valid, and
(b) that a copy may be obtained from the head office of the Department of Planning.

There is not a valid site compatibility certificate (infrastructure) as described that applies to this land.

17. SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR AFFORDABLE RENTAL HOUSING

(1) A statement of whether there is a current site compatibility certificate (affordable rental housing), of which the Council is aware, in respect of proposed development on the land and, if there is a certificate, that statement is to include:

(a) the period for which the certificate is current, and
(b) that a copy may be obtained from the head office of the Department of Planning

There is not a current site compatibility certificate (affordable rental housing) as described that applies to this land.

(2) A statement setting out any terms of a kind referred to in clause 17 (1) or 37 (1) of *State Environmental Planning Policy (Affordable Rental Housing) 2009* that have been imposed as a condition of consent to a development application in respect of the land.

There are currently no conditions of consent relating to a development application for affordable rental housing that apply to the land.

NOTE. The following matters are prescribed by section 59(2) of the *Contaminated Land Management Act 1997* as additional matters to be specified in a planning certificate:

(a) that the land to which the certificate relates is significantly contaminated land within the meaning of that Act – if the land (or part of the land) is significantly contaminated land at the date when the certificate is issued,

No.

(b) that the land to which the certificate relates is subject to a management order within the meaning of that Act – if it is subject to such an order at the date when the certificate is issued,

No.

(c) that the land to which the certificate relates is the subject of an approved voluntary management proposal within the meaning of that Act – if it is the subject of such an approved proposal at the date when the certificate is issued,

No.

(d) that the land to which the certificate relates is subject to an ongoing maintenance order within the meaning of that Act – if it is subject to such an order at the date when the certificate is issued,

No.

(e) that the land to which the certificate relates is the subject of a site audit statement within the meaning of that Act – if a copy of such a statement has been provided at any time to the local authority issuing the certificate.

No.

NOTE. Section 26 of the *Nation Building and Jobs Plan (State Infrastructure Delivery) Act 2009* provides that a planning certificate must include advice about any exemption under section 23 or authorisation under section 24 of that Act if the council is provided with a copy of the exemption or authorisation by the Co-ordinator General under that Act.

Council has not been provided any advice about any exemption under section 23 or authorisation under section 24 of the Nation Building and Jobs Plan (State Infrastructure Delivery) Act 2009 which affects this land.

THE FOLLOWING ADDITIONAL INFORMATION IS PROVIDED UNDER:

SECTION 149(5) OF THE ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

For the purposes of Section 149(5), the following information is provided in relation to the subject property:

1. The subject land is not affected by a Foreshore Building Line.

2. Any enquiries relating to whether or not the land has frontage to a classified road or a controlled access road should be referred directly to the RTA on 02 4221 2495.

3. **SECOND SYDNEY AIRPORT PROPOSAL.**

   In November 1996 the Commonwealth Government released details of five airport options being considered for the development of a second major airport for Sydney at either Badgerys Creek or the Holsworthy Military Area. In September 1997, the Government abandoned the Holsworthy option and announced that the Draft Environmental Impact Statement would concentrate on Badgerys Creek. The Government also released the Draft Environmental Impact Statement Summary, which gives an indication of the impact of the proposal on the local environment. Information on the proposal and the Summary of the Draft Environmental Impact Statement can be obtained from the Federal Department of Transport.

4. Other Matters (if applicable).

   DRAFT WOLLONDILLY DEVELOPMENT CONTROL PLAN 2010
   - VOLUME 8 THE OAKS SOUTH

   Draft Wollondilly Development Control Plan 2010- Volume 8 The Oaks South Special Provisions has been placed on public exhibition. The draft plan applies to land at The Oaks being Lot 61 DP742228, 800 Montpelier Drive and Lot 62 DP1099353, 24 Hardwicke Street. The Draft plan contains special provisions to ensure that this land is developed in accordance with the outcomes from the studies undertaken in relation to Draft Wollondilly Local Environmental Plan 2011 (Amendment No.3). Further information can be obtained by contacting Council's Strategic Planning Department.

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L McMahon
GENERAL MANAGER

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Use of agricultural machinery (tractors, chainsaws, motorbikes)

Use of bird-scare devices
Intensive livestock production (cattle feedlots, poultry farms, piggeries, restricted dairies)
Operation of rural industries (packing sheds, abattoirs, stock and sale yards, sawmills)
Vegetation clearing
Grazing of livestock

Crop and fodder production

Soil cultivation

Crop harvesting

Use of firearms

Bushfire hazard reduction burning

Construction of firebreaks

Earthworks (construction of dams, drains, contour banks, access roads and tracks)

Fencing

Pumping and irrigation

Use of pesticides and herbicides

Spreading of manure, compost and treated effluent

Fertiliser usage

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This is not an exhaustive list and intending purchasers of rural land should assess surrounding agricultural land uses and the impact these activities may have when being pursued in close proximity their proposed purchase. If you think these types of activities will affect your ability to live in a rural locality then intending purchasers are advised to reconsider their purchase and seek independent advice.
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WOLLONDILLY SHIRE COUNCIL

PLANNING CERTIFICATE UNDER SECTION 149(2) & (5)

ENVIRONMENTAL PLANNING & ASSESSMENT ACT, 1979

APPLICANT: Todd Hore - Envirnomental Investigation Services
PO Box 976
NORTH RYDE BC NSW 1670

Planning Certificate No.: 20110774
Receipt No.:
Issue Date: 8 July 2011
Applicant's Reference: E25004KH
Property No.: 19397

DESCRIPTION OF PROPERTY

Address: **2320 Silverdale Road SILVERDALE 2752**
Land Description: **Lot: 199 DP: 1092447**

Notes:

The following prescribed matters may apply to the land to which this certificate relates.

Where this certificate refers to a specific allotment (or allotments) within a strata plan, the certificate is issued for the whole of the land within the strata plan, not just the specific allotment(s) referred to, and any information contained in the certificate may relate to the whole, or any part, of the strata plan.

The following information is provided pursuant to Section 149(2) of the Environmental Planning and Assessment Act 1979 as prescribed by Schedule 4 of the Environmental Planning and Assessment Regulation 2000 and is applicable as at the date of this certificate.

Information provided in this certificate should be interpreted in conjunction with the relevant plans, policies and documents held at Council. In order to obtain copies of these documents you may purchase them from Council's Administration Centre at 62-64 Menangle Street, Picton or view free of charge on Council's Website www.wollondilly.nsw.gov.au.

1. NAMES OF RELEVANT PLANNING INSTRUMENTS AND DCPS

(1) The name of each environmental planning instrument that applies to the carrying out of development on the land.

(2) The name of each proposed environmental planning instrument that will apply to the carrying out of development on the land and that is or has been the subject of community consultation or on public exhibition under the Act (unless the Director-General has notified the council that the making of the proposed instrument has been deferred indefinitely or has not been approved).

(3) The name of each development control plan that applies to the carrying out of development on the land.

(4) In this clause, proposed environmental planning instrument includes a planning proposal for a LEP or a draft environmental planning instrument.

ENVIRONMENTAL PLANNING INSTRUMENTS

Wollondilly Local Environmental Plan 2011.

Sydney Regional Environmental Plan No 20 - Hawkesbury-Nepean River (No 2 - 1997)

Sydney Regional Environmental Plan No 9 Extractive Industries (No 2 - 1995)

State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004

State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004

State Environmental Planning Policy No 6 - Number of Storeys in a Building

State Environmental Planning Policy No 21 - Caravan Parks

State Environmental Planning Policy No 22 - Shops and Commercial Premises

State Environmental Planning Policy No 30 - Intensive Agriculture

State Environmental Planning Policy No 33 - Hazardous and Offensive Development

State Environmental Planning Policy No 44 - Koala Habitat Protection
(Note: Excludes land dedicated or reserved as National Park)

State Environmental Planning Policy No 50 - Canal Estate Development

State Environmental Planning Policy No 55 - Remediation of Land

State Environmental Planning Policy No 64 - Advertising and Signage

State Environmental Planning Policy No 65 - Design Quality of Residential Flat Development

State Environmental Planning Policy (Major Development) 2005

State Environmental Planning Policy (Temporary Structures) 2007

State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007

State Environmental Planning Policy (Infrastructure) 2007

State Environmental Planning Policy No 32 - Urban Consolidation (Redevelopment of Urban Land)

State Environmental Planning Policy (Exempt and Complying Development Codes) 2008

State Environmental Planning Policy No 62 - Sustainable Aquaculture

State Environmental Planning Policy (Affordable Rental Housing) 2009

PROPOSED ENVIRONMENTAL PLANNING INSTRUMENTS

Draft State Environmental Planning Policy (Competition) 2010

DEVELOPMENT CONTROL PLANS

Wollondilly Development Control Plan 2010

2. ZONING AND LAND USE UNDER RELEVANT LEPS

For each environmental planning instrument or proposed instrument referred to in clause 1 (other than a SEPP or proposed SEPP) that includes the land in any zone (however described):

WOLLONDILLY LOCAL ENVIRONMENTAL PLAN 2011

(a) the identity of the zone, whether by reference to a name (such as "Residential Zone" or "Heritage Area") or by reference to a number (such as "Zone No 2 (a)"),

Zone RU2 Rural Landscape

(b) the purposes for which the instrument provides that development may be carried out within the zone without the need for development consent:

Extensive agriculture; Home occupations and development listed in Schedule 2 of Wollondilly Local Environmental Plan 2011 provided it meets the criteria in that schedule

(c) the purposes for which the instrument provides that development may not be carried out within the zone except with development consent,

Agriculture; Airports; Bed and breakfast accommodation; Boat repair facilities; Boat sheds; Cellar door premises; Cemeteries; Community facilities; Crematoria; Depots; Dwelling houses; Educational establishments; Environmental facilities; Environmental protection works; Extractive industries; Farm buildings; Farm stay accommodation; Flood mitigation works; Forestry; Freight transport facilities; Funeral chapels; Funeral homes; Group homes; Home-based child care; Home businesses; Home industries; Home occupations (sex services); Hospitals; Information and education facilities; Landscape and garden supplies; Mortuaries; Places of public worship; Recreation areas; Recreation facilities (indoor); Recreation facilities (outdoor); Research stations; Restriction facilities; Roads; Roadside stalls; Rural industries; Rural supplies; Rural workers' dwellings; Secondary dwellings; Signage; Transport depots; Veterinary hospitals; Water recreation structures; Water supply systems

(d) the purposes for which the instrument provides that development is prohibited within the zone,

Stock and sale yards; Turf farming; Any other development not specified in item (b) or (c)

(a) the identity of the zone, whether by reference to a name (such as "Residential Zone" or "Heritage Area") or by reference to a number (such as "Zone No 2 (a)"),

Zone B1 Neighbourhood Centre

(b) the purposes for which the instrument provides that development may be carried out within the zone without the need for development consent:

Nil, unless the development is development listed in Schedule 2 of Wollondilly Local Environmental Plan 2011 provided it meets the criteria in that schedule

(c) the purposes for which the instrument provides that development may not be carried out within the zone except with development consent,

Boarding houses; Business premises; Child care centres; Community facilities; Home industries; Medical centres; Neighbourhood shops; Respite day care centres; Roads; Shop top housing; Any other development not specified in item (b) or (d)

(d) the purposes for which the instrument provides that development is prohibited within the zone;

Agriculture; Air transport facilities; Amusement centres; Attached dwellings; Bed and breakfast accommodation; Biosolids treatment facilities; Boat repair facilities; Boat sheds; Bulky goods premises; Caravan parks; Cemeteries; Crematoria; Depots; Dual occupancies; Exhibition homes; Exhibition villages; Extractive industries; Forestry; Freight transport facilities; Function centres; Highway service centres; Industrial retail outlets; Industries; Mortuaries; Multi dwelling housing; Passenger transport facilities; Recreation facilities (major); Recreation facilities (outdoor); Research stations; Residential flat buildings; Resource recovery facilities; Restricted premises; Restriction facilities; Roadside stalls; Rural industries; Secondary dwellings; Semi-detached dwellings; Sex services premises; Storage premises; Transport depots; Vehicle body repair workshops; Vehicle repair stations; Vehicle sales or hire premises; Waste disposal facilities; Water recreation structures; Water recycling facilities; Water treatment facilities

(e) whether any development standards applying to the land fix minimum land dimensions for the erection of a dwelling house on the land and, if so, the minimum land dimensions so fixed,

A dwelling house cannot be erected on any lot created under clause 4.2 of Wollondilly Local Environmental Plan 2011. That is, a dwelling house cannot be erected on lots less than the minimum allotment size for subdivision which have only been created for the purpose of primary production.

Reference must be made to clause 4.2 of Wollondilly Local Environmental Plan 2011 and the Lot Size Map for further information.

Wollondilly Local Environmental Plan 2011 Clause 4.2A and the Minimum Lot Size Map sets the minimum land dimensions for the erection of a dwelling house on this land as follows:

> Development consent for the purposes of the erection of a dwelling house may only be granted if no dwelling house has been erected on the land (unless the application is to replace the existing dwelling-house) and;
>
> (a) the lot is at least the minimum lot size specified for that land by the Lot Size Map being 16 hectares; or
> (b) the lot was created before this Plan commenced and on which a dwelling house was permissible immediately before that commencement; or
> (c) the lot resulted from a subdivision for which development consent (or equivalent) was granted before this Plan commenced and on which the erection of a dwelling house would have been permissible if the plan of subdivision has been registered before that commencement.

Reference must be made to Clause 4.2A of Wollondilly Local Environmental Plan 2011 and the Lot Size Map for further information.

(f) whether the land includes or comprises critical habitat,

None known

(g) whether the land is in a conservation area (however described),

The land is not located within a Heritage Conservation Area as provided by clause 5.10 and Schedule 5 of Wollondilly Local Environmental Plan 2011.

(h) whether an item of environmental heritage (however described) is situated on the land.

The land does not contain an item of environmental heritage as provided by clause 5.10 and Schedule 5 of Wollondilly Local Environmental Plan 2011.

2A. ZONING AND LAND USE UNDER STATE ENVIRONMENTAL PLANNING POLICY (SYDNEY REGION GROWTH CENTRES) 2006

This clause is not applicable to the Wollondilly Local Government Area.

3. COMPLYING DEVELOPMENT

(1) Whether or not the land is land on which complying development may be carried out under each of the codes for complying development because of the provisions of clauses 1.17A (c) and (d) and 1.19 of *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.*

(2) If complying development may not be carried out on that land because of the provisions of clauses 1.17A (c) and (d) and 1.19 of that Policy, the reasons why it may not be carried out under that clause.

THE GENERAL HOUSING CODE

Complying development MAY be carried out on the land under the General Housing Code in State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

THE RURAL HOUSING CODE

Complying development MAY be carried out on the land under the Rural Housing Code in State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

THE HOUSING ALTERATIONS CODE

Complying development MAY be carried out on the land under the Housing Alterations Code in State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

THE GENERAL DEVELOPMENT CODE

Complying development MAY be carried out on the land under the General Development Code in State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

THE GENERAL COMMERCIAL AND INDUSTRIAL CODE

Complying development MAY be carried out on the land under the General Commercial and Industrial Code in State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

THE SUBDIVISIONS CODE

Complying development MAY be carried out on the land under the Subdivisions Code in State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

THE DEMOLITION CODE

Complying development MAY be carried out on the land under the Demolition Code in State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

4. COASTAL PROTECTION

Whether or not the land is affected by the operation of section 38 or 39 of the *Coastal Protection Act* 1979, but only to the extent that the council has been notified by the Department of Services, Technology and Administration.

No

4A. CERTAIN INFORMATION RELATING TO BEACHES AND COASTS

This clause is not applicable to the Wollondilly Local Government Area.

4B. ANNUAL CHARGES UNDER LOCAL GOVERNMENT ACT 1993 FOR COASTAL PROTECTION SERVICES THAT RELATE TO EXISTING COASTAL PROTECTION WORKS

This clause is not applicable to the Wollondilly Local Government Area.

5. MINE SUBSIDENCE

Whether or not the land is proclaimed to be a mine subsidence district within the meaning of section 15 of the *Mine Subsidence Compensation Act* 1961.

The land is not in a Mine Subsidence District.

6. ROAD WIDENING AND ROAD REALIGNMENT

Whether or not the land is affected by any road widening or road realignment under:

(a) Division 2 or Part 3 of the *Roads Act* 1993, or

(b) Any environmental planning instrument, or

(c) Any resolution of the council.

No

7. COUNCIL AND OTHER PUBLIC AUTHORITY POLICIES ON HAZARD RISK RESTRICTIONS

Whether or not the land is affected by a policy:

(a) Adopted by the council, or

(b) Adopted by any other public authority and notified to the council for the express purpose of its adoption by that authority being referred to in planning certificates issued by the council,

that restricts the development of the land because of the likelihood of land slip, bushfire, tidal inundation, subsidence, acid sulphate soils or any other risk (other than flooding).

No

7A. FLOOD RELATED DEVELOPMENT CONTROLS INFORMATION

(1) Whether or not development on that land or part of the land for the purposes of dwelling houses, dual occupancies, multi dwelling housing or residential flat buildings (not including development for the purposes of group homes or seniors housing) is subject to flood related development controls.

No

(2) Whether or not development on that land or part of the land for any other purpose is subject to flood related development controls.

No

(3) Words and expressions in this clause have the same meanings as in the instrument set out in the Schedule to the Standard Instrument (Local Environmental Plans) Order 2006.

8. LAND RESERVED FOR ACQUISITION

Whether or not any environmental planning instrument or proposed environmental planning instrument referred to in clause 1 makes provision in relation to the acquisition of the land by a public authority, as referred to in section 27 of the Act.

Wollondilly Local Environmental Plan 2011 does not provide for the acquisition of the subject land by a public authority as referred to in section 27 of the Act.

9. CONTRIBUTIONS PLANS

The name of each contributions plan applying to the land.

Wollondilly Development Contribution Plan 2010 applies to the land.

9A. BIODIVERSITY CERTIFIED LAND

If the land is biodiversity certified land (within the meaning of Part 7AA of the *Threatened Species Conservation Act 1995*), a statement to that effect.

The land is not biodiversity certified land (within the meaning of Part 7AA of the Threatened Species Conservation Act 1995).

10. BIOBANKING AGREEMENTS

If the land is land to which a biobanking agreement under Part 7A of the *Threatened Species Conservation Act 1995* relates, a statement to that effect (but only if the council has been notified of the existence of the agreement by the Director-General of the Department of Environment, Climate Change and Water).

Council has not been notified by the Director-General of the Department of Environment, Climate Change and Water of any biobanking agreement approved under the Threatened Species Conservation Act 1995 for this land.

11. BUSH FIRE PRONE LAND

If any of the land is bush fire prone land (as defined in the Act), a statement that all or as the case may be, some of the land is bush fire prone land.

If none of the land is bush fire prone land, a statement to that effect.

The land is partially bush fire prone land as shown in Council's records. Further details of any applicable restrictions on development of the land may be obtained on application to Council.

12. PROPERTY VEGETATION PLANS

Whether or not the land is land to which a property vegetation plan under the *Native Vegetation Act 2003* applies, a statement to that effect (but only if the council has been notified of the existence of the plan by the person or body that approved the plan under the Act).

Council has not been notified of any such plan that affects this land.

13. ORDER UNDER TREES (DISPUTES BETWEEN NEIGHBOURS) ACT 2006

Whether an order has been made under the *Trees (Disputes between Neighbours) Act 2006* to carry out work in relation to a tree on the land (but only if the council has been notified of the order).

No

14. DIRECTIONS UNDER PART 3A

If there is a direction by the Minister in force under section 75P (2) (c1) of the Act that a provision of an environmental planning instrument prohibiting or restricting the carrying out of a project or a stage of a project on the land under Part 4 of the Act does not have effect, a statement to that effect identifying the provision that does not have effect.

No

15. SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR SENIORS HOUSING

If the land is land to which *State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004* applies:

(a) a statement of whether there is a current site compatibility certificate (seniors housing), of which the council is aware, in respect of proposed development on the land and, if there is a certificate, the statement is to include:

  (i) the period for which the certificate is current, and
  (ii) that a copy may be obtained from the head office of the Department of Planning, and

There is not a current site compatibility certificate (seniors housing) as described that applies to this land.

(b) a statement setting out any terms of a kind referred to in clause 18 (2) of that Policy that have been imposed as a condition of consent to a development application granted after 11 October 2007 in respect of the land.

There are currently no conditions of consent relating to a development application for seniors housing that apply to the land.

16. SITE COMPATIBILITY CERTIFICATES FOR INFRASTRUCTURE

A statement of whether there is a valid site compatibility certificate (infrastructure), of which the Council is aware, in respect of proposed development on the land and, if there is a certificate, that statement is to include:

(a) the period for which the certificate is valid, and
(b) that a copy may be obtained from the head office of the Department of Planning.

There is not a valid site compatibility certificate (infrastructure) as described that applies to this land.

17. SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR AFFORDABLE RENTAL HOUSING

(1) A statement of whether there is a current site compatibility certificate (affordable rental housing), of which the Council is aware, in respect of proposed development on the land and, if there is a certificate, that statement is to include:

(a) the period for which the certificate is current, and
(b) that a copy may be obtained from the head office of the Department of Planning

There is not a current site compatibility certificate (affordable rental housing) as described that applies to this land.

(2) A statement setting out any terms of a kind referred to in clause 17 (1) or 37 (1) of *State Environmental Planning Policy (Affordable Rental Housing) 2009* that have been imposed as a condition of consent to a development application in respect of the land.

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NOTE. The following matters are prescribed by section 59(2) of the *Contaminated Land Management Act 1997* as additional matters to be specified in a planning certificate:

(a) that the land to which the certificate relates is significantly contaminated land within the meaning of that Act – if the land (or part of the land) is significantly contaminated land at the date when the certificate is issued,

No.

(b) that the land to which the certificate relates is subject to a management order within the meaning of that Act – if it is subject to such an order at the date when the certificate is issued,

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No.

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Use of bird-scare devices
Intensive livestock production (cattle feedlots, poultry farms, piggeries, restricted dairies)
Operation of rural industries (packing sheds, abattoirs, stock and sale yards, sawmills)
Vegetation clearing
Grazing of livestock

Crop and fodder production

Soil cultivation

Crop harvesting

Use of firearms

Bushfire hazard reduction burning

Construction of firebreaks

Earthworks (construction of dams, drains, contour banks, access roads and tracks)

Fencing

Pumping and irrigation

Use of pesticides and herbicides

Spreading of manure, compost and treated effluent

Fertiliser usage

Slashing and mowing of grass

Production of silage

Re-vegetation activities (planting trees and shrubs)

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Livestock droving on roads

This is not an exhaustive list and intending purchasers of rural land should assess surrounding agricultural land uses and the impact these activities may have when being pursued in close proximity their proposed purchase. If you think these types of activities will affect your ability to live in a rural locality then intending purchasers are advised to reconsider their purchase and seek independent advice.
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(Site History Documents – WorkCover Records)

28 JUN 2011

NSW GOVERNMENT | WorkCover NEW SOUTH WALES

Our Ref: D11/078749
Your Ref: Todd Hore

27 June 2011

Attention: Todd Hore
Environmental Investigation Services
PO Box 976
North Ryde BC NSW 1670

Dear Mr Hore,

RE SITE: 2316-2320 Silverdale Road Silverdale

I refer to your site search request received by WorkCover NSW on 23 June 2011 requesting information on licences to keep dangerous goods for the above site.

Enclosed are copies of the documents that WorkCover NSW holds on Dangerous Goods Licence 35/004918 relating to the storage of dangerous goods at the above-mentioned premises, as listed on the Stored Chemical Information Database (SCID).

If you have any further queries please contact the Dangerous Goods Licensing Team on (02) 4321 5500.

Yours Sincerely

Diana Hayes
Senior Licensing Officer
Dangerous Goods Notification Team

CONTACT FOR NOTIFICATION INQUIRIES

Title: (Mr) / Miss / Ms / Mrs / Other (please specify) _____ Family name ANSARI

Given name EJAZ Other names

Business phone 02 4774-1153 Business fax number 02 4774-1020

Business email address Primesilverdale@hotmail.com

Previous Licence Number or Acknowledgement Number (if known)

35/004918

Previous Occupier (if known)

Site on which dangerous goods are to be kept

Number 2320 Street SILVERDALE RD

Suburb/Town/Locality SILVERDALE NSW Postcode 2752

Nearest cross Street ECONO PLACE

Lot and DP if no street number

Is the site staffed? If yes state number of employees 4

Site staffing: Hours per day 16 Days per week 7

Site Emergency Contact

Phone number 02 8786 0005 **Name** EJAZ ANSARI

Nature of site (eg petrol station, warehouse etc)

PETROL STATION

Nature of primary business activity

FUEL RETAIL

ABN Number (if any) 93 087 662 002 Website details (if any)

What is the ANSZIC code most applicable to your business? (see guide for list of codes and further information)

Code 5321 Description AUTOMOTIVE FUEL RETAILING

Attach a site sketch(s) of the premises. Refer to the Guide GDG01 for information on the requirements for the site sketch.

Attach a legible photocopy page from a local Street Directory or other map showing the locality of the premises. Mark the location of the premises with an X.

List the dangerous goods that will be stored and/or processed on these premises (refer to Guide GDG01). Copy this page and attach additional sheets if there is insufficient space.

Depot No	Type of storage location or process	Class	Maximum Storage Capacity (L, kg)
1	UNDERGROUND	3	28000 L

UN Number	Proper Shipping Name	Class	PG (I, II, III)	Product or Common Name	HazChem Code	Typical Qty	Unit eg L, kg
1203	PETROL	3	II	PETROL	3(Y)E	28000	L

Depot No	Type of storage location or process	Class	Maximum Storage Capacity (L, kg)
2	UNDERGROUND	3	24000 L

UN Number	Proper Shipping Name	Class	PG (I, II, III)	Product or Common Name	HazChem Code	Typical Qty	Unit eg L, kg
1	PETROL	3	II	PETROL	3(Y)E	24000	L

Depot No	Type of storage location or process	Class	Maximum Storage Capacity (L, kg)
3, 4 4/12/21	UNDERGROUND	3	53000 L

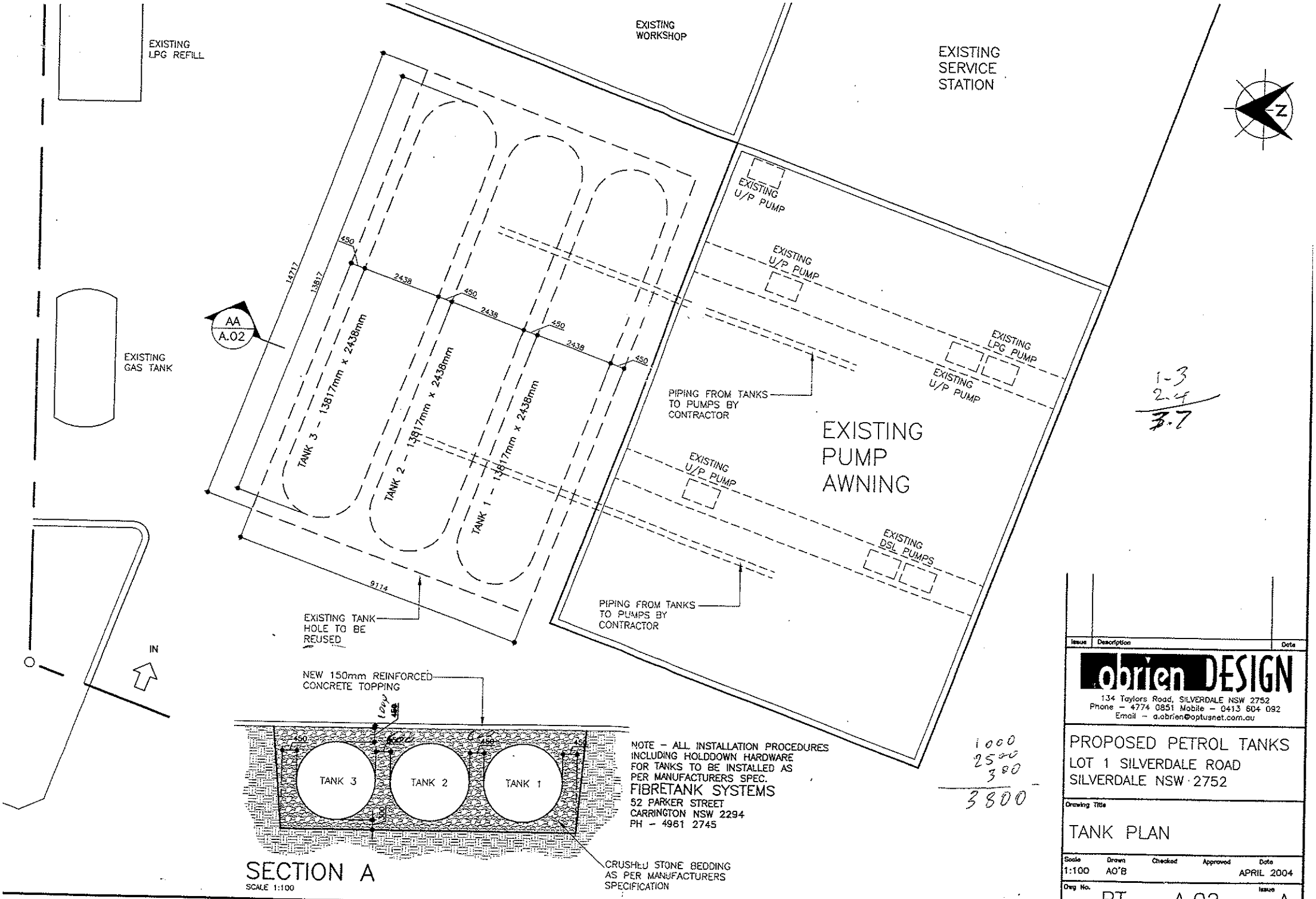
UN Number	Proper Shipping Name	Class	PG (I, II, III)	Product or Common Name	HazChem Code	Typical Qty	Unit eg L, kg
1203	PETROL	3	II	PETROL	3(Y)E	52000	L
00 C1	DIESEL	3	II	DIESEL	—	52000	L

Depot No	Type of storage location or process	Class	Maximum Storage Capacity (L, kg)
5, 6	ABOVE GROUND / U.GROUND	3	4500 L

UN Number	Proper Shipping Name	Class	PG (I, II, III)	Product or Common Name	HazChem Code	Typical Qty	Unit eg L, kg
1075	PETROLEUM GAS	2.1	II	LPG	2WY	3000	L
1203	PREMIUM	3	II	PETROL	3(Y)E	2000	L

Depot No	Type of storage location or process	Class	Maximum Storage Capacity (L, kg)
7, 8	ABOVE GROUND	2.1	420 kg

UN Number	Proper Shipping Name	Class	PG (I, II, III)	Product or Common Name	HazChem Code	Typical Qty	Unit eg L, kg
1075	DECANTING CYL	2.1	II	GAS	—	52	L
1075	PETROLEUM GAS	2.1	II	GAS	—	216	kg



SECTION A
SCALE 1:100

NOTE – ALL INSTALLATION PROCEDURES INCLUDING HOLDDOWN HARDWARE FOR TANKS TO BE INSTALLED AS PER MANUFACTURERS SPEC.

FIBRETANK SYSTEMS
52 PARKER STREET
CARRINGTON NSW 2294
PH – 4961 2745

1-3
2.4
3.7

1000
2500
300
3800

Issue	Description	Date

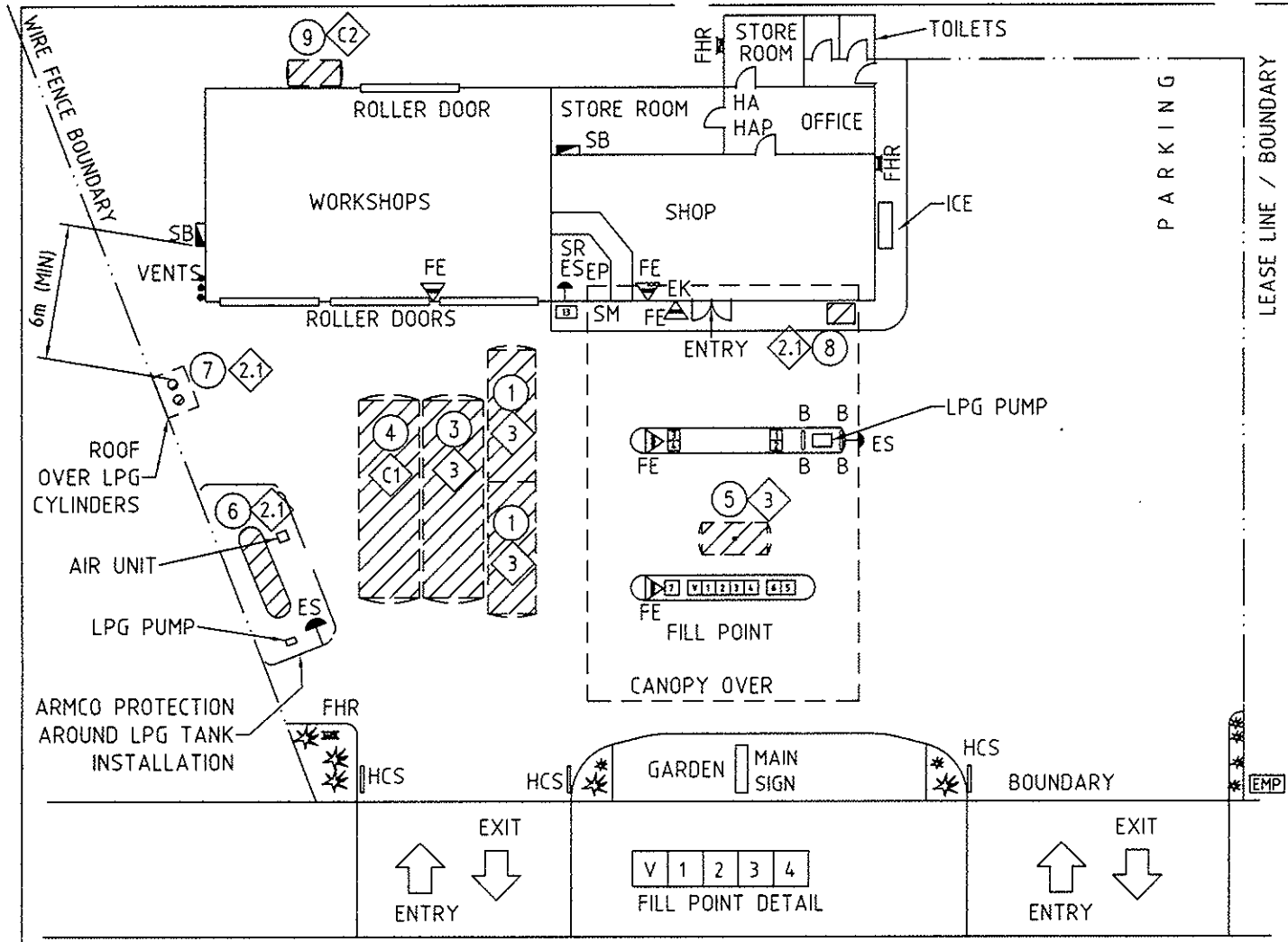
obrien DESIGN
134 Taylors Road, SILVERDALE NSW 2752
Phone – 4774 0851 Mobile – 0413 604 092
Email – a.obrien@optusnet.com.au

PROPOSED PETROL TANKS
LOT 1 SILVERDALE ROAD
SILVERDALE NSW 2752

Drawing Title
TANK PLAN

Scale	Drawn	Checked	Approved	Date
1:100	AO'B			APRIL 2004

Dwg No. PT – A.02 Issue A



No.	TYPE	SIZE	PRODUCT	CLASS	PG	UN No	HAZCHEM
1	UST	28.8 KL	PULP	3	II	1203	3(Y)E
2	UST	24 KL	PULP	3	II	1203	3(Y)E
3	UST	53 KL	ULP	3	II	1203	3(Y)E
4	UST	53 KL	DIESEL	C1	-	00C1	3(Y)E
5	UST	4.4 KL	KERO	3	II	1223	3(Y)E
6	AGST	4.5 KL	LPG	2.1	-	1075	2WE
7	DECANT CYL.	998 L	LPG	2.1	-	1075	2WE
8	EXCHANGE CYL.	528 L	LPG	2.1	-	1075	2WE
9	UST	2 KL	WASTE OIL	00C2	-	00C2	3(Y)E

SITE MANIFEST & DEPOT LIST

GENERAL NOTES

MANDATORY SIGNS NEAR DISPENSERS EMERGENCY STOPS & LPG CYLINDERS

- FE = FIRE EXTINGUISHER
- AFES = ALL FUELS EMERGENCY STOP
- ES = EMERGENCY STOP
- EK = ENVIRONMENTAL SPILL KIT
- SB = SWITCHBOARD
- SM = SITE MANIFEST
- VENT(S) = VENT PIPE TERMINATIONS
- B = BOLLARDS
- = DISPENSERS - FUEL & LPG
- SR = SITE REGISTER OF ALL PRODUCTS & MATERIAL SAFETY DATA SHEETS
- EMP = EMERGENCY MEETING POINT
- 3 = CLASS OF DANGEROUS GOODS
- 1 = DANGEROUS GOODS DEPOT
- HAP = HAZARD AREA PLAN
- HA = HAZARD RISK ASSESSMENT
- HCS = HAZCHEM SIGN
- EP = EMERGENCY PROCEDURES

EMERGENCY CONTACTS

1. STORE MANAGER TEL. NO. 4774 1020
2. EJAZ ANSARI TEL. NO. 0411 821 080

PRIME SERVICE STATION

LICENCE No: 35/004918
KARIM HOLDING PTY LTD
2320 SILVERDALE RD
SILVERDALE, NSW 2752

SITE SAFETY PLAN

TVG: 01166-05 | DATE: 03.01.06

35/004918

lile + appl to fe

RECEIVED MAIL ROOM 19 SEP 1995 WORKCOVER NEW SOUTH WALES

Reference

WORKCOVER AUTHORITY

APPLICATION FOR RENEWAL
OF LICENCE TO KEEP DANGEROUS GOODS

ISSUED UNDER AND SUBJECT TO THE PROVISIONS OF THE DANGEROUS GOODS ACT, 1975 AND REGULATION THEREUNDER

DECLARATION: *Please renew licence number 35/004918 to 1996. I confirm that all the licence details shown below are correct (amend if necessary).*

Lopreiato	MARIA LOPREIATO	18.9.95
(Signature)	*(Please print name)*	*(Date signed)*
for: LOPREIATO B & M		

*THIS **SIGNED** DECLARATION SHOULD BE **RETURNED TO:***

WorkCover Authority
Dangerous Goods Licensing Section (Level 3)
Locked Bag 10
P O CLARENCE STREET 2000

Details of licence on 28 August 1995

FILED 19 SEP 1995 SCIENTIFIC SERVICES BRANCH

Licence Number 35/004918 **Expiry Date** 16/10/95

Licensee LOPREIATO B & M
B & M SILVERDALE CENTRE

Postal Address 45 SILVERDALE RD, SILVERDALE 2752

Licensee Contact Bruno Lopreiato Ph. 047 74 1035

Premises Licensed to Keep Dangerous Goods
45 SILVERDALE RD
SILVERDALE 2752

DATA 12 OCT 1995 ENTERED

Nature of Site SERVICE STATIONS **Major Supplier of Dangerous Goods** MOBIL

Emergency Contact for this Site Bruno or Maria Lopreiato ph. 047 74 1581

Site staffing 15 hrs 7 days

Details of Depots

Depot No.	Depot Type	Goods Stored in Depot	Qty
1	DECANTING CYLINDER(S)	Class 2.1	350 kg
		UN 1075 PETROLEUM GASES, LIQUE	175 kg
		UN 1075 PETROLEUM GASES, LIQUE	175 kg
2	ABOVEGROUND TANK	Class 2.1	4500 L
		UN 1075 PETROLEUM GASES, LIQUE	4500 L
4	~~ABOVEGROUND~~ TANK UNDERGROUND TANK	Class 3	55000 L
		UN 1203 PETROL	55000 L
5	UNDERGROUND TANK	Class 3	45000 L
		UN 1203 PETROL	45000 L

13 OCT 1995

WORKCOVER AUTHORITY

Reference			
6	UNDERGROUND TANK	Class 3 ~~UN 1223 KEROSENE~~ delete	4500 L 4500 L

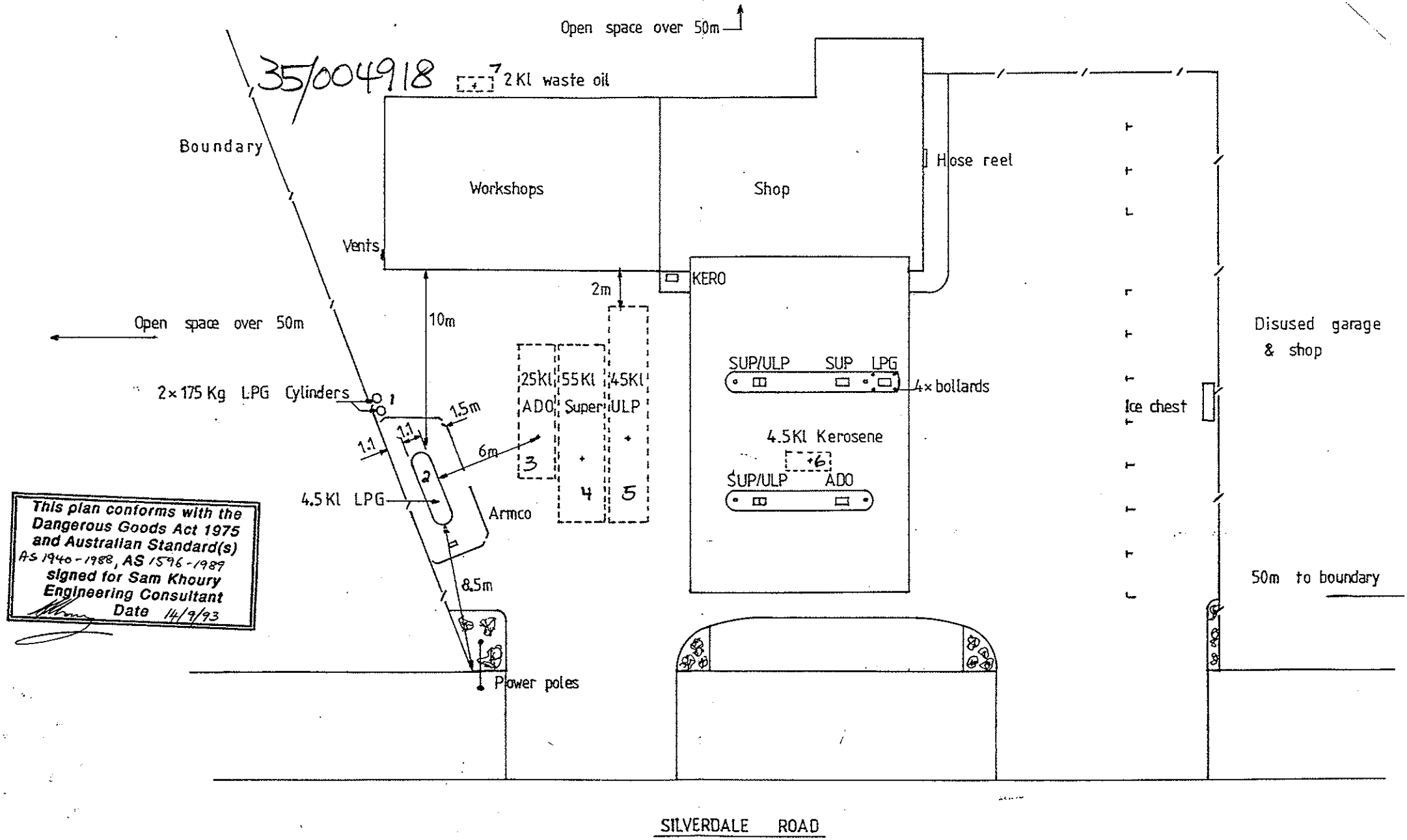
add 1203 Petrol PREMIUM unleaded.

400 Kent Street Sydney NSW 2000 Phone (02) 370 5000 Fax (02) 370 5999 DX 480 Sydney
All correspondence to Locked Bag 10 Clarence St Sydney 2000
New South Wales Government

CERTIFICATION OF FUEL & LPG INSTALLATION

B & M LOPREIATO - 45 SILVERDALE ROAD, SILVERDALE

Scale - 1: 200



This plan conforms with the Dangerous Goods Act 1975 and Australian Standard(s) AS 1940-1988, AS 1596-1989
signed for Sam Khoury
Engineering Consultant
Date 14/9/93

Form DGI

Department of Industrial Relations

DANGEROUS GOODS ACT, 1975

LICENCE No. 35 - 004918.P

APPLICATION FOR LICENCE (or AMENDMENT or TRANSFER of LICENCE)* FOR THE KEEPING OF DANGEROUS GOODS

(* delete whichever is not required)

148079 05/01/88 CHQ $15.00

FEE: $15.00 per Depot for new licence.
$15.00 for amendment or transfer.

Name of Applicant in full (see Item 1 - Explanatory notes - page 4)	BRUNO & MARIA LOPREIATO . NF
Trading name or occupier's name (if any)	B & M. SILVERDALE CENTRE . JF
Postal Address	45 SILVERDALE RD SILVERDALE Postcode 2750.
Address of the premises to be licensed. (Including Street No.)	45 SILVERDALE RD SILVERDALE Postcode 2750
Nature of premises (See Item 2 - Explanatory notes - page 4)	
Telephone number of applicant	STD Code 047 (44035) Number 741035

Particulars of type of depots and maximum quantities of dangerous goods to be kept at any one time.

Depot number	Type of depot (See item 3 - Explanatory notes - page 4)	Storage capacity	Dangerous goods: Product being stored	C & C Office use only
1	U/G TANK	1000L	PETROL DD	003120
2	—	1000L	—	202053
3	CYLINDER	200 kg	LPG	710022
4				
5				
6				
7				
8	R120			
9	Licence expired		15/10/85 - Renewal fee	
10	application - Balance of $30 received			
11				
12				

DATA ENTERED
14 JAN 1988
OPERATOR FIVE

11/1/88

Has site plan been approved by the Dangerous Goods Branch? (Yes) No — If yes, no plans required. If no, please attach site plan, or provide sketch plan overleaf.

Have premises previously been licensed? (Yes) No — If yes, state name of previous occupier, and licence No. (if known).

Name of oil company supplying flammable liquid (if applicable).

X Signature of applicant Mary Lopreiato Date 29.12.87

For external explosives magazine(s), please fill in page 3.

FOR OFFICE USE ONLY

CERTIFICATE OF INSPECTION

I, being an Inspector under the Dangerous Goods Act, 1975, do hereby certify that the premises described above do comply with the requirements of the Dangerous Goods Act, 1975, and the Dangerous Goods Regulation with regard to their situation and construction for the keeping of dangerous goods of the nature and in the quantity specified.

Signature of Inspector ..... Date .....

FOR THE KEEPING OF DANGEROUS GOODS

24 FEB 1984 OPERATIONS VERIFIED OP4

Application is hereby made for ~~*a licence (or amendment of the licence)~~ *the transfer of the licence described below. for the keeping of dangerous goods in or on the premises

(*delete whichever is not required)

FEE: $10.00 per Depot for new licence.
10 $10.00 for amendment or transfer.

Name of Applicant in full (see over)	Anthony Keith MARSHALL
Trading name or occupier's name (if any)	~~Anthony Keith MARSHALL~~ Shell Fen/Stn
Postal address	45 Silverdale Rd Silverdale Postcode 2750.
Address of the premises including street number (if any)	45 Silverdale Rd Silverdale Postcode 2750.
Nature of premises (see over)	~~Garage Petrol~~ Service Station
Telephone number of applicant	STD Code 047 Number 741153 741035

Particulars of type of depots and maximum quantities of dangerous goods to be kept at any one time.

Depot number	Type of depot (see over)	Storage capacity	Dangerous goods: Product being stored	C & C Office use only
	Underground tank			DD 002 020 F
1	~~Service Stat~~	5,000 L.	Petrol	2020 53
2	"	5,000 L.	Petrol	2020 53
3	"	5,000 L	Diesel.	
4				
5				
6				
7				
8				
9				
10				
11				
12				

Has site plan been approved? Yes / ~~No~~ If yes, no plans required. If no, please ~~attach~~ site plan. Existing for 20 yrs Unchanged

Have premises previously been licensed? Yes / ~~No~~ If yes, state name of previous occupier. M.J. Jenkins.

Name of company supplying flammable liquid (if any) Shell Australia.

Signature of applicant ..... Date 20.2.84

For external explosives magazine(s), please fill in side 2.

FOR OFFICE USE ONLY

CERTIFICATE OF INSPECTION

I, ... being an Inspector under the Dangerous Goods Act, 1975, do hereby certify that the premises described above do comply with the requirements of the Dangerous Goods Act, 1975, and the Dangerous Goods Regulation with regard to their situation and construction for the keeping of dangerous goods of the nature and in the quantity specified.

Signature of Inspector ..... Date .....

Licence No.

1. Applications must be forwarded to the Chief Inspector of Inflammable Liquids, Exchange Sydney, N.S.W. 2000 and must be accompanied by the prescribed fee, as set out hereunder:

Registration of Premises (Fee $3.00 p.a.) – For quantities not exceeding 300 gallons of mineral oil and 100 gallons of mineral spirit, if kept together; or 800 gallons of mineral oil and 100 gallons of mineral spirit, if kept in separate depots; or 300 gallons of mineral spirit, if kept in an underground tank depot; or 800 gallons of mineral oil and 500 gallons of mineral spirit, if mineral spirit is kept in an underground tank depot.

In addition to, or in lieu of the above, similar quantities of Dangerous Goods of Classes 1 and 2 may be kept under the like conditions; reading Dangerous Goods of Class 1 for the words Mineral Spirit and Dangerous Goods of Class 2 for the words Mineral Oil.

Store License, Div. A (Fee, $6.50 p.a.) – For quantities in excess of those stated above, but not exceeding 4,000 gallons mineral oil and/or mineral spirit, and/or Dangerous Goods of Classes 1, 2 and 9.

Store License, Div. B (Fee, See Regulation 7) – For quantities exceeding 4,000 gallons of mineral spirit, and/or dangerous goods of Classes 1 and 2, and/or dangerous goods of Class 3.

For the keeping of Dangerous Goods of Classes 3 and/or 4. ($15.00 p.a.).

Fees for the keeping of inflammable liquid and dangerous goods in excess of the above stated quantities and also for Liquid Petroleum Gas storage are set out in Regulation 7.

1. Name of occupier including full christian names.	JENKINS, (Mrs) Margaret Jessie
2. Trading Name (if any)	Silverdale Service Station / General Store
3. Locality of the premises in which the depot or depots are situated	No. or Name 45 Street Silverdale Road, Town SILVERDALE. (WALLACIA) Postcode 2750
4. Postal address	10.
5. Occupation	s/stn. prop. & storekeeper
6. Nature of premises (dwelling, garage etc.)	garage & store

7. Particulars of construction of depots and maximum quantities of inflammable liquid and/or Dangerous Goods to be kept at any one time.

PLEASE ATTACH PLAN OF PREMISES

Depot No.	Construction of depots *			Inflammable liquid		Dangerous goods					
	Walls	Roof	Floor	Mineral spirit gallons	Mineral oil gallons	Class 1 gallons	Class 2 gallons	Class 3 lb	Class 4 cu ft	Class 5A water gal	Class 9 gallons
1	UNDERGROUND		TANK	1000							
2	✓		✓	1000							
3	2 x 100 LB CYLINDERS									40.	
4											
5											
6											
7											
8											
9											
10											

PUBLIC REVENUE A/c.
Chq $4.00
4.5.72
(Trade) Receipt No. 2372

* If product is kept in tanks describe depots as underground or aboveground tanks.

Signature of applicant X Letta E.F.B.

Date of application _____, 19__

CERTIFICATE OF INSPECTION

I, A. Leonard Bartlett being an Inspector under the Inflammable Liquid Act, 1915 (as amended), do hereby certify that the premises or store herein referred to and described is suitable with regard to its situation and construction for the safe keeping of inflammable liquid and/or dangerous goods in quantity and nature specified.

Place Sydney

Date 28/8/73

Signature of Inspector A L Bartlett

PLEASE TURN OVER

APPENDIX D

(Sampling Protocols and QA/QC Definitions)

SOIL AND GROUNDWATER SAMPLING PROTOCOLS

These protocols specify the basic procedures to be used when sampling soils or groundwater for environmental site assessments undertaken by EIS. The purpose of these protocols is to provide standard methods for: sampling, decontamination procedures for sampling equipment, sample preservation, sample storage and sample handling. Deviations from these procedures must be recorded.

Soil Sampling

a) Prepare a test pit/borehole log.
b) Layout sampling equipment on clean plastic sheeting to prevent direct contact with ground surface. The work area should be at a distance from the drill/rig excavator such that the drill rig/excavator can operate in a safe manner.
c) Ensure all sampling equipment has been decontaminated prior to use.
d) Remove any surface debris from the immediate area of the sampling location.
e) Collect samples and place in glass jar with a Teflon seal. This should be undertaken as quickly as possibly to prevent the loss of volatiles. If possible, fill the glass jars completely.
f) Collect samples for asbestos analysis and place in a zip-lock plastic bag.
g) Label the jar and/or bag with the EIS job number, sample location (eg. BH1), sampling depth interval and date. If more than one sample container is used, this should also be indicated (eg. 2 = Sample jar 1 of 2 jars).
h) Photoionisation detector (PID) screening of volatile organic compounds (VOCs) should be undertaken on samples using the soil sample headspace method. Headspace measurements are taken following equilibration of the headspace gasses in partly filled zip-lock plastic bags. PID headspace data is recorded on the borehole/test pit log and the chain of custody forms.
i) Record the lithology of the sample and sample depth on the borehole/test pit log in accordance with AS1726-1993[47].
j) Store the sample in a sample container cooled with ice or chill packs. On completion of the sampling the sample container should be delivered to the lab immediately or stored in the refrigerator prior to delivery to the lab. All samples are preserved in accordance with AS 4482.1:2005, AS 4482.2:1999 and AS/NZS 5667.1:1998.
k) Check for the presence of groundwater after completion of each borehole using an electronic dip metre or water whistle. Boreholes should be left open until the end of fieldwork. All groundwater levels in the boreholes should be rechecked on the completion of the fieldwork.

[47] *Geotechnical Site Investigations*, Standards Australia 1993 (AS1726-1993)

l) Backfill the boreholes/test pits with the excavation cuttings or clean sand prior to leaving the site.

Decontamination Procedures for Soil Sampling Equipment

a) All of the equipment associated with the soil sampling procedure should be decontaminated between every sampling location.

b) The following equipment and materials are required for the decontamination procedure:
   - Phosphate free detergent (Decon 90)
   - Potable water
   - Stiff brushes
   - Plastic sheets

c) Ensure the decontamination materials are clean prior to proceeding with the decontamination.

d) Fill both buckets with clean potable water and add phosphate free detergent to one bucket.

e) In the bucket containing the detergent scrub the sampling equipment until all the material attached to the equipment has been removed.

f) Rinse sampling equipment in the bucket containing potable water.

g) Place cleaned equipment on clean plastic sheets.

If all materials are not removed by this procedure, high-pressure water cleaning is recommended. If any equipment is not completely decontaminated by both these processes that equipment should not be used until it has been thoroughly cleaned.

Groundwater Sampling

Groundwater samples are more sensitive to contamination than soil samples and therefore adhesion to this protocol is particularly important to obtain reliable, reproducible results. The recommendations detailed in AS/NZS 5667.1:1998 are considered to form a minimum standard.

The basis of this protocol is to maintain the security of the borehole and obtain accurate and representative groundwater samples. The following procedure should be used for collection of groundwater samples from previously installed groundwater monitoring wells.

a) After monitoring well installation, at least three bore volumes should be pumped from the monitoring wells (well development) to remove any water introduced during the drilling process and/or the water that is disturbed during installation of the monitoring well. This should be completed prior to purging and sampling.

b) Groundwater monitoring wells should then be left to recharge for at least three days before purging and sampling. Prior to purging or sampling the condition of each

well should observed and any anomalies recorded on the field data sheets. The following information should be noted: the condition of the well, noting any signs of damage, tampering or complete destruction; the condition and operation of the well lock; the condition of the protective casing and the cement footing (raised or cracked); and, the presence of water between protective casing and well.

c) Take the groundwater level from the collar of the piezometer/monitoring well using an electronic dip meter. The collar level should be taken (if required) during the site visit using a dumpy level and staff.

d) Purging and sampling of piezometers/monitoring wells is done on the same site visit when using micro-purge (or low flow) techniques. Layout and organize all equipment associated with groundwater sampling in a location where they will not interfere with the sampling procedure and will not pose a risk of contaminating samples. Equipment generally required includes:
   - Micropore filtration system or Stericup single-use filters (for heavy metals samples).
   - Filter paper for Micropore filtration system.
   - Bucket with volume increments.
   - Sample containers: teflon bottles with 1 ml nitric acid, 75mL glass vials with 1 mL hydrochloric acid, 1 L amber glass bottles.
   - Bucket with volume increments.
   - Flow cell.
   - pH/EC/Eh/T meters.
   - Plastic drums used for transportation of purged water.
   - Esky and ice.
   - Nitrile gloves.
   - Distilled water (for cleaning).
   - Electronic dip meter.
   - Micro-purge pump pack and pump head.
   - Air and water tubing for Micro-purge.
   - Groundwater sampling forms.

e) If single-use stericup filtration is not being used, clean the Micropore filtration system thoroughly with distilled water prior to use and between each sample. Filter paper should be changed between samples. 0.45um filter paper should be placed below the glass fibre filter paper in the filtration system.

f) Ensure all non-disposable sampling equipment is decontaminated or that new disposable equipment is available prior to any work commencing at a new location. The procedure for decontamination of groundwater equipment is outlined at the end of this section.

g) Disposable gloves should be used whenever samples are taken to protect the sampler and to assist in avoidance of contamination.

h) Groundwater samples are obtained from the monitoring wells using low flow/micro-purge sampling equipment to reduce the disturbance of the water column and loss of volatiles.

i) During pumping to purge the well, the pH, temperature, conductivity, dissolved oxygen, redox potential and groundwater levels are monitored (where possible) using calibrated field instruments to assess the development of steady state conditions. Steady state conditions are generally considered to have been achieved when the difference in the pH measurements was less than 0.2 units and the difference in conductivity was less than 10%.

j) All measurements are recorded on specific data sheets.

k) Once steady state conditions are considered to have been achieved, groundwater samples are obtained directly from the pump tubing and placed in appropriate glass bottles, BTEX vials or plastic bottles.

l) All samples are preserved in accordance with water sampling requirements detailed in the NEPM 1999 and placed in an insulated container with ice. Groundwater samples are preserved by immediate storage in an insulated sample container with ice in accordance with AS/NZS 5667.1:1998.

m) Record the sample on the appropriate log in accordance with AS1726:1993. At the end of each water sampling complete a chain of custody form.

Decontamination Procedures for Groundwater Sampling Equipment

a) All of the equipment associated with the groundwater sampling procedure (other than single-use items) should be decontaminated between every sampling location.

b) The following equipment and materials are required for the decontamination procedure:
   - Phosphate free detergent.
   - Potable water.
   - Distilled water
   - Plastic Sheets or bulk bags (plastic bags)

c) Fill one bucket with clean potable water and phosphate free detergent, and one bucket with distilled water.

d) Flush potable water and detergent through pump head. Wash sampling equipment and pump head using brushes in the bucket containing detergent until all materials attached to the equipment are removed.

e) Flush pump head with distilled water.

f) Change water and detergent solution after each sampling location.

g) Rinse sampling equipment in the bucket containing distilled water.

h) Place cleaned equipment on clean plastic sheets.

i) If all materials are not removed by this procedure that equipment should not be used until it has been thoroughly cleaned

QA/QC DEFINITIONS

The QA/QC terms used in this report are defined below. The definitions are in accordance with US EPA publication SW-846, entitled *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (1994[48]) methods and those described in *Environmental Sampling and Analysis, A Practical Guide,* (H. Keith 1991[49]).

Practical Quantitation Limit (PQL), Limit of Reporting (LOR) and Estimated Quantitation Limit (EQL)

These terms all refer to the concentration above which results can be expressed with a minimum 95% confidence level. The laboratory reporting limits are generally set at ten times the standard deviation for the Method Detection limit (MDL) for each specific analyte. For the purposes of this report the LOR, PQL, and EQL are considered to be equivalent.

When assessing laboratory data it should be borne in mind that values at or near the PQL have two important limitations. *"The uncertainty of the measurement value can approach, and even equal, the reported value. Secondly, confirmation of the analytes reported is virtually impossible unless identification uses highly selective methods. These issues diminish when reliably measurable amounts of analytes are present. Accordingly, legal and regulatory actions should be limited to data at or above the reliable detection limit"* Keith 1991.

Precision

The degree to which data generated from repeated measurements differ from one another due to random errors. Precision is measured using the standard deviation or Relative Percent Difference (RPD). Acceptable targets for precision in this report will be less than 50% RPD for concentrations greater than ten times the PQL, less than 75% RPD for concentrations between five and ten times the PQL and less than 100% RPD for concentrations that are less than five times the PQL.

Accuracy

Accuracy is a measure of the agreement between an experimental result and the true value of the parameter being measured. The assessment of accuracy for an

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[48] *SW-846: Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,* US EPA, 1994 (US EPA SW-846)

[49] *Environmental Sampling and Analysis, A Practical Guide*, Keith, H, 1991 (Keith 1991)

analysis can be achieved through the analysis of known reference materials or assessed by the analysis of surrogates, field blanks, trip spikes and matrix spikes.

The proximity of an averaged result to the true value, where all random errors have been statistically removed. Accuracy is measured by percent recovery. Acceptable limits for accuracy generally lie between 70% to 130% recoveries. Certain laboratory methods may allow for values that lie outside these limits.

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is primarily dependent upon the design and implementation of the sampling program. Representativeness of the data is partially ensured by the avoidance of contamination, adherence to sample handing and analysis protocols and use of proper chain-of-custody and documentation procedures.

Completeness

Completeness is a measure of the number of valid measurements in a data set compared to the total number of measurements made and overall performance against DQIs. The following information is assessed for completeness:

- Chain-of-custody forms;
- Sample receipt form;
- All sample results reported;
- All blank data reported;
- All laboratory duplicate and RPDs calculated;
- All surrogate spike data reported;
- All matrix spike and lab control spike (LCS) data reported and RPDs calculated;
- Spike recovery acceptable limits reported; and
- NATA stamp on reports.

Comparability

Comparability is the evaluation of the similarity of conditions (eg. sample depth, sample homogeneity) under which separate sets of data are produced. Data comparability checks include a bias assessment that may arise from the following sources:

- Collection and analysis of samples by different personnel;
- Use of different techniques;
- Collection and analysis by the same personnel using the same methods but at different times; and

- Spatial and temporal changes (due to environmental dynamics).

Blanks

The purpose of laboratory and field blanks is to check for artifacts and interferences that may arise during sampling and analysis.

Matrix Spikes

Samples are spiked with laboratory grade standards to detect interactive effects between the sample matrix and the analytes being measured. Matrix Spikes are reported as a percent recovery and are prepared for 1 in every 20 samples. Sample batches that contain less than 20 samples may be reported with a Matrix Spike from another batch. The percent recovery is calculated using the formula;

$$\frac{\text{(Spike Sample Result – Sample Result)}}{\text{Concentration of Spike Added}} \times 100$$

Acceptable recovery limits are 70% to 130%.

Surrogate Spikes

Samples are spiked with a known concentration of compounds that are chemically related to the analyte being investigated but unlikely to be detected in the environment. The purpose of the Surrogate Spikes is to check the accuracy of the analytical technique. Surrogate Spikes are reported as percent recovery.

Duplicates

Laboratory duplicates measure precision, expressed as Relative Percent Difference. Duplicates are prepared from a single field sample and analysed as two separate extraction procedures in the laboratory. The RPD is calculated using the formula where D1 is the sample concentration and D2 is the duplicate sample concentration:

$$\frac{(D1 - D2)}{\{(D1 + D2)/2\}} \times 100$$

APPENDIX E

(Hardness Calculations)

ADJUSTING THE TRIGGER VALUE TO TAKE ACCOUNT OF HARDNESS

Reference: Australian and New Zealand Guidelines for Fresh and Marine Water Quality ANZECC 2000
Chapter 3 p3.4-21
Table 3.4.3

The calculation allows you you to adjust the trigger value for some of the heavy metals

The calculation only applies to fresh waters with a salinty of 2500mg/L or less.
At 25^{o}C a salinity value of 2500mg/L approximates to a conductivity reading of 4750 μS/cm. (assumes a conversion factor 0.52)

CALCULATION:

Calculate the average hardness (H) value (mg/L as CaCO3) for the site and enter here **67**

The original 95% trigger values (TV) and the hardness modified trigger values (HMTV) are shown in the Table below in μg/L

Metal	TV	Hardness algorithm	HMTV
Cadmium	0.2	HMTV =TV(H/30)$^{0.89}$	0.4
Chromium lll	1	HMTV =TV(H/30)$^{0.82}$	1.9
Copper	1.4	HMTV =TV(H/30)$^{0.85}$	2.8
Lead	3.4	HMTV =TV(H/30)$^{1.27}$	9.4
Nickel	11	HMTV =TV(H/30)$^{0.85}$	21.8
Zinc	8	HMTV =TV(H/30)$^{0.85}$	15.8