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Environmental - Remediation - Engineering - Laboratories - Drilling

ENVIRONMENTAL SITE ASSESSMENT

Malco Site
Rich Street,
Marrickville NSW

Prepared for

E & D Danias Pty Ltd

30th August 2013

Report No. ES5544

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Approved By:

Nick Kariotoglou
Managing Director

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REFERENCES

This report was prepared with reference to the following guiding documents:

- Aargus Pty Ltd (1999): "*Environmental Assessment Report, Lot 54 Rich Street and Shepherd Street, Marrickville NSW*". (Ref No. EM266, dated 1st July 1999);
- ANZECC/NHMRC (1992) – "Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites". Australian and New Zealand Environment and Conservation Council and the National Health and Medical Research Council, Canberra;
- ANZECC National Water Quality Management Strategy "Australian Water Quality Guidelines for Fresh and Marine Waters", 1992.
- CRC Care Technical Report No. 13 – Soil Vapour Assessment (August 2009);
- Department of Urban Affairs and Planning – EPA (1998) "Managing Land Contamination – Planning Guidelines – SEPP 55 – Remediation of Land";
- Douglas Partners (1999): "Stage 1 Contamination Assessment Machine Shop 1, *9 Rich Street, Marrickvillet NSW*". (Project 28552, dated 12th October 1999)
- Douglas Partners (1996): "Report on Contamination Assessment, *61-65 Shepherd Street, Marrickville NSW*". (Project 23711, dated 19th March 1996);
- National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No.1);
- National Environmental Protection Council (NEPC) (1999) National Environmental Protection (Assessment of Site Contamination) Measure;
- NSW DEC, "Guidelines for the Assessment and Management of Groundwater Contamination" (March 2007);
- NSW DEC "Guidelines for the NSW Site Auditor Scheme" (2006, 2nd edition). NSW Environment Protection Authority, Sydney;
- NSW DECC (2009) – "Waste Classification Guidelines, Part 1: Classifying Waste";
- NSW DECCW, "Vapour Intrusion: Technical Practice Note", (September 2010);
- NSW EPA "Guidelines for Assessing Service Station Sites" (1994). NSW Environment Protection Authority, Sydney;

- NSW EPA "Guidelines for Consultants Reporting on Contaminated Sites" (2011). NSW Environment Protection Authority, Sydney;
- NSW EPA "Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997" (2009). NSW Environment Protection Authority, Sydney;
- NSW EPA "Sampling Design Guidelines" (1995). NSW Environment Protection Authority, Sydney.

ABBREVIATIONS

AIP	Australian Institute of Petroleum Ltd
ADWG	Australian Drinking Water Guidelines
ANZECC	Australian and New Zealand Environment and Conservation Council
AST	Aboveground Storage Tank
BGL	Below Ground Level
BTEX	Benzene, Toluene, Ethyl benzene and Xylene
COC	Chain of Custody
DQOs	Data Quality Objectives
EPA	Environment Protection Authority
ESA	Environmental Site Assessment
HIL	Health-Based Soil Investigation Level
LGA	Local Government Area
NEHF	National Environmental Health Forum
NEPC	National Environmental Protection Council
NHMRC	National Health and Medical Research Council
OCP	Organochlorine Pesticides
OPP	Organophosphate Pesticides
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PID	Photo Ionisation Detector
PQL	Practical Quantitation Limit
PSH	Phase Separated Hydrocarbon
QA/QC	Quality Assurance / Quality Control
RAC	Remediation Acceptance Criteria
RAP	Site Remediation Plan
RPD	Relative Percentage Difference
SAC	Site Assessment Criteria
SMP	Site Management Plan
SVC	Site Validation Criteria
TESA	Targeted Environmental Site Assessment
TCLP	Toxicity Characteristics Leaching Procedure
TPH	Total Petroleum Hydrocarbons
UCL	Upper Confidence Limit
UST	Underground Storage Tank
VOC	Volatile Organic Compounds
VHC	Volatile Halogenated Compounds

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EXECUTIVE SUMMARY

Aargus Pty Ltd (Aargus) was appointed by E&D Danias Pty Ltd to undertake a Targeted Environmental Site Assessment (TESA) for the Malco Site located at Rich Street, Marrickville NSW (refer to Figure 1 – Locality Map in Appendix A).

The report has been prepared as part of a due diligence process for investigation purposes. Although the assessment draws upon relevant NSW EPA guidelines and regulatory criteria, as this is a Targeted investigation, the assessment incorporates findings from previous reports to correlate with current data and as such should be utilised for due diligence purposes and/or rezoning purposes.

The primary objective of this TESA was to assess the contamination status of the site and its suitability for various future site uses.

Potential areas of concern include unknown sources of fill, former foundry & landfill waste, current and previous site uses, parking of vehicles, chemical storage and use, asbestos based building materials, leaks from the USTs into the soil and groundwater and possible onsite migration of contaminated groundwater. Sampling design was adjusted accordingly to address any significant areas of concern and where site access was permitted.

Based on the NSW EPA "Sampling Design Guidelines" (1995), for a site with an area of 1.2 hectares (ha), a minimum of twenty-one (21) to twenty-five (25) samples are required. Due to the purpose of this TESA being for due diligence and rezoning requirements and also due to site access limitations, samples were recovered from a total of eleven (11) locations by Aargus in 2013, with a further five boreholes (5) utilised from a Douglas Partners 1996 report (a total of 16 sample data sets)..

The results of the Targeted Environmental Site Assessment indicated that, within the investigated areas, the site is suitable for its current commercial land use and any potential redevelopment into residential land use with minimal access to soils (medium to high density residential developments). Remediation if warranted can be undertaken through either

landfill disposal or capping. The areas where levels were found above current and future proposed residential land use were:

- Copper exceeded HIL 'F' in BH3 (0.4-0.6m);
- Chrysotile asbestos fines were detected in BH4 (1.7-1.9m);
- Benzo(a)pyrene, Total PAH & TPH C_{10}-C_{36} exceeded HIL 'F' & the EPA Service Station guidelines in BH5 (0.3-0.5m);
- Chrysotile asbestos was detected in SS1 (BH1 0.5-0.7m).
- Lead and TPH C_{10}-C_{36} exceeded HIL 'F' in B3 (3.0m);
- TPH C_{10}-C_{36} exceeded the EPA Service Station guidelines in B10 (1.0m).
- Total PAH exceeded HIL'F' in borehole B10 (1.0m).

Groundwater was found at concentrations above criteria as follows:

- Cadmium, chromium, copper and zinc exceeded the ANZECC freshwater guidelines for GW1, GW2, GW3;
- Arsenic and nickel exceeded the ANZECC freshwater guidelines for GW3;
- TPH C_{10}-C_{36} & PAH (Anthrancene, Phenanthrene, Fluoranthene & benzo(a)pyrene) exceeded the Dutch intervention & ANZECC freshwater guidelines for GW1;
- Zinc exceeded the ANZECC freshwater guidelines for W/B1; and
- Benzo(a)pyrene exceeded the Water for recreational purposes in GW1.

The groundwater was noted to be impacted at location GW1 where a well was placed on the upgradient boundary within the landfill leachate. The downgradient well GW3 showed no chemicals of concern had migrated and all wells showed regional heavy metal concentrations within levels.

The following data gaps were identified and require addressing in any future detailed environmental investigations for future redevelopment:

- Characterisation of soils within the sealed areas of the site beneath the existing building footprint,

- Bringing the sampling density to the minimum requirement of the NSW EPA "Sampling Design Guidelines"; and
- Determine the extent of contamination in the groundwater (non landfill leachate) beneath the site;

This can be achieved by undertaking a Detailed Site Investigation as part of any future Development Applications.

Any soils requiring removal from the site, as part of future site works, should be classified in accordance with the "*Waste Classification Guidelines, Part 1: Classifying Waste*" NSW DECC (2009).

Reference should be made to the Limitations of Assessment at the end of the report and Appendix H, which set out details of the limitations of the assessment.

1 INTRODUCTION

Aargus Pty Ltd (Aargus) was appointed by E&D Danias Pty Ltd to undertake a Targeted Environmental Site Assessment (TESA) for the Malco Site located at Rich Street, Marrickville NSW (refer to Figure 1 – Locality Map in Appendix A).

The report has been prepared as part of a due diligence process for investigation purposes as a part of a rezoning/new medium density residential land use application. Although the assessment draws upon relevant NSW EPA guidelines and regulatory criteria, as this is a Targeted investigation, the assessment incorporates findings from previous reports to correlate with current data and as such should be utilised for due diligence purposes and/or rezoning purposes.

This report was prepared with reference to the NSW Environment Protection Authority (EPA) "*Guidelines for Consultants Reporting on Contaminated Sites*" (2011).

2 OBJECTIVES

The primary objective of this TESA is to assess the contamination status of the site and its suitability for various future site uses. The other objectives of this TESA were to:

- Assess the likelihood and/or extent of significant soil and groundwater contamination which may have resulted from the current and previous activities at the site;
- Identify contamination which may be occurring within the current land use, and non-compliance with existing environmental regulations; and
- Recommend management strategies which may be required at the site, including additional investigations and / or remediation works.

The TESA includes the assessment of the following:

- contaminant dispersion in soil and groundwater;
- potential effects of contaminants on human health, the environment and building structures; and
- the adequacy and completeness of the information available on the contamination status of the site.

3 SCOPE OF WORKS

The scope of works for this TESA includes:

- Research and review of the information available, including groundwater bore searches, land titles, EPA notices, historical aerials, NSW Workcover, Section 149s and anecdotal evidence;
- Site walkover, including research of the location of sewers, drains, holding tanks and pits, spills, patches of discoloured vegetation, etc.;
- A Targeted soil boring/sampling investigative study – formulating and conducting a sampling plan and borehole investigation; the soil samples were taken and submitted for analysis on particular contaminants;
- A Targeted groundwater investigation including the installation and sampling of three groundwater wells;
- Laboratory analysis and results from sample analysis – findings and comparison to regulatory guidelines;
- Development of a preliminary conceptual site model to demonstrate the interactions between potential sources of contamination, exposure pathways and human/environmental receptors identified;
- Quality Assurance/Quality Control (QA/QC) – all QA/QC procedures were undertaken in accordance with the Aargus Quality Assurance/Quality Control manual;
- Recommendations for additional investigations should any data gaps be identified or possible strategies for the management of the site, where relevant; and

4 SITE CONDITION AND SURROUNDING ENVIRONMENT

4.1 Site Identification

The site is currently registered as Lot 53 in DP 868710, Lot A in DP 178259 & Lot 5 in DP 63446 and is located at Rich Street, Marrickville NSW as shown in Figure 2 of Appendix A. Site identification information is summarised in the table below.

Table 1: Site Identification

Street Address	**25 Pelican Street**
Lot and DP Number	Lot A in DP 178259 Lot 53 in DP 868710 Lot 5 in DP 63446
Local Government Area	Marrickville
Parish	Petersham
County	Cumberland
Current Site Owner	Dina Danias George Danias Michael Danias Susie Danias
Approx. Site Area	1.2 Hectares
Zoning	IN1 General Industrial LEP 2011
Coordinates (Centre of site)*	E: 330284.291 N: 6246828.126

4.2 Site Description

A site visit was carried out on 23rd July 2013 by an Aargus field scientist to inspect the site for any potential sources of contamination and document any observations made regarding the current site conditions.

At the time of the site inspection, the following observations were made:

- The site was irregular in shape;
- The main access to the site was located along Rich Street in the south western boundary and Brompton Street in northern eastern boundary;

- The site comprised of a commercial / industrial area, including one two storey brick office building, three brick factory style buildings, one pre cast panel warehouse style building and car park areas;
- The north eastern half of the northern brick factory building was occupied by a paint workshop;
- There was evidence of a previous building located in the central portion of the site that appears to have been burnt down recently as ash was located on the sealed surfaces;
- An above ground oil tank was located in the northern brick factory style building. This building was occupied by Road Runner Coaches and was used to service the coaches;
- The sealed car park areas contained a number of cracks located across the site;
- A man-made canal intersected the site. The depth of the canal base was approximately 2-3m BGL;
- There was a bunded plant area located in the north eastern portion of the site;
- A generator was located in the car park area which appeared to be leaking diesel onto the sealed concrete surface;
- There was an unsealed gravel and grass area located to the north of the site. There were cars, rubbish & machinery standing on the unsealed surfaces. Also Road Runners coaches parked part of their buses on this area;
- No surface standing water was noticed at the site.
- There was evidence of chemical storage located on the site. Chemicals included paint, oil & lacquer;
- There are no visual indicators of underground storage tanks within the site. A previous site plan does indicate fill points and these could not be located at the time of the site visit due to possibly being covered by building materials and skip bin. Anecdotally, it has been recorded that the previous tanks were decommissioned.

The site features are presented in Figure 3 of Appendix A and site photographs are included in Appendix B.

4.3 Topography and Surface Waters

The regional topography is undulating, with an approximate slope of 5˚ towards the south-east. The general slope of the subject site is towards the south east, but the western part of the site appears to have been filled.

Stormwater runoff from the site is expected to flow towards the south and south east.

4.4 Surrounding Land Uses

The surrounding land uses identified are described in the table below:

Table 2: Surrounding Land Uses

Orientation	Description
North	Commercial and Industrial properties & Brompton Street (former foundry landfill)
East	Commercial and Industrial properties and the Victoria Road
West	Medium to high density residential dwellings (former foundry landfill that is at least 9m deep that has been capped)
South	Rich Street then Commercial and Industrial properties

In summary, the surrounding land use was predominantly commercial and industrial.

4.5 Local Geology

The Geological Map of Sydney (Geological Series Sheet 9130, Scale 1:100,000, 1983), published by the Department of Mineral Resources indicates the residual soils within the site to be underlain by Triassic Age Shale of the Wianamatta Group, comprising black to dark grey shale and laminite.

4.6 Acid Sulfate Soils

A review of the NSW Department of Land & Water Conservation (DLWC) *Acid Sulphate Soil Risk Maps* (Edition Two, December 1997, Scale 1:250,000), in particular "93 - Botany Bay", indicated that the north & south western portions of the site are located within the "No Known Occurrence" area of acid sulphate soil materials, however, there is "Disturbed Terrain" indicated for the north & south eastern portion of the site.

The Acid Sulphate Soils Map in the 2011 Marrickville LEP indicates the site contains Class 2 & 5 acid sulphate soils. Class 2 soils trigger acid sulphate soil investigations where works below the natural ground surface occur. Class 5 soils trigger acid sulphate soil investigations where works within 500metres of adjacent class 1, 2, 3 or 4 land that is below 5 metres AHD.

4.7 Local Hydrogeology

A search of the Department of Natural Resources (DNR) borehole database information revealed twelve (12) groundwater bores within a 1km radius of the site. A copy of the groundwater bore search records can be found in Appendix I.

A summary of the relevant information provided by the registered groundwater bore record search is provided in the following table.

Table 3:Summary of Registered Groundwater Bore Records

GW Bore ID	Intended Purpose	Depth (m bgl)	Standing Water Level (m bgl)	Water Bearing Zones
GW111350	Monitoring	7.50	No details	No details
GW111351	Monitoring	9.00	No details	No details
GW111353	Monitoring	7.00	2.50	No details
GW111686	Monitoring	3.50	1.55	1.55-3.55
GW111687	Monitoring	4.25	2.50	2.50-4.25
GW111692	Monitoring	1.30	0.50	0.50-1.30
GW110118	Monitoring	6.00	2.00	No details
GW110119	Monitoring	3.50	1.50	No details

GW Bore ID	Intended Purpose	Depth (m bgl)	Standing Water Level (m bgl)	Water Bearing Zones
GW110120	Monitoring	6.00	3.00	No details
GW110121	Monitoring	3.50	3.00	No details
GW110122	Monitoring	3.50	2.50	No details
GW109824	Monitoring	20.70	4.51	13.00-20.00

4.8 Sensitive Receptors

To address the potential impacts of contamination that may be present on site, the following sensitive receptors closest to the site were identified:

- Residents and the general public with access to the site and adjacent properties;
- Recreational users and aesthetics at the Enmore Park, located 250m east of the site; Wicks Park, 400m south of the site; and Henson Park, located at 350m west of the site;
- Alexandra Canal, located approximately 1.8 km to the southeast, and Cooks river, located approximately 2.0km to the southwest, both hydraulically down-gradient from the site; and
- The aquatic ecosystem in Alexandra Canal, Cooks River and Botany Bay.

5 SITE HISTORY

5.1 Land Titles

A review of historical documents held at the NSW Department of Lands offices was undertaken to identify the current and previous land owners and potential land uses. A copy of the historical land titles information obtained by Aargus can be found in Appendix J.

The site is currently registered as Lot 53 in DP 868710, Lot A in DP 176259 & Lot 5 in DP 63446. The results of the title search are summarised in the following table.

Table 4:Land Title Information

Year	Lot A in DP178259
2012 - current	Dina Danias George Danias Michael Danias Susie Danias
1999	Dina Danias Evangelas Danias George Danias Michael Danias Susie Danias
	Prior: Vol 15544 Fol 193
1989	Malco Industries (Operations) Pty Ltd
	Prior: Vol 3783 Fol 235
1989	B R Jones Bros Pty Ltd
1973	Malco Industries (Operations) Pty Ltd
1925	Mallable Castings Limited
	Prior: Vol 2205 Fol 40
1925	L Laude Robert Ogden
1921	J G Ludovici & Sons Limited
1914	The Continential G & G Rubber Company Pty Ltd
1911	Joseph King

Year	Lot 5 in DP63446
2012 - current	Dina Danias George Danias Michael Danias Susie Danias
1999	Dina Danias Evangelas Danias George Danias Michael Danias Susie Danias
	Prior: Vol 3941 Fol 181
1973	Malco Industries (Operations) Pty Ltd
1926	Mallable Castings Limited
	Prior: Vol 1790 Fol 55
1912	Richard Brothers Limited
1907	Emily Ascott

Year	Lot 53 in DP868710
2012 - current	Dina Danias George Danias Michael Danias Susie Danias
1999	Dina Danias Evangelas Danias George Danias Michael Danias Susie Danias
	Prior : 53/ 866480 splits into **3/775440 & 5/785028** **5/785028**
1989	E W Fittings Pty Ltd
	3/775440 splits into **1/773622 splits into** **Prior: Vol 7049 Fol 170 & Vol 12467 Fol 160** **Prior: Vol 7049 Fol 170**
1955	E W Fittings Pty Ltd
	Prior: Vol 3391 Fol 23
1926	Edward Weir Ltd
1923	Edward Weir
1923	Bridget Cordingley
1922	Edward Weir – Iron founder

	Prior: Vol 12467 Fol 160
1974	Malco Industries Pty Ltd
	Prior: Vol 3973 Fol 65
1938	Malleable Castings Ltd
1927	Triangle Foundry Ltd
	Prior: Vol 3374 Fol 230
1927	Triangle Foundry Ltd
1922	Perry King

In summary, the land title information provided suggests that the site was occupied by private individual and commercial / industrial owners since at least 1907. The following owners are of a concern in relation to possible site contamination:

- Triangle Foundry Ltd
- Malleable Castings Ltd
- Malco Industries (Operations) Pty Ltd
- The Continential G & G Rubber Company Pty Ltd
- Edward Weir
- E.W. Fitting Pty Ltd

Douglas Partners (1996) report stated that the general area was used as a clay quarry for brick making purposes. Malco Industries utilised the site for the treatment of metal castings and as a foundry, with former clay pit areas reclaimed by backfilling with foundry wastes.

5.2 EPA Records

The NSW EPA publishes records of contaminated sites under Section 58 of the Contaminated Land Management (CLM) Act 1997. The notices relate to investigation and/or remediation of site contamination considered to pose a significant risk of harm under the definition in the CLM Act. However, it should be noted that the EPA record of Notices for Contaminated Land does not provide a record of all contaminated land in NSW.

A search of the database revealed that the subject site is not listed, however there are five sites pertaining to thirteen notices within the Marrickville Council area. The sites are all between 1.8km and 2.2km around the site. The closest one being 15 Campbell Road, St

Peters which is located 1.8km southeast of the site and hydraulically down-gradient from the site. All sites listed were affected by elevated levels of chlorinated hydrocarbons, including tetrachloroethene, trichloroethene, dichloroethene and vinyl chloride, detected in the groundwater.

Table 5: Summary of EPA Records

Issued Date of Notice	Recipient	Notice Type	Status	Address	Site Name	Approx. Distance and Direction from Site
Dec 2002	Marrickville Council	Agreed Voluntary Remediation Proposal * 26029	1 Former	Ross Street, Salisbury Lane and Cardigan Lane, Camperdown, 2050	O'Dea Reserve (Former Landfill)	1.9km NE
Sep 2002 Oct 2006	TRW Australia Holdings Ltd and Gem Fashion Group Australia Pty Lt	Agreed Voluntary Remediation Proposal * 26014 Notice for Maintaining Remediation * 28030	1 Former, 1 current	22-28 Carrington Road, Marrickville, 2204	TRW Marrickville	2.1km SW
Sep 2006 May 2012	Not Applicable	Declaration of Remediation Site * 21094Amendment or Repeal of Order or Notice * 20124408	2 Current	15 Campbell Road, St Peters, 2042	Former Drum Reconditioning Facility	1.8km SE
Aug 2000 May 2004	Not Applicable then Sydney Water Corporation	Declaration of Remediation Site * 21008 Remediation Order * 23004	2 Current	Off Swamp Road, Tempe, 2044	Alexandra Canal	2km SW
Jul 2000 Mar 2001 Nov 2001 Mar 2003 Aug 2004 Sep 2005	Not Applicable then Marrickville Council	Site Audit Statements * GN35C Site Audit Statements * GN35B Agreed Voluntary Remediation Proposal * 26050 Site Audit Statements * GN35 Declaration of	1 Former, 5 current	Swamp Road and other lots, Tempe, 2044	Tempe Tip	2.2m S

Issued Date of Notice	Recipient	Notice Type	Status	Address	Site Name	Approx. Distance and Direction from Site
		Remediation Site * 21005 Remediation Order * 23003				

A copy of the EPA record are included in Appendix C.

5.3 Aerial Photographs

A number of aerial photographs obtained from the NSW Department of Lands were reviewed as part of this TESA. A copy of the aerial photographs obtained by Aargus can be requested. Descriptions of the site and surrounding areas from each aerial photograph reviewed are presented in the table below:

Table 6: Summary of Historical Aerial Photos

Year	Site	Surrounding areas
1930	A canal appears to intersect the site in the central portion of the site. The site to the north of the canal appeared to be part of a larger industrial site and contained three buildings and a large unsealed area. South of the canal the site appeared to be occupied by two residential properties and one commercial property.	N:Road, then residential and commercial S:Rich Street, then warehouses E:Victoria Road then residential W: Possible foundry / landfill site
1951	The site appears to have changed site the 1930 aerial photograph. The site to the north of the canal appears to be part of a larger industrial site and contained three buildings, car parking areas and a large unsealed area. South of the canal the site appeared to be occupied by one large rectangular warehouse and car parking areas along Rich Street.	The surrounding area is predominantly unchanged, with the exception of: N: A very large unsealed area which is part of an industrial site and a number of warehouses. E: Victoria road then commercial and industrial properties. W: A very large unsealed area which is part of an industrial site and a number of warehouses.
1961	The site appears to be unchanged site the 1951 aerial photograph.	The surrounding area is predominantly unchanged.
1970	The site appears to have changed site the 1961 aerial photograph. There appears to be an access road developed over the canal. South of the	The surrounding area is predominantly unchanged, with the exception of: N: A very large unsealed area which is part of an

	canal the site appeared to be occupied by one large rectangular warehouse, one small office building & car park areas along Rich Street.	industrial site. S:Rich Street then cleared commercial land
1982	The site appears to be unchanged site the 1970 aerial photograph	The surrounding area is predominantly unchanged, with the exception of: S:Rich Street then developed commercial land
1994	The site appears to be unchanged site the 1982 aerial photograph.	The surrounding area is predominantly unchanged, with the exception of: N: A large warehouse which was part of the large industrial site has been developed.
2005	The site appears to have changed since the 1994 aerial photograph. North of the canal one of the small rectangular buildings has been removed.	The surrounding area is predominantly unchanged, with the exception of: N: The large warehouse which is part of a large industrial site has been developed. W: A number of warehouses north and south of the canal.
2013 (Google)	The site appears to be unchanged site the 2005 aerial photograph.	The surrounding area is predominantly unchanged

In summary, the site was developed before 1930 and appears to have been used for predominantly industrial and commercial land use (foundry with landfilling activities). The surrounding area was predominantly residential and commercial since at least 1930. Since then the site and surrounding land use appears to have converted to predominantly commercial to date.

5.4 Section 149 Certificate(s)

Lot: 53 in DP 868710

A review of the Planning Certificate under Section 149 under the Environmental Planning and Assessment Act 1979 for the site states the following matters prescribed by section 59 (2) of the Contaminated Land Management Act 1997:

- The land is not significantly contaminated land within the meaning of the Contaminated Land Management Act 1997.
- The land is not subject to a management order within the meaning of the Contaminated Land Management Act 1997.

- The land is not subject of an approved voluntary management proposal within the meaning of the Contaminated Land Management Act 1997.
- The land is not subject to an ongoing maintenance order within the meaning of the Contaminated Land Management Act 1997.
- As at the date when the certificate was issued, council has not identified that a site audit statement within the meaning of that act has been received in respect of the land the subject of the certificate.
- The land is excluded land identified on an Acid Sulfate Soils map as being Class 2.
- As at the date when the certificate was issued, council has not identified the land of including and comprising of critical habitats, wilderness area, heritage & environmental conservation area or an environmentally sensitive area.

Lot: 5 in DP 63446

A review of the Planning Certificate under Section 149 under the Environmental Planning and Assessment Act 1979 for the site states the following matters prescribed by section 59 (2) of the Contaminated Land Management Act 1997:

- The land is not significantly contaminated land within the meaning of the Contaminated Land Management Act 1997.
- The land is not subject to a management order within the meaning of the Contaminated Land Management Act 1997.
- The land is not subject of an approved voluntary management proposal within the meaning of the Contaminated Land Management Act 1997.
- The land is not subject to an ongoing maintenance order within the meaning of the Contaminated Land Management Act 1997.
- As at the date when the certificate was issued, council has not identified that a site audit statement within the meaning of that act has been received in respect of the land the subject of the certificate.
- The land is identified as being subject to an Acid Sulfate Soils risk under clause 6.2 of Marrickville Environmental Plan 2011.

- As at the date when the certificate was issued, council has not identified the land of including and comprising of critical habitats, wilderness area, heritage & environmental conservation area or an environmentally sensitive area.

Lot: A in DP 178259

A review of the Planning Certificate under Section 149 under the Environmental Planning and Assessment Act 1979 for the site states the following matters prescribed by section 59 (2) of the Contaminated Land Management Act 1997:

- The land is not significantly contaminated land within the meaning of the Contaminated Land Management Act 1997.
- The land is not subject to a management order within the meaning of the Contaminated Land Management Act 1997.
- The land is not subject of an approved voluntary management proposal within the meaning of the Contaminated Land Management Act 1997.
- The land is not subject to an ongoing maintenance order within the meaning of the Contaminated Land Management Act 1997.
- As at the date when the certificate was issued, council has not identified that a site audit statement within the meaning of that act has been received in respect of the land the subject of the certificate.
- The land is excluded land identified on an Acid Sulfate Soils map as being Class 2.
- As at the date when the certificate was issued, council has not identified the land of including and comprising of critical habitats, wilderness area, heritage & environmental conservation area or an environmentally sensitive area.

Copies of the Section 149 records are included in Appendix M.

5.5 WorkCover NSW Records

A search of the Stored Chemical Information Database (SCID) for licences to keep dangerous goods at the site was conducted by the Work Cover NSW and indicated no records pertaining to the site.

A previous report by Douglas Partners has listed two UST's located in the central portion of the site. During the site investigation no visible features of the UST's were found. However, the area where the fill points were mapped was inaccessible due to building materials and a skip bin. It is assumed that the UST's are still present until excavation ascertains otherwise.

A copy of the NSW WorkCover record is included in Appendix L.

5.6 Spill & Loss History

At the time of the inspections, the sealed surfaces of the concrete slab were in average condition. There were some visible signs of oil and/or chemical staining indicating that any spills (if they did occur at all) were cleaned up immediately and did not penetrate the existing slab. There was evidence of a previous building that had recently burnt down as there was ash present on the sealed surface.

The northern portion of the site was unsealed grass and gravel (permeable soil). Road Runner Coaches parked their buses on part of the unsealed surfaces. There were also a number of cars, rubbish & machinery located on the unsealed portion of the site.

5.7 Anecdotal Evidence

An interview with a tenant from Road Runner Coaches was conducted by Aargus during the site visit, to assess the potential impact of current and historical site activities.

The tenant said that a building on the site had recently burnt down and some premises had only recently received power back on and some premises still remained without power. Further to this, it was relayed to Aargus that 2 former USTs were decommissioned and removed from the site. No sampling was however noted to have been undertaken.

6 SUMMARY OF PREVIOUS REPORTS

6.1 General

The following previous site investigations were undertaken for the site and in the vicinity of the subject site:

- Aargus Pty Ltd (1999), *"Environmental Assessment Report, Lot 54 Rich Street and Shepherd Street, Marrickville NSW"*. (Ref No. EM266, dated 1st July 1999);
- Douglas Partners (1999), "Stage 1 Contamination Assessment Machine Shop 1, *9 Rich Street, Marrickville NSW"*. (Project 28552, dated 12th October 1999)
- Douglas Partners (1996), "Report on Contamination Assessment, *61-65 Shepherd Street, Marrickville NSW"*. (Project 23711, dated 19th March 1996);

A summary of the findings from each investigation is provided in the following sub-sections and full reports are included in Appendix K.

6.2 Aargus 1999 Environmental Assessment Report

Aargus Pty Ltd was engaged by Protea Holdings (NSW) Pty Ltd to provide an Environmental Assessment Report for the proposed development at Lot 54 Rich and Shepherd Streets, Marrickville. This report relates to an adjoining property.

The objective of the project was to make the site acceptable for the proposed commercial development. The proposed development of the site was the construction of a two-storey factory and an additional two-storey unit adjacent to factory D.

In proposing recommendations and/or remediation criteria for the site, the recently published NEHF F Health Based Investigation Levels were used. Due to the proposed development of the property, the NEHF F Health Based Investigation Levels allow higher levels of contaminants due to minimal exposures from the proposed commercial development.

The scope of work in preparing the Environmental Assessment Report included review of existing information, filling information gaps, systematic sampling and analysis, interpretation of results/findings and report generation in accordance with Guidelines for the NSW Site auditor scheme.

To reach the stated objective, a set of twelve (12) soil samples and one (1) groundwater sample were taken in total and analysed in a systematic pattern across the site. Analytes were tabulated and statistical analysis was undertaken to ascertain the 95% Upper Confidence Limit. The 95% Upper Confidence Limit of the average concentration for the analysed contaminants were then compared with the NEHF F Health Based Investigation Levels. The research levels looked at was for commercial or industrial soil (NSWEPA Guidelines for the NSW Site Auditor Scheme).

From the analysis of results and conclusions, all samples analysed have met Regulatory Acceptance Criteria and Data Quality Objectives. There is minimal environmental risk posed by the site, so long as the site is used for its intended purpose for commercial development and appropriate measures for capping are conducted. The site was therefore suitable for its intended purpose as a commercial development.

6.3 Douglas Partners 1999 – Stage 1 Contamination Assessment

This report relates to one portion of the current site. The scope comprised a site inspection and a review of previous contamination assessments in the vicinity. No intrusive sampling was conducted on the site. On the basis of the Stage 1 Contamination Assessment inspection it was considered that there was a low risk to human health or the environment as a result of past or future site use provided that the site remained sealed with the existing paving arrangements.

6.4 Douglas Partners 1996 – Report on Contamination Assessment

This report detailed the findings of a contamination assessment carried by Douglas Partners. The report related to the site located 61-65 Shepherd Street, Marrickville NSW comprised an area of approximately 2 ha. The site was to be redeveloped for industrial purposes and the assessment was required to determine the extent. The site currently registered as Lot 53 in DP 868710, Lot A in DP 178259 & Lot 5 in DP 63446 and located at Rich Street, Marrickville NSW is located within the 61-65 Shepherd Street property. The relevant boreholes from the Douglas Partners report included; B1, B2, B3, B9 & B10.

Douglas partners indicated that up until the 1930s, the general area was used as a clay quarry for brick making purposes. The site was also used by Malco Industries for the production and treatment of metal castings. It was also expressed that Malco Industries utilised the site at 61-65 Shepherd Street as a foundry, with former clay pit areas reclaimed by backfilling with foundry wastes.

Based on the analytical results of the soil and groundwater samples analysed in the investigation, hydrocarbon contamination had been identified in the soil adjacent to the UST's, an oil sump and some heavy metal contamination had been detected in the fill containing foundry sand.

It was recommended that B3 & B10 be excavated of the contaminated material and validation sampling was to be undertaken once this had been completed. It was also suggested that the excavated contaminated material be disposed of to a secure land.

Heavy metal contamination was considered to not pose a threat to the underlying groundwater. It was understood that the proposed industrial high-rise development incorporated secure containment areas by sealing off areas of heavy metal contaminated soils with concrete pavements and or concrete slabs.

7 AREAS OF POTENTIAL ENVIRONMENTAL CONCERN

Based on the site inspection and review of available information from the desktop study, the potential areas of environmental concern (AEC) and their associated chemicals of concern (CoC) for the site were identified. These are summarised in the following table.

Table 7: Summary of Potential Areas and Chemicals of Concern

Potential AEC	Potentially contaminating activity	Potential CoCs	Likelihood of Site Impact	Justification
Entire site	Importation of fill material from unknown origin & former foundry & landfill waste	Metals, TPH, BTEX, PAH, Phenols, Ammonia, Sulphate, & Asbestos	Moderate to high	Based on the site observations, site history and site topography, the presence of fill material is likely to be significant in some areas of the site.
	Leaching of contaminants into the groundwater	Metals, TPH, BTEX & PAH	Moderate to high	Based on the; depth to groundwater, site observations, site history and site topography, the presence of contaminates in the groundwater are expected.
	Landfill Vapour	TO-15	Moderate	Based on the site observations, site history and site topography, the presence of contaminates in the fill with the potential for issues with soil vapour are expected.
	Historical and current use and storage of chemicals	Various	Moderate to high	Based on the site observations, site history and site topography, the presence of fill material is likely to be significant.
Car parking areas	Leaks from vehicles	Metals, TPH, BTEX, PAH	Moderate	The sealed surfaces within the site were observed to be in average conditions, with some evidence of cracks &/or staining. Unsealed areas were observed to contain vehicles and machinery.
USTs	Leaks from USTs into the soil and groundwater	TPH, BTEX, VOC,	Low-moderate	Based on previous reports within and around the site, hydrocarbon contamination is expected in both

Potential AEC	Potentially contaminating activity	Potential CoCs	Likelihood of Site Impact	Justification
		Phenol		the soil and groundwater.
Building Structures	Potential Asbestos/Fibro Features	Asbestos	Low	Although the buildings were mainly constructed from concrete, asbestos features may be present within the building structures.
Contaminated sites listed within the Marrickville area	Various sites	Chlorinated solvents	Low	Impacted groundwater may migrated on site from these locations, however the large distance from the site allows for natural attenuation to take place and therefore the risk is considered low.

8 SITE ASSESSMENT CRITERIA

8.1 Soils

8.1.1 Soil Assessment Criteria

The selection of appropriate health-based site assessment criteria for soils was based on the following guiding documents:

- NEPC (1999), "National Environmental Protection (Assessment of Site Contamination) Measure (NEPM)";
- NSW DEC (2006), "Guidelines for the NSW Auditor Scheme (2nd Edition)"; and
- NSW EPA (1994), "Guidelines for Assessing Service Station Sites".

The NSW DEC (2006) *Guidelines for the NSW Site Auditor Scheme* and the NEPM present health-based investigation levels for different land uses (e.g. industrial / commercial, residential, recreational etc.) as well as provisional phytotoxicity based investigation levels.

The EPA guidelines indicate that the assessment of soil test results and comparison with defined soil criteria should include consideration of a number of factors such as:

1. Land uses, e.g. residential, agricultural/horticultural, recreation or commercial/industrial;
2. Potential child occupancy;
3. Potential environmental effects including leaching into groundwater;
4. Single or multiple contaminants;
5. Depth of contamination;
6. Level and distribution of contamination;
7. Bioavailability of contaminant(s), e.g. Related to speciation, route of exposure;
8. Toxicological assessment of the contaminant(s), e.g. Toxic kinetics, carcinogenicity, acute and chronic toxicity;
9. Physico-chemical properties of the contaminant(s);

10. State of the site surface, e.g. paved or grassed exposed;
11. Potential exposure pathways; and
12. Uncertainties with the sampling methodology and toxicological assessment.

At the time of this report, it was understood that the TESA was requested for due diligence purposes in sight of future site redevelopment projects including rezoning. On this basis, soil investigation results will be assessed against the following criteria:

- **(HIL 'D') -** *Residential with minimal opportunities for soil access, including high-rise, apartments and flats*.
- **(HIL 'F')** – *Commercial and Industrial Uses.*

However, the NEPM (1999) Guidelines do not include investigation levels for volatile fractions of TPH and BTEX. The NSW EPA (1994) "*Guidelines for Assessing Service Station Sites*" provide an indication of acceptable clean-up levels for petroleum hydrocarbons compounds at service station sites to be reused for sensitive land-uses. The NSW EPA has recommended that these threshold values should also be used to assess the suitability of sites for less stringent uses, such as residential with minimal access to the soil or parklands.

For semi-volatile petroleum hydrocarbons (C_{16} – C_{35} and $>C_{35}$) investigation levels are provided in the NSW DEC (2006) guidelines, however, these are based on the NEPM health-based criteria, which require the laboratory analysis to unequivocally differentiate between aromatic and aliphatic compounds. The NSW EPA guidelines will be applied in the first instance as broad criteria to assess TPH concentrations. If significant TPH impacts are recorded in soil, aromatic/aliphatic criteria from NSW DEC (2006) may be utilised to assess the speciation of TPH.

Full details of the site assessment criteria for each potential contaminant of concern in soils identified in Section 6 are presented in the table below.

Table 8: Site assessment criteria for soil

Contaminant	Assessment Criteria (mg/kg)			Source
	HIL 'D'	HIL 'F'	NSW EPA	
Inorganics				
Arsenic	400	500	-	NEPM, 1999
Cadmium	80	100	-	NEPM, 1999
Chromium (III)	480,000	600,000	-	NEPM, 1999
Copper	4,000	5,000	-	NEPM, 1999
Lead	1,200	1,500	-	NEPM, 1999
Zinc	28,000	35,000	-	NEPM, 1999
Nickel	2400	3000	-	NEPM, 1999
Mercury	60	75	-	NEPM, 1999
Organics				
TPH/BTEX				
C_6 to C_9 Fraction	-	-	65	NSW EPA, 1994
C_{10} to C_{36}	-	-	1,000	NSW EPA, 1994
Benzene	-	-	1	NSW EPA, 1994
Toluene	-	-	1.4	NSW EPA, 1994
Ethylbenzene	-	-	3.1	NSW EPA, 1994
Total Xylenes	-	-	14	NSW EPA, 1994
PAH				
Benzo(a)pyrene	4	5	-	NEPM, 1999
Total PAH	80	100	-	NEPM, 1999
OCP				
Aldrin + Dieldrin	40	50	-	NEPM, 1999
Chlordane	200	250	-	NEPM, 1999
DDT+DDD+DD	800	1000	-	NEPM, 1999
Heptachlor	40	50	-	NEPM, 1999
PCB (Total)	40	50	-	NEPM, 1999
Total Phenols	34,000		-	NEPM, 1999
Cyanides	1,000	50	-	NEPM, 1999

8.2 Groundwater

8.2.1 General

The process adopted for the selection of appropriate site assessment criteria for groundwater was based on the following guiding documents:

- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC & ARMCANZ (2000);
- "Australian Drinking Water Guidelines", NHMRC & NRMMC (2004); and
- 1999 NEPM (1999), 'Schedule B (1) Guideline on the Investigation Levels for Soil and Groundwater'.

8.2.2 Potential Beneficial Uses

In order to establish appropriate groundwater assessment criteria, it is necessary to identify the potential beneficial uses of groundwater down-gradient from the site based on the Six Environmental Values presented in the table below.

Table 9: Potential Benefical Uses of Groundwater

Environmental Value	Applicability
Aquatic ecosystems	✓
Aquaculture and human consumers of food	×
Agricultural water	×
Recreation and aesthetics	✓
Drinking water	✓
Industrial water	×

The applicable Environmental Values were selected on the basis of the following down-gradient receptors as identified in Section 4.7 of this report:

- Recreational users and aesthetics at the Enmore Park, located 250m east of the site; Wicks Park, 400m north of the site; and Henson Park, located at 350m west of the site;
- Alexandra Canal, located approximately 1.8 km to the southeast, and Cooks river, located approximately 2.0km to the southwest, both at hydraulically down-gradient from the site; and
- The aquatic ecosystem at the Alexandra Canal, Cooks River and Botany Bay.

No abstraction wells for agricultural or industrial use were identified within 1 km of the site. For each relevant Environmental Value identified above, the groundwater assessment criteria to be adopted are discussed in the following sub-sections.

8.2.3 Protection of Aquatic Ecosystems

Section 3.1 of the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC 2000) provides an Australia-wide framework for identification and selection of aquatic ecosystems and provides a range of water quality guidelines values based upon three levels of ecosystem conditions (i.e. high value, slightly to moderate disturbed and highly disturbed) as shown in the table below. Based on observations made during the site walkover, the aquatic ecosystem value of the Alexandra Canal area was considered to be slightly to moderately disturbed.

Table 10: Aquatic Ecosytem Values

Ecosystem Value	Protection Level	Brief Definition	Applicability
High value ecosystems (HVE)	99%	Effectively unmodified, with ecological integrity regarded as intact.	×
Slightly to moderately disturbed ecosystems (SMDE)	95%	Small impacts to aquatic biological diversity within moderately cleared catchments with reasonably intact riparian vegetation.	✓
Highly disturbed ecosystems (HDE)	90%	Measurably degraded ecosystems typically associated with shipping ports or urban catchments.	×

Based on the ecosystem value identified, the trigger values for the protection of 95% of aquatic ecosystems were adopted, except where contaminants are potentially bio-accumulative, in which case the trigger values for protection of 99% of species were used. However, low reliability trigger values presented in Table 3.4.1 of the ANZECC 2000 guidelines were also adopted in the absence of high or moderate reliability trigger values.

ANZECC (2000) states that there is currently insufficient data to derive high reliability trigger values for TPH, but propose a low reliability trigger value for TPH of 7µg/L for marine waters. However, this guideline is generally considered by industry to be overly conservative and is also well below the TPH detection limit that most laboratories can achieve. In this instance, the target and intervention values set out in the Dutch (1999) guidelines of 0.6 mg/L for TPH C_{10}-C_{36} and in the Dutch (1994) guidelines of 0.15 mg/L for TPH C_6-C_9 have been used as a screening level criterion, but may trigger assessment of specific toxic components of TPH when exceeded.

8.2.4 Recreational Water Use and Aesthetics

The trigger values in Table 5.2.3 of the ANZECC (2000) "Guidelines for recreational water quality and aesthetics" were adopted as groundwater assessment criteria for the protection of recreational water use and preservation of the aesthetic appeal of water bodies. The water quality characteristics relevant to recreational use have been categorised into the following:

- Primary contact (e.g. swimming);
- Secondary contact (e.g. boating); and
- Aesthetic (visual appearance and odour).

8.2.5 Protection of Human Health

The NSW DEC (2007) states that groundwater should be considered as potential drinking water unless the total dissolved solids (TDS) exceeds 2000 mg/L. NSW DEC (2004) indicates that TDS can be estimated from EC using a correction factor of 0.00155, which was applied to the field measurements taken during the groundwater investigation. The results indicated EC concentrations of X µS/cm, which is considered to brackish to saline.

On this basis, the health-based trigger levels specified in the Australian Drinking Water Guidelines", (NHMRC & NRMMC 2004), were adopted as groundwater assessment criteria for the protection of drinking water.

8.2.6 Duty to Report

In regard to groundwater objectives, the notification triggers for groundwater from DECC (2009) Contaminated Sites: Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997 are considered appropriate for water quality.

In accordance with Sections 2.3.4 and 2.3.5 of the DECC (2009) Contaminated Sites: Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997, groundwater contaminant concentrations will be compared to Column 1 and Column 3 of Appendix A to determine whether a notification trigger for reporting groundwater contamination is required.

8.2.7 Groundwater Assessment Criteria

Based on the guidelines specified above, full details of the site assessment criteria for groundwater notification triggers and potential contaminants of concern in groundwater are presented as table 11 below.

Table 11: Site Assessment Citeria for Groundwater

Analyte	ANZECC 2000 Fresh water 95%	ANZECC 2000 Fresh water 90%	ANZECC 2000 Marine Water 95%	ANZECC 2000 Marine Water 90%	ANZECC 2000 Recreational Water & Aesthetics	ADWG 2011 Health	Dutch Intervention Value
HEAVY METALS							
Arsenic (III)	24	94	2.3[a]	ID	50	10	
Arsenic (V)	13	42	4.5[a]	ID	50	10	
Cadmium	0.2	0.4	5.5	14	5	2	
Chromium (III)	3.3[a]	ID	27.4	48.6	-	-	
Chromium (VI)	1	6	4.4	20	50	50	
Copper	1.4	1.8	1.3	3	1,000	2,000	
Lead	3.4	5.6	4.4	6.6	50	10	
Mercury (Inorganic)	0.6	1.9	0.4	0.7	-	-	
Mercury (Total)	-	-	-	-	1	1	
Nickel	11	13	70	200	100	20	

Analyte	ANZECC 2000 Fresh water 95%	ANZECC 2000 Fresh water 90%	ANZECC 2000 Marine Water 95%	ANZECC 2000 Marine Water 90%	ANZECC 2000 Recreational Water & Aesthetics	ADWG 2011 Health	Dutch Intervention Value
Zinc	8	15	15	23	5,000	-	
TOTAL PETROLEUM HYDROCARBONS							
(C6-C36)	-	-	-	-	-	-	600
BTEX							
Benzene	950	1,300	700	900	10	1	
Toluene	180[a]	230[a]	180[a]	ID	-	800	
Ethyl Benzene	80[a]	110[a]	5[a]	ID	-	300	
Xylene (m)	75[a]	100[a]	75[a]	ID	-	-	
Xylene (o)	350	470	350	ID	-	-	
Xylene (p)	200	250	200	ID	-	-	
Total Xylene	-	-	-	-	-	600	
POLYCYCLIC AROMATIC HYDROCARBONS (PAH)							
Anthracene	0.4[a]	1.5[a]	0.4[a]	1.5[a]	-	-	
Benzo(a)pyrene	0.2[a]	0.4[a]	0.2[a]	0.4[a]	0.01	0.01	
Fluoranthene	1.4[a]	1.7[a]	1.4[a]	1.7[a]	-	-	
Naphthalene	16	37	70	90	-	-	
Phenanathrene	2[a]	4[a]	2[a]	4[a]	-	-	
PAH Total	-	-	-	-	-	0.01	

Notes:
All units for trigger values are in µg/L
a **=** Interim working values (low reliability) in the absence of reliable trigger values (as referenced from the ANZECC 2000 Guidelines - Section 8.3.7).
ID =Insufficient Data to derive a reliable trigger value
* =99% protection level for slightly to moderately disturbed ecosystem value (as referenced from ANZECC 2000 Guidelines)

It should be noted that the threshold concentrations presented in the ANZECC (2000) Fresh and Marine Waters Quality Guidelines are considered applicable for the protection of aquatic ecosystems of the receiving waters. As these guidelines apply to receiving waters, it is generally conservative to apply these to groundwater discharging to receiving waters. If the trigger values are exceeded, then further consideration will be given to processes such natural attenuation, advection, adsorption and contaminant flux to assess potential risks to down-gradient aquatic ecosystems.

8.3 Asbestos

Asbestos is the fibrous form of various mineral silicates, which belong to the Serpentine and Amphibole groups. The more significant species of asbestos in terms of health risks include

Chrysotile (white), Crocidolite (blue), Amosite (brown or grey). As a product, asbestos has a remarkable ability to resist heat and considerable resistance to acids, alkalines and other chemicals. It is also a very good non-conductor of electricity. Asbestos is found in a wide variety of materials which include insulation, roofing materials, floor tiling, cement products, resins and in many other building materials and structures.

Transport and disposal of asbestos-contaminated soil should be carried out in accordance with state and territory legislation and guidelines. Soils that are known or suspected to be contaminated with asbestos should not be reused or recycled at other sites.

8.3.1 Work Health & Safety

Exposure to the asbestos dust will occur primarily during a disturbance of the material when dust is formed and dispersed as airborne contamination. Drilling, sawing, sanding, grinding and cracking of the materials will generally provide enough disturbances to create harmful dust.

The requirements of both national and jurisdictional work health and safety legislation and guidance relating to asbestos and its control, management and removal must comply with the following:

- Work Health and Safety Act 2011
- Work Health and Safety Regulations 2011
- NSW WorkCover Code of Practice: *How to control and manage asbestos in the workplace*
- NSW WorkCover Code of Practice: *How to safely remove asbestos*

Any admissible exposure to airborne asbestos should be kept as low as achievable and in any case below the specified exposure standards. These standards are determined by the *National Commission for Occupational Exposures*. Below is a summary of the threshold limits for airborne concentrations measured as a time-weighted average (TWA) fibre concentration.

Table 12: Asbestos

Asbestos Species	Concentration (fibres/mL)
Chrysotile	0.1
Crocidolite	0.1
Amosite	0.1
Other forms	0.1
Other mixtures of species	0.1

8.3.2 In-Situ Soil

To assess the contamination status of soils at a site, the NSW EPA generally refers to the National Environmental Protection (Assessment of Site Contamination) Measure (NEPM), NEPC Schedule B series, 1999.

For the purpose of assessing the significance of asbestos in soil contamination, three terms are used in the Schedule which is based on guidance developed by the Western Australian Department of Health (WA DoH, 2009).

The equivalent terms used in work health and safety legislation are listed below in Table 2:

Table 13: Equivalency of terms used in the NEPM, WA DoH (2009) & Work Health & Safety legislation and guidelines

NEPM terminology (based on WA DoH 2009)	Concentration (fibres/mL)
Bonded asbestos-containing material or 'bonded 'ACM *(referred to as ACM in WA DoH 2009)*	Bonded asbestos / non-friable asbestos
Fibrous asbestos, FA	Non-bonded / friable asbestos
Asbestos Fines, AF	

Bonded ACM comprises asbestos-containing material which is in sound condition, although possibly broken or fragmented, and where the asbestos is bound in a matrix such as cement or resin (e.g. asbestos fencing and vinyl tiles). This term is restricted to material that cannot pass

a 7mm x 7mm sieve. This sieve size is selected because it approximates the thickness of common asbestos cement sheeting and for fragments to be smaller than this would imply a high degree of damage and hence potential for fibre release.

FA comprises friable asbestos material and includes severely weathered cement sheet, insulation products and wove asbestos material. This type of friable asbestos is defined here as asbestos material that is in a degraded condition such that it can be broken or crumbled by hand pressure. This material is typically unbound or was previously bonded and is now significantly degraded (crumbling).

AF includes free fibres, small fibre bundles and also small fragments of bonded ACM that pass through a 7mm x 7mm sieve. Both FA and AF have the potential to generate or be associated with free asbestos fibres, which can pose a considerable inhalation risk if made airborne.

8.3.3 Health Screening level for asbestos in soil

Health screening for asbestos in soil, which are based on scenario-specific likely exposure levels, are adopted from the WA DoH guidelines and are listed in Table 14.

There are various acceptable means to provide confidence that the soil surface is free of visible asbestos including, but not limited to, multi-directional raking of soil to a depth of 10cm and hand-picking of asbestos fragments or covering with a durable hard cover. The requirement for the soil surface to be free of visible asbestos applies to both assessment and remediation phases.

Table 14: Health Screening levels (% w/w)

	Health Screening Level (%w/w)			
Form of asbestos	**Residential A[1]**	**Residential B[2]**	**Recreational C[3]**	**Commercial /Industrial D[4]**
Bonded ACM	0.01	0.04	0.02	0.05
FA and AF (friable asbestos)	0.001			
All forms of asbestos	No visible asbestos for surface soils (0-0.1m)			

1 Residential A with garden/accessible soil also includes children's day care centres, preschools and primary schools.

2 Residential B with minimal opportunities for soil access; includes dwellings with fully and permanently paved yard space such as high-rise buildings and apartments

3 Recreational C includes public open space such as parks, playgrounds, playing field (e.g. ovals) secondary schools and unpaved footpaths.

4 Commercial/Industrial D includes premises such as shops, offices, factories and industrial sites.

5 The screening level of 0.001%w/w asbestos in soil for FA and AF (i.e. non-bonded / friable asbestos) only applies where FA and AF are able to be quantified by gravimetric procedures. This screening level is not applicable to free fibres.

8.3.4 Remediation Management

Remediation options which minimise soil disturbance and therefore public risk are preferred. Management of asbestos in situ is encouraged, which may include covering the contamination with uncontaminated fill or other protective or warning layers. It should be noted that the common alternative of complete removal of asbestos from a site often involves extensive and costly investigative and validation sampling and may not be effective or necessary for the protection of human health.

Regulatory authorities may consider statutory management controls to land with substantial asbestos contamination to ensure that appropriate management conditions, including land use limitations, apply to the site. These controls may include notation on title, approved

management and listing on public site contamination registers or ongoing controls under audit statements and planning controls, as relevant for the jurisdiction.

8.4 Waste Classification

To assess the waste classification of materials to be disposed of off-site, the NSW EPA refers to the NSW DECC (2009) Waste Classification Guidelines, Part 1: Classifying Waste.

To classify a non-liquid waste as General Solid Waste or Restricted Solid Waste, the threshold values of the "total concentration without TCLP" (referred to as CT in the text), or the threshold values for the "leachable and total concentration" together can be used.

Full details of the assessment criteria for waste classification are presented in Appendix N.

9 FIELD INVESTIGATIONS

9.1 General Methodology

The soil investigation was carried out on the 13th July 2013and was designed to meet the Data Quality Objectives. The fieldwork procedures adopted were carried out in general accordance with the Aargus fieldwork protocols (refer to Appendix D), which are based on industry accepted standard practice.

Each borehole was drilled using a truck mounted drilling rig or hand auger. The boreholes were backfilled with clean spoil or clean sand/gravel.

A description of sub-surface conditions observed during drilling is summarised below and presented in borehole logs included in Appendix E.

- FILL – Silty Gravel, medium grained, angular, brown with bricks, ash & bitumen;
- FILL – Silty Clayey Gravel, medium grained, angular, brown and orange;
- FILL – Silty Clay, low-medium plasticity, brown, orange, black, grey, traces of ironstone, sandstone, shale and gravel;
- FILL – Silty Gravelly Sand, coarse to medium grained, white, brown & black with traces of gravel and brick;
- FILL – Sand, coarse grained, white, brown & black with traces of gravel and brick;
- NATURAL – Silty Clay, low plasticity, grey & brown, traces of ironstone & gravel;
- NATURAL – Clay, low to medium plasticity, grey with ironstone and shale gravel;
- NATURAL – Clay, low to medium plasticity, red, grey & brown, traces of gravel;
- NATURAL – Clay, medium plasticity, orange, grey, green & brown, traces of shale;
- NATURAL – Silty Clay, low to medium plasticity, brown, orange & grey with shale mottling; and
- NATURAL – Clay, medium to high plasticity, orange & brown, traces of shale;

9.2 Soil Investigation

9.2.1 Sampling Density and Depths

Eleven boreholes (BH1 to BH11) were drilled within the areas of accessible soil across the site to provide general site coverage with consideration given to accessibility and site features. The rationale for the sampling locations is described in the following table.

Table 15: Rationale for sampling locations

Borehole	Rationale
BH1 / GW1	• North western portion of the site, in the vicinity of the former foundry and landfill area potential
BH2	• Central portion of the site, in the vicinity of the canal and burnt building.
BH3	• Near the north eastern boundary, general site coverage
BH4	• North western portion of the site, in the vicinity of the former foundry area & unsealed area where buses were parked and serviced.
BH5	• North western portion of the site, in the vicinity of the former USTs & former foundry / landfill areas.
BH6	• Near the north western boundary, next to canal and in the driveway area.
BH7	• South eastern portion of the site, in the vicinity of the car park area and to provide a triangulation for the groundwater wells.
BH8	• South eastern portion of the site, next to canal and in the car park area.
BH9	• North eastern portion of the site, in the vicinity of the car park area and to provide a triangulation for the groundwater wells.
BH10	• North eastern portion of the site, in the vicinity of the car park area.

Borehole	Rationale
BH11	• South western boundary, general site coverage

Boreholes were also targeted to fill in data gaps from initial sampling undertaken at the site. The borehole locations are shown in Figure 4 of Appendix A).

Based on the NSW EPA "Sampling Design Guidelines" (1995), for a site with an area of 1.2 hectares (ha), a minimum of twenty-one (21) to twenty-five (25) samples are required. Due to the purpose of this TESA being for due diligence and rezoning requirements and also due to site access limitations, samples were recovered from a total of eleven (11) locations by Aargus in 2013, with a further five boreholes (5) utilised from a Douglas Partners 1996 report (a total of 16 sample data sets)..

9.2.2 Sampling Methodology

Soil sampling was carried out in general accordance with Aargus Fieldwork Protocols. In summary:

- Soil samples were collected directly from the auger from fill and natural material;
- Samples were transferred into clean laboratory supplied containers; and
- In general, each soil sample was divided into two sub-samples. One of the sub-samples was placed into a laboratory-supplied container and a second sub-sample was placed in a separate zip-lock bag for asbestos analysis.

9.2.3 Laboratory Analysis

Soil samples were submitted to their respective laboratories as specified in Section 9.2. The following table lists the number of primary and QA/QC soil samples that were analysed for various contaminants.

Table 16: Laboratory Analysis Schedule – Soils

Analyte / Analyte Group Sample	Depth (m)	TYPE	SAMPLING DATE	MET-12	TPH & BTEX	PAH	PHENOLS	SULPHATE	AMMONIA	ASBESTOS PRESENCE	ASBESTOS %
Aargus 23.07.2013											
BH1	0.5-0.7	F	23.07.2013	✔	✔	✔	✔			✔	✔
BH1	1.5-1.6	F	23.07.2013	✔	✔	✔		✔	✔		
BH2	0.3-0.5	F	23.07.2013	✔	✔	✔		✔	✔		
BH2	1-1.2	F	23.07.2013	✔	✔	✔	✔			✔	✔
BH3	0.4-0.6	F	23.07.2013	✔	✔	✔	✔			✔	✔
BH4	0.5-0.7	F	23.07.2013	✔	✔	✔		✔	✔		
BH4	1.7-1.9	F	23.07.2013	✔	✔	✔	✔			✔	✔
BH5	0.3-0.5	F	23.07.2013	✔	✔	✔		✔	✔		
BH5	1.6-1.7	F	23.07.2013	✔	✔	✔	✔			✔	✔
BH6	0.7-0.9	F	23.07.2013	✔	✔	✔	✔			✔	✔
BH6	1.6-1.7	N	23.07.2013	✔	✔	✔		✔	✔		
BH7	0.4-0.6	F	23.07.2013	✔	✔	✔		✔	✔		
BH7	1.4-1.6	F	23.07.2013	✔	✔	✔	✔			✔	✔
BH8	0.2-0.3	F	23.07.2013	✔	✔	✔	✔			✔	✔
BH8	3.0-3.1	N	23.07.2013	✔	✔	✔	✔			✔	✔
BH9	0.4-0.5	F	23.07.2013	✔	✔	✔		✔	✔		
BH9	1.5-1.6	F	23.07.2013	✔	✔	✔	✔			✔	✔
BH10	0.9-1.0	F	23.07.2013	✔	✔	✔	✔			✔	✔
BH10	2-2.1	N	23.07.2013	✔	✔	✔		✔	✔		
BH11	0.1-0.2	F	23.07.2013	✔	✔	✔		✔	✔		
BH11	0.7-0.8	F	23.07.2013	✔	✔	✔	✔			✔	✔
D1	-		23.07.2013	✔	✔	✔	✔			✔	✔
D2	-		23.07.2013	✔	✔	✔		✔	✔		
R1	-		23.07.2013	✔	✔	✔					
SS1	-		23.07.2013	✔	✔	✔	✔	✔	✔	✔	✔

Notes

MET-12:	Arsenic, Aluminium, Cadmium, Chromium, Copper, Iron, Lead, Manganese, Mercury, Nickel, Tin, Zinc
PAH:	Polycyclic Aromatic Hydrocarbons
TPH:	Total Petroleum Hydrcarbons
BTEX:	Benzene, Toluene, Ethyl Benzene, Xylene
F,T,N:	Fill, Topsoil, Natural
D:	Duplicate (Blind)
SS:	Split Sample

9.3 Groundwater Investigation

9.3.1 General Methodology

Three (3) of the boreholes drilled were converted into groundwater monitoring wells on the date of fieldwork and were designated as GW1 (BH1), GW2 (BH7) & GW3 (BH9). The locations of the monitoring wells are shown on Figure 4 of Appendix A and were selected on the following basis:

- To provide an assessment of the groundwater conditions within the fill material;
- To target potential groundwater impacts in the UST area;
- To review attenuation patterns from onsite to off-site wells.

The groundwater gauging, purging and sampling methodology adopted was carried out in accordance with Aargus fieldwork protocols attached in Appendix D.

Groundwater well gauging, purging and sampling details are included on copies of the Aargus field record forms included in Appendix O.

Where relevant, tubing was retained within the monitoring wells for future sampling to minimise decontamination requirements between samples.

9.3.2 Well Installation

Groundwater monitoring well were constructed during the date by adopting the following methodology:

- 50mm diameter, Class 18PVC threaded and flush joined casing and 0.45 machine-slotted screens were used;
- The screen extended 1m above and 2m below the standing water table measured after drilling;

- Coarse, washed sand and gravel was placed in the annulus surrounding the piping to a height of 0.2m above the screen;
- Bentonite pellets were placed in the annulus above the sand to form an impermeable plug of a thickness of 1.0m and near the top of the well to prevent surface runoff from entering directly into the well; and
- A PVC cap was placed on the casing;
- 100mm diameter stainless steel flushed covers were used for all well finishes and concreted onto the ground surface.

A summary of the groundwater monitoring well construction details installed are listed in the table below and are also presented in full detail within their respective borehole logs included in Appendix E.

Table 17: Summary of Well Construction Details

Well ID	Total Depth (m BGL)	Screening Zone (m BGL)	Surface Level (m AHD)	Coordinates (MGA GDA 1994)	Lithological Description
GW1	5.5	2.5-5.5	-	-	Fill
GW2	8.5	2.5-8.5	-	-	Fill / Natural
GW3	9.5	6.5-9.5	-	-	Natural

The following works were carried out upon completion of the well installations:

- The wells were developed by removing at least three well volumes with a disposable bailer and until no further turbidity improvements were observed. The purged groundwater was stored in drums on site and collected by a licensed contractor for offsite disposal. Copies of well development records can be found in Appendix O.

9.3.3 Groundwater Gauging

Measurements of groundwater well depths were obtained to assess whether siltation of the well had occurred following well development. Where a significant difference was noted, the well was redeveloped.

Groundwater levels were measured within a single time interval at all locations prior to the commencement of purging and sampling.

9.3.4 Groundwater Purging and Sampling

Wells were purged and sampled using low flow techniques with low flow pump and maintaining a flow rate of between 100ml/min and 500 ml/min to reduce potential loss of VOCs.

Purging of groundwater was carried out until three consecutive readings from a Water Quality Meter were measured within the stabilisation criteria specified for each physico-chemical parameters listed in the table below.

Table 18: Groundwater Quality Stabilisation Criteria

Parameter	Measurement Unit	Stabilisation Variance
Temperature	ºC	± 0.2
pH	pH units	± 0.1
Oxidation Reduction Potential (ORP)	mV	± 10 mV
Dissolved Oxygen (DO)	mg/L	± 0.2 or 10%
Electrical Conductivity	mS/cm	± 5%

Groundwater samples were collected only after stabilised groundwater quality readings were achieved to ensure representative sampling and then transferred into laboratory-supplied sample containers appropriate for laboratory analyses.

9.3.5 Laboratory Analyses

Groundwater samples were submitted to their respective laboratories as specified in Section 10. The following table lists the number of primary groundwater samples that were analysed for various contaminants.

Table 19: Schedule of Laboratory Analysis - Groundwater

Analyte / Analyte Group Sample	Depth (m)	TYPE	SAMPLING DATE	MET-8	TPH & BTEX	PAH
Aargus Groundwater 8.8.2013						
GW1	-	GW	08.08.2013	✔	✔	✔
GW2	-	GW	08.08.2013	✔	✔	✔
GW3	-	GW	08.08.2013	✔	✔	✔
DP Groundwater 1996						
W/B1	-	GW	19.03.1996	✔	✔	✔

Notes

MET-8:	arsenic, cadmium, chromium, copper, lead, mercury, nickel,
PAH:	Polycyclic Aromatic Hydrocarbons
TPH:	Total Petroleum Hydrcarbons
BTEX:	Benzene, Toluene, Ethyl Benzene, Xylene
GW:	Groundwater

10 QUALITY ASSURANCE/QUALITY CONTROL

10.1 Data Quality Objectives

10.1.1 General

Data Quality Objectives (DQOs) have been defined to ensure that the data was sufficiently accurate and precise to be used for the purpose of these environmental works. DQOs have been defined for a number of areas including:

- sampling methods;
- decontamination procedures;
- sample storage (including nature of the containers) and preservation;
- laboratory analysis, including PQL, recoveries (surrogates, spikes), duplicates;
- preparation of CoC forms;
- document and data completeness; and
- data comparability.

In summary, a review of analytical results shows that laboratory QA/QC samples were within their respective limits. Fieldwork was conducted in general accordance with Aargus fieldwork protocols which are based on industry accepted standard practice and as such met relevant DQOs. All other data was reviewed and found to meet our DQOs and as such the data was found to be of a sufficient quality to allow accurate interpretation of results. A discussion of DQOs is presented in Appendix D – Aargus fieldwork protocols.

10.1.2 Field QA/QC

The following sampling handling, storage and transport procedures were adopted to ensure sample integrity:

- All samples were collected in laboratory supplied containers.

- All soil sample containers were placed immediately into a chilled cooler box and dispatched to their respective analytical laboratories on the same day. If this was not possible, samples were temporarily held overnight in the Aargus office refrigerator at a temperature of no greater than 4 ºC and dispatched the following day;
- A Chain of Custody form (COC) was completed for all samples collected and included with the samples for transport to their respective laboratories for chemical analysis. Copies of COCs are included in Appendix G.
- Disposable nitrile gloves were used for OH&S purposes and were changed between every sample location.

The decontamination of non-dedicated sampling equipment was achieved by washing with phosphate-free detergent and tap water, followed by a final rinse with distilled water. Decontamination was conducted after the collection of samples at each sample location. A clean pair of disposable gloves was used when handling each sample.

The drilling augers were decontaminated between sampling locations by physically removing soil material between boreholes, washing the augers with Decon 90 and rinsing them water.

10.2 Laboratory QA/QC

10.2.1 Laboratories Used

Soil samples were analysed by the laboratory of Eurofins MGT located in Lane Cove West NSW & Groundwater samples were analysed by Groundswell Laboratories in South Melbourne, which are both accredited by the National Association of Testing Authorities (NATA) for the analyses undertaken.

A review of the Eurofins MGT & Groundswell QC procedures including matrix and surrogate spikes, provided within the laboratory report indicated that the laboratory QA/QC was satisfactory for the laboratory analyses undertaken, and met the DQOs for this project.

10.2.2 Holding Times

The following table lists the allowable holding times adopted in accordance with Schedule B(3) of The National Environment Protection (Assessment of Site Contamination) Measure 1999 (NEPM) prepared by the National Environment Protection Council (NEPC), the Standard Methods for the Examination of Water and Wastewater (APHA) and/or the laboratories.

Table 20: Holding Times

ANALYTE – Soil	HOLDING TIME
Metals *	6 months
Mercury	28 days
Chromium VI	7 days
Monocyclic Aromatic Hydrocarbons (MAH)	14 days
Total Petroleum Hydrocarbons (TPH)	14 days
Polycyclic Aromatic Hydrocarbons (PAH)	14 days
Phenols	14 days
Asbestos	Indefinite
ANALYTE – Water	**HOLDING TIME**
Metals *	6 months
Mercury	30 days
Chromium VI	28 days (preserved)
Monocyclic Aromatic Hydrocarbons (MAH)	7 days
Total Petroleum Hydrocarbons (TPH)	7 days
Polycyclic Aromatic Hydrocarbons (PAH)	7 days

10.3 QA/QC Data Evaluation

The sampling methods (including sample preservation, transport and decontamination procedures) and laboratory methods followed during this investigation works were consistent with Aargus protocols and were found to meet the DQOs for this project. It is therefore considered that the data is sufficiently precise and accurate and that the results can be used for the purpose of this project.

10.4 Duplicates/ Splits/ Rinsates Data Evaluation

Copies of the summary tables are presented in Appendix P.

11 LABORATORY RESULTS

11.1 General

A comparison of soil laboratory results against their respective assessment criteria (as specified in Section 8) are presented in tables in Appendix F. Certificates of laboratory analysis are attached in Appendix G. A discussion of the results is presented in the following sub-sections.

11.2 Soil Results

11.2.1 Heavy Metals

As indicated in Table A, the concentrations of the discrete heavy metals were below the adopted assessment criteria, those being the HIL 'D' and 'F' with the exception of the following:

- 5700mg/kg of copper in borehole BH3 (0.4m-0.6m) exceeded the HIL 'F' level of 5000mg/kg for copper;
- 1500mg/kg of lead in borehole B3 (3.0m) equalled the HIL 'F' level of 1500mg/kg for lead.

11.2.2 TPH & BTEX

As indicated in Table B, the TPH & BTEX concentrations were below the suggested levels in the EPA Service Station with the exception of the following:

- 6500mg/kg of TPH C_{10}-C_{36} in borehole BH5 (0.3m-0.5m) exceeded the EPA Service Station guidelines of 1000mg/kg for TPH C_{10}-C_{36};
- 4070mg/kg of TPH C_{10}-C_{36} in borehole B3 (3.0m) exceeded the EPA Service Station guidelines of 1000mg/kg for TPH C_{10}-C_{36};
- 4610mg/kg of TPH C_{10}-C_{36} in borehole B10 (1.0m) exceeded the EPA Service Station guidelines of 1000mg/kg for TPH C_{10}-C_{36}.

11.2.3 B(a)P & Total PAH

As indicated in Table C, the concentrations of B(a)P and Total PAH, were below the adopted assessment criteria, that being the HIL 'D' and 'F' with the exception of the following:

- 110mg/kg of benzo(a)pyrene in borehole BH5 (0.3-0.5m) exceeded the HIL 'F' level of 5mg/kg for benzo(a)pyrene;
- 1300mg/kg of Total PAH in borehole BH5 (0.3-0.5m) exceeded the HIL 'F' level of 100mg/kg for Total PAH;
- 411mg/kg of Total PAH in borehole B10 (1.0m) exceeded the HIL 'F' level of 100mg/kg for Total PAH.

11.2.4 Asbestos

As indicated in Table D, no asbestos was detected in the samples analysed with exception of the following:

- Chrysotile asbestos fines were detected in BH4 (1.7-1.9m) which exceeded the WA Guidelines;
- Chrysotile asbestos was detected in SS1.

11.2.5 Ammonia and Sulphate

As indicated in Table E, ammonia ranged from 0.3 to 2.8 mg/kg and Sulphate ranged from <10 to 20 mg/kg across the site.

11.3 Groundwater Results

A comparison of groundwater laboratory results against their respective assessment criteria (as specified in Section 8) are presented in tables in Appendix F. Certificates of laboratory analysis are attached in Appendix G. A discussion of the results is presented in the following sub-sections.

11.3.1 Heavy Metals

As indicated in Table F, the concentrations of the heavy metals were below the relevant trigger values for aquatic ecosystems (fresh water) with the exception of the following:

- Cadmium, chromium, copper and zinc in GW1;
- Cadmium, chromium, copper and zinc in GW2;
- Arsenic, cadmium, chromium, copper, nickel and zinc in GW3; and
- Zinc in W/B1.

11.3.2 TPH & BTEX

As indicated in Table G, the concentrations of TPH for the samples were below the Dutch Intervention guidelines with the exception of:

- 820ug/L of TPH C_{10}-C_{36} in GW1 exceeded the Dutch Intervention Guidelines of 600mg/kg for TPH C_{10}-C_{36}.

The concentrations of BTEX for the samples in Table G were all below the relevant trigger values for aquatic ecosystems (fresh). The concentrations of benzene were below the relevant guidelines of water for recreational purposes in the ANZ Guidelines 2000.

11.3.3 B(a)P & Total PAH

As indicated in Table H, the concentrations of the Organics for the samples were below the relevant trigger values for aquatic ecosystems (fresh) and the relevant guidelines of water for recreational purposes in the ANZECC Guidelines (2000) with the exception of:

- Anthrancene, phenanthrene, fluoranthene & benzo(a)pyrene in GW1 exceeded the ANZECC freshwater guidelines;
- Benzo(a)pyrene in GW1 exceeded the Water for recreational purposes guideline.

12 SITE CHARACTERISATION

12.1 Soils

The laboratory results for the testing undertaken by Aargus in 2013 for heavy metals, TPH, BTEX, PAH, Ammonia & Sulphate were either below their respective PQLs or the assessment criteria of HIL 'D', 'F' & the EPA Service Station guidelines with the exception of the following:

- Copper exceeded HIL 'F' in BH3 (0.4-0.6m);
- Chrysotile asbestos fines were detected in BH4 (1.7-1.9m);
- Benzo(a)pyrene, Total PAH & TPH C_{10}-C_{36} exceeded HIL 'F' & EPA Service Station guidelines in BH5 (0.3-0.5m); and
- Chrysotile asbestos was detected in SS1.

The laboratory results for the testing undertaken by Douglas Partners in 1996 for heavy metals, TPH, BTEX & PAH were either below their respective PQLs or the assessment criteria of HIL 'D', 'F' & the EPA Service Station guidelines with the exception of the following:

- Lead and TPH C_{10}-C_{36} exceeded HIL 'F' in B3 (3.0m);
- TPH C_{10}-C_{36} exceeded the EPA Service Station guidelines in B10 (1.0m); and
- Total PAH exceeded HIL'F' in borehole B10 (1.0m).

12.2 Groundwater

The laboratory results for the testing undertaken by Aargus in 2013 for heavy metals, TPH, BTEX & PAH were either below their respective PQLs or the assessment criteria with the exception of the following:

- Cadmium, chromium, copper and zinc exceeded the ANZECC freshwater guidelines for GW1, GW2, GW3;
- Arsenic & nickel exceeded the ANZECC freshwater guidelines for GW3;

- TPH C_{10}-C_{36} & PAH (Anthrancene, Phenanthrene, Fluoranthene & benzo(a)pyrene) exceeded the Dutch intervention & ANZECC freshwater guidelines for GW1; and
- Benzo(a)pyrene exceeded the Water for recreational purposes guideline in GW1.

The laboratory results for the testing undertaken by Douglas Partners in 1996 for heavy metals, TPH, BTEX & PAH were either below their respective PQLs or the assessment criteria with the exception of the following locations:

- Zinc exceeded the ANZECC freshwater guidelines for W/B1.

12.3 CSM

The Conceptual Site Model (CSM) presented in the table below provides a representation of the linkages between the following elements:

- Potential contamination sources and their associated contaminants of concern identified in Section 6.
- Potential human and environmental receptors identified in Section 4.8; and
- Potential and complete exposure pathways.

In general, the foundry landfill is located at the upgradient locations (off-site) from the subject property. Whilst limited impact to the site has occurred, it can be seen that residual foundry fill occurs on the site. The average depth of fill across the subject site is 2m with the deepest fill found at the western boundary (5m) and the northern boundary (3m) where the adjoining foundry landfill occurs. Various hotspots were found but the fill was generally found to be suitable for medium density residential occupation and commercial occupation.

The groundwater was found at shallow depths (~2m). The upgradient well GW1 was found to contain the main impact but this well was located within the landfill leachate. GW2 was also founded within the fill/natural interface but was located further downgradient from the adjoining foundry landfill. GW3 was located furthest downgradient and within the natural soils. Levels of contaminants within GW3 were shown to not have been impacted by chemicals of concern and as such natural attenuation was evident. Some residual heavy

metals were found in similar concentrations in all wells but these are noted as regional groundwater quality. The petroleum hydrocarbons and Benzo(a)pyrene found within GW1 can therefore be managed by removal of fill source or management via capping and monitoring. No groundwater remediation would be warranted but further investigation would be recommended to ascertain the connection between leachate landfill and groundwater at perched shallow levels and deeper aquifers.

The canal has not acted as a conduit for contaminant migration and concentrations surrounding the canal were similar to those found further away. The contamination exceeding site criteria is therefore limited to the hotspots found on the site being:

- Copper exceeded HIL 'F' in BH3;
- Asbestos was detected in BH4 & SS1;
- Benzo(a)pyrene, Total PAH & TPH C_{10}-C_{36} exceeded HIL 'F' & EPA Service Station guidelines in BH5; and for the Douglas Report
- Lead and TPH C_{10}-C_{36} exceeded HIL 'F' in B3;
- TPH C_{10}-C_{36} & PAH exceeded HIL'F' & EPA Service Station guidelines in B10.

Table 21: Conceptual Site Model

Potential Sources	Potential Receptor	Potential Exposure Pathways	Complete Linkages	Risk	Justification
Contaminated soil from the placement of uncontrolled fill across the site. Hydrocarbon spills and leakages from car parking areas & UST's.	Site users or the general public	Dermal contact, inhalation or ingestion of exposed impacted soils	Targeted(Current)	Low-medium	The site is almost entirely sealed with a concrete slab therefore direct contact with impacted soils is Targeted to the unsealed areas.
			No (Future)	Negligible	If present, contaminated soils are likely to be remediated and removed.
	The aquatic ecosystems at Alexandra Canal, Cooks River and Botany Bay	Migration of impacted groundwater and surface water run-off	Yes (Current)	Low	When factors such as dilution, advection and diffusion are taken into account the contaminants in groundwater are likely to be at low concentrations when discharging into the nearest waterbodies.

Potential Sources	Potential Receptor	Potential Exposure Pathways	Complete Linkages	Risk	Justification
			Yes (Future)	Negligible to Low	If present, contaminated groundwater is likely to be remediated and any remaining residual contamination would likely be at negligible to low concentrations.
	Underlying Aquifer	Leaching and migration of contaminants through groundwater infiltration	Targeted(Current)	Low	Groundwater infiltration would be Targeted to the unsealed areas.
			No (Future)	Negligible	If present, contaminated soils are likely to be remediated and removed
Asbestos in buildings	Site user or visitors	Inhalation of airborne fibres	Targeted(Current)	Low	If present, asbestos material is likely to be Targeted to the building fabric and would be in bonded form.
			No (Future)	Negligible	A hazardous materials survey is likely to be required prior to the demolition of the existing buildings and licensed contractors would have to remove any asbestos likely to be present.

12.4 Data Gaps

Based on the findings of the investigation and the CSM, the following data gaps were identified:

- Characterisation of soils within the sealed areas of the site beneath the existing building footprint,
- Bringing the sampling density to the minimum requirement of the NSW EPA "Sampling Design Guidelines"; and
- Determine the extent of contamination in the groundwater (non landfill leachate) beneath the site;

13 WASTE CLASSIFICATION

A summary of the soil results are included in Appendix F. The Waste Classification guidelines have been applied to these results. A number of the analytes have exceeded the criteria for General Solid Waste; however *no leachate testing* has been undertaken at this stage. Leachate testing is most likely going to downgrade the Waste Classification to General Solid Waste. It should also be noted that asbestos fines and asbestos fragments have been detected at two locations and therefore Special Waste (GSW) classifications would also apply to those locations.

14 CONCLUSIONS AND RECOMMENDATIONS

The results of the TESA indicated that, within the investigated areas, the site is suitable for its current commercial land use and any potential redevelopment into residential land use with minimal access to soils. The site can therefore be made suitable for a mixed use residential development subject to the remediation of the following areas using both Aargus and previous reports:

- Copper exceeded HIL 'F' in BH3;
- Asbestos was detected in BH4 & SS1;
- Benzo(a)pyrene, Total PAH & TPH C_{10}-C_{36} exceeded HIL 'F' & EPA Service Station guidelines in BH5; and for the Douglas Report
- Lead and TPH C_{10}-C_{36} exceeded HIL 'F' in B3;
- TPH C_{10}-C_{36} & PAH exceeded HIL'F' & EPA Service Station guidelines in B10.

The 4 hotspots plus 2 areas where asbestos was found can be easily remediated via landfill disposal or a capping strategy.

The following data gaps were identified and require addressing to consider the suitability of the site for future development:

- Characterisation of soils within the sealed areas of the site beneath the existing building footprint,
- Bringing the sampling density to the minimum requirement of the NSW EPA "Sampling Design Guidelines"; and
- Characterise further groundwater (non-landfill leachate) beneath the site;

This can be achieved by undertaking a Detailed Site Investigation as part of any future Development Applications.

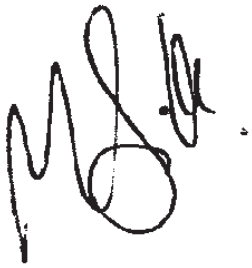
Any soils requiring removal from the site, as part of future site works, should be classified in accordance with the "*Waste Classification Guidelines, Part 1: Classifying Waste*" NSW DECC (2009).

If during any potential site works, significant odours and / or evidence of gross contamination not previously detected are encountered, or any other significant unexpected occurrence, site works should cease in that area, at least temporarily, and the environmental consultant should be notified immediately to set up a response to this unexpected occurrence.

Thank you for the opportunity to undertake this work. We would be pleased to provide further information on any aspects of this report.

For and on behalf of
Aargus Pty Ltd

Written by:



Michael Silk
Environmental Scientist

Reviewed By:

Nick Kariotoglou
Managing Director

15 LIMITATIONS

The Aargus assessment is based on the result of Targetedsite investigations and sample testing. Neither Aargus, nor any other reputable consultant, can provide unqualified warranties nor does Aargus assume any liability for site conditions not observed or accessible during the time of the investigations.

Despite all reasonable care and diligence, the materials encountered and concentrations of contaminants measured may not be representative of conditions between the locations sampled and investigated. There is always some disparity in subsurface conditions across a site that cannot be fully defined by investigation. Hence it is unlikely that measurements and values obtained from sampling and testing during environmental works carried out at a site will characterise the extremes of conditions that exist within the site. In addition, site characteristics may change at any time in response to variations in natural conditions, chemical reactions, truck movement or contractor movement of soils and other events, e.g. groundwater movement and or spillages of contaminating substances. These changes may occur subsequent to Aargus investigations and assessment.

This report and associated documentation and the information herein have been prepared solely for the use of the client and interested parties at the time or writing the report and is valid (for the purposes of management or transport of material) for a period of one month only from the date of issue. Any other reliance assumed by third parties on this report shall be at such parties' own risk. Any ensuing liability resulting from use of the report by third parties cannot be transferred to Aargus.

Whilst this report provides a review of site conditions encountered at sampling locations within the investigation, it should be noted that if materials are proposed to moved from site - Part 5.6, Section 143 of the Protection of the Environment Operations (POEO) Act 1997 states that is an offence for waste to be transported to a place that cannot lawfully be used as a facility to accept that waste. It is the duty of the owner and transporter of the waste to ensure that all material removed from a site must be accompanied by an appropriate waste classification report and materials are disposed of appropriately. An environmental or

validation report does not constitute a waste classification report and results are treated differently. Aargus accepts no liability for the unlawful disposal of waste materials from any site. Aargus does not accept any responsibility for the material tracking, loading, management, transport or disposal of waste from the site. If material is to be removed from a site, before disposal of any material to a licensed landfill is undertaken, the site owner must ensure an appropriate waste classification exists for all materials on the site planning to be removed, the waste producer will need to obtain prior consent from the licensed landfill/recycler. The receiving site should check to ensure that the material received matches the description provided in the report.

Opinions are judgements, which are based on our understanding and interpretation of current regulatory standards, and should not be construed as legal opinions.

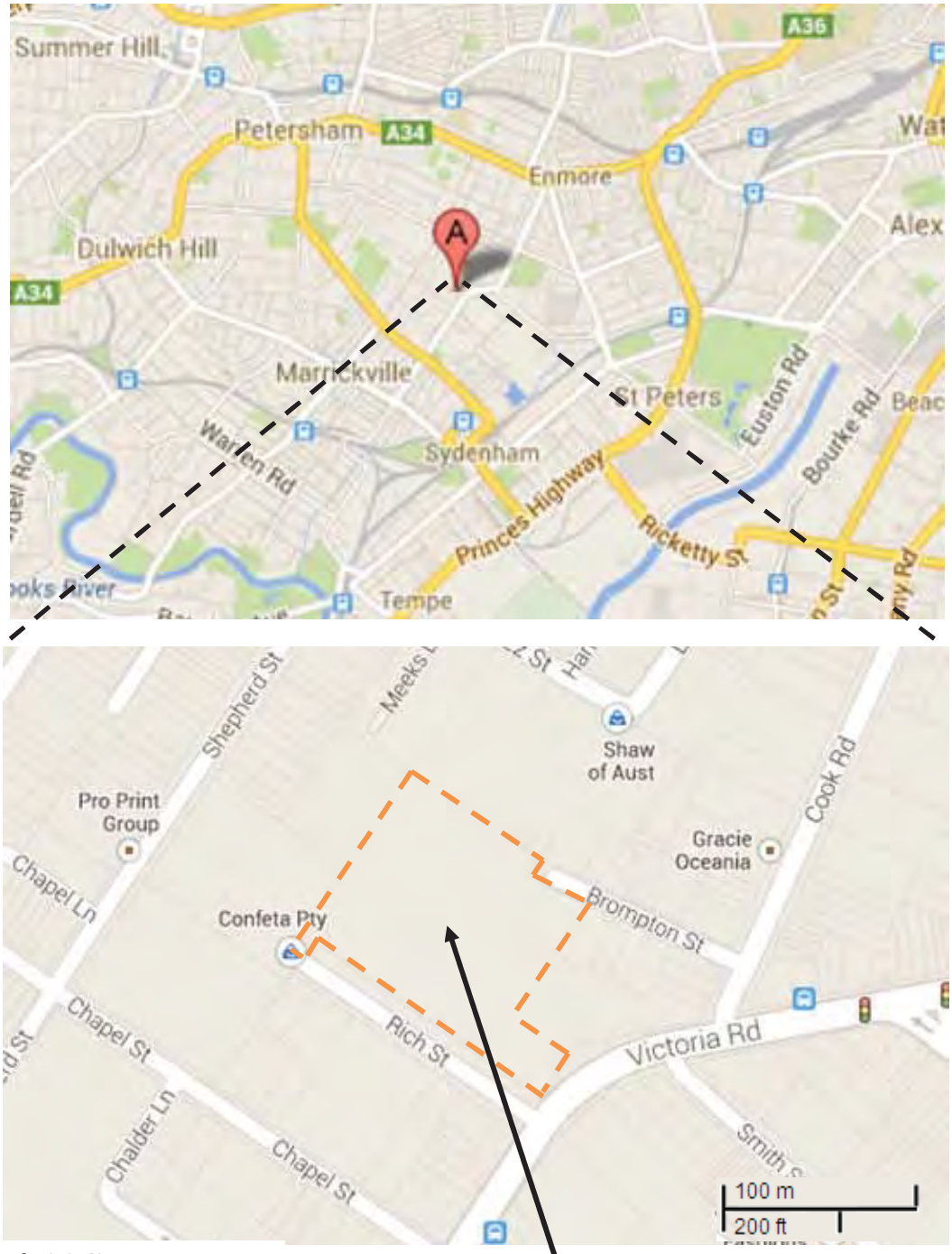
Appendix H – Important information about your environmental site report should also be read in conjunction with this report.

APPENDIX A

SITE PLANS

Aargus

LOCALITY MAP



Reference: Google (2013)

Site Location

ABN 75 050 212 710 Aargus Pty Limited Environment – Chemicals – Business Development

Drawn	NZ	**Targeted Environmental Site Assessment E & D Danias Pty Ltd Malco Site - Rich Street, Marrickville NSW**	Aargus	Figure 1
Approved	MK			
Date	30/07/13			Job No: ES5544
Scale	N/A			

SITE LOT & DP PLAN

N

Legend

Site boundary

ABN 46 063 579 313 Aargus Pty Limited Environment – Remediation – Geotechnical Engineering

Source: Google 2013

Drawn	MS
Approved	MK
Date	18.7.13
Approx Scale	N/A

Targeted Environmental Site Assessment
E & D Danias Pty Ltd
Malco Site
Rich Street, Marrickville NSW

Aargus

Fig 2

ES5544

SITE FEATURES

N

Legend:

Site Boundary

1 Site Features

Source: Google 2013

No.	Site Features	No.	Site Features
1	Cracks on concrete slab	14	Commercial / Office / Warehouse
2	Pallets	15	Road Runner Coaches
3	High voltage wire	16	Storage area
4	Metal	17	Grass area
5	Above ground oil tank	18	Brick building occupied by Greek sculptures
6	Buses/ caravan/ trucks	19	Previous factory that was burnt down
7	Water/oil /petrol tank on soil	20	Pre cast panel building
8	Rubbish storage	21	Brick factory for hardwood design
9	Car	22	Car park
10	Container	23	Generator with leaking diesel on the surface
11	Empty oil drum	24	Two storey brick office complex (locked)
12	Plant area	25	Canal
13	Paint workshop (spraying)	26	Former UST area

Drawn	NZ
Approved	MK
Date	29/07/2013
Approx. Scale	As Shown

Targeted Environmental Site Investigation
E & D Daias Pty Ltd
Malco Site
Rich Street, Marrickville NSW

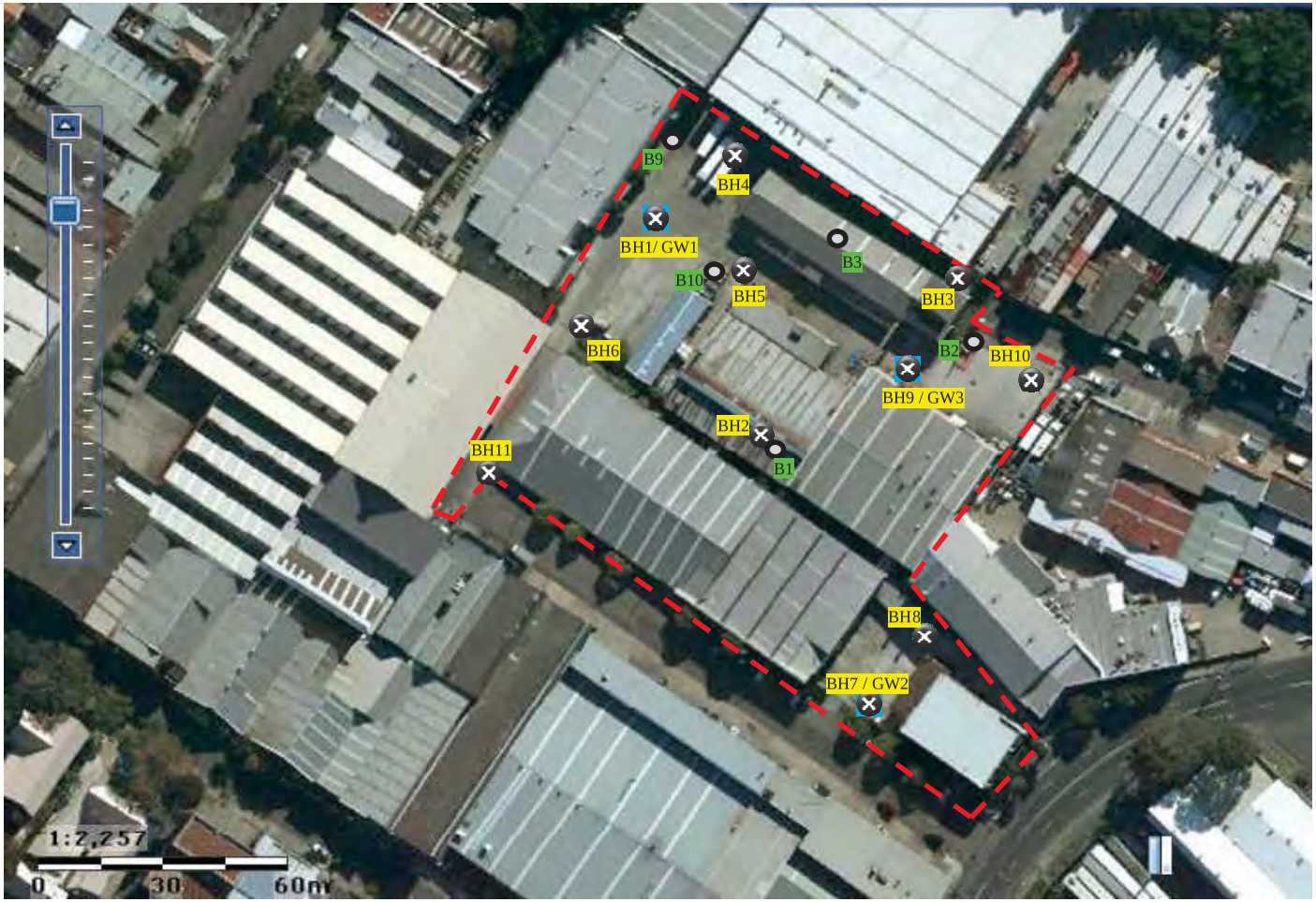
Aargus

Fig 3

ES5544

SITE PLAN

N



Legend

- Site Boundary
- Aargus 2013 Soil Borehole Locations
- Aargus 2013 GW Well Locations
- Douglas Partners 1996 Borehole locations

ABN 46 063 579 313 Aargus Pty Limited Environment – Remediation – Geotechnical Engineering

Source: Six Maps 2013

Drawn	MS
Approved	MK
Date	18.7.13
Approx Scale	1:2,257

Targeted Environmental Site Assessment
E & D Danias Pty Ltd
Malco Site
Rich Street, Marrickville NSW

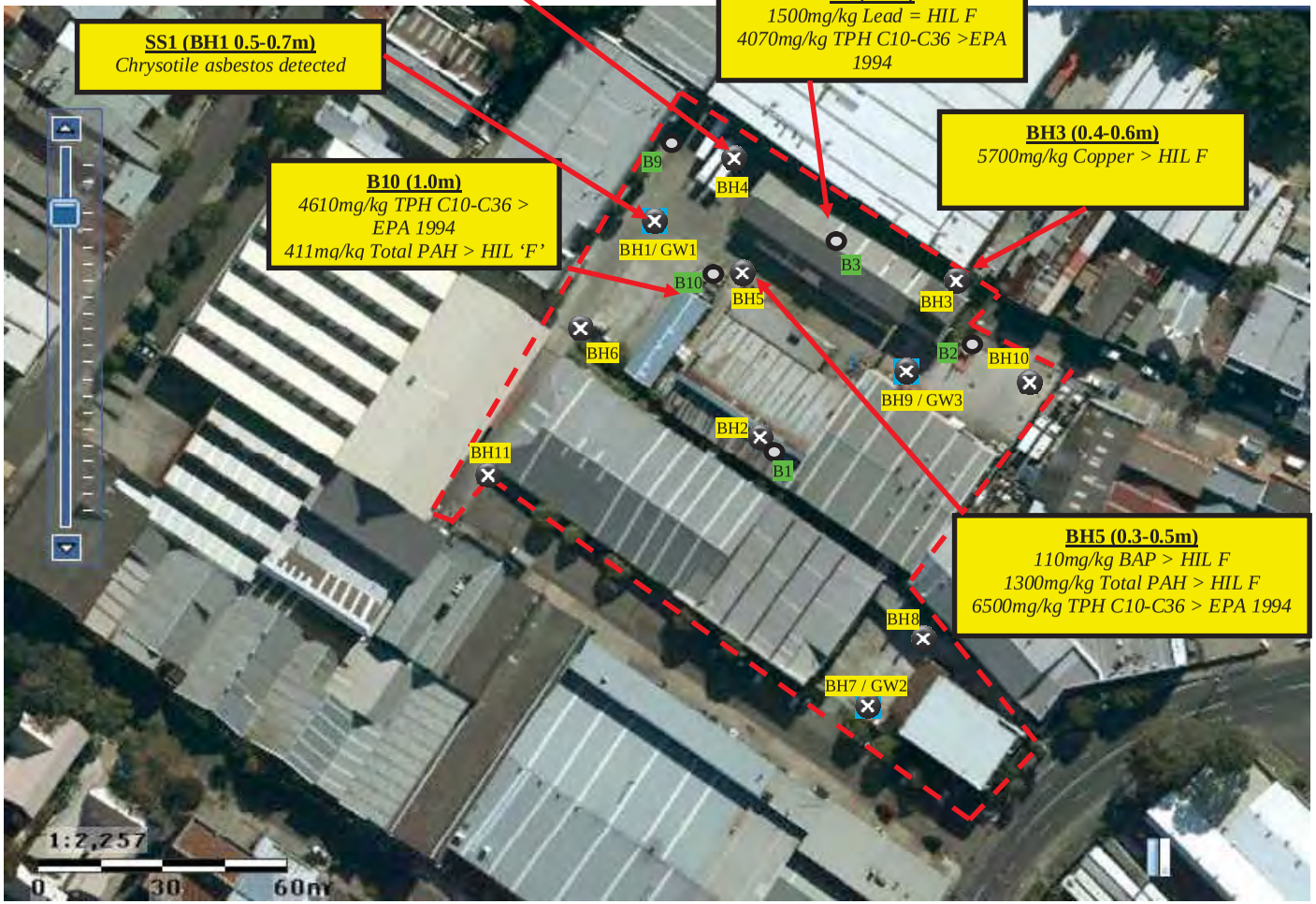
Aargus

Fig 4

ES5544

SOIL EXCEEDANCES PLAN

N



Legend

- Site Boundary
- Aargus 2013 Soil Borehole Locations
- Aargus 2013 GW Well Locations
- Douglas Partners 1996 Borehole locations

ABN 46 063 579 313 Aargus Pty Limited Environment – Remediation – Geotechnical Engineering

Source: Six Maps 2013

Drawn	MS
Approved	MK
Date	18.7.13
Approx Scale	1:2,257

Targeted Environmental Site Assessment
E & D Danias Pty Ltd
Malco Site
Rich Street, Marrickville NSW

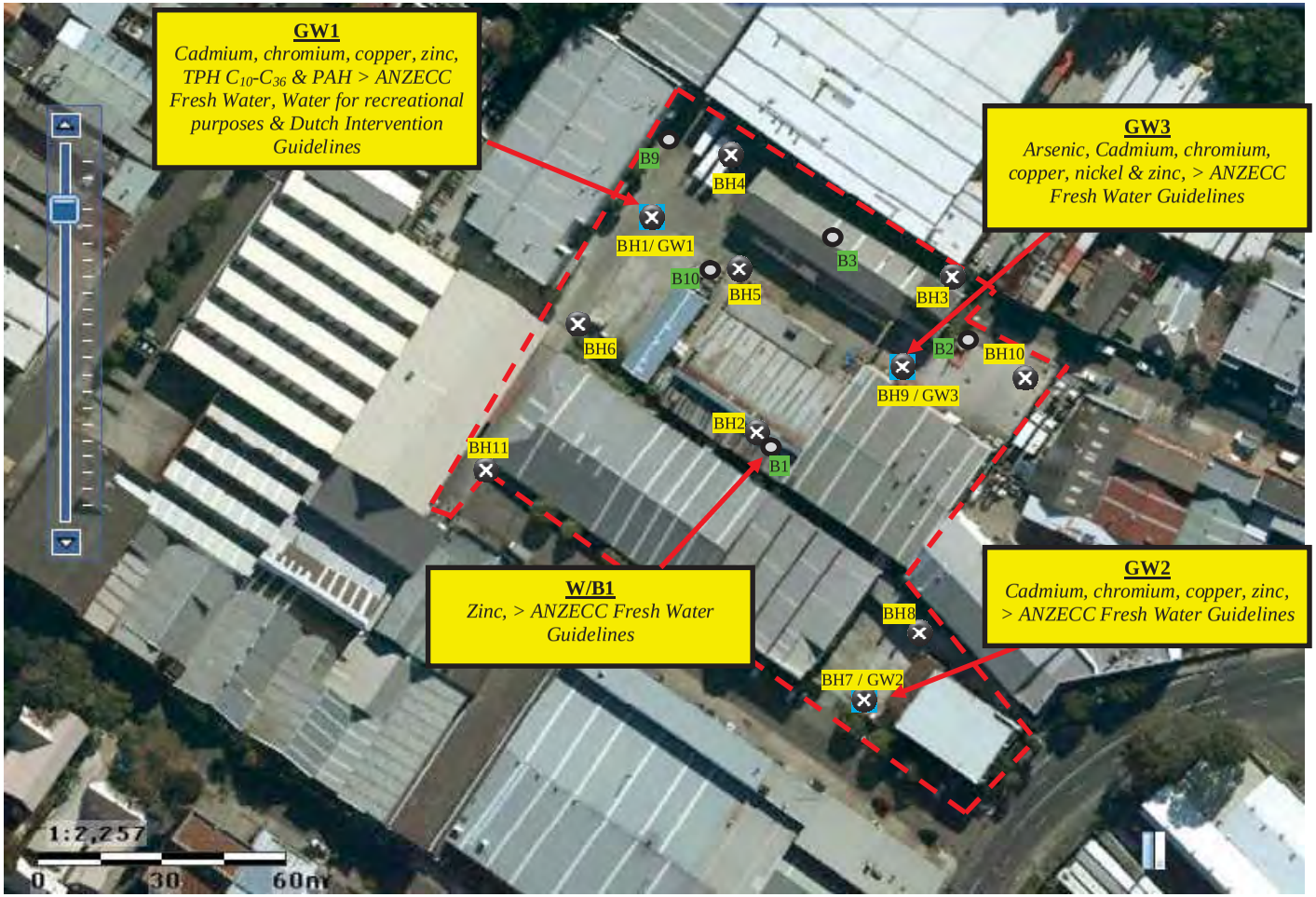
Aargus

Fig 5

ES5544

GROUNDWATER EXCEEDANCES PLAN

N



Legend

- Site Boundary
- Aargus 2013 Soil Borehole Locations
- Aargus 2013 GW Well Locations
- Douglas Partners 1996 Borehole locations

ABN 46 063 579 313 Aargus Pty Limited Environment – Remediation – Geotechnical Engineering

Source: Six Maps 2013

Drawn	MS
Approved	MK
Date	18.7.13
Approx Scale	1:2,257

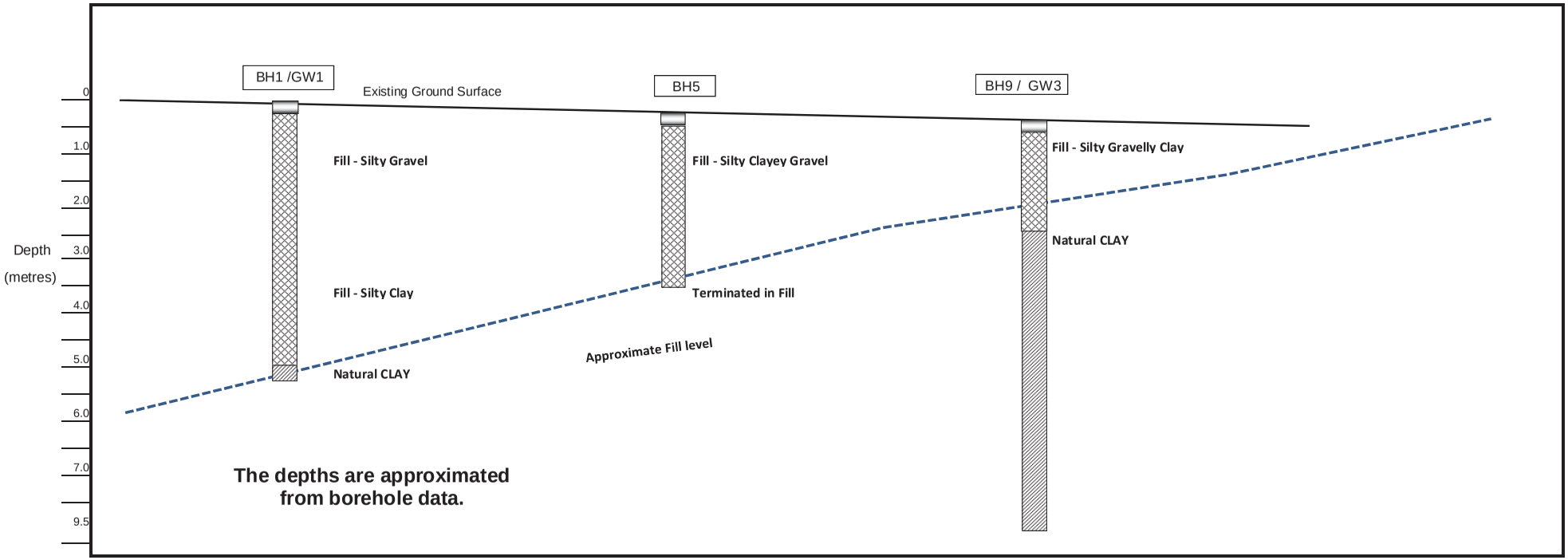
Targeted Environmental Site Assessment
E & D Danias Pty Ltd
Malco Site
Rich Street, Marrickville NSW

Aargus

Fig 6

ES5544

Environmental Cross Section One



Approximate Distance (metres)

Legend

Clay	Sandy Gravel	Sandstone	Silty Clay
Fill	Shale	Shaley Clay	Asphalt
		Clayey Sand	Concrete

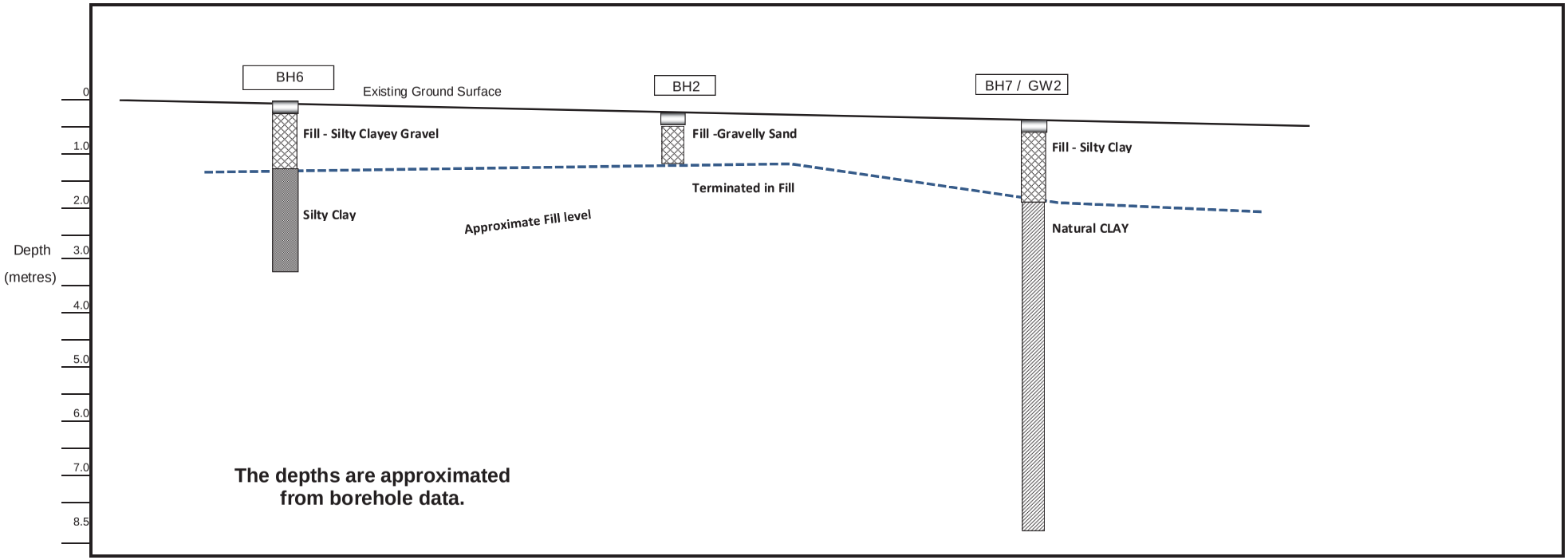
Drawn	MS
Approved	NK
Date	26.08.2013
Scale	NTS

E & D Danias Pty Ltd
Targeted Environmental Site Assessment
Rich Street, Marrickville NSW

Figure
7.0

Job No. ES 5544

Environmental Cross Section Two



Approximate Distance (metres)

Legend

	Clay		Sandy Gravel		Sandstone		Silty Clay
	Fill		Shale		Shaley Clay		Asphalt
					Clayey Sand		Concrete

Drawn	MS
Approved	NK
Date	26.08.2013
Scale	NTS

E & D Danias Pty Ltd
Targeted Environmental Site Assessment
Rich Street, Marrickville NSW

Figure
8.0

Job No. ES 5544

GRAPHIC SYMBOLS FOR SOIL AND ROCK

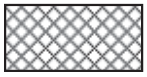
Aargus

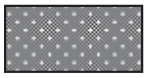
Soil

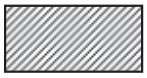

Bituminous Concrete


Concrete

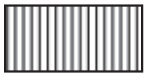

Topsoil


Fill


Peat

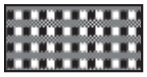

Clay

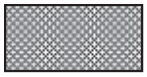

Silty Clay

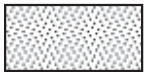

Silt


Sandy Clay

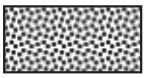

Gravelly Clay

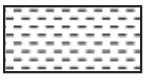

Shaley Clay


Clayey Silt

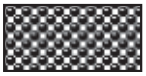

Sandy Silt

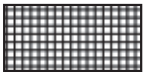

Basalt


Sand

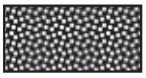

Clayey Sand

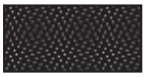

Silty Sand


Gravel


Sandy Gravel

Sedimentary Rock


Sandstone Coarse Grained

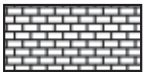

Sandstone Fine Grained


Siltstone


Laminite


Shale


Coal


Limestone

APPENDIX B

SITE PHOTOGRAPHS

SITE PHOTOGRAPHS

Client	E & D DANIAS Pty Ltd
Project	TESA
Location	Rich Street, Marrickville NSW
Job No.	ES5544
Checked By	MK

Aargus

Photograph Nº 1

View of the generators leaking diesel onto the sealed surface
Looking northwest

Photograph Nº 2

View of the car park area & BH7/GW2
Looking south

Photograph Nº 3

View of the canal located onsite

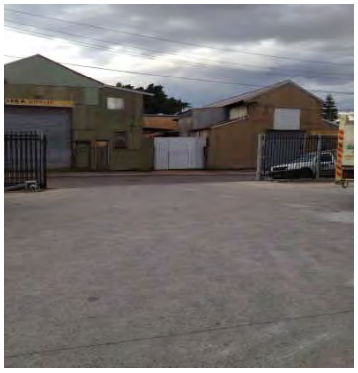
Photograph Nº 4

View of the car park area, canal, BH8 & the office building
Looking east

Photograph Nº 5

View of the car park area & BH9/GW3
Looking south west

Photograph Nº 6



View of the car park area, BH10 & Brompton Street Entrance
Looking north east

SITE PHOTOGRAPHS

Client	E & D DANIAS Pty Ltd
Project	TESA
Location	Rich Street, Marrickville NSW
Job No.	ES5544
Checked By	MK

Aargus

Photograph Nº 7

View of metal storage & unsealed area
Looking north

Photograph Nº 8

View of the bunded plant area
Looking south east

Photograph Nº 9

View of the above ground oil tank

Photograph Nº 10

View of the approximate UST area
Looking south west

Photograph Nº 11

View of the burnt down building footprint
Looking north

Photograph Nº 12

View of the unsealed area
Looking east

APPENDIX C

NSW EPA RECORDS

NSW EPA

Healthy Environment, Healthy Community, Healthy Business

Search results

Your search for:LGA: Marrickville Council

Matched 13 notices relating to 5 sites.

Search Again

Refine Search

Suburb	Address	Site Name	Notices related to this site
Camperdown	Ross Street, Salisbury Lane and Cardigan Lane	O'Dea Reserve (Former Landfill)	1 former
Marrickville	22-28 Carrington Road	TRW Marrickville	1 current and 1 former
St Peters	15 Campbell Road	Former Drum Reconditioning Facility	2 current
Tempe	Off Swamp Road	Alexandra Canal	2 current
Tempe	Swamp Road and other lots	Tempe Tip	5 current and 1 former

Page 1 of 1

20 August 2013

APPENDIX D

AARGUS FIELDWORK PROTOCOLS

Aargus

Environmental - Remediation - Engineering - Laboratories - Drilling

Sampling Quality & Fieldwork Assurance Protocols

January 2013

HEAD OFFICE: PO Box 398 Drummoyne NSW 1470
Aargus Pty Ltd ACN 050 212 710 • Aargus Holdings Pty Ltd ACN 063 579 313
Aargus Australia Pty Ltd ACN 086 993 937 • Aargus Recruitment Pty Ltd ACN 098 905 894
Telephone: 1300 137 038 • Facsimile: 1300 136 038 • Email: admin@aargus.net • Website: www.aargus.net

TABLE OF CONTENTS

LIST OF TABLES

ATTACHMENTS

Groundwater Well & Wellhead Construction Details

Asbestos Risk Assessment

1 OBJECTIVE AND SCOPE

The objective of Aargus Pty Ltd (Aargus) Protocols is to ensure that the methodology followed during fieldworks is adequate to provide data which is usable and representative of the conditions actually encountered at the site.

The scope of these protocols is to:

- Outline the methods and procedures for the field investigations during an engineering, laboratory or environmental assessment or remediation and validation program; and
- Specify methods and procedures which ensure that soil and groundwater samples recovered are representative of the actual subsurface or surface conditions at the site, as well as ensuring that the risk of introducing external contamination to samples and to the environment is minimised.

These protocols must be adhered to by Aargus personnel and by sub-contractors involved in field investigations under Aargus Management. Any deviations from these protocols should be explained within the Aargus Report to which they are attached.

2 SOIL SAMPLING

2.1 Collection methods

Possible collection methods

Soil samples are generally collected by drilling or excavating the subsurface, using one of the following drilling / excavating technique:

- Rotary air hammer
- Hand auger, trowel or manual handling (shovel)
- Solid or hollow auger
- Backhoe or Excavator

Rotary Air Hammer

The air hammer technique requires the use of synthetic blend lubricants to prevent potential contamination of the borehole if a leak were to occur. In addition, micro-filters are installed into the drilling airline to avoid contamination by hydrocarbons present in the compressed air.

Samples of rock are generally not collected. Where rock samples are needed, specialised techniques are used.

Hand auger, trowel or manual

A hand auger or trowel is generally used to investigate subsurface conditions of unconsolidated materials at shallow depths or in areas difficult to access with other equipment. Samples are recovered from the hand auger, taking care to avoid cross contamination, especially between samples from the same hole but at different depths. Sampling equipment is to be thoroughly cleaned between sampling events, in accordance with the procedures outlined in Section 2.5 Equipment decontamination. In the case of laboratory sampling, a pick and shovel can be used to gather adequate sample size as cross contamination is not considered an issue.

Solid or Hollow auger

Solid and hollow auger drilling techniques are well suited to unconsolidated materials. The main advantage of the hollow auger technique is that the drill rods allow access of sampling equipment at specified depths within the annulus of the drill rods.

Samples of soil are recovered using a split spoon sampler at specific depth intervals. The split spoon sampler is driven into the soil by the drill rig whilst attached to the end of the drill rods. The retrieved sample is then split lengthways into two halves when duplicate samples are required. A few centimetres of soil from the top of the split spoon sampler is discarded. Samples for volatile analysis are collected first, without mixing.

Test pits and trenches excavated with a backhoe or an excavator

Test Pit and Trenches excavated with a backhoe/excavator are used to collect relatively shallow (i.e. less than 3.5m depth) soil samples on occasions where:

- Access multiple sample locations at a site are needed;
- A description of the subsurface soil profile to approximately 3.5 m depth is required (generally in unsaturated conditions);
- The investigated site is free from known underground services and access problems;
- The investigated site is free from impenetrable surface or near surface layers including concrete and asphalt pavements; and
- Undisturbed soil samples are required, usually at multiple depths.

Backfilling

On completion of drilling / test pitting, the investigated locations are backfilled with cuttings and compacted. Excess drill cuttings are disposed of appropriately. If the sampling location is located in an area used for the circulation of people or vehicles, the top of the sampling location should be sealed with mortar.

2.2 Soil logging

The lithological logging of soil samples and subsurface conditions is undertaken by Aargus personnel. The soil characteristics are logged in accordance with the Australian Standard *AS1726-1993 Geotechnical Site Investigations.* This includes description of grain size, visible staining, odour and colour, and of the clues which may suggest that the soil may be contaminated. Descriptions of soils are made using the Northcote method.

2.3 Collecting soil samples

The soil sample is collected using a stainless steel trowel, split tube sampler, or directly with the hand if the sampler wears disposable gloves. Soils are quickly transferred into 250g clean amber glass jars, which have been acid washed and solvent rinsed. The jars are sealed with a screw-on teflon lined plastic lid, labelled, and placed for storage in an ice filled chest. Alternatively for engineering and laboratory sampling, 20kg plastic bulk bags are used and appropriately labelled.

2.4 Labelling of soil samples

Samples are labelled with the following information:

- Job number;
- Date of sample collection;
- Name of the Aargus professional who collected the sample; and
- Sample number: the letters used to label the samples are BH, C, SS, SP, TP and V which refer respectively to borehole samples, composite samples, surface samples, stockpile samples, test pit samples and validation samples. For borehole samples, BH3.1.0 is the sample taken from borehole 3 at 1.0m below ground level. For stockpile samples, SP1/1 is the first sample from stockpile 1. TP1.2.5 is the sample taken from testpit 1 at a depth of 2.5 metres below ground level. V3/F is the validation sample taken from location V3, the letters F N, S, E and W refer to the floor, north, south, east and west walls of an excavation; if some contamination is found in the validation sample, then chasing out of the contamination is required and in this case, the label of the sample is changed by adding /1 or /2 according to the number of times the contamination has been chased out. B stands for blind and could be B1, B2 etc. dependant on how many blind samples were taken.

2.5 Equipment decontamination

The drilling and sampling equipment are cleaned using an appropriate surfactant (e.g. phosphate-free detergent or Decon 90), then rinsed with tap water prior to final rinsing with distilled water.

The following procedures shall be followed for decontamination of drilling and sampling equipment where required:

- buckets or tubs used for decontamination shall be cleaned with tap water and detergent and rinsed with tap water before sampling commences;
- fill first bucket or tub with tap water, and phosphate free detergent;
- fill second bucket or tub with tap water;
- clean equipment thoroughly in detergent water, using a stiff brush; rinse equipment in tap water;
- dry equipment with disposable towels;

- rinse equipment by thoroughly spraying with tap water, then final rinse with distilled water;
- allow equipment to dry; and
- change water and detergent solution between sampling event where required or when water is dirty.

Sampling decontaminated equipment should be kept in a clean area to prevent cross-contamination. Equipment that cannot be thoroughly decontaminated using the detergent wash and water rinse should be cleaned with steam or high pressure water or if a cleaner is not available, not used for further sampling (and labelled clearly "not decontaminated") or discarded. Equipment decontaminated using the high pressure steam cleaner will be treated as described above. Any equipment that cannot be thoroughly decontaminated shall be discarded and replaced.

A new pair of latex gloves is used to handle each sample. Contaminated materials such as disposable clothing should be disposed of in accordance with environmental best practice.

2.6 Surveying of sampling locations

Sampling locations are generally located by measured reference to existing ground and site features, e.g. fences, buildings.

If the survey for location and elevation is required, it should be done by a licensed surveyor, or alternatively by an Aargus environmental engineer / scientist using proprietary laser dumpies and theodolites required can be obtained by the use of Aargus field equipment. Aargus also has GPS equipment and level meters.

If the location is given by a licensed surveyor, it is generally given to the nearest 0.1m and referenced to the Australian Map Grid (AMG) coordinates.

3 GROUNDWATER SAMPLING

3.1 Groundwater Sampling Objectives

The primary objective of any groundwater (quality) sampling is to produce groundwater samples that are representative of groundwater in the aquifer and will remain representative until analytical determination or measurements are made.

3.2 Groundwater well construction

Typically wells are installed to gain access to the groundwater to be sampled. Well construction details will depend on hydrogeological setting of the site, for example the depth to groundwater strata present. Relevant information regarding the hydrogeological setting will have been obtained prior the development of any groundwater sampling program.

The preferred drilling methods will depend on the hydrogeological setting of the site and the objectives of the groundwater sampling program. For example, shallow wells in unconsolidated materials, such as sand, may be drilled using a hand auger. Drill rigs using solid of hollow flight augers may be used to drill deeper wells or through semi consolidated materials, such as stiff clay. Rotary air hammer drilling may be used were well is to be drilled through consolidated materials, such as rock. Soil samples may also be collected during drilling (see Section 2 SOIL SAMPLING).

Drilling methods and materials must not have an unacceptable impact on the groundwater to be sampled. For example, if groundwater from the wells is to be tested for organic analytes, petroleum based lubricants are not to be used and oil traps must be installed on compressed air lines. Drilling techniques should also minimise compaction or smearing of the boreholes wells and transport of material into different zones, in particular, when drilling through potentially contaminated material to access groundwater.

Drill cuttings accumulated over a hole are to be removed as drilling progresses so as to prevent fallback of cuttings into the hole. Samples may be collected at a range of depths in the borehole profile during drilling.

The depth of groundwater well depends of the purpose of the investigation on the soil profile and the regional geology of the area. If the borehole location is covered by concrete, coring of the superficial hard layer is undertaken first.

Petroleum based lubricants are not used on drilling and sampling equipment, instead, Teflon based greases are used where appropriate. An Aargus professional monitors and records drilling activities, procedures adopted, materials used, progress of the stages of well construction, screen location, standpipe lens, placement, of sand filters and well seals, and general completion details, as well as the lithology of the subsurface, visible staining, unusual odours and colours (if any).

The use of a rotary air hammer rig has many advantages for consolidated material (e.g. rock), including:

- Large diameter to allow precise placement of groundwater monitoring equipment;
- No injection of drilling fluids into the formation with resulting benefits in ensuring integrity of recovered samples, and therefore no need to dispose off-site drilling fluids;
- Rapid penetration in consolidated material; and
- Provision of reliable indications of saturated conditions whilst drilling.

Drill cuttings accumulated over a hole are removed as drilling progresses so as to prevent fallback of cuttings into the hole. Samples are taken at a range of depths in the borehole profile.

Construction of the monitoring well may be carried out by the Aargus professional or the drilling contractor under the direct supervision of the Aargus environmental scientist/engineer. Typically on completion of drilling, slotted heavy duty PVC pipe (generally 50mm in diameter for the installation of monitoring well) is inserted into the drilled hole. The base of the pipe is capped prior to insertion in order to prevent natural soils entering the well from below. The drilled area surrounding the pipe screen is filled with coarse-grained sand. Bentonite or cement grout seal plugs may be placed above the screen depending on the hydrogeological setting of the site and sand cement mix. Excess drill cuttings are disposed of in accordance with environmental best practice.

The Aargus professional will monitor and record drilling activities, and materials encountered during drilling (including visible staining, unusual odours and colours (if any)). They will log the procedures adopted, materials used, and well construction (i.e. location of the screen, placement of sand packs and well seals and general completion details).

3.3 Development of monitoring wells

Development is the process of removing fine sand silt and clay from the aquifer around the well screen in order to maximise the hydraulic connection between the bore and the formation.

Development involves removal of fluids that may have been introduced during drilling operations as well as fines from the sand filter and screens. Well development generally involves actively agitating the water column in the well then pumping water out until, ideally, water pumped comes out visibly clean and of

constant quality. Development can be undertaken immediately after installation of the groundwater well or after sufficient time has been allowed for bentonite / grout seals to consolidate.

Bores used for groundwater quality monitoring should be developed after drilling, then left for a period until bore chemistry can be demonstrated to have stabilised, anywhere between 24 hours and 7 days.

3.4 Purging of monitoring well

In most groundwater monitoring wells, there is a column of stagnant water above the screen that remains standing in the bore between sampling rounds. Stagnant water is generally not representative of formation water because it is in contact with bore construction materials for extended periods, is in direct contact with the atmosphere and is subject to different chemical equilibrium.

Purging is the process of removing this water from the well prior to sampling. In newly installed wells, the disturbance cause by drilling may also affect water present in the well, and purging may be carried out concurrently with well development. Ideally wells should be purged at the lowest rate practicable until stable water chemistry is achieved.

Purging is to be performed less than 24 hours before sample collection, but usually it is performed just before sampling. The default procedure for purging a groundwater monitoring well is as follows:

- If required, measure the concentration of volatile organic vapours in the well standpipe headspace.
- Measure the depth to the standing water level in the well standpipe and the total depth of the well relative to a reference mark (generally the top of the groundwater pipe). The depth of any light non-aqueous phase liquids (LNAPL) floating on the standing water should be recorded if present using an interface probe or other suitable device.
- Calculate the volume of the groundwater in the well standpipe. The internal diameter of the well casing and the diameter of the drill hole are used to calculate the volume of water to be removed during development (nominally a minimum of three well volumes, including water present in the sand pack, should be abstracted during purging).

- Samples of water are collected generally following development/purging of each well volume. The samples are measured immediately in the field for water quality parameters, pH, electrical conductivity, redox potential and temperature. Water quality measurement probes are to be calibrated against stock standards on regular basis and decontaminated between wells.

- Pump/bail groundwater from the well until the water quality parameters have stabilised (i.e. within 10% of the previous reading) or the well is pumped/bailed dry. Collect all purged water into an appropriate volume measurement vessel. Purged water is disposed of appropriately.

- Record all appropriate development details on the well development and sampling sheet.

- Decontaminate all equipment used in the purging procedure.

3.5 Groundwater sampling

For each sampling event, starting water levels, purging times and volumes, water quality parameters and sample details are recorded on well development and sampling sheets.

At each groundwater monitoring well, a polyethylene sheet or Eski lid is placed beside the well head and firmly fixed into position. Sampling equipment is placed onto the sheet to avoid cross contamination between the ground surface and the groundwater in the well.

Groundwater samples are collected in a bailer (Stainless Steel or disposable polymer) fitted with an emptying device. The bailer is decontaminated prior to use. All groundwater samples are retrieved at an appropriate rate in order for turbulence (which leads to cloudy samples) to be minimised.

When collecting a water sample the bailer is lowered gently into the well, until it is within the screened interval. The bailer is then steadily withdrawn, to minimise agitation of water in the well and disturbance of the surrounding sand filter material.

The procedure for using the bailer is:

- Slowly lower the bailer into the water and allow it to sink and fill with a minimum of disturbance;

- Empty the first bailer sample into a container in order to measure the volume of bailed water and to rinse the bailer with well water;

- Emptying the bailer through the bottom-emptying device (BED) collects the samples. The sample is discharged down the side of the sample bottle to minimise entry turbulence;
- Collect samples for volatile organics first, followed by semi-volatiles, other organics and then inorganics;
- The flow from the BED is adjusted so that a relatively low flow rate is maintained.

3.6 Low flow purging

Purging large volumes of water can be impractical, hazardous or may adversely affect the contaminant distribution in the sub-surface (e.g. through dilution). Low-flow purging involves minimal disturbance of the water column and aquifer and is preferable to the removal of a number of bore volumes. This method removes only small volumes of water, typically at rates of 0.1 to 1.0L/min, at a discrete depth within the bore.

Low-flow purging consists essentially of the following steps:

- The pump inlet is carefully and slowly placed in the middle or slightly above the middle of the screened interval at the point where the contaminant concentration is required (dedicated pumps, such as bladder pumps, are ideal for low-flow sampling). Placement of the pump inlet too close to the bottom of the bore can cause increased entrainment of solids, which have collected in the bore over time.
- Purging begins, typically at a rate of 0.1 to 1.0L/min, although higher rates may be possible provident the rate of purging does not cause significant draw down in the bore.
- During purging, groundwater stabilisation parameters should be measured and recorded to determine when they stabilise.
- When parameters have stabilised, the sample may be collected, at a rate slower or equal to purge rate.

3.7 Labelling of water samples

The water samples are identified with the same information than soil samples. GW4/2 is the sample collected from well GW4, and 2 refers to the sample number from this well, i.e. second time the well is sampled.

3.8 Sampling containers

Water samples are generally collected in bottles and containers provided by the laboratory who will analyse the samples. These are generally plastic bottles for inorganic analysis, and amber glass bottles for organic analysis. Vials are used to collect samples to be analysed for volatile organics. Sampling containers have appropriate preservatives added.

The bottles are filled to overflowing so as to remove air bubbles as much as possible prior to firmly screwing on the container cap. When performing purge and trap analyses, the vials are filled to 100% of their capacity. For headspace analyses, the vials are filled to approximately 75% of their capacity.

3.9 Well surveying

If the survey for location and elevation of a groundwater well is required, it should be done by a licensed surveyor, or alternatively by an Aargus environmental engineer / scientist if the level of precision required can be obtained by the use of Aargus field equipment.

If the location is given by a licensed surveyor, it is generally given to the nearest 0.1m and referenced to the Australian Map Grid (AMG) coordinates.

If the elevation is given by a licensed surveyor, the top of the standpipe and the ground surface adjacent to the standpipe are generally given to the nearest 0.01m and may be referenced to the Australian Height Datum (AHD). Relative levels (RLs) can be used if general contours are required.

4 SURFACE WATERS AND STORMWATER SAMPLING

4.1 Surface waters

Surface water samples are collected by hand, using automatic samplers, batch samplers or continuous samplers which can be installed to take samples at discrete time intervals or continuously. For well mixed surface water samples (up to 1m depth) a sample bottle is immersed by hand covered by a glove below the surface. Samples are also taken with sample poles that have extension arms so that more representative samples can be taken. For areas where access is difficult, samples can be collected using a retractable sample extension pole (sample bottle on the end) or in a bucket and transferred to sample bottles immediately following collection.

Other methods such as pumping systems, depth samplers, automatic samplers, and integrating systems are all relatively similar with water samples being supplied to a discharge point where samples can be collected in appropriate bottles.

4.2 Stormwater

The monitoring of stormwater quality is generally required prior to reject waters into stormwater drains. Field measurements are generally carried out using a Hanna Multiprobe prior to the discharge of the water to stormwater. The water parameters measured include pH, electrical conductivity (EC, in mS/cm) and Total Dissolved Solids (TDS).

If sampling is required, samples to be analysed for inorganic compounds are collected in plastic bottles, and samples to be analysed for organic compounds are collected in amber glass bottles. The bottles are filled to overflowing so as to remove air bubbles as much as possible prior to firmly screwing on the container cap. Sample containers may have preservatives added, in accordance with the laboratory recommendations.

Vials are used for volatile organic analysis. When performing purge and trap analysis, the vials should be filled to 100% of their capacity, whereas for headspace measurements, the vials should be filled to approximately 75% of their capacity..

4.3 Filtration devices

Water filtration devices may be required to filter surface water before it is discharged to the stormwater network, in order to remove suspended solids in water. One of the most simple and commonly used filtration device consists of between two to four retention sedimentation bays with a geotextile covering the inlet and outlet hoses.

Litter traps (wire or plastic grids or netting) may also be used to remove larger particles or debris. Other techniques to reduce the amount of suspended matter in water include wet basins, artificial wetlands, infiltration trenches and basins, sand filters and porous pavements. Some of these latter methods are also likely to reduce the bacterial levels in water.

The use of these filtration devices does not preclude carrying out monitoring of water quality following treatment and prior to discharge, particularly to the stormwater system.

5 FIELD TESTING

5.1 Field measurements

Field measurement of soils and groundwater parameters provides a rapid means of assessing certain aspects of soil and water quality. They are generally taken to:

- Ensure that formation water is being sampled
- Ensure screening of soils prepares samples for laboratory testing
- Provide on-site measurements for soil and water quality parameters that are sensitive to sampling and may change rapidly (e.g. temperature, pH, redox and dissolved oxygen (DO)).
- Compare with laboratory measurements of these parameters to assist in the interpretation of analytical results of other parameters (e.g. check for chemical changes due to holding time, preservation and transport).

Field measurements may be taken either in-situ or after groundwater has been extracted from a bore. Field measurements should be taken immediately before collecting each sample.

pH and dissolved oxygen meters need to be calibrated before every use, in accordance with the manufacturer's instructions. If field meters are to be used over several hours, periodic readings of a reference solution must be made to ensure calibration is stable.

5.2 PID Photo Ionisation Detector

Photo Ionisation Detector (PID) measurements are used to provide indicative field measurements of the amount of ionisable vapours released from a soil or water sample into the head space above the sample.

The procedure for field screening of samples using the PID is as follows:

- Prior to testing commencing, the PID is calibrated using standard laboratory calibration gas. The battery of the PID should also be sufficiently charged for the duration of the testing;

- The background concentrations of total ionisable compounds in the ambient air in the vicinity of the work area are established prior to the commencement of site activities. Background measurements are normally taken approximately 5 to 10m upwind of the work area. The readings are observed before and after each measurement of a sample to ensure that the PID is operating correctly. The maximums, fluctuations and other relevant comments are recorded.

- A glass sample jar is filled with the soil sample to be tested. The jar should not be filled more than 3/4 full;

- The jar is sealed with aluminium foil or plastic wrap and the lid is screwed;

- At least 20 minutes after placing the sample into the sampling jar, check that the PID reading is constant and similar to the background. Insert the top of the PID through the foil or plastic wrap in order to measure the ionisable vapour concentrations in the airspace above the sample;

- Monitor and record the PID readings noting fluctuations and maximum readings;

- Monitor the readings after returning the PID to a location with background concentrations. Interchangeable, clean, in-line filters for the PID probe are available to allow rapid decontamination of the unit in the field if background readings measured by the instrument are significantly greater than the background air concentration initially established;

- If perforations are present in the aluminium foil prior to analysis reseal the jar and test after having waited again for at least 20minutes.

An alternative acceptable method is to place the soil to be tested in a disposable zip loc plastic bag and test the sample by punching a hole in the bag with the PID tube to sample the gas from the bag.

6 ACID SULFATE SOILS

6.1 Desktop Classification

An initial review of Acid Sulphate Soils (ASS) Planning Maps is undertaken to identify the likelihood and risk of ASS being present at the site. The following geomorphic conditions of the site are also checked as an indication of the presence of

ASS: sediments of recent geological age (Holocene) ~ 6000 to 10 000 years old; soil horizons less than 5m AHD (Australian Height Datum); marine or estuarine sediments and tidal lakes; coastal wetlands or back swamp areas; waterlogged or scalded areas; inter-dune swales or coastal sand dunes; areas where the dominant vegetation is mangroves, reeds, rushes and other swamp tolerant and marine vegetation; areas identified in geological descriptions or in maps bearing sulfide minerals, coal deposits or former marine shales/sediments; and deeper older estuarine sediments >10m below the ground surface.

6.2 Site Walkover

The presence on site of hydrogen sulphide odours, acid scalds, flocculated iron, monosulfidic sludges, salt crusts, stressed vegetation, corrosion of concrete and/or steel structures and water logged soils are noted as cues for the presence of ASS.

6.3 Visual Classification

Visual indicators taken into account for the presence of ASS are the presence of jarosite (pale yellow colour) horizons or mottling, unripe muds (waterlogged, soft, blue grey or dark greenish grey in colour), silty sands and sands (mid to dark grey in colour) and the presence of shells.

6.4 Sample Collection

Samples are collected to at least one metre below the depth of the proposed excavation or estimated drop in the water table, or two metres below ground level, whichever is deepest. Samples are collected from every soil horizon or every 0.25m. Large shells, stones and fragments of wood, charcoal and other matter are noted, but removed from the sample. Small roots are not removed from the sample. If laboratory analysis is required, samples are sent for laboratory testing within 24 hours of sampling.

6.5 Field Testing

The field pH peroxide test (pH_{FOX}) is used to obtain an indication of the presence of oxidisable sulphur in the soil. The procedure for this test is as follows:

- A small sample of soil (<100g) is collected in a glass jar and split into two sub-samples. One sub-sample is made into a 1:5 (soil : deionised water) solution in order to measure field soil pH and electrical conductivity (EC) analysis. If the resulting pH is less than 4 (pH_F<4), the sample is identified as actual acid sulphate soil (AASS)

- The second sub-sample is made into a 1:5 (soil : Hydrogen Peroxide) solution to measure pH of oxidised soil. Sodium Hydroxide (NaOH)-adjusted analytical (30%) grade Hydrogen Peroxide (H_2O_2) is used as the soil oxidising agent. A mobile electronic pH/EC probe is used to measure soil pH.

- The presence of oxidisable sulphides, organic matter or manganese in the sample, will trigger a chemical reaction. The type of effervescence and any colour change is noted with the final pH measured to give an indication of the potential change in pH should the soil remain exposed to oxygen. If the resulting pH is less than 3 ($pH_{FOX}<3$) or if pH_{FOX} is at least one unit less than the $pH_{F,}$ this suggests that the soil tested is potential acid sulfate soil (PASS).

6.6 Laboratory Testing

When the field test suggests that the material tested contains ASS or PASS, this should be confirmed by laboratory analysis (POCAS/SPOCAS or TOS testing).

7 NOISE MONITORING

Measurements are taken at a range of times during the day in order to assess the trends in noise emission over time. Noise is measured using a hand-held Rion NA-29 Sound Level Meter with digital microphone. Some noise meters change and appropriate equipment which is calibrated is used for all monitoring. The reference level of the meter is checked before and after the measurements using a Rion NC-73 Sound Level Calibrator to ensure there is no significant drift. Noise measurements are made over a 15-minute interval using the “fast” response of the sound level meter. 5dB would be added if the noise is substantially tonal or impulsive in character. Measurements should be adapted to the type of noise being measured i.e. construction, occupation, club, etc.

8 DUST MONITORING

Sampling is conducted at locations of potential concern. The deposit gauge static sampler contains a glass funnel measuring approximately 150mm with the angle of the cones sides being 60 degrees, placed into a rubber stoppers in the mouth of a five-litre glass receptacle. The deposit gauge is placed in a stand so that the height of the funnel of the deposit gauge is between 1.8 and 2.2m above ground level. A

quantity of 7.8g copper sulfate pentahydrate dissolved in water is placed in the glass receptacle in order to prevent algal growth.

Exposure periods vary depending on the purpose of the investigation but typically the period is 30 ±2 days. Samples are usually analysed for measured soils: total solids, insoluble solids, ash and combustible solids.

Dust can also be measured using a High Volume Air Sampler. Such sampler should be located at least 2 metre away from any structures so that an undisturbed sample can be collected. HVASs can be used indoors or outdoors.

9 ASBESTOS INSPECTION, FIELDWORK AND SAMPLING

9.1 Assessment of soils that may contain asbestos contamination

Soils that are assessed as part of an environmental site assessment may be in-situ fill soils or stockpiled soils. The site/area-specific assessment for asbestos should be made in accordance with standard site investigation procedures with care taken during the site inspection stage. Details regarding assessment for asbestos are found within the WA Department of Health guidance (DoH 2009a) guidelines and draft NEPM 2011 guidelines. The assessment process may move from a preliminary site investigation to a more comprehensive detailed site investigation where required and indicators for asbestos are present. For most cases, a detailed environmental site assessment may not be needed if no soil contamination is found other than asbestos as a management approach will be preferred and qualitative assessment of the lateral extent of soil contamination will be sufficient. The severity of Asbestos risk can be calculated using the Aargus Asbestos Risk Assessment Hazard Level sheet found in the attachments of this document.

Assessment would normally require a sampling and analysis plan (SAP) to support the investigations and also any validation sampling that occurs. A site asbestos management plan (AMP) may be required to protect the public and workers during the assessment phase, as well as long term users of the site.

Initial inspections during site and soil assessments should be grid-based as far as practical in the first instance to detect any visible asbestos. The identified areas should then be surveyed in more detail along with suspect locations indicated as a result of the desktop study. enHealth 2005 *(Appendix V: Sample inspection and investigation form)* provides an asbestos visual inspection checklist. Relevant

guidelines recommend that such an approach be used to assist the systematic collection of relevant data.

Site inspection methods should be adopted to prevent further degradation or distribution of asbestos. This may include: restricted on-site use of vehicles and equipment; minimal disturbance of stockpiled or discarded materials; and the use of equipment and footwear scrub-down areas.

The most likely presence of asbestos, if present, will be visible on the surface and in significant quantities. The main exception is free fibre which will be hard to identify unless in bulk. An experienced inspector (Aargus OH&S scientist or experienced senior) is likely to identify asbestos as such, but confirmation of representative samples by analysis is appropriate if there is any uncertainty.

If the surface is heavily vegetated, then confidence in the visual inspection will be lessened. Some careful vegetation clearance may help to clarify the situation.

The inspection should also include any asbestos-containing structures, especially if in poor repair, footprints of demolished structures, and debris that has been dumped on the site, particularly demolition waste

The condition, quantities and location of the asbestos should be evaluated in general terms to inform initial remediation and management decisions. The following basic approach is generally appropriate:

- Where there is good historic information on the sources of the asbestos contamination, the estimated surface area of contamination can be considered equivalent to the visually delineated area of impact, and up to 1 m in all directions to account for uncertainty;
- The depth of contamination may be inferred from the desktop investigation, or later informed by targeted sampling. In either case, an additional 30 cm should be incorporated to account for uncertainty;
- The condition of ACM (Asbestos Cement Material) should be considered equivalent to the most degraded samples found in an area, noting that this may vary across different areas;
- Where significant amounts of free asbestos fibres may have been exposed over time, the immediate surrounding area should also be considered contaminated.

9.2 Preliminary Site Investigation

Sampling during the PSI is not normally recommended, since either a management strategy may be adequately defined based on other PSI investigation findings or because it is evident that a detailed site investigation (DSI) will be necessary anyway. Limited PSI sampling may be appropriate for the following reasons:

- To form part of the initial site or soil assessment;
- To confirm that asbestos is present/absent, including as free fibre;
- To roughly delineate the contamination's lateral and vertical extent;
- To inform the Sampling and Analysis Plan for the Detailed Site Investigation;
- To obtain a preliminary idea of appropriate management options;
- For air sampling, to ascertain what additional site-control measures are warranted or if immediate response actions are required.

PSI sampling would most likely be surface hand-picking or targeted sampling (also in accordance with general site/area soil assessment requirements as part of standard site assessments). Any sampling should be based on a Sampling and Analysis Program.

Fragments if found must be inspected by an appropriately qualified and experienced asbestos consultant (Aargus OH&S scientist or experienced senior). The default assumption should be that any suspect material does contain asbestos and appropriate management action should be initiated. Where confirmation is required regarding the nature of the fibre in the ACM, identification by transmission electron microscopy is the favoured method to determine if the suspect material in the cement matrix is asbestos.

9.3 Detailed Site Assessment

A DSI is an investigation which confirms and delineates potential or actual contamination through a comprehensive sampling program. These form part of the standard Aargus sampling protocols for site and soil assessments and elements specific to asbestos are provided below as additional items to review when taking asbestos into consideration.

A DSI is not usually required if the contamination is demonstrated to be ACM in limited quantities sitting on the soil surface (simple surface impact). Hand-picking as

outlined below may be sufficient to manage this type of contamination. The AMP can be used instead for management purposes just for asbestos, although this will depend on site-specific circumstances, especially the remediation approach proposed. A DSI should only be undertaken when delineation of asbestos impacts must be accurate, such as if:

- The remediation or management approach requires asbestos to be removed or relocated from an area;
- Asbestos contamination is due to friable or free-fibre generating material;
- Land uses are to be determined and delineated according to the extent and nature of asbestos contamination.

A DSI may also help resolve uncertain findings from the PSI, or to help assess the likely effectiveness of alternative remediation and management strategies.

Care is necessary during the DSI to ensure that sampling and monitoring results are not compromised due to poor site management practices, specifically:

- Sampling should follow removal of any asbestos material that may be actively generating asbestos free fibres, such as exposed ACM products in poor condition;
- Investigations should follow any planned demolition of asbestos-containing structures or buildings, or removal of asbestos from within them, unless the demolition is closely monitored and the associated removal site is professionally validated;
- All equipment operation, vehicle movements and dust during the sampling and monitoring regime need to be carefully managed.

Qualitative assessment may be sufficient to determine that the distribution of ACM is limited and that no further action, or limited action such as removal of minor surface material, is all that is required. Where there is a concern (and a need to determine) that the level of ACM may exceed the screening criterion, quantitative assessment using a graivimetric approach may be undertaken to assess the site-specific risk. This more detailed assessment may also be carried out when ongoing management of the site under regulatory controls is a potential requirement. This approach should be checked first as in general a zero tolerance of asbestos is the preferred regulatory approach at the moment.

Detailed site assessment should be undertaken for sensitive land uses where asbestos contamination (using a gravimetric approach) is likely to approach or exceed screening criteria. This may involve a quantitative, thorough; and well-argued risk assessment involving a detailed test pit and trenching program based on site history where it is available, and appraisal of the relevant site-specific risk issues.

9.4 Sampling of Asbestos

Surface distribution - ACM fragments are often present as surface deposits on sites from past poor demolition and building practices. While isolated fragments across the surface of a site are usually of low concern, any surface material may present a risk of exposure over time from decay through corrosive weathering or abrasion by vehicle traffic and other activities. There should be no visible ACM fragments greater than 7mm x 7mm on the surface or in the top 10cm of soil, which can be achieved by multi-directional raking or tilling and hand picking (as described below). When cohesive soils or a large surface area is involved it may be more practical to skim the top 10cm of soil for disposal in accordance with regulatory requirements. The exposed surface of the site can then be further visually assessed by an appropriately qualified and experienced professional on a systematic basis where some localised hand picking or additional earthworks may be required.

ACM through a soil profile, test pits or boreholes may reveal the presence of ACM in fill through a soil profile. This can be quantified on a gravimetric basis and compared to the screening criteria in Schedule B1 of the NEPM.

Judgmental sampling targets particular areas of a site based on known or likely contamination, which is the preferred approach. It depends heavily on a thorough PSI and should reflect the state of the site at that time. Judgmental sampling can help avoid unnecessary broad area sampling. Judgmental sampling may need to be augmented or substituted by grid sampling.

Grid sampling is most appropriate when asbestos contamination is widespread or may be present at unknown locations. If the contamination is buried then test pits in particular and/or boreholes are used for either the judgmental or grid-based regimes.

The following situations are especially relevant to judgmental sampling:

- If contamination ‘hot spots’ are identified by the PSI, a sampling strategy is required to confirm their extent, which if indicated to be sub-surface should include test pits and stratified sampling methods;
- The SAP provides for opportunistic (discretionary) sampling to be conducted as necessary, for example, when unexpected suspect asbestos products or unusual soil strata are encountered;
- Areas that will remain covered by hardstand do not require sampling. However, if asbestos is likely, its presence will be assumed unless sampling indicates otherwise. If sampling cannot readily meet the recommended density because of hardstands, targeted sampling in key locations is suitable to allow limited characterisation of sub-surface contamination;
- If structures containing asbestos have been removed, the former ‘footprint’

should be investigated, unless the removal was properly managed and documented. In addition to a visual inspection, sub-surface sampling should only be necessary if the structure was partially buried, for instance, asbestos fencing, or subsequent soil disturbance has occurred. Sampling below 30 cm depth is not generally warranted. Sampling should extend laterally up to 50 cm outside the footprint perimeter, and include soak-wells. A sampling interval of 5-10 m along and within the footprint perimeter is recommended, aligned with any adjacent grid sampling pattern;

- Disused sub-surface asbestos structures and products, such as former service trenches or piping, may be localised areas of potential contamination. If not properly documented, these should be delineated by sampling, although validation sampling would suffice if structure removal is undertaken.

Hand-picking (Emu bob) primarily refers to the visual inspection of the soil surface and manual collection of ACM, as outlined below.

Process

- Can use a rake to sample down to a depth of 10cm;
- Most suitable for ACM, and possibly for low levels of FA (Friable Asbestos);
- Relevant where contamination is known or considered only to be on or near the soil surface and may be attributed to a defined event;
- Limited application for deeper contamination or if there is surface vegetation or debris. Raking may be difficult except in sand or loose fill;
- Used to characterise the extent and level of contamination, whilst concurrently reducing its impact.

Method

- Locations and weights of asbestos material should be recorded;
- Rake teeth should be <7mm spaced apart and >10 cm long;
- At least 2 passes of picking (and of raking if appropriate) made with 90^{o} direction change between each and using a grid pattern;
- Material should not be further damaged or buried by the process;
- % contamination may be calculated, using 1 cm as soil depth for handpicking or using the rake teeth length as appropriate;

- Final visual inspection of the area should not detect surface ACM.

Tilling refers to a process of mechanically turning over surface soils to facilitate the presentation and collection of asbestos fragments. The process and its implementation are outlined below.

Process

- Most suitable for ACM, not for fibre-generating materials;
- Generally conducted across the entire zone of suspected impact;
- Relevant for contamination within top 30cm of soil;
- Limited application for deeper contamination or if there is surface vegetation or debris;
- Used to characterise the extent and level of contamination, whilst concurrently reducing ACM impact.

Method

- Usually preceded by hand-picking;
- Locations and weights of asbestos material should be recorded;
- Soils should be pre-wet to the tilling depth, and the dust controlled;
- Rotor blades should present ACM optimally for 1 or 2 spotters closely following depending on speed, till breadth and contamination level;
- At least 2 passes with 90^{o} direction change using a grid pattern;
- Material should not be further damaged or buried from the process;
- Evaluated areas normally cannot be considered representative of other locations;
- Percentage contamination may be calculated using an estimate of the average impact depth as well as the area involved;
- Final visual inspection of the area should not detect surface ACM.

Screening is applied to both the small-scale separation of ACM fragments from localised soil samples and the large-scale treatment of an area to detect and quantify asbestos contamination, with concomitant remediation. This Section deals with large-scale mechanical screening. The process and its implementation are outlined below.

Process

- Most suitable for minor ACM impact, not for fibre-generating materials;
- Other sampling methods are preferable because of potential dust/fibre generation;
- Generally conducted across the entire zone of suspected impact;
- Relevant for larger volumes of reasonably accessible and delineated contamination;
- Used to effectively characterise the extent and level of contamination, whilst concurrently reducing ACM impact.

Method

- May be preceded by hand-picking if appropriate;
- Oversized ACM may be removed by 'screening down' from larger mesh sizes to the final screening mesh;
- Final mesh size of <7mm is recommended. Anything larger will require validation sampling;
- ACM weights/concentrations should be closely correlated to locations or stockpiles to allow re-sampling or segregation if required;
- Impacted soil should not be mixed with other soil in a way that might compromise the concentration calculations;
- Soils should be pre-wet and procedure subject to strong dust/fibre control and monitoring measures as outlined in a Dust Management Plan;
- Evaluated areas normally cannot be considered representative of other locations;
- Percentage contamination may be calculated using the weight of ACM found

for a particular strata, area or volume;

- Final visual inspection of the stockpile surface should not detect ACM.

Test Pits and Trenching is used if asbestos extends below surface soils (>30cm), especially if contamination distribution is uncertain. Aargus recommends use of test pits instead of boreholes (where machines are available) because buried ACM and FA can be more readily identified, differing strata distinguished and there is more sampling flexibility. Specified large sample sizes should be used for both methods with reliance put on visual methods of asbestos detection and concentration calculation wherever possible. The process and its implementation are outlined below.

Process

- Suitable for all asbestos types, but especially ACM, and FA if fibre disturbance is manageable;
- Relevant if contamination is buried and of unknown location and depth.

Method

- Sampling should be conducted to 30cm below the likely lower limit of potential contamination unless this is greater than 3m;
- Suspect asbestos material or construction debris should be targeted and all sample locations noted;
- Precautions are necessary to protect workers and public from wall collapse or hole hazards, and potential fibre release from excavation/sampling.

ACM & FA

- At least one 10L sample from each relevant stratum (or per 1m depth) of one wall, and discretionary samples from other suspect spots;
- Sample screened manually on-site through a <7mm sieve or spread out for inspection on a contrasting colour material (recommended for FA);
- Identified ACM and FA weighed to calculate asbestos soil concentration for individual samples.

AF (Asbestos Fines)

- At least one wetted 500ml sample from each relevant stratum or 1m depth (if thick) of one wall, and discretionary samples from other suspect spots;
- May be done with ACM/FA sampling, or at another wall position; Whole sample submitted for laboratory analysis.

Boreholes are used generally during the site sampling process but where suspect asbestos is present and if equipment is available, TPs are recommended. Borehole sampling may be appropriate where physical obstructions may limit soil access or generation of asbestos contaminated dust is a potential problem. The sample taking and assessment is similar to that for TPs. The process and its implementation are outlined below.

Process

- Suitable for all asbestos types;
- Relevant if contamination is buried and of unknown location and depth

Method

- Sampling should be conducted to 30cm below the likely lower limit of potential contamination unless this is greater than 3m;
- Suspect asbestos material or construction debris should be targeted and all sample locations/ depths noted.

ACM & FA

- Corer diameter should be at least 15cm;
- At least one 10L sample if practical from each relevant stratum (or per 1m depth) of core. Cross-strata samples are permissible provided that asbestos detections are further investigated;
- Sample screened manually on-site through a <7mm sieve or spread out for inspection on a contrasting colour material (recommended for FA);
- Identified ACM and FA weighed to calculate asbestos soil concentration for individual samples.

AF

- At least one wetted 500ml sample from each relevant stratum (or per 1m depth);
- May be done with ACM/FA sampling;
- Whole sample submitted for laboratory analysis.

Soil stockpiles intended for use on-site and of unknown quality should be assessed for asbestos contamination. Aargus intends to adopt a conservative approach to stockpile assessment and use because of associated uncertainties and risks.

If the stockpiles originated on the site from areas not likely to be contaminated, for instance, no indication of building activity or waste, the assessment can consist of a close visual examination and hand-picking over the whole stockpile surface. If any asbestos is found or the soil came from asbestos suspect areas on site, then the stockpiles should normally be considered contaminated. These stockpiles and any imported soil, aggregate or crushed material of unknown quality should not be used as "clean" fill without further investigation and management if necessary.

The sampling regime outlined below can be used to assess better the level and nature of contamination. This is designed to be consistent with the sampling density included in standard site and soil assessments for an area likely to be contaminated.

Process

- Suitable for all asbestos types;
- Confidence in results is not as high as with other sampling procedures.

Method

- Sampling should be spread over the whole stockpile surface at a minimum rate of 14 locations per 1,000 m^3;
- If soil is subject to a conveyor process (not recommended for FA or AF) then a minimum of 1 sample should be taken per 70m^3 of material;
- Suspect asbestos material or construction debris should be targeted and all sample locations noted.

ACM and FA

- At least one 10L sample from each location;
- Sample screened manually on-site through a <7mm sieve or spread out inspection on a contrasting colour fabric (recommended for FA);
- Identified ACM and FA weighed to calculate asbestos soil concentration for individual samples.

AF

- At least one wetted 500ml sample from each location;
- May be done with ACM/FA sampling, or at another spot;
- Whole sample submitted for laboratory analysis.

For ACM, if the contamination is below the investigation criteria then the stockpile may be used on the site as non-contaminated fill, subject to suitable controls. Controls should include closely monitoring the installation process for asbestos and visual inspection and hand-pick sampling of the new soil surface and also the stockpile footprint. It may also be appropriate to undertake test pit sampling of the installed material. Depending on the results, it may be necessary to remediate the installed soil and stockpile footprint.

If any free fibre or FA is found in the stockpile, it would not normally be useable as "clean" fill and would be regarded as contaminated unless extensive sampling demonstrates otherwise.

Air quality monitoring (AQM) for asbestos fibre, dust and other contaminant emissions should be considered during the DSI, remediation and site development processes. Asbestos fibre and dust (as a surrogate for asbestos fibre) are of particular interest.

10 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

10.1 Introduction

Inaccuracies in sampling and analytical programs can result from many causes, including collection of unrepresentative samples, unanticipated interferences

between elements during laboratory analyses, equipment malfunctions and operator error. Inappropriate sampling, preservation, handling, storage and analytical techniques can also reduce the precision and accuracy of results.

The Australian Standard AS4482.1-2005 *Guide to the Sampling and Investigation of Potentially Contaminated Soil, Part 1: Non-Volatile and Semi-Volatile Compounds* has documented procedures for quality assurance (QA) and quality control (QC) for sampling and analysis to ensure that the required degree of accuracy and precision is obtained. The Australian Standard also recommends the use of two laboratories for the implementation of a QA program for the analyses in addition to the QC procedures followed by the primary laboratory.

10.2 Field QAQC samples

General

Procedures for duplicate sampling should be identical to those used for routine sampling and duplicate samples will be despatched for analysis for the same parameters using the same methods as the routine samples. No homogenisation of samples which may induce the loss of volatile compounds (such as BTEX) should occur. Whenever possible, the selection of samples for duplicate analyses should be biased towards samples believed to contain the contaminant of concern.

Intra-laboratory duplicates

Intra-laboratory duplicate samples, also referred to as Blind duplicates, are used to assess the variation in analyte concentration between samples collected from the same sampling point and / or also the repeatability of the laboratory analyses. Samples are split in the field to form a primary sample and a QC duplicate (intra-laboratory replicate) sample. The intra-laboratory duplicates are taken from a larger than normal quantity of soil collected from the same sampling point, removed from the ground in a single action, and divided into two vessels. These samples are submitted to the laboratory as two individual samples without any indication to the laboratory that they have been duplicated.

Intra-laboratory duplicate samples should be collected at a rate of approximately 1 in 20 soil samples and analysed for the full suite of analytes. At least one intra-laboratory duplicate sample should be included in each batch of samples.

Inter-laboratory duplicates

Inter-laboratory duplicate samples, also referred to as Split duplicates, provide a check on the analytical proficiency of the laboratories. The samples are taken from a larger than normal quantity of soil collected from the same sampling point, removed from the ground in a single action, and divided into two vessels. One sample from each set is submitted to a different laboratory for analysis. The same analytes should be determined by both laboratories using the same analytical methods.

Inter-laboratory duplicates should be collected at a rate of approximately 1 in 20 soil samples and analysed for the full suite of analytes. At least one inter-laboratory duplicate sample should be included in each batch of samples.

Blanks

Rinsate Blanks

Rinsate blank samples provide information on the potential for cross-contamination of substances from the sampling equipment used. Rinsate blanks are collected where cross-contamination of samples is likely to impact on the validity of the sampling and assessment process (e.g. when the investigation level of a contaminant is close to the detection limit for this contaminant). They are prepared in the field using empty bottles and the distilled water used during the final rinse of sampling equipment. After completion of the decontamination process, fresh distilled water is poured over the sampling equipment and collected. The distilled water is exposed to the air for approximately the same time the sample would be exposed. The collected water is then transferred to an appropriate sample bottle and the proper preservative added, if required.

One rinsate blank par day and / or one per piece of sampling equipment are collected during the decontamination process, and analysed for the analytes of interest. At least one rinsate blank should be included in each batch of samples. One rinsate blank should be collected for every 50 samples collected and analysed for the full suite of analytes.

Trip Blanks / Spikes

Trip blanks / spikes are a check on the sample contamination originating or lost from sample transport, handling, and shipping. These are samples of soil or water prepared by the laboratory with a zero or known concentration of analytes.

Field Blanks

Field blanks are a check on sample contamination originating from sample transport, handling, shipping, site conditions or sample containers. These are similar to trip blanks except the water is transferred to sample containers on site.

10.3 Laboratory quality assurance / quality control

The laboratories undertake the analyses utilising their own internal procedures and their test methods (for which they are NATA, or equivalent, accredited) and in accordance with their own quality assurance system which forms part of their accreditation.

Laboratory duplicate samples

Laboratory duplicate samples measure precision. These samples are taken from one sample submitted for analytical testing in a batch. The rate of duplicate analysis will be according to the requirements of the laboratory's accreditation but should be at least one per batch. Precision is reported as standard deviation SD or Relative Percent Difference %RPD, being:

$$\%RPD = \frac{(D1 - D2)}{(D1 + D2)} \times 200$$

where: D1: sample concentration and D2: duplicate sample concentration

Replicate data for precision is expected to be less than 30% RPD at concentration levels greater than ten times the EQL, or less than 50% RPD at concentration levels less than ten times the EQL. Sample results with a RPD exceeding 100% require specific discussion. Note that certain methods may allow for threshold limits outside of these limits.

Matrix Spiked Samples

Matrix spiked samples are used to monitor the performance of the analytical methods used, and to assess whether the sample matrix has an effect of on the extraction and analytical techniques. A sample is spiked by adding an aliquot of known concentration of the target analyte(s) to the sample matrix prior to sample extraction and analysis. These samples should be analysed at a rate of approximately 5% of all analyses, or at least one per batch. Matrix spikes are reported as a percent recovery %R, being:

$$\%R = \frac{(SSR-SR)}{SA} \times 100$$

where: SSR: spiked sample result, SR: sample result (blank) and SA: spike added

Recovery data for accuracy is described by control limits specified by the laboratory (generally ranging between 70% and 130%) and referenced to US EPA SW-846 method guidelines values.

Laboratory Blank

Laboratory blanks are used to correct for possible contamination resulting from the preparation or processing of the samples. These are usually an organic or aqueous solution that is as free as possible of analyte and contains all the reagents in the same volume as used in the processing of the samples. Laboratory blanks must be carried through the complete sample preparation procedure and contain the same reagent concentrations in the final solution as in the sample solution used for analysis. Laboratory blanks should be analysed at a rate of once per process batch, and typically at a rate of 5% of all analyses.

Laboratory Control Samples

Laboratory Control Samples, also referred to as Quality Control Check Samples, are used to assess the repeatability and long term accuracy of the laboratory analysis. These are externally prepared and supplied reference material containing representative analytes under investigation. Recovery check portions should be fortified at concentrations that are easily quantified but within the range of concentrations expected for real samples. Laboratory Control samples should be analysed at a rate of one per process batch, and typically at a rate of 5% of analyses. Laboratory control samples are reported as a percent recovery %R, being:

$$\%R = \frac{(SSR-SR)}{SA} \times 100$$

where: SSR: spiked sample result, SR: sample result (blank) and SA: spike added

Recovery data for accuracy is described by control limits specified by the laboratory and referenced to US EPA SW-846 method guidelines values. Ideally, all calculated recovery values should be within the acceptable limits. However, in the event that control limit outliers are reported, professional judgement is used to assess the extent to which such results may affect the overall usability of data.

Surrogates

Surrogates are used to provide a means of checking, for every analysis, that no gross errors have occurred at any stage of the procedure leading to significant analyte losses. Surrogate are quality control monitoring spikes, which are added to all fields and QAQC samples at the beginning of the sample extraction process in the laboratory. Surrogates are closely related to the sample analytes being measured (particularly with regard to extraction, recovery through clean-up procedures and response to chromatography) and are not normally found in the natural environment.

Surrogate spikes will not interfere with quantification of any analytes of interest and may be separately and independently quantified by virtue of, for example, chromatographic separation or production of different mass ions in a GC/MS system. Surrogates are measured as Percent Recovery %R expressed as:

$$\%R = \frac{(SSR)}{SA} \times 100$$

where: SSR: spiked sample result and SA: spike added

Recovery data for accuracy is described by control limits specified by the laboratory and referenced to US EPA SW-846 method guidelines values.

11 DATA QUALITY OBJECTIVES

11.1 General

Data Quality Objectives (DQOs) are defined to ensure that the data is sufficiently accurate and precise to be used for the purpose of the project works. DQOs are defined for a number of areas including:

- sampling methods;
- decontamination procedures;
- sample storage (including nature of the containers) and preservation;
- laboratory analysis, including PQL, recoveries (surrogates, spikes), duplicates;
- preparation of CoC forms;

- document and data completeness; and
- data comparability.

The NSW DEC Contaminated Sites Guidelines for the NSW Site Auditor Scheme (2nd Ed) 2006 also provide a seven step process for Data Quality Objectives (DQOs). These are as follows:

- State the problem
- Identify the decisions
- Identify inputs to the decision
- Define the study boundaries
- Develop a decision rule
- Specify limits on decision errors
- Optimise the design for obtaining data

DQOs must be adopted for all assessments and remediation programmes. The DQO process must be commenced before any investigative works begin on a project.

11.2 Field DQOs

The DQOs for sampling methods, decontamination procedures, sample storage (including nature of the containers) and preservation, preparation of CoC forms, and document and data completeness are the Aargus protocols which have been described in the previous sections of this document.

11.3 Assessment of RPD values for field duplicate samples

The criteria used to assess RPD values for field duplicate samples is based on discussion reported in AS4482.1 1997, a summary of which is presented below:

Table 1: RPD acceptance criteria

Sample type	Typical acceptable RPD
Intra-laboratory duplicate (blind duplicate)	30-50°% (*)
Inter-laboratory duplicate (split duplicate)	30-50% (*)

It is noted that other factors such as sampling technique, sample variability, absolute concentration relative to criteria and laboratory performance should also be considered when evaluating RPD values.

The Australian Standard also states that the variation can be expected to be higher for organic analytes than for inorganics, and for low concentrations of analytes (lower than five times the detection limit). Based on Aargus Pty Ltd experience, RPD up to 70% are considered to be acceptable for organic species. RPD of 100% or more are generally considered to demonstrate poor correlation and should be discussed.

11.4 Laboratory Data Quality Objectives (DQO)

General

Aargus also provides internal laboratory testing for a range of physical parameters. Aargus is NATA certified to conduct these tests.

Labmark is the Aargus-preferred laboratory for the chemical analysis of primary samples. Labmark is accredited by the National Association of Testing Authorities (NATA).

The laboratory generally used by Aargus for analysing inter-duplicate samples is Labmark.

Analytical methods including detection limits are provided on each laboratory report and are checked as part of the data review process.

Laboratory QA/QC

Specific to Labmark, standard QA/QC data includes LCS, MB, CRM (CRM metals only), Laboratory Duplicate (1 in first 5-10 samples, then every tenth sample) and Spike sample (1 in first 5-20 samples, then every 20th sample), and surrogate recovery's (target organics). All QA/QC is reviewed by a senior chemist prior to customer release and includes a DQO comment on final report. Additional QA/QC maybe performed on batches less than 10 samples; however additional charges shall apply at the appropriate analytical rate/sample.

Laboratory analyses DQOs

The following table summarises laboratory analyses DQOs.

Table 2: Laboratory Data Quality Objectives (DQOs)

Laboratory QA/QC Testing	Laboratory QA/QC Acceptance Criteria
Method Blanks	For all inorganic analytes the Method Blanks must be less than the LOR. For organics Method Blanks must contain levels less than or equal to LOR.
Surrogate Spikes	At least two of three routine level soil sample Surrogate Spike recoveries are to be within 70-130% where control charts have not been developed and within the estimated control limited for charted surrogates. Matrix effects may void this as an acceptance criteria. Any recoveries outside these limits will have comment. Water sample Surrogates Spike recoveries are to within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criteria. Any recoveries outside these limits will have comment.
Matrix Spikes	Sample Matrix Spike duplicate recovery RPD to be <30%. In the event that the matrix spike has been applied to samples whose matrix or contamination is problematic to the method then these acceptance criteria apply to the Control Matrix Spike.
Laboratory Control Samples	Control standards must be 80-120% of the accepted value. Control standard recoveries are to be within established control limits or as a default 60-140% unless compound specific limits apply.
Laboratory Duplicate Samples	For Inorganics laboratory duplicates RPD to be <15%. For Organics Laboratory duplicates must have a RPD <30%.

Laboratory QA/QC Testing	Laboratory QA/QC Acceptance Criteria
Calibration of Chromatography Equipment	The calibration check standards must be within +/-15%. The calibration check blanks must be less than the LOR.

Non-compliances

Exceedances of QAQC results outside the DQO should be thoroughly investigated and discussed with the laboratories concerned, and the outcomes of these investigations should be recorded in the project files.

12 Use and calculation of the 95% UCL for site validation purpose

For environmental services, statistical analysis is performed on data. Validation of a site at the completion of remediation works should comply with the recommendations of the applicable guidelines. For a site to be considered uncontaminated or successfully remediated, the typical minimum requirement is that the 95% upper confidence limit (UCL) of the arithmetic average concentration of the contaminant(s) is less than an acceptable limit, eg the threshold value of an health-based investigation level.

The calculation of the 95% UCL of the arithmetic average concentration method requires that the probable average concentration and standard deviation of the contaminant be known. This method is most applicable for validation sampling, where the mean concentration and the standard deviation can be estimated from sampling results. The 95% UCL is calculated as follows:

$$95\%\ UCL = mean + t_{\alpha,n-1} \frac{STDEV}{\sqrt{n}}$$

where

mean	arithmetic average of all sample measurements
$t_{\propto,n-1}$	A test statistic (Student's t at an $\propto$ level of significance and n-1 degrees of freedom)
$\propto$	The probability (in that case chosen to be 0.05) that the 'true' average concentration of the sampling area might exceed the UCL average determined by the above equation
STDEV	Standard deviation of the sample measurements
n	number of samples measurements

13 COPYRIGHT

14 ABBREVIATIONS

ANZECC Council	Australian and New Zealand Environment and Conservation
ASS	Acid Sulfate Soil
BGL	Below Ground Level
BTEX	Benzene, Toluene, Ethyl benzene and Xylene
CoC	Chain of Custody
DEC	Department of Conservation (formerly EPA)
DIPNR	Department of Infrastructure Planning and Natural Resources
DQO	Data Quality Objective
EIL	Ecological Investigation Level
EPA	Environment Protection Authority
ESA	Environmental Site Assessment
HIL	Health-Based Soil Investigation Level
LGA	Local Government Area
NEHF	National Environmental Health Forum
NEPC	National Environmental Protection Council
NEPM	National Environmental Protection Measure
NHMRC	National Health and Medical Research Council
NSL	No Set Limit
OCP/OPP	Organochlorine Pesticides /Organophosphate Pesticides
PAH	Polycyclic Aromatic Hydrocarbon
PASS	Potential Acid Sulfate Soil

PCB	Polychlorinated Biphenyl
PID	Photo Ionisation Detector
PQL	Practical Quantitation Limit
QA/QC	Quality Assurance, Quality Control
RAC	Remediation Acceptance Criteria
RAP	Remediation Action Plan
RPD	Relative Percentage Difference
SAC	Site Assessment Criteria
SVC	Site Validation Criteria
SWL	Standing Water Level
TCLP	Toxicity Characteristics Leaching Procedure
TESA	Targeted Environmental Site Assessment
TPH	Total Petroleum Hydrocarbons
UCL	Upper Confidence Limit
VHC	Volatile Halogenated Compounds
VOC	Volatile Organic Compounds

15 REFERENCES

- ANZECC (1992) – *Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites.*
- ANZECC (1996) – *Drinking Water Guidelines.*
- ANZECC (2000) – *Guidelines for Fresh and Marine Waters.*
- Land and Biodiversity committee (2003) – *Minimum Construction requirements for water bores in Australia.*

- National Environment Protection Council (NEPC) (1999) – *National Environmental Protection (Assessment of Site Contamination) Measure.*
- Netherlands Ministry of Spatial Planning, Housing and the Environment (1994 rev. 2000) – *Environmental Quality Objectives in the Netherlands.*
- New South Wales Environment Protection Authority (1994) – *Guidelines for Assessing Service Station Sites.*
- New South Wales Environment Protection Authority (1995) – *Sampling Design Guidelines.*
- New South Wales Environment Protection Authority (1997) – *Guidelines for Consultants Reporting on Contaminated Sites.*
- New South Wales Environment Protection Authority (1998) – *Guidelines for the NSW Site Auditor Scheme.*
- New South Wales Department of Environment & Conservation (2006) – *Guidelines for the NSW Site Auditor Scheme (2nd Ed).*
- New South Wales Environment Protection Authority (1999) – *Guidelines on Significant Risk of Harm from contaminated land and the duty to report.*
- New South Wales Environment Protection Authority (1999) – *Environmental Guidelines: Assessment, Classification & Management of Liquid & Non-liquid Wastes.*
- New South Wales Environment Protection Authority (2005) – *Guidelines for assessing former orchards and market gardens.*
- QLD Department of Environment (DoE) (1998) – *Draft Guidelines for the Assessment & Management of Contaminated Land in Queensland.*
- QLD EPA – Waste Management Branch, Contaminated Land Section – *Details about investigation thresholds and sampling – sent to Aargus on 14 Nov 2000.*
- Standards Australia AS1726-1993 (1993) – *Geotechnical Site Investigations.*
- Standards Australia AS4482.1-1997 (1997) – *Guide to the Sampling and Investigation of Potentially Contaminated Soil, Part 1: Non-Volatile and Semi-Volatile Compounds.*
- Standards Australia AS5667.11-1998 (1998) – *Water Quality Sampling: Guidance on the Sampling of Groundwaters.*
- Victorian EPA (2000) – *Groundwater Sampling Guidelines*

ATTACHMENTS

Figure 1 Typical Groundwater Monitoring Well Construction Details

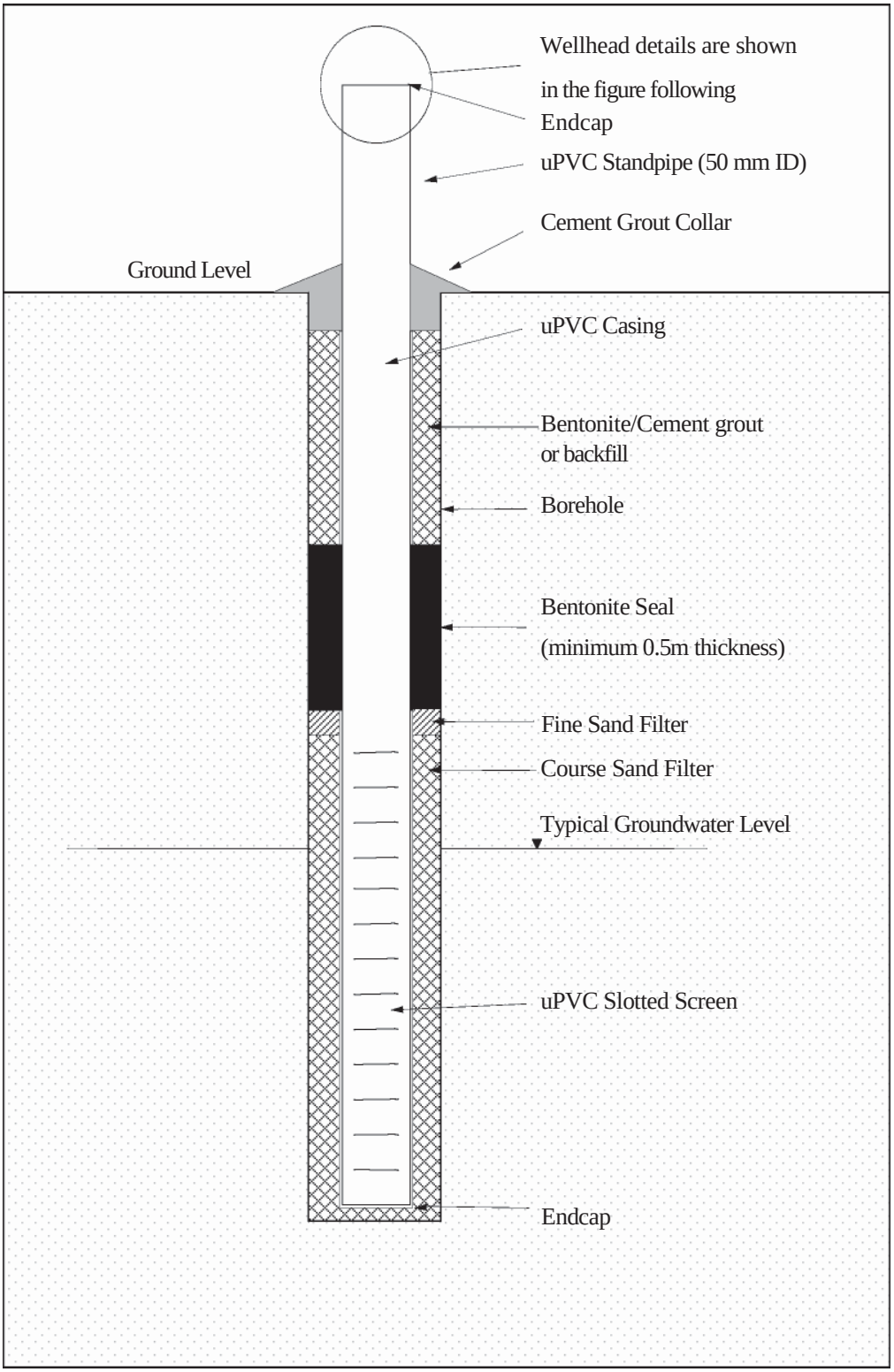
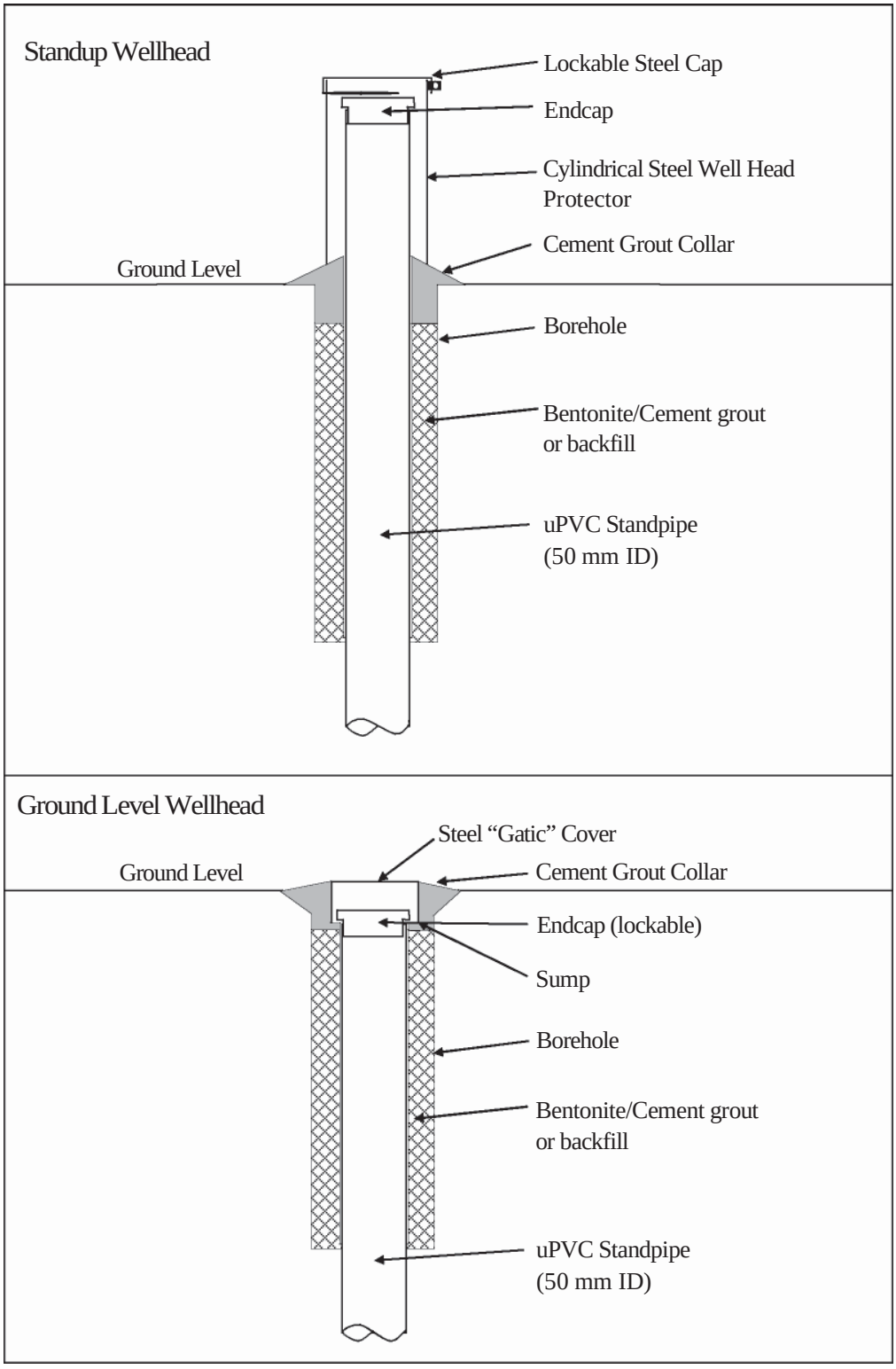


Figure 2 Groundwater Wellhead Construction Details



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ASBESTOS RISK ASSESSMENT HAZARD LEVELS

Risk Factor		Description	Rating
Status	Bonded	ACM with Asbestos contained in a stable matrix	1
	Friable	ACM which when dry may become crumbled, pulverised or reduced to powder using hand pressure	4
Condition Risk	Undamaged	No visible signs of damage or deterioration	1
	Fair	Some evidence of damage / deterioration	3
	Poor	ACM which is heavily damaged or deteriorated	5
Management Risk	Satisfactory	ACM which is effectively managed by encapsulation or enclosure	1
	Fair	ACM with limited management	2
	Unsatisfactory	ACM which is not adequately managed	3
Disturbance Potential	Unlikely	Not likely to be disturbed during normal operations	1
	Possible	ACM which may be disturbed during normal operations	3
	Likely	The material is likely to be disturbed during normal operations	5
Location Risk	Low	ACM is present in an open environment (ie. outdoors)	1
	Moderate	ACM is present within a semi-enclosed environment (ie. large factory or wet weather area)	2
	High	ACM is present within an enclosed or indoor environment	3

SEMI-QUALITATIVE RISK ASSESSMENT ALGORITHM

Status + Condition Risk + Management Risk + Disturbance Potential + Location Risk = Risk Score

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ASBESTOS RISK ASSESSMENT SCORE SHEET AND ACTION PRIORITY

Risk Score	Risk Description	Action Priority
5-10	**Low Risk** Products or materials that pose a negligible risk of exposure to Asbestos. ACM occurrences in this category are typically in good condition, are unlikely to be disturbed, and will not readily release Asbestos fibres on contact. These materials should be labelled where practicable. The material should not be unnecessarily disturbed.	**Low Priority** Monitor condition annually. Recommend that airborne fibre monitoring is conducted annually.
11-15	**Moderate Risk** Products or materials that may pose a risk of exposure to Asbestos. Bonded ACM occurrences in this category may be in poor condition, and / or be likely to be disturbed, and may readily release Asbestos fibres on contact. This category may also relate to friable ACM which is adequately managed. These materials should be labelled where practicable. The material should not be unnecessarily disturbed.	**Moderate Priority** Conduct management works within 3-6 months. Monitor condition 6-monthly. Airborne fibre monitoring at least 6-monthly.
16-20	**High Risk** Product or materials that pose an elevated risk of exposure to Asbestos. This category would usually relate to friable ACM which is not adequately managed. Management works will be required immediately. These materials and surrounding areas should be clearly signposted. The material should not be unnecessarily disturbed – an exclusion zone of approximately 5m (at least) may be required.	**High Priority** Conduct make-safe management work immediately. Monitor condition daily and/ or monthly. Regular daily and/or monthly airborne fibre monitoring considered essential.

**References: AS/NZS ISO 31000:2009 Risk Management – Principles and Guidelines (Standards Australia, 2009), HG 264 Asbestos: The Survey Guide (UK Health and Safety Executive, 2010), NSW Work Health Safety Regulations 2011, and NSW WorkCover Codes of Practice.*

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APPENDIX E

BOREHOLE LOGS

Aargus

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BOREHOLE NUMBER BH1/GW1

CLIENT E & D Danias Pty Ltd **PROJECT NAME** TESA

PROJECT NUMBER ES5544 **PROJECT LOCATION** Rich Street, Marrickville NSW

DATE STARTED 23/7/13 **COMPLETED** 23/7/13 **R.L. SURFACE** --- **DATUM** ---

DRILLING CONTRACTOR Aargus **SLOPE** 90° **BEARING** ---

EQUIPMENT Drill Rig **HOLE LOCATION** ---

HOLE SIZE 100mm **LOGGED BY** MS **CHECKED BY** MK

NOTES ---

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture	Cons./Dens.	Additional Observations
ADT							Concrete				
							Fill: Silty Gravel, medium grained, angular, brown, with bricks				
				1			Fill: Silty Sand, coarse grained, white/brown/black, traces of gravel and brick	D1/SS1			No hydrocarbon odour, No Staining, No fibro-cement material observed
				2							No hydrocarbon odour, No Staining, No fibro-cement material observed
	▼			3			Fill: Silty Clay, low plasticity, grey, traces of ironstone, shale, gravel			VS	
				4							
				5		CL	CLAY, low to medium plasticity, grey, with ironstone and shale gravel			S	
							Borehole BH1/GW1 terminated at 5.5m				
				6							
				7							
				8							
				9							
				10							

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BOREHOLE NUMBER BH10

CLIENT E & D Danias Pty Ltd **PROJECT NAME** TESA

PROJECT NUMBER ES5544 **PROJECT LOCATION** Rich Street, Marrickville NSW

DATE STARTED 23/7/13 **COMPLETED** 23/7/13 **R.L. SURFACE** **DATUM**

DRILLING CONTRACTOR Aargus **SLOPE** 90° **BEARING** ---

EQUIPMENT Hand Auger **HOLE LOCATION**

HOLE SIZE 50mm **LOGGED BY** MS **CHECKED BY** MK

NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture	Cons./Dens.	Additional Observations
DT						Concrete				
HA			0.5			Fill: Silty Clay, medium plasticity, brown/black/grey, with gravel inclusions.				
			1.0							No hydrocarbon odour, No Staining, No fibro-cement material observed
			1.5		CI	Silty CLAY, low to medium plasticity, red/grey/brown, traces of gravel.				
			2.0							No hydrocarbon odour, No Staining, No fibro-cement material observed
			2.5			Borehole BH10 terminated at 2.5m				
			3.0							
			3.5							

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BOREHOLE NUMBER BH11

CLIENT E & D Danias Pty Ltd **PROJECT NAME** TESA

PROJECT NUMBER ES5544 **PROJECT LOCATION** Rich Street, Marrickville NSW

DATE STARTED 24/7/13 **COMPLETED** 24/7/13 **R.L. SURFACE** **DATUM**

DRILLING CONTRACTOR Aargus **SLOPE** 90° **BEARING** ---

EQUIPMENT Hand Auger **HOLE LOCATION**

HOLE SIZE 50mm **LOGGED BY** MS **CHECKED BY** MK

NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture	Cons./Dens.	Additional Observations
HA			0.5			Fill: Gravel, medium grained, angular, with some ash / bitumn				No hydrocarbon odour, No Staining, No fibro-cement material observed
						Fill: Sandy Gravel, medium grained, angular, trace of ash/bitumen				No hydrocarbon odour, No Staining, No fibro-cement material observed
			1.0			Borehole BH11 terminated at 0.8m				
			1.5							
			2.0							
			2.5							
			3.0							
			3.5							

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BOREHOLE NUMBER BH2

CLIENT E & D Danias Pty Ltd **PROJECT NAME** TESA

PROJECT NUMBER ES5544 **PROJECT LOCATION** Rich Street, Marrickville NSW

DATE STARTED 23/7/13 **COMPLETED** 23/7/13 **R.L. SURFACE** **DATUM**

DRILLING CONTRACTOR Aargus **SLOPE** 90° **BEARING** ---

EQUIPMENT Hand Auger **HOLE LOCATION**

HOLE SIZE 50mm **LOGGED BY** MS **CHECKED BY** MK

NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture	Cons./Dens.	Additional Observations
HA			0.0			Fill: Gravely Sand, medium to coarse grained, brown to dark brown.		M		
			0.5			Fill: Gravely Sand, medium to coarse grained, dark grey to dark brown, with some brick.		M		No hydrocarbon odour, No Staining, No fibro-cement material observed
			1.0			Fill: Gravely Sand, medium to coarse grained, brown to dark grey, with some brick.		M		No hydrocarbon odour, No Staining, No fibro-cement material observed
			1.2			Borehole BH2 terminated at 1.2m				
			1.5							
			2.0							
			2.5							
			3.0							
			3.5							

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BOREHOLE NUMBER BH3

CLIENT E & D Danias Pty Ltd **PROJECT NAME** TESA

PROJECT NUMBER ES5544 **PROJECT LOCATION** Rich Street, Marrickville NSW

DATE STARTED 23/7/13 **COMPLETED** 23/7/13 **R.L. SURFACE** **DATUM**

DRILLING CONTRACTOR Aargus **SLOPE** 90° **BEARING** ---

EQUIPMENT Hand Auger **HOLE LOCATION**

HOLE SIZE 50mm **LOGGED BY** MS **CHECKED BY** MK

NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture	Cons./Dens.	Additional Observations
HA						Topsoil				
						Fill: Silty Gravelly Sand, fine to coarse grained, dark brown.		M		
			0.5							No hydrocarbon odour, No Staining, No fibro-cement material observed
						Borehole BH3 terminated at 0.6m				
			1.0							
			1.5							
			2.0							
			2.5							
			3.0							
			3.5							

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BOREHOLE NUMBER BH4

CLIENT E & D Danias Pty Ltd **PROJECT NAME** TESA

PROJECT NUMBER ES5544 **PROJECT LOCATION** Rich Street, Marrickville NSW

DATE STARTED 23/7/13 **COMPLETED** 23/7/13 **R.L. SURFACE** **DATUM**

DRILLING CONTRACTOR Aargus **SLOPE** 90° **BEARING** ---

EQUIPMENT Hand Auger **HOLE LOCATION**

HOLE SIZE 50mm **LOGGED BY** MS **CHECKED BY** MK

NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture	Cons./Dens.	Additional Observations
HA			0.5			Fill: Silty Clay, low to medium plasticity, black/brown, traces of gravel, sandstone.				Strong odour, No Staining, No fibro-cement material observed
			1.0			Fill: Silty Clay, medium plasticity, brown/black/grey, with gravel.		W		
			1.5							No hydrocarbon odour, No Staining, No fibro-cement material observed
	Seepage		2.0							
			2.5							
			3.0		CL	Silty CLAY, low plasticity, grey/brown, traces of gravel, ironstone.		W		
			3.5			Borehole BH4 terminated at 3m				

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BOREHOLE NUMBER BH5

CLIENT E & D Danias Pty Ltd **PROJECT NAME** TESA

PROJECT NUMBER ES5544 **PROJECT LOCATION** Rich Street, Marrickville NSW

DATE STARTED 23/7/13 **COMPLETED** 23/7/13 **R.L. SURFACE** **DATUM**

DRILLING CONTRACTOR Aargus **SLOPE** 90° **BEARING** ---

EQUIPMENT Hand Auger **HOLE LOCATION**

HOLE SIZE 50mm **LOGGED BY** MS **CHECKED BY** MK

NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture	Cons./Dens.	Additional Observations
DT						Concrete				
HA						Fill: Silty Clay, low to medium plasticity, black/brown, traces of gravel, sandstone.				No hydrocarbon odour, No Staining, No fibro-cement material observed
			0.5							
			1.0							
	Seepage ▼					Fill: Silty Clay, medium plasticity, brown/black/grey, with gravel.		W		
			1.5							No hydrocarbon odour, No Staining, No fibro-cement material observed
			2.0							
			2.5							
			3.0							
			3.5							
						Borehole BH5 terminated at 3.5m				

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BOREHOLE NUMBER BH6

CLIENT E & D Danias Pty Ltd **PROJECT NAME** TESA

PROJECT NUMBER ES5544 **PROJECT LOCATION** Rich Street, Marrickville NSW

DATE STARTED 23/7/13 **COMPLETED** 23/7/13 **R.L. SURFACE** **DATUM**

DRILLING CONTRACTOR Aargus **SLOPE** 90° **BEARING** ---

EQUIPMENT Hand Auger **HOLE LOCATION**

HOLE SIZE 50mm **LOGGED BY** MS **CHECKED BY** MK

NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture	Cons./Dens.	Additional Observations
DT						Concrete				
HA			0.5			Fill: Silty Clayey Gravel, medium grained, angular, brown/orange.		D		
			1.0							No hydrocarbon odour, No Staining, No fibro-cement material observed
			1.5		CL	Silty CLAY, low to medium plasticity, brown/orange.		M		
			2.0							No hydrocarbon odour, No Staining, No fibro-cement material observed
			2.5					W		
			3.0							
			3.5			Borehole BH6 terminated at 3.5m				

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BOREHOLE NUMBER BH7/GW2

CLIENT E & D Danias Pty Ltd **PROJECT NAME** TESA

PROJECT NUMBER ES5544 **PROJECT LOCATION** Rich Street, Marrickville NSW

DATE STARTED 23/7/13 **COMPLETED** 23/7/13 **R.L. SURFACE** **DATUM**

DRILLING CONTRACTOR Aargus **SLOPE** 90° **BEARING** ---

EQUIPMENT Drill Rig **HOLE LOCATION**

HOLE SIZE 100mm **LOGGED BY** MS **CHECKED BY** MK

NOTES

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture	Cons./Dens.	Additional Observations
ADTDT							Concrete.				
				1			Fill: Silty Clay, low to medium plasticity, brown and black, with traces of gravel.	D2	D	S	No hydrocarbon odour, No Staining, No fibro-cement material observed
				2			Fill: Silty Clay, medium plasticity, grey and orange, with traces of gravel		D	S	No hydrocarbon odour, No Staining, No fibro-cement material observed
				3							
				4		CI	CLAY, medium plasticity, brown, orange and grey, traces of shale, and mottling present.		D	F	
				5							
				6		CI	CLAY, medium plasticity, orange and grey, with some shale, and mottling present.		D	S	
	Seepage								M		
				7							
									W		
				8							
				9			Borehole BH7/GW2 terminated at 8.5m				
				10							

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BOREHOLE NUMBER BH8

CLIENT E & D Danias Pty Ltd **PROJECT NAME** TESA

PROJECT NUMBER ES5544 **PROJECT LOCATION** Rich Street, Marrickville NSW

DATE STARTED 23/7/13 **COMPLETED** 23/7/13 **R.L. SURFACE** **DATUM**

DRILLING CONTRACTOR Aargus **SLOPE** 90° **BEARING** ---

EQUIPMENT Hand Auger **HOLE LOCATION**

HOLE SIZE 50mm **LOGGED BY** MS **CHECKED BY** MK

NOTES

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture	Cons./Dens.	Additional Observations
DT						Concrete				
HA			0.5			Fill: Silty Clay, low to medium plasticity, black/brown, traces of gravel, medium grained, angular, and sandstone		D		No hydrocarbon odour, No Staining, No fibro-cement material observed
			1.0							
			1.5		CL	Silty CLAY, low to medium plasticity, brown/orange.				
			2.0							
			2.5		CL	Silty CLAY, low to medium plasticity, orange/grey with shale mottling.		D	S	
			3.0							No hydrocarbon odour, No Staining, No fibro-cement material observed
						Borehole BH8 terminated at 3.2m				
			3.5							

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BOREHOLE NUMBER BH9/GW3

CLIENT E & D Danias Pty Ltd **PROJECT NAME** TESA

PROJECT NUMBER ES5544 **PROJECT LOCATION** Rich Street, Marrickville NSW

DATE STARTED 23/7/13 **COMPLETED** 23/7/13 **R.L. SURFACE** **DATUM**

DRILLING CONTRACTOR Aargus **SLOPE** 90° **BEARING** ---

EQUIPMENT Drill Rig **HOLE LOCATION**

HOLE SIZE 100mm **LOGGED BY** MS **CHECKED BY** MK

NOTES

Method	Water	Well Details	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture	Cons./Dens.	Additional Observations
ADT DT							Concrete				
							Fill: Silty Gravelly Clay, low plasticity, brown/grey, traces of brick/concrete		D	S	No hydrocarbon odour, No Staining, No fibro-cement material observed
				1			Fill: Silty Clay, low to medium plasticity, brown/orange/grey, traces of gravel, medium grained, brick and shale.		M		
				2							No hydrocarbon odour, No Staining, No fibro-cement material observed
				3		CI	CLAY, medium plasticity, red/grey/brown, with shale inclusions.		D	H	
				4		CH	CLAY, medium to high plasticity, brown/orange.		M	F	
				5							
				6		CI	CLAY, medium plasticity, red/grey and green.		M	F	
				7							
	▼			8							
				9							
				10			Borehole BH9/GW3 terminated at 9.5m				

APPENDIX F

SUMMARY TABLES OF LABORATORY RESULTS

TABLE A
SCHEDULE OF LABORATORY TESTING

Analyte / Analyte Group Sample	Depth (m)	TYPE	SAMPLING DATE	MET-12	TPH & BTEX	PAH	PHENOLS	SULPHATE	AMMONIA	ASBESTOS PRESENCE	ASBESTOS %
Aargus 23.07.2013											
BH1	0.5-0.7	F	23.07.2013	✔	✔	✔	✔			✔	✔
BH1	1.5-1.6	F	23.07.2013	✔	✔	✔		✔	✔		
BH2	0.3-0.5	F	23.07.2013	✔	✔	✔		✔	✔		
BH2	1-1.2	F	23.07.2013	✔	✔	✔	✔			✔	✔
BH3	0.4-0.6	F	23.07.2013	✔	✔	✔	✔			✔	✔
BH4	0.5-0.7	F	23.07.2013	✔	✔	✔		✔	✔		
BH4	1.7-1.9	F	23.07.2013	✔	✔	✔	✔			✔	✔
BH5	0.3-0.5	F	23.07.2013	✔	✔	✔		✔	✔		
BH5	1.6-1.7	F	23.07.2013	✔	✔	✔	✔			✔	✔
BH6	0.7-0.9	F	23.07.2013	✔	✔	✔	✔			✔	✔
BH6	1.6-1.7	N	23.07.2013	✔	✔	✔		✔	✔		
BH7	0.4-0.6	F	23.07.2013	✔	✔	✔		✔	✔		
BH7	1.4-1.6	F	23.07.2013	✔	✔	✔	✔			✔	✔
BH8	0.2-0.3	F	23.07.2013	✔	✔	✔	✔			✔	✔
BH8	3.0-3.1	N	23.07.2013	✔	✔	✔	✔			✔	✔
BH9	0.4-0.5	F	23.07.2013	✔	✔	✔		✔	✔		
BH9	1.5-1.6	F	23.07.2013	✔	✔	✔	✔			✔	✔
BH10	0.9-1.0	F	23.07.2013	✔	✔	✔	✔			✔	✔
BH10	2-2.1	N	23.07.2013	✔	✔	✔		✔	✔		
BH11	0.1-0.2	F	23.07.2013	✔	✔	✔		✔	✔		
BH11	0.7-0.8	F	23.07.2013	✔	✔	✔	✔			✔	✔
D1	-		23.07.2013	✔	✔	✔	✔			✔	✔
D2	-		23.07.2013	✔	✔	✔		✔	✔		
R1	-		23.07.2013	✔	✔	✔					
SS1	-		23.07.2013	✔	✔	✔	✔	✔	✔	✔	✔

Notes

MET-12: Arsenic, Aluminium, Cadmium, Chromium, Copper, Iron, Lead, Manganese, Mercury, Nickel, Tin, Zinc

PAH: Polycyclic Aromatic Hydrocarbons

TPH: Total Petroleum Hydrcarbons

BTEX: Benzene, Toluene, Ethyl Benzene, Xylene

F,T,N: Fill, Topsoil, Natural

TABLE A
SCHEDULE OF LABORATORY TESTING

Analyte / Analyte Group Sample	Depth (m)	TYPE	SAMPLING DATE	MET-8	TPH & BTEX	PAH
Aargus Groundwater 8.8.2013						
GW1	-	GW	08.08.2013	✔	✔	✔
GW2	-	GW	08.08.2013	✔	✔	✔
GW3	-	GW	08.08.2013	✔	✔	✔
DP Groundwater 1996						
W/B1	-	GW	19.03.1996	✔	✔	✔

Notes

MET-8:	arsenic, cadmium, chromium, copper, lead, mercury, nickel,
PAH:	Polycyclic Aromatic Hydrocarbons
TPH:	Total Petroleum Hydrcarbons
BTEX:	Benzene, Toluene, Ethyl Benzene, Xylene
GW:	Groundwater

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Table A - Heavy Metals

	Lead	Metals										
	Lead	Aluminium	Arsenic	Cadmium	Chromium (III+VI)	Copper	Iron	Manganese	Mercury	Nickel	Tin	Zinc
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	5	10	2	0.4	5	5	5	5	0.05	5	10	5
NEPM 1999 HIL D	1200		400	80		40[1]		6000	80	2400		28000
NEPM 1999 HIL F	1500		500	100		1000		7500	75	3000		35000
NSW 2008 General Solid Waste (No Leaching)	100		100	20					4	40		
NSW 2008 Restricted Solid Waste (No Leaching)	400		400	80					16	160		
LocCode **Sample_Depth_Range** **Sampled_Date-Time**												
BH1 0.5-0.7 23/07/2013	28	8300	5	14	13	47	26,000	420	0.26	9	<10	400
BH1 1.5-1.6 23/07/2013	120	11,000	5	9.5	12	540	26,000	370	0.55	13	35	1400
BH10 0.9-1 23/07/2013	45	12,000	<2	1.2	14	20	9600	130	<0.05	<5	<10	52
BH10 2-2.1 23/07/2013	9.9	11,000	2.3	<0.4	11	<5	15,000	<5	<0.05	<5	<10	8.9
BH11 0.1-0.2 23/07/2013	17	4700	2.5	<0.4	10	42	15,000	130	<0.05	12	<10	85
BH11 0.7-0.8 23/07/2013	<5	11,000	<2	<0.4	31	18	19,000	230	<0.05	29	<10	36
BH2 0.3-0.5 23/07/2013	20	14,000	4.5	0.6	14	38	24,000	1200	0.06	13	<10	520
BH2 1-1.2 23/07/2013	10	2600	9.2	1.3	10	56	76,000	530	<0.05	19	10	2000
BH3 0.4-0.6 23/07/2013	150	6600	13	1.6	21	5100	59,000	430	0.23	31	130	14,000
BH4 0.5-0.7 23/07/2013	190	11,000	<2	1.6	23	990	44,000	200	3.2	40	70	730
BH4 1.7-1.9 23/07/2013	120	13,000	11	1	24	59	42,000	88	0.19	8	<10	300
BH5 0.3-0.5 23/07/2013	200	8300	5.5	2.4	29	92	49,000	280	0.41	23	15	420
BH5 1.6-1.7 23/07/2013	99	4000	8.4	6.1	6.7	37	29,000	44	0.16	<5	<10	370
BH6 0.7-0.9 23/07/2013	48	8700	11	2	29	110	62,000	510	<0.05	24	13	400
BH6 1.6-1.7 23/07/2013	18	3100	12	<0.4	10	17	44,000	33	<0.05	<5	<10	8.6
BH7 0.4-0.6 23/07/2013	43	8000	4.2	0.4	12	21	26,000	190	0.09	<5	<10	69
BH7 1.4-1.6 23/07/2013	12	13,000	5.7	<0.4	15	<5	32,000	5.1	<0.05	<5	<10	11
BH8 0.2-0.3 23/07/2013	360	12,000	13	1.1	24	120	45,000	880	0.64	11	14	390
BH8 3-3.1 23/07/2013	8.5	20,000	2.3	<0.4	17	<5	3400	46	<0.05	<5	<10	10
BH9 0.4-0.5 23/07/2013	17	9300	4.1	<0.4	8.6	<5	8100	23	<0.05	<5	<10	110
BH9 1.5-1.6 23/07/2013	13	13,000	4.2	<0.4	11	<5	14,000	11	<0.05	<5	<10	78
Douglas Partners 1996												
B3 3.00 6/03/1994	1500		8.9	9.1	44	440			0.13	22		2400
B9 1.00 6/03/1994	110		4.8	4.6	17	110			0.05	18		780
B10 1.00 6/03/1994			9.9	10	42	78			0.14	22		4100

Sample_Type = 'Normal'

And

Chem_Group In('Metals' , 'Lead')

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Table B - TPH & BTEX

	BTEX							TPH										
	Benzene	Ethylbenzene	Toluene	Xylene (m & p)	Xylene (o)	Xylene Total	C6-C10 less BTEX (F1)	C10-C16	C16-C34	C34-C40	F2-NAPHTHALENE	C6 - C9	C10 - C14	C15 - C28	C29-C36	+C10 - C36 (Sum of total)	C6-C10
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.1	0.1	0.1	0.2	0.1	0.3	20	50	100	100	50	20	20	50	50	50	20
EPA 1994 Health and Ecological	1	50	130			25						65				1000	
NSW 2009 General Solid Waste (No Leaching)	10	600	288			1000											
NSW 2009 Restricted Solid Waste (No Leaching)	40	2400	1152			4000											

LocCode	Sample_Depth_Range	Sampled_Date-Time																
BH1	0.5-0.7	23/07/2013	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<50	450	490	<50	<20	<20	120	480	600 - 610	<20
BH1	1.5-1.6	23/07/2013	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<50	350	280	<50	<20	22	130	300	450 - 452	<20
BH10	0.9-1	23/07/2013	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<50	<100	<100	<50	<20	20	<50	<50	<50 - 70	<20
BH10	2-2.1	23/07/2013	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<50	<100	<100	<50	<20	<20	<50	<50	<50	<20
BH11	0.1-0.2	23/07/2013	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<50	180	260	<50	<20	21	91	150	260 - 262	<20
BH11	0.7-0.8	23/07/2013	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<50	<100	<100	<50	<20	<20	<50	<50	<50	<20
BH2	0.3-0.5	23/07/2013	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<50	<100	<100	<50	<20	<20	<50	<50	<50	<20
BH2	1-1.2	23/07/2013	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	24	<50	<100	<100	<50	<20	59	<50	<50	59 - 109	24
BH3	0.4-0.6	23/07/2013	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<50	550	140	<50	<20	39	280	300	619 - 620	<20
BH4	0.5-0.7	23/07/2013	<0.1	<0.1	0.2	<0.2	<0.1	<0.3	<20	<50	860	280	<50	<20	<20	430	500	930 - 940	<20
BH4	1.7-1.9	23/07/2013	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<50	400	180	<50	<20	<20	180	250	430 - 440	<20
BH5	0.3-0.5	23/07/2013	0.2	<0.1	0.2	<0.2	<0.1	<0.3	<20	160	6300	1100	160	<20	64	3700	2700	6464 - 6500	<20
BH5	1.6-1.7	23/07/2013	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<50	110	<100	<50	<20	28	68	<50	98 - 121	<20
BH6	0.7-0.9	23/07/2013	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<50	120	140	<50	<20	33	<50	130	160 - 188	<20
BH6	1.6-1.7	23/07/2013	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<50	<100	<100	<50	<20	<20	<50	<50	<50	<20
BH7	0.4-0.6	23/07/2013	0.2	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<50	<100	<100	<50	<20	<20	<50	54	54 - 89	<20
BH7	1.4-1.6	23/07/2013	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<50	<100	<100	<50	<20	<20	<50	<50	<50	<20
BH8	0.2-0.3	23/07/2013	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<50	<100	<100	<50	<20	38	<50	<50	<50 - 88	<20
BH8	3-3.1	23/07/2013	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<50	<100	<100	<50	<20	35	<50	<50	<50 - 85	<20
BH9	0.4-0.5	23/07/2013	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<50	<100	<100	<50	<20	<20	<50	<50	<50	<20
BH9	1.5-1.6	23/07/2013	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	<20	<50	110	<100	<50	<20	21	91	<50	110 - 137	<20
		Douglas Partners 1994																	
B3	3.00	6/03/1994	<0.5	<0.5	<0.5			<1.5						<20	170	3200	700	4070	
B10	1.00	6/03/1994	<0.5	<0.5	<0.5			<1.5						<20	1200	2900	510	4610	

Sample_Type = 'Normal' AND

Chem_Group In('TPH' , 'BTEX')

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Table C - PAH & Phenol

	PAH	PAH/Phenols																								
	Benzo[b+j]fluoranthene	2,4-dimethylphenol	2-methylphenol	2-nitrophenol	3-&4-methylphenol	4-chloro-3-methylphenol	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a) pyrene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	PAHs (Sum of total)	Phenanthrene	Phenol	Pyrene
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL	0.5	0.5	0.5	0.5	1	0.5	0.5	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
[illegible]																							
[illegible]																							
NSW 2008 General Solid Waste (No Leaching)			4000								8									400		4250	
NSW 2008 Restricted Solid Waste (No Leaching)			16000								0.8												
											3.2												

LocCode	Sample_Depth_Range	Sampled_Date-Time																								
BH1	0.5-0.7	23/07/2013	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
BH1	1.5-1.6	23/07/2013	2.4	-	-	-	-	-	0.6	<0.5	1.6	3.3	2.8	1.4	1.4	2.6	<0.5	6.9	0.6	1.1	<0.5 - 0.8	37	5.1	-	6.8
BH10	0.9-1	23/07/2013	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
BH10	2-2.1	23/07/2013	<0.5	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5
BH11	0.1-0.2	23/07/2013	<0.5	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5
BH11	0.7-0.8	23/07/2013	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
BH2	0.3-0.5	23/07/2013	<0.5	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
BH2	1-1.2	23/07/2013	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5
BH3	0.4-0.6	23/07/2013	2.9	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	1.3	2.1	2	2.5	1.1	<0.5	1.8	<0.5	1.5	<0.5	18	0.7	<0.5	2
BH4	0.5-0.7	23/07/2013	<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 - 1	3.8	0.9	-	0.9
BH4	1.7-1.9	23/07/2013	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.8	<0.5	<0.5	<0.5	2.1	0.6	<0.5	0.7
BH5	0.3-0.5	23/07/2013	99	-	-	-	-	-	7.9	17	51	95	[illegible]	69	68	110	16	220	14	61	5.2 - 8.1	[illegible]	170	-	200
BH5	1.6-1.7	23/07/2013	2.4	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	1.6	3.9	3.2	1.8	1.6	2.9	<0.5	8.1	<0.5	1.5	<0.5	39	4.8	<0.5	7.5
BH6	0.7-0.9	23/07/2013	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
BH6	1.6-1.7	23/07/2013	<0.5	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5
BH7	0.4-0.6	23/07/2013	<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	3.1	0.6	-	1
BH7	1.4-1.6	23/07/2013	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
BH8	0.2-0.3	23/07/2013	1.6	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	1.9	1.7	1	0.9	1.6	<0.5	3.5	<0.5	0.9	<0.5	18	1.5	<0.5	3.2
BH8	3-3.1	23/07/2013	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
BH9	0.4-0.5	23/07/2013	<0.5	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5
BH9	1.5-1.6	23/07/2013	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.8	<0.5	<0.5	<0.5	1.5	<0.5	<0.5	0.7
	Douglas Partners 1994																									
B3	3.00	6/03/1994																				172		3.9		
B9	1.00	6/03/1994																				1.37		<0.5		
B10	1.00	6/03/1994																				[illegible]		2.3		

Sample_Type = 'Normal'

And

Chem Group In('PAH' , 'PAH/Phenols' , 'Phenolics')

TABLE D
ASBESTOS TEST RESULTS

Analyte / Sample Location	Depth (m)	Field Observations*	Laboratory Results Asbestos Type Present / Absent	Laboratory Results Asbestos %w/w
Aargus 23.07.2013				
BH1	0.5-0.7	No fibro-cement fragments observed	No Asbestos detected	-
BH2	1-1.2	No fibro-cement fragments observed	No Asbestos detected	-
BH3	0.4-0.6	No fibro-cement fragments observed	No Asbestos detected	<0.001
BH4	1.7-1.9	No fibro-cement fragments observed	**Chrysotile Asbestos detected (AF)**	0.0012
BH5	1.6-1.7	No fibro-cement fragments observed	No Asbestos detected	<0.001
BH6	0.7-0.9	No fibro-cement fragments observed	No Asbestos detected	<0.001
BH7	1.4-1.6	No fibro-cement fragments observed	No Asbestos detected	<0.001
BH8	0.2-0.3	No fibro-cement fragments observed	No Asbestos detected	<0.001
BH8	3.0-3.1	No fibro-cement fragments observed	No Asbestos detected	<0.001
BH9	1.5-1.6	No fibro-cement fragments observed	No Asbestos detected	<0.001
BH10	0.9-1.0	No fibro-cement fragments observed	No Asbestos detected	<0.001
BH11	0.7-0.8	No fibro-cement fragments observed	No Asbestos detected	<0.001
D1	-	No fibro-cement fragments observed	No Asbestos detected	-
SS1	-	No fibro-cement fragments observed	**Chrysotile Asbestos detected**	-
WA Guidelines for the Assessment, Remediation and Management of Asbestos - Contaminated Sites in Western Australia - May 2009				
%w/w asbestos for FA and AF				0.001%
%w/w asbestos for ACM - Residential use, childcare centres, preschools etc				0.01%
%w/w asbestos for ACM - Residential, minimal soil access (fully sealed surfaces)				0.04%
%w/w asbestos for ACM - Parks, public open spaces, playing fields etc.				0.02%
%w/w asbestos for ACM - Commercial / Industrial				0.05%

Note:
ACM = Asbestos Containing Materials >7mm x 7mm (visible by eye)
FA = Friable and Fibrous Asbestos Materials >7mm x 7mm (visible by eye)
AF = Asbestos Fines <7mm x 7mm ACM including free fibres (visible by microscope only)
* Field Observations: All fibro-cement fragments observed are assumed to contain Asbestos until otherwise tested and recorded as such.

Aargus

Table E - Inorganics

	Inorganics		
	Ammonia as N	Moisture Content (dried @ 103°C)	Sulphate as S
	mg/kg	%	mg/kg
EQL	0.1	0.1	10

LocCode	Sample_Depth_Range	Sampled_Date-Time			
BH1	0.5-0.7	23/07/2013	-	9.8	-
BH1	1.5-1.6	23/07/2013	2.8	19	<10
BH10	0.9-1	23/07/2013	-	20	-
BH10	2-2.1	23/07/2013	0.1	18	13
BH11	0.1-0.2	23/07/2013	0.7	7.4	<10
BH11	0.7-0.8	23/07/2013	-	6.4	-
BH2	0.3-0.5	23/07/2013	0.7	19	<10
BH2	1-1.2	23/07/2013	-	25	-
BH3	0.4-0.6	23/07/2013	-	13	-
BH4	0.5-0.7	23/07/2013	12	15	<10
BH4	1.7-1.9	23/07/2013	-	26	-
BH5	0.3-0.5	23/07/2013	1.8	14	20
BH5	1.6-1.7	23/07/2013	-	21	-
BH6	0.7-0.9	23/07/2013	-	10	-
BH6	1.6-1.7	23/07/2013	0.3	20	<10
BH7	0.4-0.6	23/07/2013	0.3	12	<10
BH7	1.4-1.6	23/07/2013	-	16	-
BH8	0.2-0.3	23/07/2013	-	15	-
BH8	3-3.1	23/07/2013	-	21	-
BH9	0.4-0.5	23/07/2013	0.5	16	<10
BH9	1.5-1.6	23/07/2013	-	19	-

Sample_Type = 'Normal'

AND

Chem_Group = 'Inorganics'

TABLE F
HEAVY METALS TEST RESULTS (GROUNDWATER SAMPLES)

Analyte / Sample Location	HEAVY METALS (µg/L)							
	ARSENIC (As) - Total	CADMIUM (Cd)	CHROMIUM (Cr) - Total	COPPER (Cu)	LEAD (Pb)	MERCURY (Hg) - Total	NICKEL (Ni)	ZINC (Zn)
Aargus 08.08.2013								
GW1 -	<5	1.3	6	25	<1	<0.1	10	400
GW2 -	10.0	0.9	7	47	<1	<0.1	10	22
GW3 -	14	0.3	6	135	<1	<0.1	12	30
Douglas Partners 19.03.1996								
W/B1 -	2	<10	<50	<30	<50	<0.5	<50	48.0
Practical Quantitation Limits (PQL)	1	0.1	1	1	1	0.1	1	5
ANZ [a] Guidelines for Fresh and Marine Water Quality (2000)								
Aquatic Ecosystems (Trigger Values)								
Fresh Water	24[b] 13[c]	0.2	3.3[d,h] 1[e]	1.4	3.4	0.6[f] 0.4[g,h]	11	8
Water for recreational purposes	50	5	50	1000	50	1	100	5000

Notes
- a: ANZ = Australia and New Zealands
- b: as As (III)
- c: as As (V)
- d: as Cr (III)
- e: as Cr (VI)
- f: as Hg (Inorganic)
- g: as Hg (methyl)
- h: Interim working values in the absence of reliable trigger values (Section 8.3.7)
- ID: Insufficient Data to derive a reliable trigger value
- LTV: Long Term Trigger Value (up to 100 years)
- STV: Short Term Trigger Value (up to 20 years)

TABLE G
TOTAL PETROLEUM HYDROCARBONS (TPH) AND BTEX TEST RESULTS (GROUNDWATER SAMPLES)

Analyte / Sample Location	TPH (µg/L)					BTEX (µg/L)			
	C6-C9	C10-C14	C15-C28	C29-C36	C10-C36	BENZENE	TOLUENE	ETHYL BENZENE	TOTAL XYLENES
Aargus 8.8.2013									
GW1 -	<40	<100	580	240	**820**	<0.5	<0.5	<0.5	<1
GW2 -	<40	<100	<200	<100	<200	<0.5	<0.5	<0.5	<1
GW3 -	<40	<100	<200	<100	<200	<0.5	<0.5	<0.5	<1
Douglas Partners 19.03.1996									
W/B1 -	<40	<100	<200	<200	<500	<1	2	<1	<3
Practical Quantitation Limits (PQL)	40	100	200	100	200	0.5	0.5	0.5	1
ANZ [a] Guidelines for Fresh and Marine Water Quality (2000)									
Aquatic Ecosystems (Trigger Values)									
Fresh water					-	950	180 [e]	80 [e]	350[b] 75[c, e] 200[d]
Dutch Intervention Guidelines (Mineral Oil)					C10-C36 = 600				
Water for recreational purposes					-	10			

Notes
a: ANZ = Australia and New Zealand
b: as o-Xylene
c: as m-Xylene
d: as p-Xylene
e: Interim working values in the absence of reliable trigger values (Section 8.3.7)
f: Contaminated Sites: "Guidelines for Assessing Service Station Sites", 1994, EPA

TABLE H
POLYCYCLIC AROMATIC HYDROCARBONS (PAH)
TEST RESULTS (GROUNDWATER SAMPLES)

Analyte / Sample Location	PAH (µg/L)				
	NAPHTHALENE	ANTHRANCENE	PHENANTHRENE	FLUORANTHENE	BENZO(a)PYRENE
Aargus 08.08.2013					
GW1	0.6	**2**	**8.7**	**8.9**	**4.9**
GW2	<0.5	<0.5	<0.5	<0.5	<0.5
GW3	<0.5	<0.5	<0.5	<0.5	<0.5
Douglas Partners 19.03.1996					
W/B1	<0.5	<0.5	<0.5	<0.5	<0.5
Practical Quantitation Limits (PQL)	0.5	0.5	0.5	0.5	0.5
ANZ [a] Guidelines for Fresh and Marine Water Quality (2000) Aquatic Ecosystems (Trigger Values)					
Fresh	16	0.4[b]	2[b]	1.4[b]	0.2[b]
Water for recreational purposes					0.01

Notes a: ANZ = Australia and New Zealands

b: Interim working values in the absence of reliable trigger values (Section 8.3.7)

APPENDIX G

LABORATORY CERTIFICATES AND REPORTS

AUSTRALIAN SAFER ENVIRONMENT & TECHNOLOGY PTY LTD
ABN 36 088 095 112

Our ref : ASET34378/ 37558 / 1 - 13
Your ref : 387159
NATA Accreditation No: 14484

29 July 2013

Eurofins | mgt
Unit F3, Building F, 16 Mars Road
Lane Cove NSW 2066

Attn: Dr Robert Symons
Laboratory & Technical Manager

Dear Robert

Asbestos Identification
This report presents the results of thirteen samples, forwarded by Eurofins | mgt on 29 July 2013, for analysis for asbestos.

1.Introduction: Thirteen samples forwarded were examined and analysed for the presence of asbestos.

2. Methods : The samples were examined under a Stereo Microscope and selected fibres were analysed by Polarized Light Microscopy in conjunction with Dispersion Staining method **(Safer Environment Method$^{\Omega}$ 1 and Australian Standard AS 4964-2004.)**

This report is consistent with the analytical procedures and reporting recommendations in the Western Australia Guidelines for the Assessment Remediation and Management of Asbestos contaminated sites in Western Australia

3. Results :

Sample No. 1. ASET34378 / 37558 / 1. 387159 - BH1 - 0.5 - 0.7 - Jl19339$^{\Omega}$.
Approx dimensions 5.0 cm x 5.0 cm x 0.45 cm
The sample consisted of a mixture of sandy soil, stones and plant matter.
No asbestos detected.

Sample No. 2. ASET34378 / 37558 / 2. 387159 - BH2 - 1 - 1.2 - Jl19342$^{\Omega}$.
Approx dimensions 6.0 cm x 7.0 cm x 1.25 cm
The sample consisted of a mixture of blackish soil, stones, plant matter and fragments of bitumen.
No asbestos detected.

Sample No. 3. ASET34378 / 37558 / 3. 387159 - BH3 - 0.4 - 0.6 - Jl19343.
Approx dimensions 8.0 cm x 8.0 cm x 5.0 cm
The sample consisted of a mixture of soil, stones, plant matter and fragments of plaster, corroded metal, brick, bitumin like material and brick.
No asbestos detected.
w/w% < 0.001%

Sample No. 4. ASET34378 / 37558 / 4. 387159 - BH4 - 1.7 - 1.9 - Jl19345.
Approx dimensions 8.0 cm x 8.0 cm x 5.0 cm
The sample consisted of a mixture of clayish soil, stones, fibres^, fragments of plaster and brick and glass.
Chrysotile (Approximate weight = 0.00435g) asbestos and Amosite (Approximate weight = < 0.0001g) asbestos detected. Approximate total asbestos fibre weight = 0.00435g.
Approximate total weight of AF = 0.00435g.
Approximate total weight of soil = 345.0g
Approximate w/w % of AF in soil = 0.0012%

Sample No. 5. ASET34378 / 37558 / 5. 387159 - BH5 - 1.6 - 1.7 - Jl19347.
Approx dimensions 8.5 cm x 8.5 cm x 5.5 cm
The sample consisted of a mixture of clayish soil, stones, fragments and powder of plaster and bitumin and brick like material.
No asbestos detected.
w/w% < 0.001%

Sample No. 6. ASET34378 / 37558 / 6. 387159 - BH6 - 0.7 - 0.9 - Jl19348.
Approx dimensions 8.0 cm x 8.5 cm x 4.75 cm
The sample consisted of a mixture of sandy soil, stones, plant matter and fragments of plaster, cement. bitumin and brick.
No asbestos detected.
w/w% < 0.001%

Sample No. 7. ASET34378 / 37558 / 7. 387159 - BH7 - 1.4 - 1.6 - Jl19351.
Approx dimensions 8.5 cm x 8.5 cm x 4.85 cm
The sample consisted of a mixture of soil, stones, plant matter, fragments of plaster, brick like matril and glass.
No asbestos detected.
w/w% < 0.001%

Sample No. 8. ASET34378 / 37558 / 8. 387159 - BH8 - 0.2 - 0.3 - Jl19352.
Approx dimensions 8.0 cm x 8.0 cm x 4.75 cm
The sample consisted of a mixture of clayish soil, stones, fragments of plaster, brick and glass.
No asbestos detected.
w/w% < 0.001%

Sample No. 9. ASET34378 / 37558 / 9. 387159 – BH8 – 3.0 – 3.1 - Jl19353.
Approx dimensions 7.5 cm x 7.5 cm x 5.0 cm
The sample consisted of a mixture of clay, plant matter and fragments of plaster and brick like material.
No asbestos detected.
w/w% < 0.001%

Sample No. 10. ASET34378 / 37558 / 10. 387159 - BH9 - 1.5 - 1.6 - Jl19355.
Approx dimensions 8.25 cm x 8.0 cm x 5.0 cm
The sample consisted of a mixture of clayish soil, stones, fragments of plaster, brick like material and glass.
No asbestos detected.
w/w% < 0.001%

Sample No. 11. ASET34378 / 37558 / 11. 387159 - BH10 - 0.9 - 1.0 - Jl193356.
Approx dimensions 8.0 cm x 7.5 cm x 4.75 cm
The sample consisted of a mixture of clayish soil, stones, plant matter and fragments of plaster and brick like material.
No asbestos detected.
w/w% < 0.001%

Sample No. 12. ASET34378 / 37558 / 12. 387159 - BH11 - 0.7 - 0.8 - Jl19359.
Approx dimensions 8.0 cm x 7.5 cm x 4.5 cm
The sample consisted of a mixture of sandy soil, stones and plant matter.
No asbestos detected.
w/w% < 0.001%

Sample No. 13. ASET34378 / 37558 / 13. 387159 - D1 - Jl19360$^{\Omega}$
Approx dimensions 6.5 cm x 6.5 cm x 2.75 cm
The sample consisted of a mixture of sandy soil, stones, plant matter and fragments of plaster and brick like material.
No asbestos detected.

Analysed and reported by,

Mahen De Silva. BSc, MSc, Grad Dip (Occ Hyg)
Occupational Hygienist / Approved Identifier.
Approved Signatory

NATA
WORLD RECOGNISED
ACCREDITATION

This document is issued in accordance with NATA's Accreditation requirements. Accredited for compliance with ISO/IEC 17025.

The approx; weights given above can be used only as a guide. They do not represent absolute weights of each kind of asbestos as it is impossible to extract all loose fibres from soil and other asbestos containing building material samples using this method. However above figures may be used as closest approximations to the exact values in each case. Estimation and/ or reporting of asbestos fibre weights in asbestos containing materials and soil is out of the Scope of the NATA Accreditation. NATA Accreditation covers only the qualitative part of the results reported.

ACM - Asbestos Containing Material - Products or materials that contain asbestos in an inert bound matrix such as cement or resin. Here taken to be sound material, even as fragments and not fitting through a 7mm X 7 mm sieve.

AF -Includes asbestos free fibres, small fibre bundles and also ACM fragments that pass through a 7mm X 7 mm sieve.

FA -Friable asbestos material such as severely weathered ACM, and asbestos in the form of loose fibrous material such as insulation products.

***denotes fibres in bonded form in fragments**

^denotes loose fibres

eurofins | mgt

Certificate of Analysis

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025.
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Aargus P/L
446 Parramatta Road
Petersham
NSW 2049

Attention: **Mark Kelly**

Report **387159-S**
Client Reference MARRICKVILLE ES5544
Received Date Jul 25, 2013

Client Sample ID			**BH1_0.5-0.7**	**BH1_1.5-1.6**	**BH2_0.3-0.5**	**BH2_1-1.2**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**S13-Jl19339**	**S13-Jl19340**	**S13-Jl19341**	**S13-Jl19342**
Date Sampled			**Jul 23, 2013**	**Jul 23, 2013**	**Jul 23, 2013**	**Jul 23, 2013**
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	22	< 20	59
TRH C15-C28	50	mg/kg	120	130	< 50	< 50
TRH C29-C36	50	mg/kg	480	300	< 50	< 50
TRH C10-36 (Total)	50	mg/kg	600	450	< 50	59
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	118	72	83	94
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	24
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	24
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	450	350	< 100	< 100
TRH >C34-C40	100	mg/kg	490	280	< 100	< 100
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.5	mg/kg	< 0.5	0.6	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	1.6	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	3.3	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	2.8	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	2.4	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	1.4	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	1.4	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	2.6	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	6.9	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	0.6	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	1.1	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	0.8	< 0.5	< 0.5

Client Sample ID Sample Matrix Eurofins | mgt Sample No. Date Sampled Test/Reference	LOR	Unit	BH1_0.5-0.7 Soil S13-Jl19339 Jul 23, 2013	BH1_1.5-1.6 Soil S13-Jl19340 Jul 23, 2013	BH2_0.3-0.5 Soil S13-Jl19341 Jul 23, 2013	BH2_1-1.2 Soil S13-Jl19342 Jul 23, 2013
Polycyclic Aromatic Hydrocarbons						
Phenanthrene	0.5	mg/kg	< 0.5	5.1	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	6.8	< 0.5	< 0.5
Total PAH	1	mg/kg	< 0.5	37	< 0.5	< 0.5
Benzo(a)pyrene TEQ*	0.5	mg/kg	0.6	3.9	0.6	0.6
2-Fluorobiphenyl (surr.)	1	%	74	74	74	71
p-Terphenyl-d14 (surr.)	1	%	84	82	76	70
Speciated Phenols						
2.4-Dichlorophenol	0.5	mg/kg	< 0.5	-	-	< 0.5
2.4-Dimethylphenol	0.5	mg/kg	< 0.5	-	-	< 0.5
2.4.5-Trichlorophenol	0.5	mg/kg	< 0.5	-	-	< 0.5
2.4.6-Trichlorophenol	0.5	mg/kg	< 0.5	-	-	< 0.5
Phenol	0.5	mg/kg	< 0.5	-	-	< 0.5
2-Methylphenol (o-Cresol)	0.5	mg/kg	< 0.5	-	-	< 0.5
3&4-Methylphenol (m&p-Cresol)	1	mg/kg	< 1	-	-	< 1
2-Chlorophenol	0.5	mg/kg	< 0.5	-	-	< 0.5
2-Nitrophenol	0.5	mg/kg	< 0.5	-	-	< 0.5
4-Chloro-3-methylphenol	0.5	mg/kg	< 0.5	-	-	< 0.5
Pentachlorophenol	1	mg/kg	< 1	-	-	< 1
Phenol-d5 (surr.)	1	%	78	-	-	70
Ammonia (as N)	0.1	mg/kg	-	2.8	0.7	-
Sulphate (as S)	10	mg/kg	-	< 10	< 10	-
% Moisture	0.1	%	9.8	19	19	25
Asbestos			see attached	-	-	see attached
Heavy Metals						
Aluminium	10	mg/kg	8300	11000	14000	2600
Arsenic	2	mg/kg	5.0	5.0	4.5	9.2
Cadmium	0.4	mg/kg	14	9.5	0.6	1.3
Chromium	5	mg/kg	13	12	14	10
Copper	5	mg/kg	47	540	38	56
Iron	5	mg/kg	26000	26000	24000	76000
Lead	5	mg/kg	28	120	20	10
Manganese	5	mg/kg	420	370	1200	530
Mercury	0.05	mg/kg	0.26	0.55	0.06	< 0.05
Nickel	5	mg/kg	9.0	13	13	19
Tin	10	mg/kg	< 10	35	< 10	10
Zinc	5	mg/kg	400	1400	520	2000

Client Sample ID Sample Matrix Eurofins | mgt Sample No. Date Sampled Test/Reference	LOR	Unit	BH3_0.4-0.6 Soil S13-Jl19343 Jul 23, 2013	BH4_0.5-0.7 Soil S13-Jl19344 Jul 23, 2013	BH4_1.7-1.9 Soil S13-Jl19345 Jul 23, 2013	BH5_0.3-0.5 Soil S13-Jl19346 Jul 23, 2013
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20

Client Sample ID Sample Matrix Eurofins | mgt Sample No. Date Sampled Test/Reference	LOR	Unit	BH3_0.4-0.6 Soil S13-Jl19343 Jul 23, 2013	BH4_0.5-0.7 Soil S13-Jl19344 Jul 23, 2013	BH4_1.7-1.9 Soil S13-Jl19345 Jul 23, 2013	BH5_0.3-0.5 Soil S13-Jl19346 Jul 23, 2013
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C10-C14	20	mg/kg	39	< 20	< 20	64
TRH C15-C28	50	mg/kg	280	430	180	3700
TRH C29-C36	50	mg/kg	300	500	250	2700
TRH C10-36 (Total)	50	mg/kg	620	930	430	6500
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	0.2
Toluene	0.1	mg/kg	< 0.1	0.2	< 0.1	0.2
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	116	113	105	74
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	5.2
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	160
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50	160
TRH >C16-C34	100	mg/kg	550	860	400	6300
TRH >C34-C40	100	mg/kg	140	280	180	1100
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	7.9
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	17
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	51
Benz(a)anthracene	0.5	mg/kg	1.3	< 0.5	< 0.5	95
Benzo(a)pyrene	0.5	mg/kg	2.1	< 0.5	< 0.5	110
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	2.9	< 0.5	< 0.5	99
Benzo(g.h.i)perylene	0.5	mg/kg	2.0	< 0.5	< 0.5	69
Benzo(k)fluoranthene	0.5	mg/kg	2.5	< 0.5	< 0.5	68
Chrysene	0.5	mg/kg	1.1	< 0.5	< 0.5	110
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	16
Fluoranthene	0.5	mg/kg	1.8	1.0	0.8	220
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	14
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	1.5	< 0.5	< 0.5	61
Naphthalene	0.5	mg/kg	< 0.5	1.0	< 0.5	8.1
Phenanthrene	0.5	mg/kg	0.7	0.9	0.6	170
Pyrene	0.5	mg/kg	2.0	0.9	0.7	200
Total PAH	1	mg/kg	18	3.8	2.1	1300
Benzo(a)pyrene TEQ*	0.5	mg/kg	3.2	0.6	0.6	160
2-Fluorobiphenyl (surr.)	1	%	74	75	76	83
p-Terphenyl-d14 (surr.)	1	%	82	72	81	88
Speciated Phenols						
2.4-Dichlorophenol	0.5	mg/kg	< 0.5	-	< 0.5	-
2.4-Dimethylphenol	0.5	mg/kg	< 0.5	-	< 0.5	-
2.4.5-Trichlorophenol	0.5	mg/kg	< 0.5	-	< 0.5	-
2.4.6-Trichlorophenol	0.5	mg/kg	< 0.5	-	< 0.5	-
Phenol	0.5	mg/kg	< 0.5	-	< 0.5	-
2-Methylphenol (o-Cresol)	0.5	mg/kg	< 0.5	-	< 0.5	-

Client Sample ID Sample Matrix Eurofins | mgt Sample No. Date Sampled Test/Reference	LOR	Unit	BH3_0.4-0.6 Soil S13-Jl19343 Jul 23, 2013	BH4_0.5-0.7 Soil S13-Jl19344 Jul 23, 2013	BH4_1.7-1.9 Soil S13-Jl19345 Jul 23, 2013	BH5_0.3-0.5 Soil S13-Jl19346 Jul 23, 2013
Speciated Phenols						
3&4-Methylphenol (m&p-Cresol)	1	mg/kg	< 1	-	< 1	-
2-Chlorophenol	0.5	mg/kg	< 0.5	-	< 0.5	-
2-Nitrophenol	0.5	mg/kg	< 0.5	-	< 0.5	-
4-Chloro-3-methylphenol	0.5	mg/kg	< 0.5	-	< 0.5	-
Pentachlorophenol	1	mg/kg	< 1	-	< 1	-
Phenol-d5 (surr.)	1	%	75	-	76	-
Ammonia (as N)	0.1	mg/kg	-	12	-	1.8
Sulphate (as S)	10	mg/kg	-	< 10	-	20
% Moisture	0.1	%	13	15	26	14
Asbestos			see attached	-	see attached	-
Asbestos (% weight as per WA Guidelines)			see attached	-	see attached	-
Heavy Metals						
Aluminium	10	mg/kg	6600	11000	13000	8300
Arsenic	2	mg/kg	13	< 2	11	5.5
Cadmium	0.4	mg/kg	1.6	1.6	1.0	2.4
Chromium	5	mg/kg	21	23	24	29
Copper	5	mg/kg	5700	990	59	92
Iron	5	mg/kg	59000	44000	42000	49000
Lead	5	mg/kg	150	190	120	200
Manganese	5	mg/kg	430	200	88	280
Mercury	0.05	mg/kg	0.23	3.2	0.19	0.41
Nickel	5	mg/kg	31	40	8.0	23
Tin	10	mg/kg	130	70	< 10	15
Zinc	5	mg/kg	14000	730	300	420

Client Sample ID Sample Matrix Eurofins | mgt Sample No. Date Sampled Test/Reference	LOR	Unit	BH5_1.6-1.7 Soil S13-Jl19347 Jul 23, 2013	BH6_0.7-0.9 Soil S13-Jl19348 Jul 23, 2013	BH6_1.6-1.7 Soil S13-Jl19349 Jul 23, 2013	BH7_0.4-0.6 Soil S13-Jl19350 Jul 23, 2013
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	28	33	< 20	< 20
TRH C15-C28	50	mg/kg	68	< 50	< 50	< 50
TRH C29-C36	50	mg/kg	< 50	130	< 50	54
TRH C10-36 (Total)	50	mg/kg	96	160	< 50	54
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	0.2
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	86	117	111	107

Client Sample ID			BH5_1.6-1.7	BH6_0.7-0.9	BH6_1.6-1.7	BH7_0.4-0.6
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins | mgt Sample No.			S13-Jl19347	S13-Jl19348	S13-Jl19349	S13-Jl19350
Date Sampled			Jul 23, 2013	Jul 23, 2013	Jul 23, 2013	Jul 23, 2013
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	110	120	< 100	< 100
TRH >C34-C40	100	mg/kg	< 100	140	< 100	< 100
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	1.6	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	3.9	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	3.2	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	2.4	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	1.8	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	1.6	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	2.9	< 0.5	< 0.5	0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	8.1	< 0.5	< 0.5	1.0
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	1.5	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	4.8	< 0.5	< 0.5	0.6
Pyrene	0.5	mg/kg	7.5	< 0.5	< 0.5	1.0
Total PAH	1	mg/kg	39	< 0.5	< 0.5	3.1
Benzo(a)pyrene TEQ*	0.5	mg/kg	4.4	0.6	0.6	0.6
2-Fluorobiphenyl (surr.)	1	%	77	74	84	75
p-Terphenyl-d14 (surr.)	1	%	86	82	87	82
Speciated Phenols						
2.4-Dichlorophenol	0.5	mg/kg	< 0.5	< 0.5	-	-
2.4-Dimethylphenol	0.5	mg/kg	< 0.5	< 0.5	-	-
2.4.5-Trichlorophenol	0.5	mg/kg	< 0.5	< 0.5	-	-
2.4.6-Trichlorophenol	0.5	mg/kg	< 0.5	< 0.5	-	-
Phenol	0.5	mg/kg	< 0.5	< 0.5	-	-
2-Methylphenol (o-Cresol)	0.5	mg/kg	< 0.5	< 0.5	-	-
3&4-Methylphenol (m&p-Cresol)	1	mg/kg	< 1	< 1	-	-
2-Chlorophenol	0.5	mg/kg	< 0.5	< 0.5	-	-
2-Nitrophenol	0.5	mg/kg	< 0.5	< 0.5	-	-
4-Chloro-3-methylphenol	0.5	mg/kg	< 0.5	< 0.5	-	-
Pentachlorophenol	1	mg/kg	< 1	< 1	-	-
Phenol-d5 (surr.)	1	%	79	77	-	-
Ammonia (as N)	0.1	mg/kg	-	-	0.3	0.3
Sulphate (as S)	10	mg/kg	-	-	< 10	< 10
% Moisture	0.1	%	21	10	20	12
Asbestos			see attached	see attached	-	-
Asbestos (% weight as per WA Guidelines)			see attached	see attached	-	-

Client Sample ID			BH5_1.6-1.7	BH6_0.7-0.9	BH6_1.6-1.7	BH7_0.4-0.6
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins | mgt Sample No.			S13-Jl19347	S13-Jl19348	S13-Jl19349	S13-Jl19350
Date Sampled			Jul 23, 2013	Jul 23, 2013	Jul 23, 2013	Jul 23, 2013
Test/Reference	LOR	Unit				
Heavy Metals						
Aluminium	10	mg/kg	4000	8700	3100	8000
Arsenic	2	mg/kg	8.4	11	12	4.2
Cadmium	0.4	mg/kg	6.1	2.0	< 0.4	0.4
Chromium	5	mg/kg	6.7	29	10	12
Copper	5	mg/kg	37	110	17	21
Iron	5	mg/kg	29000	62000	44000	26000
Lead	5	mg/kg	99	48	18	43
Manganese	5	mg/kg	44	510	33	190
Mercury	0.05	mg/kg	0.16	< 0.05	< 0.05	0.09
Nickel	5	mg/kg	< 5	24	< 5	< 5
Tin	10	mg/kg	< 10	13	< 10	< 10
Zinc	5	mg/kg	370	400	8.6	69

Client Sample ID			BH7_1.4-1.6	BH8_0.2-0.3	BH8_3.0-3.1	BH9_0.4-0.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins | mgt Sample No.			S13-Jl19351	S13-Jl19352	S13-Jl19353	S13-Jl19354
Date Sampled			Jul 23, 2013	Jul 23, 2013	Jul 23, 2013	Jul 23, 2013
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	38	35	< 20
TRH C15-C28	50	mg/kg	< 50	< 50	< 50	< 50
TRH C29-C36	50	mg/kg	< 50	< 50	< 50	< 50
TRH C10-36 (Total)	50	mg/kg	< 50	< 50	< 50	< 50
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	115	114	117	100
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100	< 100
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	1.9	< 0.5	< 0.5

Client Sample ID Sample Matrix Eurofins | mgt Sample No. Date Sampled Test/Reference	LOR	Unit	BH7_1.4-1.6 Soil S13-Jl19351 Jul 23, 2013	BH8_0.2-0.3 Soil S13-Jl19352 Jul 23, 2013	BH8_3.0-3.1 Soil S13-Jl19353 Jul 23, 2013	BH9_0.4-0.5 Soil S13-Jl19354 Jul 23, 2013
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene	0.5	mg/kg	< 0.5	1.7	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	1.6	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	1.0	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	0.9	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	1.6	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	3.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	0.9	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	1.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	3.2	< 0.5	< 0.5
Total PAH	1	mg/kg	< 0.5	18	< 0.5	< 0.5
Benzo(a)pyrene TEQ*	0.5	mg/kg	0.6	2.5	0.6	0.6
2-Fluorobiphenyl (surr.)	1	%	75	73	74	75
p-Terphenyl-d14 (surr.)	1	%	77	79	76	78
Speciated Phenols						
2.4-Dichlorophenol	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
2.4-Dimethylphenol	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
2.4.5-Trichlorophenol	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
2.4.6-Trichlorophenol	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Phenol	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
2-Methylphenol (o-Cresol)	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
3&4-Methylphenol (m&p-Cresol)	1	mg/kg	< 1	< 1	< 1	-
2-Chlorophenol	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
2-Nitrophenol	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
4-Chloro-3-methylphenol	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Pentachlorophenol	1	mg/kg	< 1	< 1	< 1	-
Phenol-d5 (surr.)	1	%	78	73	74	-
Ammonia (as N)	0.1	mg/kg	-	-	-	0.5
Sulphate (as S)	10	mg/kg	-	-	-	< 10
% Moisture	0.1	%	16	15	21	16
Asbestos			see attached	see attached	see attached	-
Asbestos (% weight as per WA Guidelines)			see attached	see attached	see attached	-
Heavy Metals						
Aluminium	10	mg/kg	13000	12000	20000	9300
Arsenic	2	mg/kg	5.7	13	2.3	4.1
Cadmium	0.4	mg/kg	< 0.4	1.1	< 0.4	< 0.4
Chromium	5	mg/kg	15	24	17	8.6
Copper	5	mg/kg	< 5	120	< 5	< 5
Iron	5	mg/kg	32000	45000	3400	8100
Lead	5	mg/kg	12	360	8.5	17
Manganese	5	mg/kg	5.1	880	46	23
Mercury	0.05	mg/kg	< 0.05	0.64	< 0.05	< 0.05
Nickel	5	mg/kg	< 5	11	< 5	< 5
Tin	10	mg/kg	< 10	14	< 10	< 10
Zinc	5	mg/kg	11	390	10	110

Client Sample ID Sample Matrix Eurofins | mgt Sample No. Date Sampled Test/Reference	LOR	Unit	BH9_1.5-1.6 Soil S13-Jl19355 Jul 23, 2013	BH10_0.9-1.0 Soil S13-Jl19356 Jul 23, 2013	BH10_2-2.1 Soil S13-Jl19357 Jul 23, 2013	BH11_0.1-0.2 Soil S13-Jl19358 Jul 23, 2013
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	21	20	< 20	21
TRH C15-C28	50	mg/kg	91	< 50	< 50	91
TRH C29-C36	50	mg/kg	< 50	< 50	< 50	150
TRH C10-36 (Total)	50	mg/kg	110	< 50	< 50	260
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	120	114	112	122
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	110	< 100	< 100	180
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100	260
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	0.8	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	0.7	< 0.5	< 0.5	< 0.5
Total PAH	1	mg/kg	1.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ*	0.5	mg/kg	0.6	0.6	0.6	0.6
2-Fluorobiphenyl (surr.)	1	%	76	75	70	86
p-Terphenyl-d14 (surr.)	1	%	82	79	78	94
Speciated Phenols						
2.4-Dichlorophenol	0.5	mg/kg	< 0.5	< 0.5	-	-
2.4-Dimethylphenol	0.5	mg/kg	< 0.5	< 0.5	-	-
2.4.5-Trichlorophenol	0.5	mg/kg	< 0.5	< 0.5	-	-
2.4.6-Trichlorophenol	0.5	mg/kg	< 0.5	< 0.5	-	-
Phenol	0.5	mg/kg	< 0.5	< 0.5	-	-

Client Sample ID			BH9_1.5-1.6	BH10_0.9-1.0	BH10_2-2.1	BH11_0.1-0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins | mgt Sample No.			S13-Jl19355	S13-Jl19356	S13-Jl19357	S13-Jl19358
Date Sampled			Jul 23, 2013	Jul 23, 2013	Jul 23, 2013	Jul 23, 2013
Test/Reference	LOR	Unit				
Speciated Phenols						
2-Methylphenol (o-Cresol)	0.5	mg/kg	< 0.5	< 0.5	-	-
3&4-Methylphenol (m&p-Cresol)	1	mg/kg	< 1	< 1	-	-
2-Chlorophenol	0.5	mg/kg	< 0.5	< 0.5	-	-
2-Nitrophenol	0.5	mg/kg	< 0.5	< 0.5	-	-
4-Chloro-3-methylphenol	0.5	mg/kg	< 0.5	< 0.5	-	-
Pentachlorophenol	1	mg/kg	< 1	< 1	-	-
Phenol-d5 (surr.)	1	%	77	76	-	-
Ammonia (as N)	0.1	mg/kg	-	-	0.1	0.7
Sulphate (as S)	10	mg/kg	-	-	13	< 10
% Moisture	0.1	%	19	20	18	7.4
Asbestos			see attached	see attached	-	-
Asbestos (% weight as per WA Guidelines)			see attached	see attached	-	-
Heavy Metals						
Aluminium	10	mg/kg	13000	12000	11000	4700
Arsenic	2	mg/kg	4.2	< 2	2.3	2.5
Cadmium	0.4	mg/kg	< 0.4	1.2	< 0.4	< 0.4
Chromium	5	mg/kg	11	14	11	10.0
Copper	5	mg/kg	< 5	20	< 5	42
Iron	5	mg/kg	14000	9600	15000	15000
Lead	5	mg/kg	13	45	9.9	17
Manganese	5	mg/kg	11	130	< 5	130
Mercury	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Nickel	5	mg/kg	< 5	< 5	< 5	12
Tin	10	mg/kg	< 10	< 10	< 10	< 10
Zinc	5	mg/kg	78	52	8.9	85

Client Sample ID			BH11_0.7-0.8	D1	D2
Sample Matrix			Soil	Soil	Soil
Eurofins | mgt Sample No.			S13-Jl19359	S13-Jl19360	S13-Jl19361
Date Sampled			Jul 23, 2013	Jul 23, 2013	Jul 23, 2013
Test/Reference	LOR	Unit			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions					
TRH C6-C9	20	mg/kg	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	190	< 50
TRH C29-C36	50	mg/kg	< 50	580	150
TRH C10-36 (Total)	50	mg/kg	< 50	770	150
BTEX					
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Xylenes - Total	0.3	mg/kg	< 0.3	< 0.3	< 0.3

Client Sample ID			BH11_0.7-0.8	D1	D2
Sample Matrix			Soil	Soil	Soil
Eurofins | mgt Sample No.			S13-Jl19359	S13-Jl19360	S13-Jl19361
Date Sampled			Jul 23, 2013	Jul 23, 2013	Jul 23, 2013
Test/Reference	LOR	Unit			
BTEX					
4-Bromofluorobenzene (surr.)	1	%	116	123	117
Total Recoverable Hydrocarbons - 2013 NEPM Fractions					
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	610	140
TRH >C34-C40	100	mg/kg	< 100	620	140
Polycyclic Aromatic Hydrocarbons					
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	0.9
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	0.8
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	0.7
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	0.8
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	1.8
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	0.7
Pyrene	0.5	mg/kg	< 0.5	< 0.5	1.7
Total PAH	1	mg/kg	< 0.5	< 0.5	7.9
Benzo(a)pyrene TEQ*	0.5	mg/kg	0.6	0.6	1.3
2-Fluorobiphenyl (surr.)	1	%	77	76	77
p-Terphenyl-d14 (surr.)	1	%	81	85	87
Speciated Phenols					
2.4-Dichlorophenol	0.5	mg/kg	< 0.5	< 0.5	-
2.4-Dimethylphenol	0.5	mg/kg	< 0.5	< 0.5	-
2.4.5-Trichlorophenol	0.5	mg/kg	< 0.5	< 0.5	-
2.4.6-Trichlorophenol	0.5	mg/kg	< 0.5	< 0.5	-
Phenol	0.5	mg/kg	< 0.5	< 0.5	-
2-Methylphenol (o-Cresol)	0.5	mg/kg	< 0.5	< 0.5	-
3&4-Methylphenol (m&p-Cresol)	1	mg/kg	< 1	< 1	-
2-Chlorophenol	0.5	mg/kg	< 0.5	< 0.5	-
2-Nitrophenol	0.5	mg/kg	< 0.5	< 0.5	-
4-Chloro-3-methylphenol	0.5	mg/kg	< 0.5	< 0.5	-
Pentachlorophenol	1	mg/kg	< 1	< 1	-
Phenol-d5 (surr.)	1	%	80	78	-
Ammonia (as N)	0.1	mg/kg	-	-	1.0
Sulphate (as S)	10	mg/kg	-	-	< 10
% Moisture	0.1	%	6.4	9.4	25
Asbestos			see attached	see attached	-

Client Sample ID Sample Matrix Eurofins | mgt Sample No. Date Sampled Test/Reference	LOR	Unit	BH11_0.7-0.8 Soil S13-Jl19359 Jul 23, 2013	D1 Soil S13-Jl19360 Jul 23, 2013	D2 Soil S13-Jl19361 Jul 23, 2013
Asbestos (% weight as per WA Guidelines)			see attached	-	-
Heavy Metals					
Aluminium	10	mg/kg	11000	2700	7800
Arsenic	2	mg/kg	< 2	3.2	7.4
Cadmium	0.4	mg/kg	< 0.4	6.7	< 0.4
Chromium	5	mg/kg	31	7.7	16
Copper	5	mg/kg	18	41	49
Iron	5	mg/kg	19000	9100	17000
Lead	5	mg/kg	< 5	120	100
Manganese	5	mg/kg	230	190	150
Mercury	0.05	mg/kg	< 0.05	0.19	< 0.05
Nickel	5	mg/kg	29	5.9	11
Tin	10	mg/kg	< 10	< 10	< 10
Zinc	5	mg/kg	36	330	130

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

Description	Testing Site	Extracted	Holding Time
Eurofins | mgt Suite 7			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Sydney	Jul 30, 2013	14 Day
- Method: E004 Petroleum Hydrocarbons (TPH)			
BTEX	Sydney	Jul 29, 2013	14 Day
- Method: E029/E016 BTEX			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Jul 30, 2013	14 Day
- Method: LM-LTM-ORG2010			
Polycyclic Aromatic Hydrocarbons	Sydney	Jul 30, 2013	14 Day
- Method: E007 Polyaromatic Hydrocarbons (PAH)			
Metals M8	Sydney	Jul 26, 2013	28 Day
- Method: E022 Acid Extractable metals in Soils & E026 Mercury			
Eurofins | mgt Suite 3			
Speciated Phenols	Sydney	Jul 30, 2013	14 Day
- Method: E008 Speciated Phenols			
Ammonia (as N)	Sydney	Jul 26, 2013	28 Day
- Method: E036/E050 Ammonia as N			
Sulphate (as S)	Sydney	Jul 29, 2013	28 Day
- Method: E045 Sulphate			
% Moisture	Sydney	Jul 26, 2013	28 Day
- Method: E005 Moisture Content			
Heavy Metals	Sydney	Jul 26, 2013	180 Day
- Method: E022 Acid Extractable metals in Soils			

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NATA # 1261 Site # 18217

Brisbane
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Murarrie QLD 4172
Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

Company Name:	Aargus P/L	**Order No.:**	
Address:	446 Parramatta Road Petersham NSW 2049	**Report #:** **Phone:** **Fax:**	387159 1300 137 038 1300 136 038
Client Job No.:	MARRICKVILLE ES5544		

Received:	Jul 25, 2013 1:30 PM
Due:	Aug 1, 2013
Priority:	5 Day
Contact Name:	Mark Kelly

Eurofins | mgt Client Manager: Ruth Callander

Sample Detail					% Moisture	Aluminium	Aluminium (filtered)	Ammonia (as N)	Asbestos	Asbestos (% weight as per WA Guidelines)	Iron	Iron (filtered)	Manganese	Manganese (filtered)	Sulphate (as S)	Tin	Tin (filtered)	Polycyclic Aromatic Hydrocarbons	Metals M8 filtered	BTEX	Total Recoverable Hydrocarbons	Eurofins | mgt Suite 6	Eurofins | mgt Suite 3	Eurofins | mgt Suite 7
Laboratory where analysis is conducted																								
Melbourne Laboratory - NATA Site # 1254 & 14271																								
Sydney Laboratory - NATA Site # 18217					X	X	X	X			X	X	X	X	X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794																								
External Laboratory									X	X														
Sample ID	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**																				
BH1_0.5-0.7	Jul 23, 2013		Soil	S13-Jl19339	X	X			X		X		X			X						X	X	
BH1_1.5-1.6	Jul 23, 2013		Soil	S13-Jl19340	X	X		X			X		X		X	X								X
BH2_0.3-0.5	Jul 23, 2013		Soil	S13-Jl19341	X	X		X			X		X		X	X								X
BH2_1-1.2	Jul 23, 2013		Soil	S13-Jl19342	X	X			X		X		X			X						X	X	
BH3_0.4-0.6	Jul 23, 2013		Soil	S13-Jl19343	X	X			X	X	X		X			X						X	X	
BH4_0.5-0.7	Jul 23, 2013		Soil	S13-Jl19344	X	X		X			X		X		X	X								X
BH4_1.7-1.9	Jul 23, 2013		Soil	S13-Jl19345	X	X			X	X	X		X			X						X	X	
BH5_0.3-0.5	Jul 23, 2013		Soil	S13-Jl19346	X	X		X			X		X		X	X								X
BH5_1.6-1.7	Jul 23, 2013		Soil	S13-Jl19347	X	X			X	X	X		X			X						X	X	
BH6_0.7-0.9	Jul 23, 2013		Soil	S13-Jl19348	X	X			X	X	X		X			X						X	X	

eurofins | mgt

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NATA # 1261 Site # 20794

Company Name: Aargus P/L
Address: 446 Parramatta Road
Petersham
NSW 2049

Client Job No.: MARRICKVILLE ES5544

Order No.:
Report #: 387159
Phone: 1300 137 038
Fax: 1300 136 038

Received: Jul 25, 2013 1:30 PM
Due: Aug 1, 2013
Priority: 5 Day
Contact Name: Mark Kelly

Eurofins | mgt Client Manager: Ruth Callander

Sample Detail					% Moisture	Aluminium	Aluminium (filtered)	Ammonia (as N)	Asbestos	Asbestos (% weight as per WA Guidelines)	Iron	Iron (filtered)	Manganese	Manganese (filtered)	Sulphate (as S)	Tin	Tin (filtered)	Polycyclic Aromatic Hydrocarbons	Metals M8 filtered	BTEX	Total Recoverable Hydrocarbons	Eurofins | mgt Suite 6	Eurofins | mgt Suite 3	Eurofins | mgt Suite 7
Laboratory where analysis is conducted																								
Melbourne Laboratory - NATA Site # 1254 & 14271																								
Sydney Laboratory - NATA Site # 18217					X	X	X	X			X	X	X	X	X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794																								
External Laboratory									X	X														
BH6_1.6-1.7	Jul 23, 2013		Soil	S13-Jl19349	X	X		X			X		X		X	X								X
BH7_0.4-0.6	Jul 23, 2013		Soil	S13-Jl19350	X	X		X			X		X		X	X								X
BH7_1.4-1.6	Jul 23, 2013		Soil	S13-Jl19351	X	X			X	X	X		X			X						X	X	
BH8_0.2-0.3	Jul 23, 2013		Soil	S13-Jl19352	X	X			X	X	X		X			X						X	X	
BH8_3.0-3.1	Jul 23, 2013		Soil	S13-Jl19353	X	X			X	X	X		X			X						X	X	
BH9_0.4-0.5	Jul 23, 2013		Soil	S13-Jl19354	X	X		X			X		X		X	X								X
BH9_1.5-1.6	Jul 23, 2013		Soil	S13-Jl19355	X	X			X	X	X		X			X						X	X	
BH10_0.9-1.0	Jul 23, 2013		Soil	S13-Jl19356	X	X			X	X	X		X			X						X	X	
BH10_2-2.1	Jul 23, 2013		Soil	S13-Jl19357	X	X		X			X		X		X	X								X
BH11_0.1-0.2	Jul 23, 2013		Soil	S13-Jl19358	X	X		X			X		X		X	X								X
BH11_0.7-0.8	Jul 23, 2013		Soil	S13-Jl19359	X	X			X	X	X		X			X						X	X	

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Client Job No.: MARRICKVILLE ES5544

Order No.:
Report #: 387159
Phone: 1300 137 038
Fax: 1300 136 038

Received: Jul 25, 2013 1:30 PM
Due: Aug 1, 2013
Priority: 5 Day
Contact Name: Mark Kelly

Eurofins | mgt Client Manager: Ruth Callander

Sample Detail					% Moisture	Aluminium	Aluminium (filtered)	Ammonia (as N)	Asbestos	Asbestos (% weight as per WA Guidelines)	Iron	Iron (filtered)	Manganese	Manganese (filtered)	Sulphate (as S)	Tin	Tin (filtered)	Polycyclic Aromatic Hydrocarbons	Metals M8 filtered	BTEX	Total Recoverable Hydrocarbons	Eurofins | mgt Suite 6	Eurofins | mgt Suite 3	Eurofins | mgt Suite 7
Laboratory where analysis is conducted																								
Melbourne Laboratory - NATA Site # 1254 & 14271																								
Sydney Laboratory - NATA Site # 18217					X	X	X	X			X	X	X	X	X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794																								
External Laboratory									X	X														
D1	Jul 23, 2013		Soil	S13-Jl19360	X	X			X		X		X			X						X	X	
D2	Jul 23, 2013		Soil	S13-Jl19361	X	X		X			X		X		X	X								X
R1	Jul 23, 2013		Water	S13-Jl19362			X					X		X			X	X	X	X	X			

Eurofins | mgt Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Actual PQLs are matrix dependant. Quoted PQLs may be raised where sample extracts are diluted due to interferences.
4. Results are uncorrected for matrix spikes or surrogate recoveries.
5. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
6. Samples were analysed on an 'as received' basis. 7. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Acknowledgment.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

****NOTE:** pH duplicates are reported as a range NOT as RPD

UNITS

mg/kg: milligrams per Kilogram

ug/l: micrograms per litre

ppb: Parts per billion

org/100ml: Organisms per 100 millilitres

MPN/100mL: Most Probable Number of organisms per 100 millilitres

mg/l: milligrams per litre

ppm: Parts per million

%: Percentage

NTU: Units

TERMS

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery
CRM	Certified Reference Material - reported as percent recovery
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands. In the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
Batch Duplicate	A second piece of analysis from a sample outside of the clients batch of samples but run within the laboratory batch of analysis.
Batch SPIKE	Spike recovery reported on a sample from outside of the clients batch of samples but run within the laboratory batch of analysis.
USEPA	United States Environment Protection Authority
APHA	American Public Health Association
ASLP	Australian Standard Leaching Procedure (AS4439.3)
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within

QC - ACCEPTANCE CRITERIA

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries : Recoveries must lie between 50-150% - Phenols 20-130%.

QC DATA GENERAL COMMENTS

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxophene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxophene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Arochlor 1260 in Matrix Spikes and LCS's.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPD's are calculated from raw analytical data thus it is possible to have two sets of data.

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions E004 Petroleum Hydrocarbons (TPH)							
TRH C6-C9	mg/kg	< 20			20	Pass	
TRH C10-C14	mg/kg	< 20			20	Pass	
TRH C15-C28	mg/kg	< 50			50	Pass	
TRH C29-C36	mg/kg	< 50			50	Pass	
Method Blank							
BTEX E029/E016 BTEX							
Benzene	mg/kg	< 0.1			0.1	Pass	
Toluene	mg/kg	< 0.1			0.1	Pass	
Ethylbenzene	mg/kg	< 0.1			0.1	Pass	
m&p-Xylenes	mg/kg	< 0.2			0.2	Pass	
o-Xylene	mg/kg	< 0.1			0.1	Pass	
Xylenes - Total	mg/kg	< 0.3			0.3	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions LM-LTM-ORG2010							
Naphthalene	mg/kg	< 0.5			0.5	Pass	
TRH C6-C10	mg/kg	< 20			20	Pass	
TRH C6-C10 less BTEX (F1)	mg/kg	< 20			20	Pass	
TRH >C10-C16	mg/kg	< 50			50	Pass	
TRH >C16-C34	mg/kg	< 100			100	Pass	
TRH >C34-C40	mg/kg	< 100			100	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons E007 Polyaromatic Hydrocarbons (PAH)							
Acenaphthene	mg/kg	< 0.5			0.5	Pass	
Acenaphthylene	mg/kg	< 0.5			0.5	Pass	
Anthracene	mg/kg	< 0.5			0.5	Pass	
Benz(a)anthracene	mg/kg	< 0.5			0.5	Pass	
Benzo(a)pyrene	mg/kg	< 0.5			0.5	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Benzo(g.h.i)perylene	mg/kg	< 0.5			0.5	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Chrysene	mg/kg	< 0.5			0.5	Pass	
Dibenz(a.h)anthracene	mg/kg	< 0.5			0.5	Pass	
Fluoranthene	mg/kg	< 0.5			0.5	Pass	
Fluorene	mg/kg	< 0.5			0.5	Pass	
Indeno(1.2.3-cd)pyrene	mg/kg	< 0.5			0.5	Pass	
Naphthalene	mg/kg	< 0.5			0.5	Pass	
Phenanthrene	mg/kg	< 0.5			0.5	Pass	
Pyrene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Speciated Phenols E008 Speciated Phenols							
2.4-Dichlorophenol	mg/kg	< 0.5			0.5	Pass	
2.4-Dimethylphenol	mg/kg	< 0.5			0.5	Pass	
2.4.5-Trichlorophenol	mg/kg	< 0.5			0.5	Pass	
2.4.6-Trichlorophenol	mg/kg	< 0.5			0.5	Pass	
Phenol	mg/kg	< 0.5			0.5	Pass	
2-Methylphenol (o-Cresol)	mg/kg	< 0.5			0.5	Pass	
3&4-Methylphenol (m&p-Cresol)	mg/kg	< 1			1	Pass	
2-Chlorophenol	mg/kg	< 0.5			0.5	Pass	
2-Nitrophenol	mg/kg	< 0.5			0.5	Pass	
4-Chloro-3-methylphenol	mg/kg	< 0.5			0.5	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Pentachlorophenol	mg/kg	< 1			1	Pass	
Method Blank							
Ammonia (as N)	mg/kg	< 0.1			0.1	Pass	
Method Blank							
Heavy Metals E022 Acid Extractable metals in Soils							
Aluminium	mg/kg	< 10			10	Pass	
Arsenic	mg/kg	< 2			2	Pass	
Cadmium	mg/kg	< 0.4			0.4	Pass	
Chromium	mg/kg	< 5			5	Pass	
Copper	mg/kg	< 5			5	Pass	
Iron	mg/kg	< 5			5	Pass	
Lead	mg/kg	< 5			5	Pass	
Manganese	mg/kg	< 5			5	Pass	
Mercury	mg/kg	< 0.05			0.05	Pass	
Nickel	mg/kg	< 5			5	Pass	
Tin	mg/kg	< 10			10	Pass	
Zinc	mg/kg	< 5			5	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions E004 Petroleum Hydrocarbons (TPH)							
TRH C6-C9	%	96			70-130	Pass	
TRH C10-C14	%	94			70-130	Pass	
LCS - % Recovery							
BTEX E029/E016 BTEX							
Benzene	%	111			70-130	Pass	
Toluene	%	104			70-130	Pass	
Ethylbenzene	%	99			70-130	Pass	
m&p-Xylenes	%	97			70-130	Pass	
o-Xylene	%	95			70-130	Pass	
Xylenes - Total	%	96			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions LM-LTM-ORG2010							
Naphthalene	%	74			70-130	Pass	
TRH C6-C10	%	104			70-130	Pass	
TRH >C10-C16	%	109			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons E007 Polyaromatic Hydrocarbons (PAH)							
Acenaphthene	%	96			70-130	Pass	
Acenaphthylene	%	86			70-130	Pass	
Anthracene	%	103			70-130	Pass	
Benz(a)anthracene	%	88			70-130	Pass	
Benzo(a)pyrene	%	91			70-130	Pass	
Benzo(b&j)fluoranthene	%	113			70-130	Pass	
Benzo(g.h.i)perylene	%	89			70-130	Pass	
Benzo(k)fluoranthene	%	97			70-130	Pass	
Chrysene	%	98			70-130	Pass	
Dibenz(a.h)anthracene	%	89			70-130	Pass	
Fluoranthene	%	96			70-130	Pass	
Fluorene	%	95			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	90			70-130	Pass	
Naphthalene	%	93			70-130	Pass	
Phenanthrene	%	86			70-130	Pass	
Pyrene	%	96			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
LCS - % Recovery							
Speciated Phenols E008 Speciated Phenols							
2.4-Dichlorophenol	%	111			70-130	Pass	
2.4-Dimethylphenol	%	100			70-130	Pass	
2.4.5-Trichlorophenol	%	104			70-130	Pass	
2.4.6-Trichlorophenol	%	104			70-130	Pass	
Phenol	%	121			70-130	Pass	
2-Methylphenol (o-Cresol)	%	113			70-130	Pass	
3&4-Methylphenol (m&p-Cresol)	%	114			70-130	Pass	
2-Chlorophenol	%	120			70-130	Pass	
2-Nitrophenol	%	94			70-130	Pass	
4-Chloro-3-methylphenol	%	101			70-130	Pass	
Pentachlorophenol	%	72			70-130	Pass	
LCS - % Recovery							
Ammonia (as N)	%	107			70-130	Pass	
LCS - % Recovery							
Heavy Metals E022 Acid Extractable metals in Soils							
Aluminium	%	98			70-130	Pass	
Arsenic	%	86			70-130	Pass	
Cadmium	%	99			70-130	Pass	
Chromium	%	95			70-130	Pass	
Copper	%	115			70-130	Pass	
Iron	%	130			70-130	Pass	
Lead	%	87			70-130	Pass	
Manganese	%	100			70-130	Pass	
Mercury	%	98			70-130	Pass	
Nickel	%	89			70-130	Pass	
Tin	%	89			70-130	Pass	
Zinc	%	117			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	S13-Jl19339	CP	%	91			70-130	Pass	
TRH C10-C14	S13-Jl19339	CP	%	105			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	S13-Jl19339	CP	%	106			70-130	Pass	
Toluene	S13-Jl19339	CP	%	99			70-130	Pass	
Ethylbenzene	S13-Jl19339	CP	%	94			70-130	Pass	
m&p-Xylenes	S13-Jl19339	CP	%	92			70-130	Pass	
o-Xylene	S13-Jl19339	CP	%	91			70-130	Pass	
Xylenes - Total	S13-Jl19339	CP	%	92			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	S13-Jl19339	CP	%	74			70-130	Pass	
TRH C6-C10	S13-Jl19339	CP	%	95			70-130	Pass	
TRH >C10-C16	S13-Jl19339	CP	%	127			70-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	S13-Jl20333	NCP	%	110			70-130	Pass	
Acenaphthylene	S13-Jl20333	NCP	%	114			70-130	Pass	
Anthracene	S13-Jl20333	NCP	%	117			70-130	Pass	
Benz(a)anthracene	S13-Jl20333	NCP	%	117			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Benzo(a)pyrene	S13-Jl20333	NCP	%	95			70-130	Pass	
Benzo(b&j)fluoranthene	S13-Jl20333	NCP	%	125			70-130	Pass	
Benzo(g.h.i)perylene	S13-Jl20333	NCP	%	61			70-130	Fail	Q08
Benzo(k)fluoranthene	S13-Jl20333	NCP	%	106			70-130	Pass	
Chrysene	S13-Jl20333	NCP	%	107			70-130	Pass	
Dibenz(a.h)anthracene	S13-Jl20333	NCP	%	82			70-130	Pass	
Fluoranthene	S13-Jl20333	NCP	%	122			70-130	Pass	
Fluorene	S13-Jl20333	NCP	%	115			70-130	Pass	
Indeno(1.2.3-cd)pyrene	S13-Jl20333	NCP	%	73			70-130	Pass	
Naphthalene	S13-Jl20333	NCP	%	124			70-130	Pass	
Phenanthrene	S13-Jl20333	NCP	%	106			70-130	Pass	
Pyrene	S13-Jl20333	NCP	%	119			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Aluminium	S13-Jl19339	CP	%	96			70-130	Pass	
Arsenic	S13-Jl19339	CP	%	78			70-130	Pass	
Chromium	S13-Jl19339	CP	%	76			70-130	Pass	
Iron	S13-Jl19339	CP	%	93			70-130	Pass	
Mercury	S13-Jl19339	CP	%	99			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	S13-Jl19349	CP	%	94			70-130	Pass	
TRH C10-C14	S13-Jl19349	CP	%	93			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	S13-Jl19349	CP	%	108			70-130	Pass	
Toluene	S13-Jl19349	CP	%	101			70-130	Pass	
Ethylbenzene	S13-Jl19349	CP	%	97			70-130	Pass	
m&p-Xylenes	S13-Jl19349	CP	%	95			70-130	Pass	
o-Xylene	S13-Jl19349	CP	%	94			70-130	Pass	
Xylenes - Total	S13-Jl19349	CP	%	95			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	S13-Jl19349	CP	%	73			70-130	Pass	
TRH C6-C10	S13-Jl19349	CP	%	103			70-130	Pass	
TRH >C10-C16	S13-Jl19349	CP	%	109			70-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	S13-Jl19349	CP	%	98			70-130	Pass	
Acenaphthylene	S13-Jl19349	CP	%	92			70-130	Pass	
Anthracene	S13-Jl19349	CP	%	93			70-130	Pass	
Benz(a)anthracene	S13-Jl19349	CP	%	75			70-130	Pass	
Benzo(a)pyrene	S13-Jl19349	CP	%	79			70-130	Pass	
Benzo(b&j)fluoranthene	S13-Jl19349	CP	%	77			70-130	Pass	
Benzo(g.h.i)perylene	S13-Jl19349	CP	%	84			70-130	Pass	
Benzo(k)fluoranthene	S13-Jl19349	CP	%	87			70-130	Pass	
Chrysene	S13-Jl19349	CP	%	90			70-130	Pass	
Dibenz(a.h)anthracene	S13-Jl19349	CP	%	89			70-130	Pass	
Fluoranthene	S13-Jl19349	CP	%	90			70-130	Pass	
Fluorene	S13-Jl19349	CP	%	98			70-130	Pass	
Indeno(1.2.3-cd)pyrene	S13-Jl19349	CP	%	87			70-130	Pass	
Naphthalene	S13-Jl19349	CP	%	93			70-130	Pass	
Phenanthrene	S13-Jl19349	CP	%	96			70-130	Pass	
Pyrene	S13-Jl19349	CP	%	89			70-130	Pass	
Spike - % Recovery									

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Heavy Metals				Result 1					
Aluminium	S13-Jl19349	CP	%	106			70-130	Pass	
Arsenic	S13-Jl19349	CP	%	85			70-130	Pass	
Cadmium	S13-Jl19349	CP	%	101			70-130	Pass	
Chromium	S13-Jl19349	CP	%	85			70-130	Pass	
Copper	S13-Jl19349	CP	%	71			70-130	Pass	
Iron	S13-Jl19349	CP	%	120			70-130	Pass	
Lead	S13-Jl19349	CP	%	92			70-130	Pass	
Mercury	S13-Jl19349	CP	%	98			70-130	Pass	
Nickel	S13-Jl19349	CP	%	101			70-130	Pass	
Zinc	S13-Jl19349	CP	%	104			70-130	Pass	
Spike - % Recovery									
				Result 1					
Ammonia (as N)	S13-Jl19357	CP	%	104			70-130	Pass	
Sulphate (as S)	S13-Jl19357	CP	%	99			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	S13-Jl19359	CP	%	99			70-130	Pass	
TRH C10-C14	S13-Jl19359	CP	%	99			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	S13-Jl19359	CP	%	110			70-130	Pass	
Toluene	S13-Jl19359	CP	%	103			70-130	Pass	
Ethylbenzene	S13-Jl19359	CP	%	98			70-130	Pass	
m&p-Xylenes	S13-Jl19359	CP	%	96			70-130	Pass	
o-Xylene	S13-Jl19359	CP	%	95			70-130	Pass	
Xylenes - Total	S13-Jl19359	CP	%	95			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	S13-Jl19359	CP	%	78			70-130	Pass	
TRH C6-C10	S13-Jl19359	CP	%	106			70-130	Pass	
TRH >C10-C16	S13-Jl19359	CP	%	110			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Aluminium	S13-Jl19359	CP	%	95			70-130	Pass	
Arsenic	S13-Jl19359	CP	%	99			70-130	Pass	
Cadmium	S13-Jl19359	CP	%	88			70-130	Pass	
Chromium	S13-Jl19359	CP	%	97			70-130	Pass	
Copper	S13-Jl19359	CP	%	113			70-130	Pass	
Lead	S13-Jl19359	CP	%	100			70-130	Pass	
Mercury	S13-Jl19359	CP	%	99			70-130	Pass	
Nickel	S13-Jl19359	CP	%	108			70-130	Pass	
Zinc	S13-Jl19359	CP	%	100			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	S13-Jl19339	CP	mg/kg	< 20	< 20	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	S13-Jl19339	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	S13-Jl19339	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	S13-Jl19339	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	S13-Jl19339	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	S13-Jl19339	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	

Duplicate									
BTEX				Result 1	Result 2	RPD			
Xylenes - Total	S13-Jl19339	CP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	S13-Jl19339	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
TRH C6-C10	S13-Jl19339	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C6-C10 less BTEX (F1)	S13-Jl19339	CP	mg/kg	< 20	< 20	<1	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	S13-Jl19339	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	S13-Jl19339	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	S13-Jl19339	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	S13-Jl19339	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	S13-Jl19339	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	S13-Jl19339	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	S13-Jl19339	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	S13-Jl19339	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	S13-Jl19339	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	S13-Jl19339	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	S13-Jl19339	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	S13-Jl19339	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	S13-Jl19339	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	S13-Jl19339	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	S13-Jl19339	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	S13-Jl19339	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Speciated Phenols				Result 1	Result 2	RPD			
2.4-Dichlorophenol	S13-Jl19339	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2.4-Dimethylphenol	S13-Jl19339	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2.4.5-Trichlorophenol	S13-Jl19339	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2.4.6-Trichlorophenol	S13-Jl19339	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenol	S13-Jl19339	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2-Methylphenol (o-Cresol)	S13-Jl19339	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
3&4-Methylphenol (m&p-Cresol)	S13-Jl19339	CP	mg/kg	< 1	< 1	<1	30%	Pass	
2-Chlorophenol	S13-Jl19339	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2-Nitrophenol	S13-Jl19339	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
4-Chloro-3-methylphenol	S13-Jl19339	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pentachlorophenol	S13-Jl19339	CP	mg/kg	< 1	< 1	<1	30%	Pass	
Duplicate									
Metals M8				Result 1	Result 2	RPD			
Arsenic	S13-Jl19339	CP	mg/kg	5.0	5.1	1.0	30%	Pass	
Cadmium	S13-Jl19339	CP	mg/kg	14	12	18	30%	Pass	
Chromium	S13-Jl19339	CP	mg/kg	13	14	12	30%	Pass	
Copper	S13-Jl19339	CP	mg/kg	47	47	<1	30%	Pass	
Iron	S13-Jl19339	CP	mg/kg	26000	23000	11	30%	Pass	
Lead	S13-Jl19339	CP	mg/kg	28	29	2.0	30%	Pass	
Manganese	S13-Jl19339	CP	mg/kg	420	370	12	30%	Pass	
Mercury	S13-Jl19339	CP	mg/kg	0.26	0.39	40	30%	Fail	Q15
Nickel	S13-Jl19339	CP	mg/kg	9.0	7.6	17	30%	Pass	
Tin	S13-Jl19339	CP	mg/kg	< 10	< 10	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Ammonia (as N)	S13-Jl19341	CP	mg/kg	0.7	0.5	35	30%	Fail	Q15
Sulphate (as S)	S13-Jl19341	CP	mg/kg	< 10	< 10	<1	30%	Pass	

Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	S13-Jl19349	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C10-C14	S13-Jl19349	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	S13-Jl19349	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C29-C36	S13-Jl19349	CP	mg/kg	< 50	< 50	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	S13-Jl19349	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	S13-Jl19349	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	S13-Jl19349	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	S13-Jl19349	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	S13-Jl19349	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total	S13-Jl19349	CP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	S13-Jl19349	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
TRH C6-C10	S13-Jl19349	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C6-C10 less BTEX (F1)	S13-Jl19349	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH >C10-C16	S13-Jl19349	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C16-C34	S13-Jl19349	CP	mg/kg	< 100	< 100	<1	30%	Pass	
TRH >C34-C40	S13-Jl19349	CP	mg/kg	< 100	< 100	<1	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	S13-Jl19349	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	S13-Jl19349	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	S13-Jl19349	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	S13-Jl19349	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	S13-Jl19349	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	S13-Jl19349	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	S13-Jl19349	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	S13-Jl19349	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	S13-Jl19349	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	S13-Jl19349	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	S13-Jl19349	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	S13-Jl19349	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	S13-Jl19349	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	S13-Jl19349	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	S13-Jl19349	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	S13-Jl19349	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Metals M8				Result 1	Result 2	RPD			
Arsenic	S13-Jl19349	CP	mg/kg	12	13	9.0	30%	Pass	
Cadmium	S13-Jl19349	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Copper	S13-Jl19349	CP	mg/kg	17	8.9	65	30%	Fail	Q15
Iron	S13-Jl19349	CP	mg/kg	44000	40000	9.0	30%	Pass	
Lead	S13-Jl19349	CP	mg/kg	18	20	13	30%	Pass	
Manganese	S13-Jl19349	CP	mg/kg	33	29	13	30%	Pass	
Mercury	S13-Jl19349	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Nickel	S13-Jl19349	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Tin	S13-Jl19349	CP	mg/kg	< 10	< 10	<1	30%	Pass	
Zinc	S13-Jl19349	CP	mg/kg	8.6	17	68	30%	Fail	Q15
Duplicate									
				Result 1	Result 2	RPD			
Ammonia (as N)	S13-Jl19357	CP	mg/kg	0.1	0.1	14	30%	Pass	
Sulphate (as S)	S13-Jl19357	CP	mg/kg	13	13	1.0	30%	Pass	

Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	S13-Jl19359	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C10-C14	S13-Jl19359	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	S13-Jl19359	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C29-C36	S13-Jl19359	CP	mg/kg	< 50	< 50	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	S13-Jl19359	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	S13-Jl19359	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	S13-Jl19359	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	S13-Jl19359	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	S13-Jl19359	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total	S13-Jl19359	CP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	S13-Jl19359	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
TRH C6-C10	S13-Jl19359	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C6-C10 less BTEX (F1)	S13-Jl19359	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH >C10-C16	S13-Jl19359	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C16-C34	S13-Jl19359	CP	mg/kg	< 100	< 100	<1	30%	Pass	
TRH >C34-C40	S13-Jl19359	CP	mg/kg	< 100	< 100	<1	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	S13-Jl19359	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	S13-Jl19359	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	S13-Jl19359	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	S13-Jl19359	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	S13-Jl19359	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	S13-Jl19359	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	S13-Jl19359	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	S13-Jl19359	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	S13-Jl19359	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	S13-Jl19359	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	S13-Jl19359	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	S13-Jl19359	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	S13-Jl19359	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	S13-Jl19359	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	S13-Jl19359	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	S13-Jl19359	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Speciated Phenols				Result 1	Result 2	RPD			
2.4-Dichlorophenol	S13-Jl19359	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2.4-Dimethylphenol	S13-Jl19359	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2.4.5-Trichlorophenol	S13-Jl19359	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2.4.6-Trichlorophenol	S13-Jl19359	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenol	S13-Jl19359	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2-Methylphenol (o-Cresol)	S13-Jl19359	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
3&4-Methylphenol (m&p-Cresol)	S13-Jl19359	CP	mg/kg	< 1	< 1	<1	30%	Pass	
2-Chlorophenol	S13-Jl19359	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2-Nitrophenol	S13-Jl19359	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
4-Chloro-3-methylphenol	S13-Jl19359	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pentachlorophenol	S13-Jl19359	CP	mg/kg	< 1	< 1	<1	30%	Pass	
Duplicate									
Metals M8				Result 1	Result 2	RPD			
Arsenic	S13-Jl19359	CP	mg/kg	< 2	2.4	95	30%	Fail	Q15

Duplicate									
Metals M8				Result 1	Result 2	RPD			
Cadmium	S13-Jl19359	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	S13-Jl19359	CP	mg/kg	31	29	8.0	30%	Pass	
Copper	S13-Jl19359	CP	mg/kg	18	16	14	30%	Pass	
Iron	S13-Jl19359	CP	mg/kg	19000	15000	26	30%	Pass	
Lead	S13-Jl19359	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Manganese	S13-Jl19359	CP	mg/kg	230	230	1.0	30%	Pass	
Mercury	S13-Jl19359	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Nickel	S13-Jl19359	CP	mg/kg	29	40	29	30%	Pass	
Tin	S13-Jl19359	CP	mg/kg	< 10	< 10	<1	30%	Pass	
Zinc	S13-Jl19359	CP	mg/kg	36	36	<1	30%	Pass	

Comments

Asbestos was analysed by ASET. NATA accreditation number 14484. Report reference ASET34378/37558/1-13.

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Organic samples had Teflon liners	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	Yes

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
Q08	The matrix spike recovery is outside of the recommended acceptance criteria. An acceptable recovery was obtained for the laboratory control sample indicating a sample matrix interference
Q15	The RPD reported passes Eurofins | mgt's Acceptance Criteria as stipulated in SOP 05. Refer to Glossary Page of this report for further details

Authorised By

Ruth Callander	Client Services
Bob Symons	Senior Analyst-Inorganic (NSW)
James Norford	Senior Analyst-Metal (NSW)
Ryan Hamilton	Senior Analyst-Organic (NSW)
Ryan Hamilton	Senior Analyst-Volatile (NSW)

Dr. Bob Symons

Laboratory Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Uncertainty data is available on request

eurofins | mgt

Certificate of Analysis

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025.
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Aargus P/L
446 Parramatta Road
Petersham
NSW 2049

Attention: **Mark Kelly**

Report **387159-W**
Client Reference MARRICKVILLE ES5544
Received Date Jul 25, 2013

Client Sample ID			**R1**
Sample Matrix			**Water**
Eurofins | mgt Sample No.			**S13-Jl19362**
Date Sampled			**Jul 23, 2013**
Test/Reference	LOR	Unit	
Total Recoverable Hydrocarbons - 1999 NEPM Fractions			
TRH C6-C9	0.02	mg/L	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1
TRH C10-36 (Total)	0.1	mg/L	< 0.1
BTEX			
Benzene	0.001	mg/L	< 0.001
Toluene	0.001	mg/L	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002
o-Xylene	0.001	mg/L	< 0.001
Xylenes - Total	0.003	mg/L	< 0.003
4-Bromofluorobenzene (surr.)	1	%	84
Total Recoverable Hydrocarbons - 2013 NEPM Fractions			
Naphthalene[N02]	0.02	mg/L	< 0.02
TRH C6-C10	0.02	mg/L	< 0.02
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02
TRH >C10-C16	0.05	mg/L	< 0.05
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	0.03
TRH >C16-C34	0.1	mg/L	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1
Polycyclic Aromatic Hydrocarbons			
Acenaphthene	0.001	mg/L	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001
Anthracene	0.001	mg/L	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001
Chrysene	0.001	mg/L	< 0.001
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001
Fluoranthene	0.001	mg/L	< 0.001
Fluorene	0.001	mg/L	< 0.001
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001
Naphthalene	0.001	mg/L	< 0.001

Client Sample ID			R1
Sample Matrix			Water
Eurofins | mgt Sample No.			S13-Jl19362
Date Sampled			Jul 23, 2013
Test/Reference	LOR	Unit	
Polycyclic Aromatic Hydrocarbons			
Phenanthrene	0.001	mg/L	< 0.001
Pyrene	0.001	mg/L	< 0.001
Total PAH	0.001	mg/L	< 0.001
2-Fluorobiphenyl (surr.)	1	%	94
p-Terphenyl-d14 (surr.)	1	%	75
Heavy Metals			
Aluminium (filtered)	0.01	mg/L	0.01
Arsenic (filtered)	0.001	mg/L	< 0.001
Cadmium (filtered)	0.0001	mg/L	< 0.0001
Chromium (filtered)	0.001	mg/L	< 0.001
Copper (filtered)	0.001	mg/L	< 0.001
Iron (filtered)	0.05	mg/L	< 0.05
Lead (filtered)	0.001	mg/L	< 0.001
Manganese (filtered)	0.001	mg/L	< 0.001
Mercury (filtered)	0.0001	mg/L	< 0.0001
Nickel (filtered)	0.001	mg/L	0.002
Tin (filtered)	0.005	mg/L	< 0.005
Zinc (filtered)	0.005	mg/L	0.011

Description	Testing Site	Extracted	Holding Time
Eurofins | mgt Suite 7			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Sydney	Jul 26, 2013	7 Day
- Method: E004 Petroleum Hydrocarbons (TPH)			
BTEX	Sydney	Jul 29, 2013	14 Day
- Method: E029/E016 BTEX			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Jul 29, 2013	7 Day
- Method: LM-LTM-ORG2010			
Polycyclic Aromatic Hydrocarbons	Sydney	Jul 26, 2013	7 Day
- Method: E007 Polyaromatic Hydrocarbons (PAH)			
Heavy Metals (filtered)	Sydney	Jul 26, 2013	180 Day
- Method: E020/E030 Filtered Metals in Water			
Metals M8 filtered	Sydney	Jul 26, 2013	28 Day
- Method: E020/E030 Filtered Metals in Water & E026 Mercury			

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NATA # 1261 Site # 18217

Brisbane
1/21 Smallwood Place
Murarrie QLD 4172
Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

Company Name: Aargus P/L
Address: 446 Parramatta Road
Petersham
NSW 2049

Client Job No.: MARRICKVILLE ES5544

Order No.:
Report #: 387159
Phone: 1300 137 038
Fax: 1300 136 038

Received: Jul 25, 2013 1:30 PM
Due: Aug 1, 2013
Priority: 5 Day
Contact Name: Mark Kelly

Eurofins | mgt Client Manager: Ruth Callander

Sample Detail					% Moisture	Aluminium	Aluminium (filtered)	Ammonia (as N)	Asbestos	Asbestos (% weight as per WA Guidelines)	Iron	Iron (filtered)	Manganese	Manganese (filtered)	Sulphate (as S)	Tin	Tin (filtered)	Polycyclic Aromatic Hydrocarbons	Metals M8 filtered	BTEX	Total Recoverable Hydrocarbons	Eurofins | mgt Suite 6	Eurofins | mgt Suite 3	Eurofins | mgt Suite 7
Laboratory where analysis is conducted																								
Melbourne Laboratory - NATA Site # 1254 & 14271																								
Sydney Laboratory - NATA Site # 18217					X	X	X	X			X	X	X	X	X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794																								
External Laboratory									X	X														
Sample ID	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**																				
BH1_0.5-0.7	Jul 23, 2013		Soil	S13-Jl19339	X	X			X		X		X			X						X	X	
BH1_1.5-1.6	Jul 23, 2013		Soil	S13-Jl19340	X	X		X			X		X		X	X								X
BH2_0.3-0.5	Jul 23, 2013		Soil	S13-Jl19341	X	X		X			X		X		X	X								X
BH2_1-1.2	Jul 23, 2013		Soil	S13-Jl19342	X	X			X		X		X			X						X	X	
BH3_0.4-0.6	Jul 23, 2013		Soil	S13-Jl19343	X	X			X	X	X		X			X						X	X	
BH4_0.5-0.7	Jul 23, 2013		Soil	S13-Jl19344	X	X		X			X		X		X	X								X
BH4_1.7-1.9	Jul 23, 2013		Soil	S13-Jl19345	X	X			X	X	X		X			X						X	X	
BH5_0.3-0.5	Jul 23, 2013		Soil	S13-Jl19346	X	X		X			X		X		X	X								X
BH5_1.6-1.7	Jul 23, 2013		Soil	S13-Jl19347	X	X			X	X	X		X			X						X	X	
BH6_0.7-0.9	Jul 23, 2013		Soil	S13-Jl19348	X	X			X	X	X		X			X						X	X	

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Received: Jul 25, 2013 1:30 PM
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Sample Detail					% Moisture	Aluminium	Aluminium (filtered)	Ammonia (as N)	Asbestos	Asbestos (% weight as per WA Guidelines)	Iron	Iron (filtered)	Manganese	Manganese (filtered)	Sulphate (as S)	Tin	Tin (filtered)	Polycyclic Aromatic Hydrocarbons	Metals M8 filtered	BTEX	Total Recoverable Hydrocarbons	Eurofins | mgt Suite 6	Eurofins | mgt Suite 3	Eurofins | mgt Suite 7
Laboratory where analysis is conducted																								
Melbourne Laboratory - NATA Site # 1254 & 14271																								
Sydney Laboratory - NATA Site # 18217					X	X	X	X			X	X	X	X	X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794																								
External Laboratory									X	X														
BH6_1.6-1.7	Jul 23, 2013		Soil	S13-Jl19349	X	X		X			X		X		X	X								X
BH7_0.4-0.6	Jul 23, 2013		Soil	S13-Jl19350	X	X		X			X		X		X	X								X
BH7_1.4-1.6	Jul 23, 2013		Soil	S13-Jl19351	X	X			X	X	X		X			X						X	X	
BH8_0.2-0.3	Jul 23, 2013		Soil	S13-Jl19352	X	X			X	X	X		X			X						X	X	
BH8_3.0-3.1	Jul 23, 2013		Soil	S13-Jl19353	X	X			X	X	X		X			X						X	X	
BH9_0.4-0.5	Jul 23, 2013		Soil	S13-Jl19354	X	X		X			X		X		X	X								X
BH9_1.5-1.6	Jul 23, 2013		Soil	S13-Jl19355	X	X			X	X	X		X			X						X	X	
BH10_0.9-1.0	Jul 23, 2013		Soil	S13-Jl19356	X	X			X	X	X		X			X						X	X	
BH10_2-2.1	Jul 23, 2013		Soil	S13-Jl19357	X	X		X			X		X		X	X								X
BH11_0.1-0.2	Jul 23, 2013		Soil	S13-Jl19358	X	X		X			X		X		X	X								X
BH11_0.7-0.8	Jul 23, 2013		Soil	S13-Jl19359	X	X			X	X	X		X			X						X	X	

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Contact Name: Mark Kelly

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Sample Detail					% Moisture	Aluminium	Aluminium (filtered)	Ammonia (as N)	Asbestos	Asbestos (% weight as per WA Guidelines)	Iron	Iron (filtered)	Manganese	Manganese (filtered)	Sulphate (as S)	Tin	Tin (filtered)	Polycyclic Aromatic Hydrocarbons	Metals M8 filtered	BTEX	Total Recoverable Hydrocarbons	Eurofins | mgt Suite 6	Eurofins | mgt Suite 3	Eurofins | mgt Suite 7
Laboratory where analysis is conducted																								
Melbourne Laboratory - NATA Site # 1254 & 14271																								
Sydney Laboratory - NATA Site # 18217					X	X	X	X			X	X	X	X	X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794																								
External Laboratory									X	X														
D1	Jul 23, 2013		Soil	S13-Jl19360	X	X			X		X		X			X						X	X	
D2	Jul 23, 2013		Soil	S13-Jl19361	X	X		X			X		X		X	X								X
R1	Jul 23, 2013		Water	S13-Jl19362			X					X		X			X	X	X	X	X			

Eurofins | mgt Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Actual PQLs are matrix dependant. Quoted PQLs may be raised where sample extracts are diluted due to interferences.
4. Results are uncorrected for matrix spikes or surrogate recoveries.
5. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
6. Samples were analysed on an 'as received' basis. 7. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Acknowledgment.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

****NOTE:** pH duplicates are reported as a range NOT as RPD

UNITS

mg/kg: milligrams per Kilogram

mg/l: milligrams per litre

ug/l: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100ml: Organisms per 100 millilitres

NTU: Units

MPN/100mL: Most Probable Number of organisms per 100 millilitres

TERMS

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery
CRM	Certified Reference Material - reported as percent recovery
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands. In the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
Batch Duplicate	A second piece of analysis from a sample outside of the clients batch of samples but run within the laboratory batch of analysis.
Batch SPIKE	Spike recovery reported on a sample from outside of the clients batch of samples but run within the laboratory batch of analysis.
USEPA	United States Environment Protection Authority
APHA	American Public Health Association
ASLP	Australian Standard Leaching Procedure (AS4439.3)
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within

QC - ACCEPTANCE CRITERIA

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries : Recoveries must lie between 50-150% - Phenols 20-130%.

QC DATA GENERAL COMMENTS

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxophene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxophene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Arochlor 1260 in Matrix Spikes and LCS's.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPD's are calculated from raw analytical data thus it is possible to have two sets of data.

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions E004 Petroleum Hydrocarbons (TPH)							
TRH C6-C9	mg/L	< 0.02			0.02	Pass	
TRH C10-C14	mg/L	< 0.05			0.05	Pass	
TRH C15-C28	mg/L	< 0.1			0.1	Pass	
TRH C29-C36	mg/L	< 0.1			0.1	Pass	
Method Blank							
BTEX E029/E016 BTEX							
Benzene	mg/L	< 0.001			0.001	Pass	
Toluene	mg/L	< 0.001			0.001	Pass	
Ethylbenzene	mg/L	< 0.001			0.001	Pass	
m&p-Xylenes	mg/L	< 0.002			0.002	Pass	
o-Xylene	mg/L	< 0.001			0.001	Pass	
Xylenes - Total	mg/L	< 0.003			0.003	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions LM-LTM-ORG2010							
Naphthalene	mg/L	< 0.02			0.02	Pass	
TRH C6-C10	mg/L	< 0.02			0.02	Pass	
TRH C6-C10 less BTEX (F1)	mg/L	< 0.02			0.02	Pass	
TRH >C10-C16	mg/L	< 0.05			0.05	Pass	
TRH >C16-C34	mg/L	< 0.1			0.1	Pass	
TRH >C34-C40	mg/L	< 0.1			0.1	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons E007 Polyaromatic Hydrocarbons (PAH)							
Acenaphthene	mg/L	< 0.001			0.001	Pass	
Acenaphthylene	mg/L	< 0.001			0.001	Pass	
Anthracene	mg/L	< 0.001			0.001	Pass	
Benz(a)anthracene	mg/L	< 0.001			0.001	Pass	
Benzo(a)pyrene	mg/L	< 0.001			0.001	Pass	
Benzo(b&j)fluoranthene	mg/L	< 0.001			0.001	Pass	
Benzo(g.h.i)perylene	mg/L	< 0.001			0.001	Pass	
Benzo(k)fluoranthene	mg/L	< 0.001			0.001	Pass	
Chrysene	mg/L	< 0.001			0.001	Pass	
Dibenz(a.h)anthracene	mg/L	< 0.001			0.001	Pass	
Fluoranthene	mg/L	< 0.001			0.001	Pass	
Fluorene	mg/L	< 0.001			0.001	Pass	
Indeno(1.2.3-cd)pyrene	mg/L	< 0.001			0.001	Pass	
Naphthalene	mg/L	< 0.001			0.001	Pass	
Phenanthrene	mg/L	< 0.001			0.001	Pass	
Pyrene	mg/L	< 0.001			0.001	Pass	
Method Blank							
Heavy Metals (filtered) E020/E030 Filtered Metals in Water							
Aluminium (filtered)	mg/L	< 0.01			0.01	Pass	
Arsenic (filtered)	mg/L	< 0.001			0.001	Pass	
Cadmium (filtered)	mg/L	< 0.0001			0.0001	Pass	
Chromium (filtered)	mg/L	< 0.001			0.001	Pass	
Copper (filtered)	mg/L	< 0.001			0.001	Pass	
Iron (filtered)	mg/L	< 0.05			0.05	Pass	
Lead (filtered)	mg/L	< 0.001			0.001	Pass	
Manganese (filtered)	mg/L	< 0.001			0.001	Pass	
Mercury (filtered)	mg/L	< 0.0001			0.0001	Pass	
Nickel (filtered)	mg/L	< 0.001			0.001	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Tin (filtered)	mg/L	< 0.005			0.005	Pass	
Zinc (filtered)	mg/L	< 0.005			0.005	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions E004 Petroleum Hydrocarbons (TPH)							
TRH C6-C9	%	81			70-130	Pass	
TRH C10-C14	%	86			70-130	Pass	
LCS - % Recovery							
BTEX E029/E016 BTEX							
Benzene	%	104			70-130	Pass	
Toluene	%	108			70-130	Pass	
Ethylbenzene	%	107			70-130	Pass	
m&p-Xylenes	%	104			70-130	Pass	
o-Xylene	%	105			70-130	Pass	
Xylenes - Total	%	105			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions LM-LTM-ORG2010							
Naphthalene	%	98			70-130	Pass	
TRH C6-C10	%	93			70-130	Pass	
TRH >C10-C16	%	91			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons E007 Polyaromatic Hydrocarbons (PAH)							
Acenaphthene	%	83			70-130	Pass	
Acenaphthylene	%	79			70-130	Pass	
Anthracene	%	88			70-130	Pass	
Benz(a)anthracene	%	77			70-130	Pass	
Benzo(a)pyrene	%	78			70-130	Pass	
Benzo(b&j)fluoranthene	%	88			70-130	Pass	
Benzo(g.h.i)perylene	%	77			70-130	Pass	
Benzo(k)fluoranthene	%	89			70-130	Pass	
Chrysene	%	84			70-130	Pass	
Dibenz(a.h)anthracene	%	73			70-130	Pass	
Fluoranthene	%	83			70-130	Pass	
Fluorene	%	85			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	70			70-130	Pass	
Naphthalene	%	82			70-130	Pass	
Phenanthrene	%	85			70-130	Pass	
Pyrene	%	80			70-130	Pass	
LCS - % Recovery							
Heavy Metals (filtered) E020/E030 Filtered Metals in Water							
Aluminium (filtered)	%	78			70-130	Pass	
Arsenic (filtered)	%	99			70-130	Pass	
Cadmium (filtered)	%	102			70-130	Pass	
Chromium (filtered)	%	104			70-130	Pass	
Copper (filtered)	%	100			70-130	Pass	
Iron (filtered)	%	108			70-130	Pass	
Lead (filtered)	%	103			70-130	Pass	
Manganese (filtered)	%	100			70-130	Pass	
Mercury (filtered)	%	101			70-130	Pass	
Nickel (filtered)	%	99			70-130	Pass	
Tin (filtered)	%	98			70-130	Pass	
Zinc (filtered)	%	96			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	S13-Jl18857	NCP	%	79			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	S13-Jl18857	NCP	%	102			70-130	Pass	
Toluene	S13-Jl18857	NCP	%	104			70-130	Pass	
Ethylbenzene	S13-Jl18857	NCP	%	103			70-130	Pass	
m&p-Xylenes	S13-Jl18857	NCP	%	102			70-130	Pass	
o-Xylene	S13-Jl18857	NCP	%	103			70-130	Pass	
Xylenes - Total	S13-Jl18857	NCP	%	102			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	S13-Jl18857	NCP	%	100			70-130	Pass	
TRH C6-C10	S13-Jl18857	NCP	%	90			70-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	S13-Jl16942	NCP	%	102			70-130	Pass	
Acenaphthylene	S13-Jl16942	NCP	%	96			70-130	Pass	
Anthracene	S13-Jl16942	NCP	%	94			70-130	Pass	
Benz(a)anthracene	S13-Jl16942	NCP	%	100			70-130	Pass	
Benzo(a)pyrene	S13-Jl16942	NCP	%	92			70-130	Pass	
Benzo(b&j)fluoranthene	S13-Jl16942	NCP	%	98			70-130	Pass	
Benzo(g.h.i)perylene	S13-Jl16942	NCP	%	81			70-130	Pass	
Benzo(k)fluoranthene	S13-Jl16942	NCP	%	98			70-130	Pass	
Chrysene	S13-Jl16942	NCP	%	86			70-130	Pass	
Dibenz(a.h)anthracene	S13-Jl16942	NCP	%	90			70-130	Pass	
Fluoranthene	S13-Jl16942	NCP	%	92			70-130	Pass	
Fluorene	S13-Jl16942	NCP	%	103			70-130	Pass	
Indeno(1.2.3-cd)pyrene	S13-Jl16942	NCP	%	89			70-130	Pass	
Naphthalene	S13-Jl16942	NCP	%	103			70-130	Pass	
Phenanthrene	S13-Jl16942	NCP	%	95			70-130	Pass	
Pyrene	S13-Jl16942	NCP	%	92			70-130	Pass	
Spike - % Recovery									
Heavy Metals (filtered)				Result 1					
Aluminium (filtered)	S13-Jl20756	NCP	%	86			70-130	Pass	
Arsenic (filtered)	S13-Jl20756	NCP	%	105			70-130	Pass	
Cadmium (filtered)	S13-Jl20756	NCP	%	105			70-130	Pass	
Chromium (filtered)	S13-Jl20756	NCP	%	106			70-130	Pass	
Copper (filtered)	S13-Jl20756	NCP	%	100			70-130	Pass	
Iron (filtered)	S13-Jl20756	NCP	%	110			70-130	Pass	
Lead (filtered)	S13-Jl20756	NCP	%	104			70-130	Pass	
Manganese (filtered)	S13-Jl20756	NCP	%	104			70-130	Pass	
Mercury (filtered)	S13-Jl21349	NCP	%	94			70-130	Pass	
Nickel (filtered)	S13-Jl20756	NCP	%	98			70-130	Pass	
Zinc (filtered)	S13-Jl20756	NCP	%	101			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	S13-Jl18856	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	S13-Jl18856	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Toluene	S13-Jl18856	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	

Duplicate									
BTEX				Result 1	Result 2	RPD			
Ethylbenzene	S13-Jl18856	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
m&p-Xylenes	S13-Jl18856	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
o-Xylene	S13-Jl18856	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Xylenes - Total	S13-Jl18856	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	S13-Jl18856	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH C6-C10	S13-Jl18856	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
TRH C6-C10 less BTEX (F1)	S13-Jl18856	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	S13-Jl21349	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Acenaphthylene	S13-Jl21349	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Anthracene	S13-Jl21349	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benz(a)anthracene	S13-Jl21349	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(a)pyrene	S13-Jl21349	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(b&j)fluoranthene	S13-Jl21349	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(g.h.i)perylene	S13-Jl21349	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(k)fluoranthene	S13-Jl21349	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Chrysene	S13-Jl21349	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Dibenz(a.h)anthracene	S13-Jl21349	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Fluoranthene	S13-Jl21349	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Fluorene	S13-Jl21349	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	S13-Jl21349	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Naphthalene	S13-Jl21349	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Phenanthrene	S13-Jl21349	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Pyrene	S13-Jl21349	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Duplicate									
Heavy Metals (filtered)				Result 1	Result 2	RPD			
Aluminium (filtered)	S13-Jl20755	NCP	mg/L	0.094	0.093	1.0	30%	Pass	
Arsenic (filtered)	S13-Jl20755	NCP	mg/L	0.0020	0.0020	1.0	30%	Pass	
Cadmium (filtered)	S13-Jl20755	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Chromium (filtered)	S13-Jl20755	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper (filtered)	S13-Jl20755	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Iron (filtered)	S13-Jl20755	NCP	mg/L	0.25	0.26	4.0	30%	Pass	
Lead (filtered)	S13-Jl20755	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Manganese (filtered)	S13-Jl20755	NCP	mg/L	0.12	0.13	3.0	30%	Pass	
Mercury (filtered)	S13-Jl21349	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel (filtered)	S13-Jl20755	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Tin (filtered)	S13-Jl20755	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	
Zinc (filtered)	S13-Jl20755	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Organic samples had Teflon liners	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	Yes

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs

Authorised By

Ruth Callander	Client Services
James Norford	Senior Analyst-Metal (NSW)
Ryan Hamilton	Senior Analyst-Organic (NSW)
Ryan Hamilton	Senior Analyst-Volatile (NSW)

Dr. Bob Symons

Laboratory Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Uncertainty data is available on request

Liability & Risk Management Consulting

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Eurofins/Mgt
2-5 Kingston Town Close
Oakleigh Victoria 3164

Client Ref: 387428

Job Number: 10228.000
Batch Number: B7840
Received Date: July 31, 2013
Analysed Date: August 05, 2013
No of Samples: 1

Dear Ruth Calander,

This report presents the analytical result of sample forwarded by Eurofins/Mgt for asbestos analysis.

Methodology:
The sample was examined under a Stereo Microscope and selected fibres were analysed by Polarized Light Microscopy in conjunction with Dispersion Staining Method. (**LRM Global ID Method 1**)

Analytical Results:

Sample No.	Sample Description	Result
SS1_JL21466	The sample consisted of *fibro plaster cement, plant matter and soils Sample Dimensions: 5.0cm X 3.0cm X 2.0cm	*Chrysotile Asbestos Detected Organic Fibre Detected

Approved Identifier
Karu Jayasundara

Report Issued by
Karu Jayasundara

NATA
WORLD RECOGNISED
ACCREDITATION
Accreditation No: 15684

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

eurofins | mgt

Certificate of Analysis

NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025.
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Aargus P/L
446 Parramatta Road
Petersham
NSW 2049

Attention: **Mark Kelly**

Report **387428-S**
Client Reference MARRICKVILLE ES5544
Received Date Jul 29, 2013

Client Sample ID			**SS1**
Sample Matrix			**Soil**
Eurofins | mgt Sample No.			**M13-Jl21466**
Date Sampled			**Jul 23, 2013**
Test/Reference	LOR	Unit	
Total Recoverable Hydrocarbons - 1999 NEPM Fractions			
TRH C6-C9	20	mg/kg	< 20
TRH C10-C14	20	mg/kg	< 20
TRH C15-C28	50	mg/kg	300
TRH C29-C36	50	mg/kg	610
TRH C10-36 (Total)	50	mg/kg	910
BTEX			
Benzene	0.1	mg/kg	< 0.1
Toluene	0.1	mg/kg	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1
o-Xylene	0.1	mg/kg	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2
Xylenes - Total	0.3	mg/kg	< 0.3
Fluorobenzene (surr.)	1	%	93
Total Recoverable Hydrocarbons - 2013 NEPM Fractions			
Naphthalene[N02]	0.5	mg/kg	< 0.5
TRH C6-C10	20	mg/kg	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20
TRH >C10-C16	50	mg/kg	< 50
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50
TRH >C16-C34	100	mg/kg	740
TRH >C34-C40	100	mg/kg	480
Polycyclic Aromatic Hydrocarbons			
Acenaphthene	0.5	mg/kg	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5
Anthracene	0.5	mg/kg	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5
Chrysene	0.5	mg/kg	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5
Fluorene	0.5	mg/kg	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5
Naphthalene	0.5	mg/kg	< 0.5

Client Sample ID			SS1
Sample Matrix			Soil
Eurofins | mgt Sample No.			M13-Jl21466
Date Sampled			Jul 23, 2013
Test/Reference	LOR	Unit	
Polycyclic Aromatic Hydrocarbons			
Phenanthrene	0.5	mg/kg	< 0.5
Pyrene	0.5	mg/kg	< 0.5
Total PAH	0.5	mg/kg	< 0.5
Benzo(a)pyrene TEQ*	0.5	mg/kg	0.6
2-Fluorobiphenyl (surr.)	1	%	124
p-Terphenyl-d14 (surr.)	1	%	122
Phenols (Halogenated)			
2-Chlorophenol	0.5	mg/kg	< 0.5
2.4-Dichlorophenol	0.5	mg/kg	< 0.5
2.4.5-Trichlorophenol	1.0	mg/kg	< 1
2.4.6-Trichlorophenol	1.0	mg/kg	< 1
2.6-Dichlorophenol	0.5	mg/kg	< 0.5
4-Chloro-3-methylphenol	1.0	mg/kg	< 1
Pentachlorophenol	1.0	mg/kg	< 1
Tetrachlorophenols - Total	1.0	mg/kg	< 1
Total Halogenated Phenol	1	mg/kg	< 1
Phenols (non-Halogenated)			
2-Cyclohexyl-4.6-dinitrophenol	20	mg/kg	< 20
2-Methyl-4.6-dinitrophenol	5	mg/kg	< 5
2-Methylphenol (o-Cresol)	0.2	mg/kg	< 0.2
2-Nitrophenol	1.0	mg/kg	< 1
2.4-Dimethylphenol	0.5	mg/kg	< 0.5
2.4-Dinitrophenol	5	mg/kg	< 5
3&4-Methylphenol (m&p-Cresol)	0.4	mg/kg	< 0.4
4-Nitrophenol	5	mg/kg	< 5
Dinoseb	20	mg/kg	< 20
Phenol	0.5	mg/kg	< 0.5
Total Non-Halogenated Phenol	20	mg/kg	< 20
Phenol-d6 (surr.)	1	%	101
Ammonia (as N)	5	mg/kg	< 5
Sulphate (as S)	10	mg/kg	< 10
% Moisture	0.1	%	10
Asbestos			see attached
Heavy Metals			
Aluminium	10	mg/kg	7300
Arsenic	2	mg/kg	< 2
Cadmium	0.4	mg/kg	11
Chromium	5	mg/kg	17
Copper	5	mg/kg	54
Iron	5	mg/kg	18000
Lead	5	mg/kg	29
Manganese	5	mg/kg	520
Mercury	0.1	mg/kg	0.2
Nickel	5	mg/kg	9.4
Tin	10	mg/kg	< 10
Zinc	5	mg/kg	560

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.
A recent review of our LIMS has resulted in the correction or clarification of some method identifications. Due to this, some of the method reference information on reports has changed. However, no substantive change has been made to our laboratory methods, and as such there is no change in the validity of current or previous results (regarding both quality and NATA accreditation).

Description	Testing Site	Extracted	Holding Time
Eurofins | mgt Suite 6			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Melbourne	Jul 29, 2013	14 Day
- Method: TRH C6-C36 - MGT 100A			
BTEX	Melbourne	Jul 29, 2013	14 Day
- Method: USEPA 8260 - MGT 350A Monocyclic Aromatic Hydrocarbons and MGT 100A			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Melbourne	Jul 29, 2013	14 Day
- Method: LM-LTM-ORG2010			
Metals M8	Melbourne	Jul 29, 2013	28 Day
- Method: USEPA 6010/6020 Heavy Metals & USEPA 7470/71 Mercury			
Eurofins | mgt Suite 3			
Polycyclic Aromatic Hydrocarbons	Melbourne	Jul 29, 2013	14 Day
- Method: USEPA 8270 Polycyclic Aromatic Hydrocarbons			
Phenols (Halogenated)	Melbourne	Jul 29, 2013	14 Day
- Method: USEPA 8270 Phenols			
Phenols (non-Halogenated)	Melbourne	Jul 29, 2013	14 Day
- Method: USEPA 8270 Phenols			
Ammonia (as N)	Melbourne	Jul 29, 2013	7 Day
- Method: APHA 4500-NH3 Ammonia Nitrogen by FIA			
Sulphate (as S)	Melbourne	Jul 30, 2013	28 Day
- Method: In house MGT1110A (SO4 by Discrete Analyser)			
% Moisture	Melbourne	Jul 29, 2013	14 Day
- Method: Method 102 - ANZECC - % Moisture			
Heavy Metals	Melbourne	Jul 29, 2013	180 Day
- Method: USEPA 6010/6020 Heavy Metals			

Company Name: Aargus P/L
Address: 446 Parramatta Road
Petersham
NSW 2049

Client Job No.: MARRICKVILLE ES5544

Order No.:
Report #: 387428
Phone: 1300 137 038
Fax: 1300 136 038

Received: Jul 29, 2013 9:00 AM
Due: Aug 5, 2013
Priority: 5 Day
Contact Name: Mark Kelly

Eurofins | mgt Client Manager: Ruth Callander

Sample Detail					% Moisture	Aluminium	Ammonia (as N)	Asbestos	Iron	Manganese	Sulphate (as S)	Tin	Phenols (IWRG 621)	Eurofins | mgt Suite 3	Total Recoverable Hydrocarbons	Eurofins | mgt Suite 6
Laboratory where analysis is conducted																
Melbourne Laboratory - NATA Site # 1254 & 14271					X	X	X		X	X	X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217																
Brisbane Laboratory - NATA Site # 20794																
External Laboratory								X								
Sample ID	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**												
SS1	Jul 23, 2013		Soil	M13-Jl21466	X	X	X	X	X	X	X	X	X	X	X	X

Eurofins | mgt Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Actual PQLs are matrix dependant. Quoted PQLs may be raised where sample extracts are diluted due to interferences.
4. Results are uncorrected for matrix spikes or surrogate recoveries.
5. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
6. Samples were analysed on an 'as received' basis. 7. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Acknowledgment.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

****NOTE:** pH duplicates are reported as a range NOT as RPD

UNITS

mg/kg: milligrams per Kilogram

ug/l: micrograms per litre

ppb: Parts per billion

org/100ml: Organisms per 100 millilitres

MPN/100mL: Most Probable Number of organisms per 100 millilitres

mg/l: milligrams per litre

ppm: Parts per million

%: Percentage

NTU: Units

TERMS

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery
CRM	Certified Reference Material - reported as percent recovery
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands. In the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
Batch Duplicate	A second piece of analysis from a sample outside of the clients batch of samples but run within the laboratory batch of analysis.
Batch SPIKE	Spike recovery reported on a sample from outside of the clients batch of samples but run within the laboratory batch of analysis.
USEPA	United States Environment Protection Authority
APHA	American Public Health Association
ASLP	Australian Standard Leaching Procedure (AS4439.3)
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within

QC - ACCEPTANCE CRITERIA

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries : Recoveries must lie between 50-150% - Phenols 20-130%.

QC DATA GENERAL COMMENTS

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxophene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxophene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Arochlor 1260 in Matrix Spikes and LCS's.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPD's are calculated from raw analytical data thus it is possible to have two sets of data.

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions TRH C6-C36 - MGT 100A							
TRH C6-C9	mg/kg	< 20			20	Pass	
TRH C10-C14	mg/kg	< 20			20	Pass	
TRH C15-C28	mg/kg	< 50			50	Pass	
TRH C29-C36	mg/kg	< 50			50	Pass	
Method Blank							
BTEX USEPA 8260 - MGT 350A Monocyclic Aromatic Hydrocarbons and MGT 100A							
Benzene	mg/kg	< 0.1			0.1	Pass	
Toluene	mg/kg	< 0.1			0.1	Pass	
Ethylbenzene	mg/kg	< 0.1			0.1	Pass	
o-Xylene	mg/kg	< 0.1			0.1	Pass	
m&p-Xylenes	mg/kg	< 0.2			0.2	Pass	
Xylenes - Total	mg/kg	< 0.3			0.3	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions LM-LTM-ORG2010							
Naphthalene	mg/kg	< 0.5			0.5	Pass	
TRH C6-C10	mg/kg	< 20			20	Pass	
TRH >C10-C16	mg/kg	< 50			50	Pass	
TRH >C16-C34	mg/kg	< 100			100	Pass	
TRH >C34-C40	mg/kg	< 100			100	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons USEPA 8270 Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/kg	< 0.5			0.5	Pass	
Acenaphthylene	mg/kg	< 0.5			0.5	Pass	
Anthracene	mg/kg	< 0.5			0.5	Pass	
Benz(a)anthracene	mg/kg	< 0.5			0.5	Pass	
Benzo(a)pyrene	mg/kg	< 0.5			0.5	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Benzo(g.h.i)perylene	mg/kg	< 0.5			0.5	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Chrysene	mg/kg	< 0.5			0.5	Pass	
Dibenz(a.h)anthracene	mg/kg	< 0.5			0.5	Pass	
Fluoranthene	mg/kg	< 0.5			0.5	Pass	
Fluorene	mg/kg	< 0.5			0.5	Pass	
Indeno(1.2.3-cd)pyrene	mg/kg	< 0.5			0.5	Pass	
Naphthalene	mg/kg	< 0.5			0.5	Pass	
Phenanthrene	mg/kg	< 0.5			0.5	Pass	
Pyrene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Phenols (Halogenated) USEPA 8270 Phenols							
2-Chlorophenol	mg/kg	< 0.5			0.5	Pass	
2.4-Dichlorophenol	mg/kg	< 0.5			0.5	Pass	
2.4.5-Trichlorophenol	mg/kg	< 1			1.0	Pass	
2.4.6-Trichlorophenol	mg/kg	< 1			1.0	Pass	
2.6-Dichlorophenol	mg/kg	< 0.5			0.5	Pass	
4-Chloro-3-methylphenol	mg/kg	< 1			1.0	Pass	
Pentachlorophenol	mg/kg	< 1			1.0	Pass	
Tetrachlorophenols - Total	mg/kg	< 1			1.0	Pass	
Method Blank							
Phenols (non-Halogenated) USEPA 8270 Phenols							

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
2-Cyclohexyl-4.6-dinitrophenol	mg/kg	< 20			20	Pass	
2-Methyl-4.6-dinitrophenol	mg/kg	< 5			5	Pass	
2-Methylphenol (o-Cresol)	mg/kg	< 0.2			0.2	Pass	
2-Nitrophenol	mg/kg	< 1			1.0	Pass	
2.4-Dimethylphenol	mg/kg	< 0.5			0.5	Pass	
2.4-Dinitrophenol	mg/kg	< 5			5	Pass	
3&4-Methylphenol (m&p-Cresol)	mg/kg	< 0.4			0.4	Pass	
4-Nitrophenol	mg/kg	< 5			5	Pass	
Dinoseb	mg/kg	< 20			20	Pass	
Phenol	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Ammonia (as N)	mg/kg	< 5			5	Pass	
Sulphate (as S)	mg/kg	< 10			10	Pass	
Method Blank							
Heavy Metals USEPA 6010/6020 Heavy Metals							
Aluminium	mg/kg	< 10			10	Pass	
Arsenic	mg/kg	< 2			2	Pass	
Cadmium	mg/kg	< 0.4			0.4	Pass	
Chromium	mg/kg	< 5			5	Pass	
Copper	mg/kg	< 5			5	Pass	
Iron	mg/kg	< 5			5	Pass	
Lead	mg/kg	< 5			5	Pass	
Manganese	mg/kg	< 5			5	Pass	
Mercury	mg/kg	< 0.1			0.1	Pass	
Nickel	mg/kg	< 5			5	Pass	
Tin	mg/kg	< 10			10	Pass	
Zinc	mg/kg	< 5			5	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions TRH C6-C36 - MGT 100A							
TRH C6-C9	%	97			70-130	Pass	
TRH C10-C14	%	99			70-130	Pass	
LCS - % Recovery							
BTEX USEPA 8260 - MGT 350A Monocyclic Aromatic Hydrocarbons and MGT 100A							
Benzene	%	104			70-130	Pass	
Toluene	%	96			70-130	Pass	
Ethylbenzene	%	96			70-130	Pass	
m&p-Xylenes	%	94			70-130	Pass	
Xylenes - Total	%	95			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions LM-LTM-ORG2010							
TRH C6-C10	%	97			70-130	Pass	
TRH >C10-C16	%	103			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons USEPA 8270 Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	96			70-130	Pass	
Acenaphthylene	%	101			70-130	Pass	
Anthracene	%	95			70-130	Pass	
Benz(a)anthracene	%	102			70-130	Pass	
Benzo(a)pyrene	%	119			70-130	Pass	
Benzo(b&j)fluoranthene	%	78			70-130	Pass	
Benzo(g.h.i)perylene	%	84			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Benzo(k)fluoranthene	%	97			70-130	Pass	
Chrysene	%	88			70-130	Pass	
Dibenz(a.h)anthracene	%	79			70-130	Pass	
Fluoranthene	%	103			70-130	Pass	
Fluorene	%	100			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	83			70-130	Pass	
Naphthalene	%	85			70-130	Pass	
Phenanthrene	%	103			70-130	Pass	
Pyrene	%	96			70-130	Pass	
LCS - % Recovery							
Phenols (Halogenated) USEPA 8270 Phenols							
2-Chlorophenol	%	104			30-130	Pass	
2.4-Dichlorophenol	%	93			30-130	Pass	
2.4.5-Trichlorophenol	%	114			30-130	Pass	
2.4.6-Trichlorophenol	%	98			30-130	Pass	
2.6-Dichlorophenol	%	122			30-130	Pass	
4-Chloro-3-methylphenol	%	97			30-130	Pass	
Pentachlorophenol	%	60			30-130	Pass	
LCS - % Recovery							
Phenols (non-Halogenated) USEPA 8270 Phenols							
2-Cyclohexyl-4.6-dinitrophenol	%	44			30-130	Pass	
2-Methyl-4.6-dinitrophenol	%	43			30-130	Pass	
2-Methylphenol (o-Cresol)	%	108			30-130	Pass	
2-Nitrophenol	%	88			30-130	Pass	
2.4-Dimethylphenol	%	76			30-130	Pass	
2.4-Dinitrophenol	%	33			30-130	Pass	
3&4-Methylphenol (m&p-Cresol)	%	110			30-130	Pass	
4-Nitrophenol	%	73			30-130	Pass	
Phenol	%	107			30-130	Pass	
LCS - % Recovery							
Ammonia (as N)	%	93			70-130	Pass	
Sulphate (as S)	%	93			70-130	Pass	
LCS - % Recovery							
Metals M8 USEPA 6010/6020 Heavy Metals & USEPA 7470/71 Mercury							
Arsenic	%	83			80-120	Pass	
Cadmium	%	93			80-120	Pass	
Chromium	%	96			80-120	Pass	
Copper	%	98			80-120	Pass	
Lead	%	95			80-120	Pass	
Manganese	%	119			80-120	Pass	
Mercury	%	104			75-125	Pass	
Nickel	%	97			80-120	Pass	
Tin	%	82			80-120	Pass	
Zinc	%	112			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	M13-Jl22942	NCP	%	85			70-130	Pass	
TRH C10-C14	M13-Jl20711	NCP	%	100			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	M13-Jl22942	NCP	%	91			70-130	Pass	
Toluene	M13-Jl22942	NCP	%	84			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Ethylbenzene	M13-Jl22942	NCP	%	84			70-130	Pass	
o-Xylene	M13-Jl22942	NCP	%	86			70-130	Pass	
m&p-Xylenes	M13-Jl22942	NCP	%	83			70-130	Pass	
Xylenes - Total	M13-Jl22942	NCP	%	84			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
TRH C6-C10	M13-Jl22942	NCP	%	85			70-130	Pass	
TRH >C10-C16	M13-Jl20711	NCP	%	108			70-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	M13-Jl21042	NCP	%	89			70-130	Pass	
Acenaphthylene	M13-Jl21042	NCP	%	90			70-130	Pass	
Anthracene	M13-Jl21042	NCP	%	74			70-130	Pass	
Benz(a)anthracene	M13-Jl21042	NCP	%	95			70-130	Pass	
Benzo(a)pyrene	M13-Jl21042	NCP	%	105			70-130	Pass	
Benzo(b&j)fluoranthene	M13-Jl21042	NCP	%	72			70-130	Pass	
Benzo(g.h.i)perylene	M13-Jl21042	NCP	%	74			70-130	Pass	
Benzo(k)fluoranthene	M13-Jl21042	NCP	%	97			70-130	Pass	
Chrysene	M13-Jl21042	NCP	%	78			70-130	Pass	
Dibenz(a.h)anthracene	M13-Jl21042	NCP	%	72			70-130	Pass	
Fluoranthene	M13-Jl21042	NCP	%	84			70-130	Pass	
Fluorene	M13-Jl21042	NCP	%	91			70-130	Pass	
Indeno(1.2.3-cd)pyrene	M13-Jl21042	NCP	%	74			70-130	Pass	
Naphthalene	M13-Jl21042	NCP	%	81			70-130	Pass	
Phenanthrene	M13-Jl21042	NCP	%	109			70-130	Pass	
Pyrene	M13-Jl21042	NCP	%	83			70-130	Pass	
Spike - % Recovery									
Phenols (Halogenated)				Result 1					
2-Chlorophenol	M13-Jl20602	NCP	%	106			30-130	Pass	
2.4-Dichlorophenol	M13-Jl20602	NCP	%	95			30-130	Pass	
2.4.5-Trichlorophenol	M13-Jl20602	NCP	%	126			30-130	Pass	
2.4.6-Trichlorophenol	M13-Jl20602	NCP	%	94			30-130	Pass	
2.6-Dichlorophenol	M13-Jl20602	NCP	%	110			30-130	Pass	
4-Chloro-3-methylphenol	M13-Jl20602	NCP	%	99			30-130	Pass	
Pentachlorophenol	M13-Jl20602	NCP	%	61			30-130	Pass	
Tetrachlorophenols - Total	M13-Jl20602	NCP	%	93			30-130	Pass	
Spike - % Recovery									
Phenols (non-Halogenated)				Result 1					
2-Cyclohexyl-4.6-dinitrophenol	M13-Jl20602	NCP	%	35			30-130	Pass	
2-Methyl-4.6-dinitrophenol	M13-Jl20602	NCP	%	37			30-130	Pass	
2-Methylphenol (o-Cresol)	M13-Jl20602	NCP	%	102			30-130	Pass	
2-Nitrophenol	M13-Jl20602	NCP	%	93			30-130	Pass	
2.4-Dimethylphenol	M13-Jl20602	NCP	%	65			30-130	Pass	
2.4-Dinitrophenol	M13-Jl19407	NCP	%	41			30-130	Pass	
3&4-Methylphenol (m&p-Cresol)	M13-Jl20602	NCP	%	109			30-130	Pass	
4-Nitrophenol	M13-Jl20602	NCP	%	80			30-130	Pass	
Dinoseb	M13-Jl20602	NCP	%	59			30-130	Pass	
Phenol	M13-Jl20602	NCP	%	114			30-130	Pass	
Spike - % Recovery									
				Result 1					
Ammonia (as N)	M13-Jl19977	NCP	%	75			70-130	Pass	
Sulphate (as S)	M13-Jl20884	NCP	%	91			70-130	Pass	
Spike - % Recovery									
Metals M8				Result 1					
Arsenic	M13-Jl21117	NCP	%	84			75-125	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Cadmium	M13-Jl21117	NCP	%	89			75-125	Pass	
Chromium	M13-Jl21117	NCP	%	87			75-125	Pass	
Copper	M13-Jl21117	NCP	%	93			75-125	Pass	
Lead	M13-Jl21117	NCP	%	84			75-125	Pass	
Manganese	M13-Jl21467	NCP	%	87			75-125	Pass	
Mercury	M13-Jl21417	NCP	%	97			70-130	Pass	
Nickel	M13-Jl21117	NCP	%	84			75-125	Pass	
Tin	M13-Jl21325	NCP	%	81			75-125	Pass	
Zinc	M13-Jl21362	NCP	%	81			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	M13-Jl22942	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C10-C14	M13-Jl20711	NCP	mg/kg	250	270	9.1	30%	Pass	
TRH C15-C28	M13-Jl20711	NCP	mg/kg	1600	1400	11	30%	Pass	
TRH C29-C36	M13-Jl20711	NCP	mg/kg	970	770	24	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	M13-Jl22942	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	M13-Jl22942	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	M13-Jl22942	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
o-Xylene	M13-Jl22942	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	M13-Jl22942	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Xylenes - Total	M13-Jl22942	NCP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	M13-Jl22942	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
TRH C6-C10	M13-Jl22942	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH >C10-C16	M13-Jl20711	NCP	mg/kg	360	390	5.9	30%	Pass	
TRH >C16-C34	M13-Jl20711	NCP	mg/kg	2300	2000	15	30%	Pass	
TRH >C34-C40	M13-Jl20711	NCP	mg/kg	400	280	35	30%	Fail	Q15
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	M13-Jl21042	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	M13-Jl21042	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	M13-Jl21042	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	M13-Jl21042	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	M13-Jl21042	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	M13-Jl21042	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	M13-Jl21042	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	M13-Jl21042	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	M13-Jl21042	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	M13-Jl21042	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	M13-Jl21042	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	M13-Jl21042	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	M13-Jl21042	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	M13-Jl21042	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	M13-Jl21042	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	M13-Jl21042	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Phenols (Halogenated)				Result 1	Result 2	RPD			
2-Chlorophenol	M13-Jl20602	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2.4-Dichlorophenol	M13-Jl20602	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2.4.5-Trichlorophenol	M13-Jl20602	NCP	mg/kg	< 1	< 1	<1	30%	Pass	

Duplicate									
Phenols (Halogenated)				Result 1	Result 2	RPD			
2.4.6-Trichlorophenol	M13-Jl20602	NCP	mg/kg	< 1	< 1	<1	30%	Pass	
2.6-Dichlorophenol	M13-Jl20602	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
4-Chloro-3-methylphenol	M13-Jl20602	NCP	mg/kg	< 1	< 1	<1	30%	Pass	
Pentachlorophenol	M13-Jl20602	NCP	mg/kg	< 1	< 1	<1	30%	Pass	
Tetrachlorophenols - Total	M13-Jl20602	NCP	mg/kg	< 1	< 1	<1	30%	Pass	
Duplicate									
Phenols (non-Halogenated)				Result 1	Result 2	RPD			
2-Cyclohexyl-4.6-dinitrophenol	M13-Jl20602	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
2-Methyl-4.6-dinitrophenol	M13-Jl20602	NCP	mg/kg	< 5	< 5	<1	30%	Pass	
2-Methylphenol (o-Cresol)	M13-Jl20602	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
2-Nitrophenol	M13-Jl20602	NCP	mg/kg	< 1	< 1	<1	30%	Pass	
2.4-Dimethylphenol	M13-Jl20602	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
2.4-Dinitrophenol	M13-Jl20602	NCP	mg/kg	< 5	< 5	<1	30%	Pass	
3&4-Methylphenol (m&p-Cresol)	M13-Jl20602	NCP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
4-Nitrophenol	M13-Jl20602	NCP	mg/kg	< 5	< 5	<1	30%	Pass	
Dinoseb	M13-Jl20602	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
Phenol	M13-Jl20602	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Ammonia (as N)	M13-Jl19977	NCP	mg/kg	< 5	< 5	<1	30%	Pass	
Sulphate (as S)	M13-Jl20884	NCP	mg/kg	< 10	< 10	<1	30%	Pass	
Duplicate									
Metals M8				Result 1	Result 2	RPD			
Arsenic	M13-Jl21117	NCP	mg/kg	< 2	2.6	55	30%	Fail	Q15
Cadmium	M13-Jl21117	NCP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	M13-Jl21117	NCP	mg/kg	28	26	9.0	30%	Pass	
Copper	M13-Jl21117	NCP	mg/kg	14	14	<1	30%	Pass	
Iron	M13-Jl20711	NCP	mg/kg	28000	21000	29	30%	Pass	
Lead	M13-Jl21117	NCP	mg/kg	6.9	7.0	2.0	30%	Pass	
Manganese	M13-Jl17428	NCP	mg/kg	420	390	8.0	30%	Pass	
Mercury	M13-Jl21417	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	M13-Jl21117	NCP	mg/kg	14	13	8.0	30%	Pass	
Tin	M13-Jl21117	NCP	mg/kg	< 10	< 10	<1	30%	Pass	
Zinc	M13-Jl21351	NCP	mg/kg	25	25	1.0	30%	Pass	

Comments

Asbestos was analysed by LRM Global. NATA accreditation number 15684. Job number 10228.000, batch number B7840.

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Organic samples had Teflon liners	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	Yes

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
Q15	The RPD reported passes Eurofins | mgt's Acceptance Criteria as stipulated in SOP 05. Refer to Glossary Page of this report for further details

Authorised By

Ruth Callander	Client Services
Carroll Lee	Senior Analyst-Volatile (VIC)
Emily Rosenberg	Senior Analyst-Metal (VIC)
Huong Le	Senior Analyst-Inorganic (VIC)
Stacey Jenkins	Senior Analyst-Organic (VIC)

Glenn Jackson

Laboratory Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Uncertainty data is available on request

Groundswell Laboratories

" A New Force in Analytical Testing"

CERTIFICATE OF ANALYSIS

Client Name :	Aargus	**Groundswell Batch # :**	GS13354
Client Address :	446 Parramatta Road, Petersham, NSW, 2049	**Project Name :**	Marrickville
Client Phone # :	1300 137 038	**Project # :**	ES5544
Client Fax # :	1300 136 038	**Date Samples Received :**	12/08/2013
Project Manager :	Michael Silk	**Sample Matrix :**	Waters
E-mail :	michael@aargus.net	**Sample # Submitted :**	3
Project Sample Manager :	Mark Kelly	**Groundswell Quote # :**	Not Applicable
E-mail :	mark.kelly@aargus.net	**Date CofA Issued :**	26/08/2013

Paul Woodward
Managing Director
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NATA
WORLD RECOGNISED ACCREDITATION

NATA Accredited Laboratory 17067

Accredited for compliance with ISO/IEC 17025

Chris De Luca
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Reference AF56.Rev4 Date Issued : 3/11/2010

Analytical Results

Client Sample ID				GW1	GW2	GW3							
Laboratory Sample Number				GS13354-1	GS13354-2	GS13354-3							
Date Sampled				8/08/2013	8/08/2013	8/08/2013							
Metals	Literature Reference	Units	LOR										
Arsenic	EPA 200.2	µg/L	5	<5	10	14							
Cadmium	EPA 200.2	µg/L	0.1	1.3	0.9	0.3							
Chromium	EPA 200.2	µg/L	1	6	7	6							
Copper	EPA 200.2	µg/L	1	25	47	135							
Lead	EPA 200.2	µg/L	1	<1	<1	<1							
Mercury	EPA 200.2	µg/L	0.1	<0.1	<0.1	<0.1							
Nickel	EPA 200.2	µg/L	1	10	10	12							
Zinc	EPA 200.2	µg/L	5	400	22	30							

Reference AF56.Rev4 Date Issued : 3/11/2010

Comments :

1- Samples 0.45µm filtered prior to analysis

Quality Control Report

Client Sample ID							
Laboratory Sample Number							
QC Parameter			Method Blank		Laboratory Control Standard (LCS)		
			Method Blank	Within GSL Acceptance Criteria (<LOR) (Pass/Fail)	LCS (%R)	LCS Acceptance Criteria	Within GSL Acceptance Criteria (Pass/Fail)
Analytes	Units	LOR					
Arsenic	mg/kg	5	<5	Pass	101%	85-115%	Pass
Cadmium	mg/kg	0.1	<0.1	Pass	102%	85-115%	Pass
Chromium	mg/kg	1	<1	Pass	111%	85-115%	Pass
Copper	mg/kg	1	<1	Pass	108%	85-115%	Pass
Lead	mg/kg	1	<1	Pass	105%	85-115%	Pass
Mercury	mg/kg	0.1	<0.1	Pass	81%	80-120%	Pass
Nickel	mg/kg	1	<1	Pass	111%	85-115%	Pass
Zinc	mg/kg	5	<5	Pass	112%	85-115%	Pass

Reference AF56.Rev4 Date Issued : 3/11/2010

Technical Holding Time Compliance Report

Client Sample ID			GW1	GW2	GW3							
Laboratory Sample Number			GS13354-1	GS13354-2	GS13354-3							
Date Sampled			8/08/2013	8/08/2013	8/08/2013							
Analyte	THT Parameters	THT (Days)										
Metals	Date Digested	180	14/08/2013	14/08/2013	14/08/2013							
	Analysis Time (Days)		6	6	6							
	THT Compliant		Yes	Yes	Yes							

Reference AFS6.Rev4 Date Issued : 3/11/2010

TRH BTEXN Analytical Results

Client Sample ID				GW1	GW2	GW3							
Laboratory Sample Number				GS13354-1	GS13354-2	GS13354-3							
Date Sampled				8/08/2013	8/08/2013	8/08/2013							
TRH Fraction	**Literature Reference**	**Units**	**LOR**										
TRH C_{6-9}	GSLS	µg/L	40	<40	<40	<40							
TRH C_{6-10}	GSLS	µg/L	50	<50	<50	<50							
TRH C_{6-10} less BTEX(F1)	GSLS	µg/L	50	<50	<50	<50							
TRH C_{10-14}	500.2	µg/L	100	<100	<100	<100							
TRH C_{15-28}	500.2	µg/L	200	580	<200	<200							
TRH C_{29-36}	500.2	µg/L	100	240	<100	<100							
TRH C_{10-36} Sum	—	µg/L	200	820	<200	<200							
TRH C_{10-16}	500.2	µg/L	100	110	<100	<100							
TRH C_{16-34}	500.2	µg/L	200	710	<200	<200							
TRH C_{34-40}	500.2	µg/L	100	140	<100	<100							
TRH C_{10-40} Sum	—	µg/L	200	960	<200	<200							
BTEXN		µg/L											
Benzene	GSLS	µg/L	0.5	<0.5	<0.5	<0.5							
Toluene	GSLS	µg/L	0.5	<0.5	<0.5	<0.5							
Ethylbenzene	GSLS	µg/L	0.5	<0.5	<0.5	<0.5							
meta- & para-Xylene	GSLS	µg/L	1	<1	<2	<3							
ortho-Xylene	GSLS	µg/L	0.5	<0.5	<0.5	<0.5							
Naphthalene	GSLS	µg/L	0.5	<0.5	<0.5	<0.5							
Sum of BTEXN	—	µg/L	2	<2	<2	<2							
Total Xylenes	—	µg/L	1	<1	<1	<1							
BTEXN Surrogates													
Dibromofluoromethane	GSLS	%	1	114%	118%	116%							
1,2-Dichloroethane-d4	GSLS	%	1	111%	118%	107%							
Toluene-d8	GSLS	%	1	90%	99%	98%							
4-Bromofluorobenzene	GSLS	%	1	93%	87%	89%							

Reference AF56.Rev4 Date Issued : 3/11/2010

Comments :

1- Organics analysis has been conducted by SGS, report#63673, NATA accreditation #2562

TRH & BTEXN Quality Control Report

Client Sample ID							
Laboratory Sample Number							
QC Parameter			Method Blank		Laboratory Control Standard (LCS)		
			Method Blank	Within GSL Acceptance Criteria (<LOR) (Pass/Fail)	LCS (%R)	LCS Acceptance Criteria	Within GSL Acceptance Criteria (Pass/Fail)
TRH Fraction	**Units**	**LOR**					
TRH C_{6-9}	µg/L	40	<40	Pass	106%	70-130%	Pass
TRH C_{10-14}	µg/L	100	<100	Pass	77%	70-130%	Pass
TRH C_{15-28}	µg/L	200	<200	Pass	80%	70-130%	Pass
TRH C_{29-36}	µg/L	100	<100	Pass	78%	70-130%	Pass
BTEXN							
Benzene	µg/L	0.5	<0.5	Pass	109%	70-130%	Pass
Toluene	µg/L	0.5	<0.5	Pass	108%	70-130%	Pass
Ethylbenzene	µg/L	0.5	<0.5	Pass	120%	70-130%	Pass
meta- & para-Xylene	µg/L	1	<1	Pass	122%	70-130%	Pass
ortho-Xylene	µg/L	0.5	<0.5	Pass	122%	70-130%	Pass
Naphthalene	µg/L	0.5	<0.5	Pass	—	70-130%	---

Reference AF56.Rev4 Date Issued : 3/11/2010

TRH & BTEXN Technical Holding Time Compliance Report

Client Sample ID			GW1	GW2	GW3							
Laboratory Sample Number			GS13354-1	GS13354-2	GS13354-3							
Date Sampled			8/08/2013	8/08/2013	8/08/2013							
Analytes	THT Parameters	THT (Days)										
vTRH & BTEXN	Date Extracted	14	15/08/2013	15/08/2013	15/08/2013							
	Analysis Time (Days)		7	7	7							
	THT Compliant		Yes	Yes	Yes							
svTRH	Date Extracted	7	12/08/2013	12/08/2013	12/08/2013							
	Analysis Time (Days)		4	4	4							
	THT Compliant		Yes	Yes	Yes							

Reference AF56.Rev4 Date Issued : 3/11/2010

PAH Results

Client Sample ID				GW1	GW2	GW3							
Laboratory Sample Number				GS13354-1	GS13354-2	GS13354-3							
Date Sampled				8/08/2013	8/08/2013	8/08/2013							
PAH	Literature Reference	Units	LOR										
Naphthalene	550.2	µg/L	0.5	0.6	<0.5	<0.5							
Acenaphthylene	550.2	µg/L	0.5	0.7	<0.5	<0.5							
Acenaphthene	550.2	µg/L	0.5	4.9	<0.5	<0.5							
Fluorene	550.2	µg/L	0.5	3.5	<0.5	<0.5							
Phenanthrene	550.2	µg/L	0.5	8.7	<0.5	<0.5							
Anthracene	550.2	µg/L	0.5	2.0	<0.5	<0.5							
Fluoranthene	550.2	µg/L	0.5	8.9	<0.5	<0.5							
Pyrene	550.2	µg/L	0.5	9.5	<0.5	<0.5							
Benz(a)anthracene	550.2	µg/L	0.5	4.1	<0.5	<0.5							
Chrysene	550.2	µg/L	0.5	4.0	<0.5	<0.5							
Benzo(b)fluoranthene	550.2	µg/L	0.5	4.9	<0.5	<0.5							
Benzo(k)fluoranthene	550.2	µg/L	0.5	1.8	<0.5	<0.5							
Benzo(a)pyrene	550.2	µg/L	0.5	4.9	<0.5	<0.5							
Indeno(1,2,3-cd)pyrene	550.2	µg/L	0.5	3.4	<0.5	<0.5							
Dibenz(a,h)anthracene	550.2	µg/L	0.5	1.1	<0.5	<0.5							
Benzo(ghi)perylene	550.2	µg/L	0.5	2.9	<0.5	<0.5							
Sum of PAH's	—	µg/L	4	65.9	<4	<4							
Surrogates													
p-terphenyl-d14	550.2	%	1	125%	104%	107%							

Reference AF56.Rev4 Date Issued : 3/11/2010

PAH Quality Control Report

Client Sample ID							
Laboratory Sample Number							
QC Parameter			Method Blank		Laboratory Control Standard (LCS)		
			Method Blank	Within GSL Acceptance Criteria (<LOR) (Pass/Fail)	LCS (%R)	LCS Acceptance Criteria	Within GSL Acceptance Criteria (Pass/Fail)
PAH	Units	LOR					
Naphthalene	µg/L	0.5	<0.5	Pass	98%	70-130%	Pass
Acenaphthylene	µg/L	0.5	<0.5	Pass	100%	70-130%	Pass
Acenaphthene	µg/L	0.5	<0.5	Pass	98%	70-130%	Pass
Fluorene	µg/L	0.5	<0.5	Pass	—	70-130%	—
Phenanthrene	µg/L	0.5	<0.5	Pass	98%	70-130%	Pass
Anthracene	µg/L	0.5	<0.5	Pass	97%	70-130%	Pass
Fluoranthene	µg/L	0.5	<0.5	Pass	99%	70-130%	Pass
Pyrene	µg/L	0.5	<0.5	Pass	99%	70-130%	Pass
Benz(a)anthracene	µg/L	0.5	<0.5	Pass	—	70-130%	—
Chrysene	µg/L	0.5	<0.5	Pass	—	70-130%	—
Benzo(b)fluoranthene	µg/L	0.5	<0.5	Pass	—	70-130%	—
Benzo(k)fluoranthene	µg/L	0.5	<0.5	Pass	—	70-130%	—
Benzo(a)pyrene	µg/L	0.5	<0.5	Pass	101%	70-130%	Pass
Indeno(1,2,3-cd)pyrene	µg/L	0.5	<0.5	Pass	—	70-130%	—
Dibenz(a,h)anthracene	µg/L	0.5	<0.5	Pass	—	70-130%	—
Benzo(ghi)perylene	µg/L	0.5	<0.5	Pass	—	70-130%	—
Surrogates							
p-terphenyl-d14	%	1	66%	—	93%	—	—

Reference AF56.Rev4 Date Issued : 3/11/2010

PAH Technical Holding Time Compliance

Client Sample ID			GW1	GW2	GW3							
Laboratory Sample Number			GS13354-1	GS13354-2	GS13354-3							
Date Sampled			8/08/2013	8/08/2013	8/08/2013							
Analyte	THT Parameters	THT (Days)										
PAH	Extraction Date	7	12/08/2013	12/08/2013	12/08/2013							
	Analysis Time (Days)		4	4	4							
	THT Compliant		Yes	Yes	Yes							

Reference AF56.Rev4 Date Issued : 3/11/2010

Groundswell laboratories

116 Moray Street, South Melbourne, Victoria, 3205.
Ph (03) 8669 1450 Fax (03) 8669 1451 (M) 0416 203 845 e-mail : admin@groundswelllabs.com.au

Sample Receipt Notice

Client Name	Aargus
Client Project Manager	Mark Kelly
Client e-mail	mark@aargus.net
Client Address	446 Parramatta Road, Petersham, NSW, 2049
Client Phone	1300 137 038
Project Name	Marrickville
Project Number	ES5544
CofC Serial Number	Not Applicable
Purchase Order Number	Not Applicable
Date Sampled / Sampling Period	8/08/2013
Date Samples Received	12/08/2013
Date Sample Receipt Notice Issued	18/08/2013
Date Analytical Report Due	20/08/2013
Groundswell Batch Number	GS13354
Groundswell Quote Number	Not Applicable
Groundswell Sample Receipt Contact	Chris De Luca
E-mail	chris@groundswelllabs.com.au
Groundswell Reporting Contact	Paul Woodward
E-mail	paul@groundswelllabs.com.au
Reporting Requirements	pdf, xlsx
Sample Condition	Samples at ambient temperature when received. Chilled upon receipt. COC received with samples & samples detailed on the COC match those received Analytical request on the CofC clear Samples were received in appropriate containers, and appropriately preserved Samples were received within the THT's adopted by Groundswell

Comments

Subcontracted Analysis	A range of analysis sent to SGS on the 12/8/2013

Secondary Laboratory Analysis

Thanks for choosing Groundswell Laboratories

980078807542-1

ARGUS PTY LTD

Laboratory Test Request / Chain of Custody Record

i Parramatta Road
TERSHAM NSW 2049
P O Box 398
DRUMMOYNE NSW 1470
Tel: 1300 137 038
Fax: 1300 136 038
email: admin@aargus.net

: GROUNDSWELL LABORATORIES

116 MORAY STREET
SOUTH MELBOURNE VIC 3205

: 03 8669 1450 FAX:

TN:

Sampling Date:	08.08.2013	Job No:	ES5544
Sampled By:	MS	Project:	MARRICKVILLE
Project Manager:	MK	Location:	MARRICKVILLE

Results required by: STANDARD

Sampling details		Sample type		Package										
Location	Depth (m)	Soil	Water	Heavy Metals As, Cd, Cr, Cu, Pb, Hg, Ni and Zn To be filtered by Lab	TPH	BTEX	PAH							KEEP SAMPLE
3554-1 GW1	-		WG/WP	✓	✓	✓	✓							YES
-2 GW2	-		WG/WP	✓	✓	✓	✓							YES
-3 GW3	-		WG/WP	✓	✓	✓	✓							YES

Relinquished by			Received by		
Name	Signature	Date	Name	Signature	Date
Michael Silk	MS	9.08.2013			12/8/13

end:

Water sample, glass bottle	USG	Undisturbed soil sample (glass jar)	DSP Disturbed soil sample (small plastic bag)
Water sample, plastic bottle	DSG	Disturbed soil sample (glass jar)	✓ Test required

@ mole H^+/tonne

APPENDIX H

IMPORTANT INFORMATION ABOUT YOUR ENVIRONMENTAL REPORT

IMPORTANT INFORMATION ABOUT YOUR ENVIRONMENTAL SITE ASSESSMENT

These notes have been prepared by Aargus (Australia) Pty Ltd and its associated companies using guidelines prepared by ASFE (The Association) of Engineering Firms Practising in the Geo-sciences. They are offered to help you in the interpretation of your Environmental Site Assessment (ESA) reports.

REASONS FOR CONDUCTING AN ESA

ESA's are typically, though not exclusively, carried out in the following circumstances:

- as pre-acquisition assessments, on behalf of either purchaser or vender, when a property is to be sold;
- as pre-development assessments, when a property or area of land is to be redeveloped or have its use changed for example, from a factory to a residential subdivision;
- as pre-development assessments of greenfield sites, to establish "baseline" conditions and assess environmental, geological and hydrological constraints to the development of, for example, a landfill; and
- as audits of the environmental effects of an ongoing operation.

Each of these circumstances requires a specific approach to the assessment of soil and groundwater contamination. In all cases however, the objective is to identify and if possible quantify the risks that unrecognised **c**ontamination poses to the proposed activity. Such risks may be both financial, for example, cleanup costs or limitations on site use, and physical, for example, health risks to site users or the public.

THE LIMITATIONS OF AN ESA

Although the information provided by an ESA could reduce exposure to such risks, no ESA, however, diligently carried out can eliminate them. Even a rigorous professional assessment may fail to 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.

AN ESA REPORT IS BASED ON A UNIQUE SET OF PROJECT SPECIFIC FACTORS

Your environmental report should not be used:

- when the nature of the proposed development is changed, for example, if a residential development is proposed instead of a commercial one;
- when the size or configuration of the proposed development is altered;
- when the location or orientation of the proposed structure is modified;
- when there is a change of ownership
- or for application to an adjacent site.

To help avoid costly problems, refer to your consultant to determine how any factors, which have changed subsequent to the date of the report, may affect its recommendations.

ESA "FINDINGS" ARE PROFESSIONAL ESTIMATES

Site assessment identifies actual subsurface conditions only at those points where samples are taken, when they are taken. Data derived through sampling and subsequent laboratory testing are interpreted by geologists, engineers or scientists who then render an opinion about overall subsurface conditions, the nature and extent of contamination, its likely impact on the proposed development and appropriate remediation measures. Actual conditions may differ from those inferred to exist, 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 a report indicates. Actual conditions in areas not sampled may differ from predictions. Nothing can be done to help minimise its impact. For this reason owners should retain the services of their consultants

through the development stage, to identify variances, conduct additional tests which may be needed, and to recommend solutions to problems encountered on site.

SUBSURFACE CONDITIONS CAN CHANGE

Natural processes and the activity of man change subsurface conditions. As an ESA report is based on conditions, which existed at the time of subsurface exploration, decisions should not be based on an ESA report whose adequacy may have been affected by time. Speak with the consultant to learn if additional tests are advisable.

ESA SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND PERSONS

Every study and ESA report is prepared in response to a specific brief to meet the specific needs of specific individuals. A report prepared for a consulting civil engineer may not be adequate for a construction contractor, or even some other consulting civil engineer. Other persons should not use a report for any purpose, or by the client for a different purpose. No individual other than the client should apply a report even apparently for its intended purpose without first conferring with the consultant. No person should apply a report for any purpose other than that originally contemplated without first conferring with the consultant.

AN ESA REPORT IS SUBJECT TO MISINTERPRETATION

Costly problems can occur when design professionals develop their plans based on misinterpretations of an ESA. To help avoid these problems, the environmental consultant should be retained to work with appropriate design professionals to explain relevant findings and to review the adequacy of their plans and specifications relative to contamination issues.

LOGS SHOULD NOT BE SEPARATED FROM THE ENGINEERING REPORT

Final borehole or test pit logs are developed by environmental scientists, engineers or geologists based upon their interpretation of field logs (assembled by site personnel) and laboratory evaluation of field samples. Only final logs customarily included in our reports. These logs should not under any circumstances be redrawn for inclusion in site remediation or other design drawings, because drafters may commit errors or omissions in the transfer process. Although photographic reproduction eliminates this problem, it does nothing to minimise the possibility of contractors misinterpreting the logs during bid preparation. When this occurs, delays, disputes and unanticipated costs are the all-too-frequent result.

To reduce the likelihood of boring log misinterpretation, the complete report must be available to persons or organisations involved in the project, such as contractors, for their use. Those who o not provide such access may proceed under the mistaken impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing all the available information to persons and organisations such as contractors helps prevent costly construction problems and the adversarial attitudes that may aggravate them to disproportionate scale.

READ RESPONSIBILITY CLAUSES CLOSELY

Because an ESA 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 transmittals. These are not exculpatory clauses designed to foist liabilities onto some other party. Rather, they are definitive clauses that identify where your consultant’s responsibilities begin and end. Their use helps all parties involved recognise their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your ESA report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

APPENDIX I

GROUNDWATER BORE RECORDS

Groundwater Works Summary

For information on the meaning of fields please see Glossary
Document Generated on Tuesday, August 13, 2013

Print Report

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

Work Requested -- GW111350

Works Details (top)

GROUNDWATER NUMBER	GW111350
LIC-NUM	10BL602389
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Well
WORK-STATUS	
CONSTRUCTION-METHOD	Auger - Solid Flight
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2007-10-23
FINAL-DEPTH (metres)	7.50
DRILLED-DEPTH (metres)	7.50
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	CALTEX AUSTRALIA PETROLEUM P/L
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	
SALINITY	
YIELD	

Site Details (top)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6247614.00
EASTING	331456.00
LATITUDE	33 53' 54"
LONGITUDE	151 10' 38"
GS-MAP	
AMG-ZONE	56
COORD-SOURCE	

REMARK

Form-A (top)

COUNTY	CUMBERLAND
PARISH	PETERSHAM
PORTION-LOT-DP	1//880463

Licensed (top)

COUNTY	CUMBERLAND
PARISH	PETERSHAM
PORTION-LOT-DP	1 880463

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	7.50				Auger - Solid Flight
1	1	Opening	Screen	0.00	3.00	50			PVC Class 18

Water Bearing Zones (top)

no details

Drillers Log (top)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	0.10	0.10	CONCRETE		
0.10	0.50	0.40	SAND FINE TO MEDIUM		
0.50	3.00	2.50	CLAY BROWN MOTTLED		
3.00	4.00	1.00	SHALE,WEATHERED,DRY,FIRM		
4.00	5.00	1.00	SHALE EXTREM.WEATHERED,GREY		
5.00	7.50	2.50	SHALE, WEATHERED,.GREY,RED COLOURED		

Groundwater Works Summary

For information on the meaning of fields please see Glossary
Document Generated on Tuesday, August 13, 2013

Print Report

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

Work Requested -- GW111351

Works Details (top)

GROUNDWATER NUMBER	GW111351
LIC-NUM	10BL602389
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Well
WORK-STATUS	
CONSTRUCTION-METHOD	Auger - Solid Flight
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2007-10-23
FINAL-DEPTH (metres)	9.00
DRILLED-DEPTH (metres)	9.00
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	CALTEX AUSTRALIA PETROLEUM P/L
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	
SALINITY	
YIELD	

Site Details (top)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6247601.00
EASTING	331436.00
LATITUDE	33 53' 55"
LONGITUDE	151 10' 37"
GS-MAP	
AMG-ZONE	56
COORD-SOURCE	

REMARK

Form-A (top)

COUNTY	CUMBERLAND
PARISH	PETERSHAM
PORTION-LOT-DP	1//880463

Licensed (top)

COUNTY	CUMBERLAND
PARISH	PETERSHAM
PORTION-LOT-DP	1 880463

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	9.00				Auger - Solid Flight
1	1	Casing	PVC Class 18	0.00	5.00	50			
1	1	Opening	Screen	0.00	4.00	50			PVC Class 18

Water Bearing Zones (top)

no details

Drillers Log (top)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	0.10	0.10	CONCRETE		
0.10	3.50	3.40	CLAY MOTTLED WITH GREY,BRICK RED COLOURED		
3.50	7.50	4.00	SHALE GREY,LIGHT BROWN,SEMI WEATHERED		
7.50	9.00	1.50	SHALE,HIGHLY WEATHERED,CLAYEY,DARK BROWN		

Groundwater Works Summary

For information on the meaning of fields please see Glossary
Document Generated on Tuesday, August 13, 2013

Print Report

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

Work Requested -- GW111353

Works Details (top)

GROUNDWATER NUMBER	GW111353
LIC-NUM	10BL602389
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Well
WORK-STATUS	
CONSTRUCTION-METHOD	Auger - Solid Flight
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2007-10-24
FINAL-DEPTH (metres)	7.00
DRILLED-DEPTH (metres)	7.00
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	CALTEX AUSTRALIA PETROLEUM P/L
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	6247590.00
EASTING	331440.00
LATITUDE	33 53' 55"
LONGITUDE	151 10' 37"
GS-MAP	
AMG-ZONE	56
COORD-SOURCE	

REMARK

Form-A (top)

COUNTY	CUMBERLAND
PARISH	PETERSHAM
PORTION-LOT-DP	1//880463

Licensed (top)

COUNTY	CUMBERLAND
PARISH	PETERSHAM
PORTION-LOT-DP	1 880463

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	7.00				Auger - Solid Flight
1	1	Casing	PVC Class 18	0.00	4.00	50			
1	1	Opening	Screen	0.00	3.00	50			PVC Class 18

Water Bearing Zones (top)

no details

Drillers Log (top)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	0.10	0.10	CONCRETE		
0.10	4.00	3.90	CLAY,BROWN,RED,GREY,HARD, MOIST		
4.00	7.00	3.00	SHALE,GREY ,DARK BROWN,WEATHERED,NO COLOUR		

Groundwater Works Summary

For information on the meaning of fields please see Glossary
Document Generated on Tuesday, August 13, 2013

Print Report

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

Work Requested -- GW111686

Works Details (top)

GROUNDWATER NUMBER	GW111686
LIC-NUM	10BL605066
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Bore
WORK-STATUS	Equipped - bore used for obs
CONSTRUCTION-METHOD	Auger - Solid Flight
OWNER-TYPE	Local Govt
COMMENCE-DATE	
COMPLETION-DATE	2012-01-12
FINAL-DEPTH (metres)	3.50
DRILLED-DEPTH (metres)	3.50
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	HENSON PARK
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	1.55
SALINITY	
YIELD	

Site Details (top)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6246909.00
EASTING	329728.00
LATITUDE	33 54' 16"
LONGITUDE	151 9' 30"
GS-MAP	
AMG-ZONE	56
COORD-SOURCE	

REMARK

Form-A (top)

COUNTY	CUMBERLAND
PARISH	PETERSHAM
PORTION-LOT-DP	423//1035319

Licensed (top)

COUNTY	CUMBERLAND
PARISH	PETERSHAM
PORTION-LOT-DP	423 1035319

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	3.50	100			Auger - Solid Flight
1	1	Casing	PVC Class 18	0.00	1.20	50	40		Screwed; Seated on Bottom; End cap
1	1	Opening	Slots - Horizontal	1.20	3.50	50			PVC Class 18; Casing - Machine Slotted; SL: 35mm; A: 4mm; Screwed
1		Annulus	Waterworn/Rounded	1.20	3.50				Graded; GS: 2-2.5mm

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
1.55	3.50	1.95		1.55					

Drillers Log (top)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	0.40	0.40	FILL,CLAY BANDS,BROWN		
0.40	1.20	0.80	SILTY CLAY,BEIGE,HIGH PLASTICITY,FIRM		
1.20	2.50	1.30	SILTY CLAY,BEIGE,SOFT,H/PLASTICITY		
2.50	3.50	1.00	CLAY GREY,FIRM,DRY		

Groundwater Works Summary

For information on the meaning of fields please see Glossary
Document Generated on Tuesday, August 13, 2013

Print Report

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

Work Requested -- GW111687

Works Details (top)

GROUNDWATER NUMBER	GW111687
LIC-NUM	10BL605066
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Bore
WORK-STATUS	Equipped - bore used for obs
CONSTRUCTION-METHOD	Auger - Solid Flight
OWNER-TYPE	Local Govt
COMMENCE-DATE	
COMPLETION-DATE	2012-01-12
FINAL-DEPTH (metres)	4.25
DRILLED-DEPTH (metres)	4.25
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	HENSON PARK
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	6246916.00
EASTING	329742.00
LATITUDE	33 54' 16"
LONGITUDE	151 9' 31"
GS-MAP	
AMG-ZONE	56
COORD-SOURCE	

REMARK

Form-A (top)

COUNTY	CUMBERLAND
PARISH	PETERSHAM
PORTION-LOT-DP	423//1035319

Licensed (top)

COUNTY	CUMBERLAND
PARISH	PETERSHAM
PORTION-LOT-DP	423 1035319

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	4.25	100			Auger - Solid Flight
1	1	Casing	PVC Class 18	0.00	1.25	50			Screwed; Seated on Bottom; End cap
1	1	Opening	Slots - Horizontal	1.25	4.25	50			PVC Class 18; Casing - Machine Slotted; SL: 35mm; A: 4mm; Screwed
1		Annulus	Waterworn/Rounded	1.25	4.25				Graded; GS: 2-2.5mm

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
2.50	4.25	1.75		2.50					

Drillers Log (top)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	1.90	1.90	FILL, SANDY GRAVEL DARK,SOFT		
1.90	2.70	0.80	SILTY CLAY,RED/ORANGE,STIFF		
2.70	3.00	0.30	SILTY CLAY,RED,ORANGE,SOFT		
3.00	4.25	1.25	SILTY CLAY BEIGE,VERY MOIST,SOFT		

Groundwater Works Summary

For information on the meaning of fields please see Glossary
Document Generated on Tuesday, August 13, 2013

Print Report

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

Work Requested -- GW111692

Works Details (top)

GROUNDWATER NUMBER	GW111692
LIC-NUM	10BL605067
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Bore
WORK-STATUS	Equipped - bore used for obs
CONSTRUCTION-METHOD	Auger - Solid Flight
OWNER-TYPE	Local Govt
COMMENCE-DATE	
COMPLETION-DATE	2012-01-12
FINAL-DEPTH (metres)	1.30
DRILLED-DEPTH (metres)	1.30
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	SYDENHAM RD
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	0.50
SALINITY	
YIELD	

Site Details (top)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6246701.00
EASTING	329704.00
LATITUDE	33 54' 23"
LONGITUDE	151 9' 29"
GS-MAP	
AMG-ZONE	56
COORD-SOURCE	

REMARK

Form-A (top)

COUNTY	CUMBERLAND
PARISH	PETERSHAM
PORTION-LOT-DP	1//173107

Licensed (top)

COUNTY	CUMBERLAND
PARISH	PETERSHAM
PORTION-LOT-DP	1 173107

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	1.30	100			Auger - Solid Flight
1	1	Casing	PVC Class 18	0.00	0.60	50	40		Screwed; Seated on Bottom; End cap
1	1	Opening	Slots - Horizontal	0.60	1.30	50			PVC Class 18; Casing - Machine Slotted; SL: 35mm; A: 4mm; Screwed
1		Annulus	Waterworn/Rounded	0.60	1.30				Graded; GS: 2-2.5mm

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
0.50	1.30	0.80		0.50					

Drillers Log (top)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	0.20	0.20	TOPSOIL BROWN SOFT		
0.20	0.60	0.40	CLAY BTOWN LOOSE WET		
0.60	1.30	0.70	CLAY SOFT VERY WET		

Groundwater Works Summary

For information on the meaning of fields please see Glossary
Document Generated on Tuesday, August 13, 2013

Print Report

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

Work Requested -- GW110118

Works Details (top)

GROUNDWATER NUMBER	GW110118
LIC-NUM	10BL600053
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Well
WORK-STATUS	
CONSTRUCTION-METHOD	Auger
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2006-01-16
FINAL-DEPTH (metres)	6.00
DRILLED-DEPTH (metres)	6.00
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	RAILCORP N S W
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	6245830.00
EASTING	329422.00
LATITUDE	33 54' 51"
LONGITUDE	151 9' 17"
GS-MAP	
AMG-ZONE	56
COORD-SOURCE	

REMARK

Form-A (top)

COUNTY	CUMBERLAND
PARISH	PETERSHAM
PORTION-LOT-DP	1 1042838

Licensed (top)

COUNTY	CUMBERLAND
PARISH	PETERSHAM
PORTION-LOT-DP	1 1042838

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	6.00	150			Auger
1	1	Casing	P.V.C.	0.00	3.00	50			
1	1	Opening	Screen	3.00	6.00	50			PVC; A: .2mm
1		Annulus	Waterworn/Rounded	0.00	0.00				Graded; GS: 2-6mm

Water Bearing Zones (top)

no details

Drillers Log (top)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	6.00	6.00	CLAY		

Groundwater Works Summary

For information on the meaning of fields please see Glossary
Document Generated on Tuesday, August 13, 2013

Print Report

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

Work Requested -- GW110119

Works Details (top)

GROUNDWATER NUMBER	GW110119
LIC-NUM	10BL600053
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Well
WORK-STATUS	
CONSTRUCTION-METHOD	Auger
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2006-01-16
FINAL-DEPTH (metres)	3.50
DRILLED-DEPTH (metres)	3.50
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	RAILCORP N S W
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	1.50
SALINITY	
YIELD	

Site Details (top)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6245821.00
EASTING	329372.00
LATITUDE	33 54' 51"
LONGITUDE	151 9' 16"
GS-MAP	
AMG-ZONE	56
COORD-SOURCE	

REMARK

Form-A (top)

COUNTY	CUMBERLAND
PARISH	PETERSHAM
PORTION-LOT-DP	1 1042838

Licensed (top)

COUNTY	CUMBERLAND
PARISH	PETERSHAM
PORTION-LOT-DP	1 1042838

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	3.50	150			Auger
1	1	Casing	P.V.C.	0.00	3.50	50			
1	1	Opening	Screen	0.00	3.50	50			PVC; A: .2mm
1		Annulus	Waterworn/Rounded	0.00	0.00				Graded; GS: 0-3.5mm

Water Bearing Zones (top)

no details

Drillers Log (top)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	3.50	3.50		CLAY	

Groundwater Works Summary

For information on the meaning of fields please see Glossary
Document Generated on Tuesday, August 13, 2013

Print Report

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

Work Requested -- GW110120

Works Details (top)

GROUNDWATER NUMBER	GW110120
LIC-NUM	10BL600053
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Well
WORK-STATUS	
CONSTRUCTION-METHOD	Auger
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2006-01-16
FINAL-DEPTH (metres)	6.00
DRILLED-DEPTH (metres)	6.00
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	RAILCORP N S W
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	3.00
SALINITY	
YIELD	

Site Details (top)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6245861.00
EASTING	329413.00
LATITUDE	33 54' 50"
LONGITUDE	151 9' 17"
GS-MAP	
AMG-ZONE	56
COORD-SOURCE	

REMARK

Form-A (top)

COUNTY	CUMBERLAND
PARISH	PETERSHAM
PORTION-LOT-DP	1 1042838

Licensed (top)

COUNTY	CUMBERLAND
PARISH	PETERSHAM
PORTION-LOT-DP	1 1042838

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	6.00	150			Auger
1	1	Casing	P.V.C.	0.00	3.00	50			
1	1	Opening	Screen	3.00	6.00	50			PVC; A: .2mm

Water Bearing Zones (top)

no details

Drillers Log (top)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	6.00	6.00	CLAY		

Groundwater Works Summary

For information on the meaning of fields please see Glossary
Document Generated on Tuesday, August 13, 2013

Print Report

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

Work Requested -- GW110121

Works Details (top)

GROUNDWATER NUMBER	GW110121
LIC-NUM	10BL600053
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Well
WORK-STATUS	
CONSTRUCTION-METHOD	Auger
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2006-01-16
FINAL-DEPTH (metres)	3.50
DRILLED-DEPTH (metres)	3.50
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	RAILCORP N S W
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	3.00
SALINITY	
YIELD	

Site Details (top)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6245840.00
EASTING	329454.00
LATITUDE	33 54' 51"
LONGITUDE	151 9' 19"
GS-MAP	
AMG-ZONE	56
COORD-SOURCE	

REMARK

Form-A (top)

COUNTY	CUMBERLAND
PARISH	PETERSHAM
PORTION-LOT-DP	1 1042838

Licensed (top)

COUNTY	CUMBERLAND
PARISH	PETERSHAM
PORTION-LOT-DP	1 1042838

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	3.50	150			Auger
1	1	Casing	P.V.C.	0.00	0.50	50			
1	1	Opening	Screen	0.50	3.50	50			PVC; A: .2mm

Water Bearing Zones (top)

no details

Drillers Log (top)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	3.50	3.50	CLAY		

Groundwater Works Summary

For information on the meaning of fields please see Glossary
Document Generated on Tuesday, August 13, 2013

Print Report

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

Work Requested -- GW110122

Works Details (top)

GROUNDWATER NUMBER	GW110122
LIC-NUM	10BL600053
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Well
WORK-STATUS	
CONSTRUCTION-METHOD	Auger
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2006-01-16
FINAL-DEPTH (metres)	3.50
DRILLED-DEPTH (metres)	3.50
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	RAILCORP N S W
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	6245833.00
EASTING	329500.00
LATITUDE	33 54' 51"
LONGITUDE	151 9' 20"
GS-MAP	
AMG-ZONE	56
COORD-SOURCE	

REMARK

Form-A (top)

COUNTY	CUMBERLAND
PARISH	PETERSHAM
PORTION-LOT-DP	1 1042838

Licensed (top)

COUNTY	CUMBERLAND
PARISH	PETERSHAM
PORTION-LOT-DP	1 1042838

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	3.50	150			Auger
1	1	Casing	P.V.C.	0.00	0.50	50			
1	1	Opening	Screen	0.50	3.50	50			PVC; A: .2mm

Water Bearing Zones (top)

no details

Drillers Log (top)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	3.50	3.50	CLAY		

Groundwater Works Summary

For information on the meaning of fields please see Glossary
Document Generated on Tuesday, August 13, 2013

Print Report

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

Work Requested -- GW109824

Works Details (top)

GROUNDWATER NUMBER	GW109824
LIC-NUM	10BL164967
AUTHORISED-PURPOSES	MONITORING BORE
INTENDED-PURPOSES	MONITORING BORE
WORK-TYPE	Bore
WORK-STATUS	
CONSTRUCTION-METHOD	Other
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2005-04-05
FINAL-DEPTH (metres)	20.70
DRILLED-DEPTH (metres)	20.70
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	ALEXANDRIA LANDFILL
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	4.51
SALINITY	
YIELD	

Site Details (top)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6245635.00
EASTING	331393.00
LATITUDE	33 54' 58"
LONGITUDE	151 10' 34"
GS-MAP	
AMG-ZONE	56
COORD-SOURCE	

REMARK

Form-A (top)

COUNTY	CUMBERLAND
PARISH	PETERSHAM
PORTION-LOT-DP	11//1013168

Licensed (top)

COUNTY	CUMBERLAND
PARISH	ALEXANDRIA
PORTION-LOT-DP	11 1013168

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	20.70	100			Other
1	1	Casing	PVC Class 18	0.00	13.40	63			Screwed
1	1	Opening	Slots - Horizontal	13.40	18.40	63			PVC; 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
13.00	20.00	7.00		4.51					4350.00

Drillers Log (top)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	4.50	4.50	FILL		
4.50	9.00	4.50	LAMINITE		
9.00	17.00	8.00	SHALE		
17.00	20.70	3.70	SANDSTONE		

APPENDIX J

LAND TITLE INFORMATION

NSW GOVERNMENT | Land & Property Information

A division of the Department of Finance & Services

TITLE SEARCH

Computer Folio Certificate issued under Section 96D of the Real Property Act 1900

COMPUTER FOLIO REFERENCE	
A/178259	
EDITION No. & DATE OF CURRENT CERTIFICATE OF TITLE	
6	25/6/2012

No. 00

Search certified to:
25/7/2013 11:30 AM

LAND

LOT A IN DEPOSITED PLAN 178259
AT MARRICKVILLE
LOCAL GOVERNMENT AREA MARRICKVILLE
PARISH OF PETERSHAM COUNTY OF CUMBERLAND
TITLE DIAGRAM DP178259

FIRST SCHEDULE

DINA DANIAS
IN 3/15 SHARE
GEORGE DANIAS
IN 4/15 SHARE
MICHAEL DANIAS
IN 4/15 SHARE
SUSIE DANIAS
IN 4/15 SHARE
AS TENANTS IN COMMON (TA AC618616)

SECOND SCHEDULE (2 NOTIFICATIONS)

---

1 RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)
2 AH70282 MORTGAGE TO NATIONAL AUSTRALIA BANK LIMITED

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

NSW GOVERNMENT | Land & Property Information

A division of the Department of Finance & Services

HISTORICAL TITLE SEARCH

Certificate issued under Section 96G
of the Real Property Act 1900

No. 11

Search certified to: 25/7/2013 11:31AM

Computer Folio Reference: A/178259

First Title(s): SEE PRIOR TITLE(S)

Prior Title(s): VOL 15544 FOL 193

Recorded	Number	Type of Instrument	C.T. Issue
29/7/1989		TITLE AUTOMATION PROJECT	LOT RECORDED FOLIO NOT CREATED
6/10/1989		CONVERTED TO COMPUTER FOLIO	FOLIO CREATED CT NOT ISSUED
21/10/1998	5344972	CHANGE OF NAME	EDITION 1
24/12/1998	5494997	CAVEAT	
4/3/1999	5650752	DISCHARGE OF MORTGAGE	
0 4/3/1999	5650753	TRANSFER	
4/3/1999	5650754	MORTGAGE	EDITION 2
20/2/2004	AA388078	DISCHARGE OF MORTGAGE	
20/2/2004	AA388081	MORTGAGE	
20/2/2004	AA388082	LEASE	EDITION 3
18/7/2006	AC124961	REJECTED - TRANSMISSION APPLICATION	
19/7/2006	AC288923	CAVEAT	
26/7/2006	AC124961	RE-INSTATED - TRANSMISSION APPLICATION	
18/8/2006	AC537948	WITHDRAWAL OF CAVEAT	
25/8/2006	AC554074	DEPARTMENTAL DEALING	EDITION 4

END OF PAGE 1 - CONTINUED OVER

HISTORICAL TITLE SEARCH

Certificate issued under Section 96G
of the Real Property Act 1900

No. 11

Search certified to: 25/7/2013 11:31AM

Computer Folio Reference: A/178259

Recorded	Number	Type of Instrument	C.T. Issue
22/9/2006	AC618616	TRANSMISSION APPLICATION	
22/9/2006	AC618618	VARIATION OF MORTGAGE	EDITION 5
25/6/2012	AH70281	DISCHARGE OF MORTGAGE	
25/6/2012	AH70282	MORTGAGE	EDITION 6

*** END OF SEARCH ***

CERTIFICATE OF TITLE

15544193

NEW SOUTH WALES

PROPERTY ACT, 1900

CANCELLED Vol. 15544 Fol. 193

First Title Old System

Prior Title Vol. 3783 Fol. 235

SEE AUTO FOLIO

EDITION ISSUED 19 5 1909

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.

Registrar General.

PERSONS ARE CAUTIONED AGAINST ALTERING OR ADDING TO THIS CERTIFICATE OR ANY NOTIFICATION HEREON

Vol. 15544 Fol. 193 (Page 1)

NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR GENERAL ARE CANCELLED

LAND REFERRED TO

Lot A in DP178259 at Marrickville in the Municipality of Marrickville Parish of Petersham County of Cumberland.

Title Diagram: DP178259

FIRST SCHEDULE

MALCO INDUSTRIES (OPERATIONS) PTY LIMITED. N297386

SECOND SCHEDULE

GRY 1. Reservations and conditions in the Crown Grant.
MX 2. N297386 Mortgage to Westpac Banking Corporation.

LT 2/64

FIRST SCHEDULE (continued)

REGISTERED PROPRIETOR	Registrar General
CANCELLED SEE AUTO FOLIO	

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

Form: 97-01T
Licence: 026CN/0526/96

TRANSFER

New South Wales
Real Property Act 1900

5650753S

Instructions for filling out this form are available from the Land Titles Office

Office of State Revenue use only

231198 0734 04 20152417901

(A) **LAND TRANSFERRED**
Show no more than 20 titles. If appropriate, specify the share or part transferred.

Identifiers 5/63446 and A/178259

(B) **LODGED BY**

LTO Box	Name, Address or DX and Telephone
602T	PHILLIPS FOX LAWYERS
	REFERENCE (15 character maximum):

(C) **TRANSFEROR MALCO ENGINEERING PTY. LIMITED ACN 000 006 726**

(D) acknowledges receipt of the consideration of **$3,850,000.00** which is the same consideration referred to in Transfer between E W Fittings Pty. Limited as Transferor and Danias as Transferees Identifier 53/868710.

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**

T TS (s713 LGA) TW (Sheriff)	**DINA DANIAS, EVANGELOS DANIAS, GEORGE DANIAS, MICHAEL DANIAS and SUSIE DANIAS**
(G)	**TENANCY: TENANTS IN COMMON IN EQUAL SHARES**

(H) We certify this dealing correct for the purposes of the Real Property Act 1900. DATE Do Not Date

Signed in my presence by the transferor who is personally known to me.

Signed for and on behalf of Malco Engineering Pty Limited (ACN 000 006 726) by its Attorney ~~STANLEY SUCHARD~~ Ian Morris Kiefel and I state that I have not received any Notice of the revocation of the Power of Attorney registered in the Office of the Registrar General Sydney as Book 4220 No. 604 under which this document is executed.

X .....
Signature of Witness

X P. O. RYAN
Name of Witness (BLOCK LETTERS)

X 43 BAIRD ST. BRIGHTON
Address of Witness

IMK
X .....
Signature of Transferor

Signed in my presence by the transferee who is personally known to me.

.....
Signature of Witness

.....
Name of Witness (BLOCK LETTERS)

Address of Witness

.....
Solicitor for Transferee
N C COOMBES

CHECKED BY (LTO use) .....

NSW GOVERNMENT | Land & Property Information

A division of the Department of Finance & Services

TITLE SEARCH

Computer Folio Certificate issued under Section 96D of the Real Property Act 1900

No. 98

Search certified to:
25/7/2013 10:51 AM

COMPUTER FOLIO REFERENCE	
5/63446	
EDITION No. & DATE OF CURRENT CERTIFICATE OF TITLE	
8	25/6/2012

LAND

LOT 5 IN DEPOSITED PLAN 63446
LOCAL GOVERNMENT AREA MARRICKVILLE
PARISH OF PETERSHAM COUNTY OF CUMBERLAND
TITLE DIAGRAM DP63446

FIRST SCHEDULE

DINA DANIAS
IN 3/15 SHARE
GEORGE DANIAS
IN 4/15 SHARE
MICHAEL DANIAS
IN 4/15 SHARE
SUSIE DANIAS
IN 4/15 SHARE
AS TENANTS IN COMMON (TA AC618616)

SECOND SCHEDULE (2 NOTIFICATIONS)
---

1 RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)
2 508190 EASEMENT AFFECTING THE PART OF THE LAND ABOVE DESCRIBED SHOWN SO BURDENED IN VOL 3941 FOL 181

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

NSW GOVERNMENT | Land & Property Information

A division of the Department of Finance & Services

HISTORICAL TITLE SEARCH

Certificate issued under Section 96G
of the Real Property Act 1900

No. 99

Search certified to: 25/7/2013 10:52AM

Computer Folio Reference: 5/63446

First Title(s): SEE PRIOR TITLE(S)

Prior Title(s): VOL 3941 FOL 181

Recorded	Number	Type of Instrument	C.T. Issue
16/2/1989		TITLE AUTOMATION PROJECT	LOT RECORDED FOLIO NOT CREATED
7/8/1990		CONVERTED TO COMPUTER FOLIO	FOLIO CREATED CT NOT ISSUED
21/10/1998	5344972	CHANGE OF NAME	EDITION 1
15/12/1998	5466985	LEASE	EDITION 2
24/12/1998	5494997	CAVEAT	
4/3/1999	5650752	DISCHARGE OF MORTGAGE	
4/3/1999	5650753	TRANSFER	
4/3/1999	5650754	MORTGAGE	EDITION 3
7/8/2000	6952664	LEASE	EDITION 4
26/7/2001	7805891	CAVEAT	
14/11/2002	9127964	WITHDRAWAL OF CAVEAT	
20/2/2004	AA388078	DISCHARGE OF MORTGAGE	
20/2/2004	AA388081	MORTGAGE	
20/2/2004	AA388082	LEASE	EDITION 5
14/1/2005	AB222909	CAVEAT	
18/7/2006	AC124961	REJECTED - TRANSMISSION	

END OF PAGE 1 - CONTINUED OVER

NSW GOVERNMENT | Land & Property Information

A division of the Department of Finance & Services

HISTORICAL TITLE SEARCH

Certificate issued under Section 96G
of the Real Property Act 1900

No. 99

Search certified to: 25/7/2013 10:52AM

Computer Folio Reference: 5/63446

Recorded	Number	Type of Instrument	C.T. Issue
		APPLICATION	
19/7/2006	AC288923	CAVEAT	
26/7/2006	AC124961	RE-INSTATED - TRANSMISSION APPLICATION	
7/8/2006	AC494620	WITHDRAWAL OF CAVEAT	
18/8/2006	AC537948	WITHDRAWAL OF CAVEAT	
25/8/2006	AC554074	DEPARTMENTAL DEALING	EDITION 6
22/9/2006	AC618616	TRANSMISSION APPLICATION	
22/9/2006	AC618618	VARIATION OF MORTGAGE	EDITION 7
25/6/2012	AH70281	DISCHARGE OF MORTGAGE	EDITION 8

*** END OF SEARCH ***

Form: 97-01T
Licence: 026CN/0526/96

TRANSFER

New South Wales
Real Property Act 1900

5650753S

Instructions for filling out this form are available from the Land Titles Office

Office of State Revenue use only

231198 0734 04 20152417901

(A) **LAND TRANSFERRED**
Show no more than 20 titles. If appropriate, specify the share or part transferred.

Identifiers 5/63446 and A/178259

(B) **LODGED BY**

LTO Box	Name, Address or DX and Telephone
602T	PHILLIPS FOX LAWYERS
	REFERENCE (15 character maximum):

(C) **TRANSFEROR MALCO ENGINEERING PTY. LIMITED ACN 000 006 726**

(D) acknowledges receipt of the consideration of **$3,850,000.00** which is the same consideration referred to in Transfer between E W Fittings Pty. Limited as Transferor and Danias as Transferees Identifier 53/868710.

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**

(G)

T TS (s713 LGA) TW (Sheriff)	**DINA DANIAS, EVANGELOS DANIAS, GEORGE DANIAS, MICHAEL DANIAS and SUSIE DANIAS** OFT X 5494997 **TENANCY: TENANTS IN COMMON IN EQUAL SHARES**

(H) We certify this dealing correct for the purposes of the Real Property Act 1900. **DATE** Do Not Date

Signed in my presence by the transferor who is personally known to me.

Signed for and on behalf of Malco Engineering Pty Limited (ACN 000 006 726) by its Attorney ~~STUART SUCHARD~~ Ian Morris Kiefel and I state that I have not received any Notice of the revocation of the power of Attorney registered in the Office of the Registrar General Sydney as Book 4220 No. 604 under which this document is executed.

X ..... Signature of Witness

X P.J. RYAN ..... Name of Witness (BLOCK LETTERS)

X 43 BAIRD ST BRIGHTON Address of Witness

IMK X ..... Signature of Transferor

Signed in my presence by the transferee who is personally known to me.

..... Signature of Witness

..... Name of Witness (BLOCK LETTERS)

Address of Witness

..... Solicitor for Transferee
N C COOMBES

CHECKED BY (LTO use) .....

NSW GOVERNMENT | Land & Property Information

A division of the Department of Finance & Services

TITLE SEARCH

Computer Folio Certificate issued under Section 96D of the Real Property Act 1900

COMPUTER FOLIO REFERENCE	
53/868710	
EDITION No. & DATE OF CURRENT CERTIFICATE OF TITLE	
7	25/6/2012

No. 14

Search certified to:
25/7/2013 11:30 AM

LAND

LOT 53 IN DEPOSITED PLAN 868710
AT MARRICKVILLE
LOCAL GOVERNMENT AREA MARRICKVILLE
PARISH OF PETERSHAM COUNTY OF CUMBERLAND
TITLE DIAGRAM DP868710

FIRST SCHEDULE

DINA DANIAS
IN 3/15 SHARE
GEORGE DANIAS
IN 4/15 SHARE
MICHAEL DANIAS
IN 4/15 SHARE
SUSIE DANIAS
IN 4/15 SHARE
AS TENANTS IN COMMON (TA AC618616)

SECOND SCHEDULE (10 NOTIFICATIONS)
---

1 RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)
2 BK 898 NO 872 EASEMENT FOR DRAINAGE AFFECTING THE PART SHOWN SO BURDENED IN THE TITLE DIAGRAM
3 T925004 EASEMENT FOR SERVICES AFFECTING THE PART SHOWN SO BURDENED IN THE TITLE DIAGRAM
4 I506658 LEASE TO SYDNEY ELECTRICITY OF SUBSTATION PREMISES NO. 7364 "BROMPTON RICH" TOGETHER WITH RIGHT OF WAY & EASEMENT FOR ELECTRICITY PURPOSES AS SHOWN IN PLAN WITH I506658. EXPIRES 30.4.2043
5 DP866480 RIGHT OF CARRIAGEWAY AND EASEMENT FOR SERVICES 9 WIDE

END OF PAGE 1 - CONTINUED OVER

TITLE SEARCH

Computer Folio Certificate issued under
Section 96D of the Real Property Act 1900

COMPUTER FOLIO REFERENCE	
53/868710	
EDITION No. & DATE OF CURRENT CERTIFICATE OF TITLE	
7	25/6/2012

No. 14

Search certified to:
25/7/2013 11:30 AM

SECOND SCHEDULE (10 NOTIFICATIONS) (CONTINUED)

		AFFECTING THE PART SHOWN SO BURDENED IN THE TITLE DIAGRAM
6	DP866480	EASEMENT TO DRAIN WATER 3 WIDE AFFECTING THE PART SHOWN SO BURDENED IN THE TITLE DIAGRAM
7	DP868710	RIGHT OF CARRIAGEWAY AND EASEMENT FOR SERVICES 9 WIDE AFFECTING THE PART(S) SHOWN SO BURDENED IN THE TITLE DIAGRAM
8	DP868710	EASEMENT FOR SERVICES 1 WIDE AFFECTING THE PART(S) SHOWN SO BURDENED IN THE TITLE DIAGRAM
9	5582001	RIGHT OF CARRIAGEWAY AFFECTING THE SITE DESIGNATED (A) IN PLAN WITH 5582001
10	AH70283	MORTGAGE TO NATIONAL AUSTRALIA BANK LIMITED

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

NSW GOVERNMENT | Land & Property Information

A division of the Department of Finance & Services

HISTORICAL TITLE SEARCH

Certificate issued under Section 96G
of the Real Property Act 1900

No. 15

Search certified to: 25/7/2013 11:30AM

Computer Folio Reference: 53/868710

First Title(s): OLD SYSTEM
Prior Title(s): 53/866480

Recorded	Number	Type of Instrument	C.T. Issue
30/5/1997	DP868710	DEPOSITED PLAN	FOLIO CREATED EDITION 1
4/8/1998	5172527	CAVEAT	
27/10/1998	5207443	REQUEST	
18/11/1998	5404515	CAVEAT	
18/11/1998	5404551	CAVEAT	
23/12/1998	5434679	WITHDRAWN - REQUEST	
23/12/1998	5434684	WITHDRAWN - REQUEST	
24/12/1998	5494996	CAVEAT	
8/2/1999	5576449	WITHDRAWAL OF CAVEAT	
9/2/1999	5582001	TRANSFER GRANTING EASEMENT	EDITION 2
4/3/1999	5650807	DISCHARGE OF MORTGAGE	
4/3/1999	5650808	TRANSFER	
4/3/1999	5650809	MORTGAGE	
4/3/1999	5650810	LEASE	
4/3/1999	5650811	LEASE	EDITION 3
26/7/2001	7805891	CAVEAT	
4/11/2002	9097215	CAVEAT	

END OF PAGE 1 - CONTINUED OVER

NSW GOVERNMENT | Land & Property Information

A division of the Department of Finance & Services

HISTORICAL TITLE SEARCH

Certificate issued under Section 96G
of the Real Property Act 1900

No. 15

Search certified to: 25/7/2013 11:30AM

Computer Folio Reference: 53/868710

Recorded	Number	Type of Instrument	C.T. Issue
14/11/2002	9127964	WITHDRAWAL OF CAVEAT	
21/2/2003	9397829	WITHDRAWAL OF CAVEAT	
20/2/2004	AA388077	DISCHARGE OF MORTGAGE	
20/2/2004	AA388081	MORTGAGE	EDITION 4
14/1/2005	AB222909	CAVEAT	
18/7/2006	AC124961	REJECTED - TRANSMISSION APPLICATION	
19/7/2006	AC288924	CAVEAT	
26/7/2006	AC124961	RE-INSTATED - TRANSMISSION APPLICATION	
7/8/2006	AC494620	WITHDRAWAL OF CAVEAT	
18/8/2006	AC537921	WITHDRAWAL OF CAVEAT	
25/8/2006	AC554074	DEPARTMENTAL DEALING	EDITION 5
22/9/2006	AC618616	TRANSMISSION APPLICATION	
22/9/2006	AC618618	VARIATION OF MORTGAGE	EDITION 6
25/6/2012	AH70281	DISCHARGE OF MORTGAGE	
25/6/2012	AH70283	MORTGAGE	EDITION 7

*** END OF SEARCH ***

Form: 97-01T
Licence: 026CN/0526/96

TRANSFER

New South Wales
Real Property Act 1900

5650808T

Instructions for filling out this form are available from the Land Titles Office

Office of State Revenue use only

(A) **LAND TRANSFERRED**
Show no more than 20 titles. If appropriate, specify the share or part transferred.

Identifier 53/868710

(B) **LODGED BY**

LTO Box	Name, Address or DX and Telephone
602T	PHILLIPS FOX LAWYERS REFERENCE (15 character maximum): FJG 936762

(C) **TRANSFEROR E W FITTINGS PTY. LIMITED ACN 000 015 985**

(D) acknowledges receipt of the consideration of **$3,850,000.00** which is the same consideration referred to in Transfer between Malco Engineering Pty. Limited as Transferor and Danias as Transfer Identifiers 5/63446 and A/189259 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**

(G)

T **TS** (s713 LGA) **TW** (Sheriff)	**DINA DANIAS, EVANGELOS DANIAS, GEORGE DANIAS, MICHAEL DANIAS and SUSIE DANIAS** **TENANCY: TENANTS IN COMMON IN EQUAL SHARES**

(H) We certify this dealing correct for the purposes of the Real Property Act 1900. **DATE** OFF 5494996

Signed in my presence by the transferor who is personally known to me.

Leisa Byrnes J.P.
Signature of Witness

LEISA L. BYRNES
Name of Witness (BLOCK LETTERS)

Level 11, 140 Phillip St, Sydney
Address of Witness

Signed for and on behalf of E W Fittings Pty Ltd (ACN 000 015 985) by its Attorney SIDNEY SUCHARD and I state that I have not received any notice of the revocation of the Power of Attorney registered in the office of the Registrar General Sydney as Book 4221 No. 244 under which this document is executed.

Signature of Transferor

Signed in my presence by the transferee who is personally known to me.

Signature of Witness

Name of Witness (BLOCK LETTERS)

Address of Witness

Solicitor for Transferee
N C COOMBES

CHECKED BY (LTO use) .....

NSW GOVERNMENT | Land & Property Information

A division of the Department of Finance & Services

HISTORICAL TITLE SEARCH

Certificate issued under Section 96G
of the Real Property Act 1900

No. 37

Search certified to: 25/7/2013 11:51AM

Computer Folio Reference: 53/866480

First Title(s): OLD SYSTEM

Prior Title(s): 3/775440 5/785028

Recorded	Number	Type of Instrument	C.T. Issue
4/3/1997	DP866480	DEPOSITED PLAN	FOLIO CREATED EDITION 1
30/5/1997	DP868710	DEPOSITED PLAN	FOLIO CANCELLED

*** END OF SEARCH ***

NSW GOVERNMENT | Land & Property Information

A division of the Department of Finance & Services

HISTORICAL TITLE SEARCH

Certificate issued under Section 96G
of the Real Property Act 1900

No. 39

Search certified to: 25/7/2013 11:51AM

Computer Folio Reference: 3/775440

First Title(s): OLD SYSTEM

Prior Title(s): 1/773622

	Recorded	Number	Type of Instrument	C.T. Issue
	8/8/1988	DP775440	DEPOSITED PLAN	FOLIO CREATED EDITION 1
	25/8/1988	X808881	DEPARTMENTAL DEALING	EDITION 2
	11/9/1989	Y602956	DEPARTMENTAL DEALING	
	20/10/1989	Y673748	DEPARTMENTAL DEALING	EDITION 3
◊	29/10/1990	Z307499	TRANSFER	EDITION 4
	17/1/1991	Z461033	MORTGAGE	EDITION 5
	10/8/1993	I506658	LEASE	EDITION 6
	3/3/1997	DP866480	DEPOSITED PLAN	FOLIO CANCELLED

*** END OF SEARCH ***

RP 13
1985

STAMP DUTY

OFFICE OF STATE REVENUE
(N.S.W. TREASURY)
1990/91 W10
STAMP DUTY
$500-00
CHIEF COMMISSIONER

Z
307499

TRANSFER

REAL PROPERTY ACT, 1900

T

CB | 1 of 1 | X
$ 47

R1/1

DESCRIPTION OF LAND Note (a)	Torrens Title Reference	If Part Only, Delete Whole and Give Details	Location
	IDENTIFIER 3/775440	WHOLE PART FORMERLY IN VOLUME 12467 FOLIO 160 Being Part of LOT 3 DEPOSITED PLAN 775440	MARRICKVILLE

TRANSFEROR
Note (b)

MALCO ENGINEERING PTY. LIMITED
VICTORIA ROAD & RICH STREET
MARRICKVILLE NSW 2204

ESTATE
Note (c)

(the abovenamed TRANSFEROR) hereby acknowledges receipt of the consideration of $ 40,000.00 (JONES LANG WOOTTON VALUATION)
and transfers an estate in fee simple
in the land above described to the TRANSFEREE

TRANSFEREE
Note (d)

E.W. FITTINGS PTY. LIMITED
8 COLLINS STREET
MELBOURNE VIC 3000

OFFICE USE ONLY

OVER

TENANCY
Note (e)

as joint tenants/tenants in common

PRIOR ENCUMBRANCES
Note (f)

subject to the following PRIOR ENCUMBRANCES 1. .....
2. ..... 3. .....

DATE 28.06.90

We hereby certify this dealing to be correct for the purposes of the Real Property Act, 1900.

EXECUTION
Note (g)

Signed in my presence by the transferor who is personally known to me

The Common Seal of

MALCO ENGINEERING PTY. LIMITED

was hereto affixed by authority of the BOARD OF DIRECTORS in the presence of —

Address and Description of Witness ..... Director

..... Secretary

MALCO ENGINEERING PTY. LIMITED THE COMMON SEAL OF

..... Signature of Transferor

Note (g)

Signed in my presence by the transferee who is personally known to me

The Common Seal of

E.W. FITTINGS PTY. LIMITED

was hereto affixed by authority of the BOARD OF DIRECTORS in the presence of —

Address and Description of Witness ..... Director

..... Secretary

E.W. FITTINGS PTY. LIMITED THE COMMON SEAL OF

..... Signature of Transferee

061

TO BE COMPLETED BY LODGING PARTY
Notes (h) and (i)

LODGED BY E. D. STOKOE, PORTLAND HOUSE CORPORATION
8 COLLINS STREET
MELBOURNE 3000
Delivery Box Number 1W

LOCATION OF DOCUMENTS

CT	OTHER	
1		Herewith ✓
		In L.T.O. with
		Produced by

47
P

OFFICE USE ONLY

Checked	Passed	REGISTERED - -19
EB18		29 OCT 1990
Signed	Extra Fee	

Secondary Directions			
Delivery Directions			

RP 13
1985

INSTRUCTIONS FOR COMPLETION

This dealing should be marked by the Commissioner of Stamp Duties before lodgment by hand at the Land Titles Office.

Typewriting and handwriting should be clear, legible and in permanent dense black or dark blue non-copying ink.

Alterations are not to be made by erasure; the words rejected are to be ruled through and initialled by the parties to the dealing in the left hand margin.

If the space provided is insufficient, additional sheets of the same size and quality of paper and having the same margins as this form should be used. Each additional sheet must be identified as an annexure and signed by the parties and the attesting witnesses.

If it is intended to create easements, covenants, &c., use forms RP13A, RP13B, RP13C as appropriate.

Rule up all blanks.

The following instructions relate to the SIDE NOTES on the form.

(a) Description of land.
- (i) TORRENS TITLE REFERENCE—For a manual reference insert the Volume and Folio (e.g., Vol. 8514 Fol. 126)—For a computer folio insert the folio identifier (e.g., 12/701824).
- (ii) PART/WHOLE—If part only of the land in the folio of the Register is being transferred, delete the word "WHOLE" and insert the lot and plan number, portion, &c. See also sections 327 and 327AA of the Local Government Act, 1919
- (iii) LOCATION—Insert the locality shown on the Certificate of Title/Crown Grant, e.g., at Chullora. If the locality is not shown, insert the Parish and County, e.g., Ph. Lismore Co. Rous

(b) Show the full name of the transferor(s).

(c) If the estate being transferred is a lesser estate than an estate in fee simple, delete "fee simple" and insert appropriate estate.

(d) Show the full name, address and occupation or description of the transferee(s).

(e) Delete if only one transferee. If more than one transferee, delete either "joint tenants" or "tenants in common", and, if the transferees hold as tenants in common, state the shares in which they hold.

(f) In the memorandum of prior encumbrances, state only the registered number of any mortgage, lease, charge or writ to which this dealing is subject.

(g) Execution.
- GENERALLY
  - (i) Should there be insufficient space for the execution of this dealing, use an annexure sheet.
  - (ii) The certificate of correctness under the Real Property Act, 1900, must be signed by all parties to the transfer, each party to execute the dealing in the presence of an adult witness, not being a party to the dealing, to whom he/she is personally known.
    The solicitor for the transferee may sign the certificate on behalf of the transferee, the solicitor's name (not that of his/her firm), to be typewritten or printed adjacent to the signature. Any person falsely or negligently certifying is liable to the penalties provided by section 117 of the Real Property Act, 1900.
- ATTORNEY
  - (iii) If the transfer is executed by an attorney for the transferor/transferee pursuant to a registered power of attorney, the form of attestation must set out the full name of the attorney, and the form of execution must indicate the source of his/her authority, e.g., "AB by his attorney (or receiver or delegate, as the case may be) XY pursuant to power of attorney registered Book No."
- AUTHORITY
  - (iv) If the transfer is executed pursuant to an authority (other than specified in (iii)), the form of execution must indicate the statutory, judicial or other authority pursuant to which the transfer has been executed.
- CORPORATION
  - (v) If the transfer is executed by a corporation under seal, the form of execution should include a statement that the seal has been properly affixed, e.g., in accordance with the Articles of Association of the corporation. Each person attesting the affixing of the seal must state his/her position (e.g., director, secretary) in the corporation.

(h) Insert the name, postal address, Document Exchange reference, telephone number, and delivery box number of the lodging party.

(i) The lodging party is to complete the LOCATION OF DOCUMENTS panel. Place a tick in the appropriate box to indicate the whereabouts of the Certificate of Title. List, in an abbreviated form, other documents lodged, e.g., stat. dec. for statutory declaration, pbte for probate, L/A for letters of administration, &c.

OFFICE USE ONLY

L.O. 1341

FIRST SCHEDULE DIRECTIONS

(A) FOLIO IDENTIFIER	(B) DIRECTION	(C) NAME
	S	E.W. FITTINGS PTY LIMITED

SECOND SCHEDULE AND OTHER DIRECTIONS

(D) FOLIO IDENTIFIER	(E) DIRECTION	(F) NOTFN TYPE	(G) DEALING NUMBER	(H) DETAILS
	CT		1W	E.D. STOKOE PORTLAND HOUSE CORPORATION P/L 8 COLLINS ST MELBOURNE VIC 3000

NSW GOVERNMENT | Land & Property Information

A division of the Department of Finance & Services

HISTORICAL TITLE SEARCH

Certificate issued under Section 96G
of the Real Property Act 1900

No. 21

Search certified to: 25/7/2013 11:50AM

Computer Folio Reference: 1/773622

First Title(s): OLD SYSTEM

Prior Title(s): VOL 7049 FOL 170 VOL 12467 FOL 160

Recorded	Number	Type of Instrument	C.T. Issue
15/3/1988	DP773622	DEPOSITED PLAN	FOLIO CREATED EDITION 1
18/5/1988	X565754	DEPARTMENTAL DEALING	
19/5/1988	X554021	DISCHARGE OF MORTGAGE	EDITION 2
4/7/1988	X368330	DISCHARGE OF MORTGAGE	EDITION 3
3/8/1988	DP775440	DEPOSITED PLAN	FOLIO CANCELLED
2/9/1999	6159023	DEPARTMENTAL DEALING	

*** END OF SEARCH ***

AP 13 STAMP DUTY (A) [redacted]

OFFICE OF STATE REVENUE (N.S.W. TREASURY) P13 1988/88 $3147.72 STAMP DUTY CITY COMMISSIONER

Y049125

TRANSFER

REAL PROPERTY ACT, 1900 T

9 | 2 of 2 | X
$ LIC

R2/2

Torrens Title Reference	If Part Only, Delete Whole and Give Details	Location
DESCRIPTION OF LAND Note (a) VOLUME 3776 FOLIO 130 / VOLUME 3777 FOLIO 55 / VOLUME 4046 FOLIO 2 / VOLUME 4033 FOLIO 200 / VOLUME 12214 FOLIO 36 — LOW F1.578.028	WHOLE NOW BEING [illegible] OF LAND COMPRISED IN FOLIO A/180526	MARRICKVILLE D

TRANSFEROR Note (b): MALLCAP CORPORATION LIMITED *

ESTATE Note (c): (the abovenamed TRANSFEROR) hereby acknowledges receipt of the consideration of $ 799,545.00 and transfers an estate in fee simple in the land above described to the TRANSFEREE

TRANSFEREE Note (d): E.W. FITTINGS PTY. LIMITED

OFFICE USE ONLY [redacted] OVER

TENANCY Note (e): as joint tenants/tenants in common

PRIOR ENCUMBRANCES Note (f): subject to the following PRIOR ENCUMBRANCES 1. 2. 3.

DATE 29 - 9 - 1988

We hereby certify this dealing to be correct for the purposes of the Real Property Act, 1900.

EXECUTION Note (g):

THE COMMON SEAL of MALLCAP CORPORATION LIMITED was hereunto affixed by authority of the Board in the presence of: [signature] Secretary

MALLCAP CORPORATION LIMITED THE COMMON SEAL OF

[signature] Director D

Name of Witness (BLOCK LETTERS)

Address and occupation of Witness

THE COMMON SEAL of E.W. FITTINGS PTY. LIMITED was hereunto affixed by authority of the Board in the presence of:

E.W. FITTINGS PTY. LIMITED THE COMMON SEAL OF

[signature] Secretary

[signature] Director

Signature of Transferor

Signature of Transferee

TO BE COMPLETED BY LODGING PARTY Notes (h) and (i)

LODGED BY
CUTLER, HUGHES & HARRIS
SOLICITORS
53 MARKET STREET SYDNEY 2000
DX 205 SYDNEY
Delivery Box Number

LOCATION OF DOCUMENTS

CT	OTHER	
4		Herewith.
		In L.T.O. with
		Produced by

OFFICE USE ONLY
1897:1183(73)
DEREGISTERED 5.2.1990 & 28.2.1990

Checked	Passed	REGISTERED 8-2-1989
		29 MAR 1990
Signed	Extra Fee	13 FEB 1989

Secondary Directions: OVER
Delivery Directions: OVER

Manual Search Comp cert 2205 RJKB 8.2.89

88X41841

Caveat X611073 does not affect the title.

RP 68A
1988

OFFICE USE ONLY

REGISTRATION DIRECTION ANNEXURE

Use this side only for First and Second Schedule directions

DO NOT USE BOTH SIDES OF THE FORM

FIRST SCHEDULE DIRECTIONS

(A) FOLIO IDENTIFIER	(B) DIRECTION	(C) NAME
5/785028	S	E.W. FITTINGS PTY LIMITED
A/180526		
4046-2		
4033-200		

SECOND SCHEDULE AND OTHER DIRECTIONS

(D) FOLIO IDENTIFIER	(E) DIRECTION	(F) NOTEN TYPE	(G) DEALING NUMBER	(H) DETAILS
4/785028	ON	CX		LOTS 4 AND 5 IN DP 785028
5/785028				
4/785028	CT	NOT		
A/180526				
5/785028				
4046-2	CT	20	Y733974	
4033-200				

NSW GOVERNMENT | Land & Property Information

A division of the Department of Finance & Services

HISTORICAL TITLE SEARCH

Certificate issued under Section 96G
of the Real Property Act 1900

No. 23

Search certified to: 25/7/2013 11:50AM

Computer Folio Reference: 5/785028

First Title(s): OLD SYSTEM
Prior Title(s): VOL 3776 FOL 130 VOL 3777 FOL 55

Recorded	Number	Type of Instrument	C.T. Issue
8/11/1988	DP785028	DEPOSITED PLAN	FOLIO CREATED EDITION 1
24/11/1988	Y467	DISCHARGE OF MORTGAGE	
24/11/1988	Y468	DISCHARGE OF MORTGAGE	EDITION 2
13/2/1989	Y49125	TRANSFER	EDITION 3
5/2/1990	Y838980	DEPARTMENTAL DEALING	EDITION 4
29/3/1990	Y924522	WITHDRAWAL OF CAVEAT	
29/3/1990	Y49125	TRANSFER	
26/7/1990	Y733974	MORTGAGE	EDITION 5
11/10/1993	I707245	DEPARTMENTAL DEALING	
3/3/1997	DP866480	DEPOSITED PLAN	FOLIO CANCELLED

*** END OF SEARCH ***

11732-003

[redacted]ICATE OF TITLE

NEW SOUTH WALES [redacted]L PROPERTY ACT, 1900

Vol. 11732 Fol. 3

Applns. Nos. 2514 & 18062
Prior Titles Vol. 1413 Fols. 121 and 122
Vol. 2498 Fols. 132 and 141
Vol. 2618 Fol. 239
Vol. 3366 Fol. 203
Vol. 7516 Fol. 113

Edition issued 9-12-1971

I certify that the person described in the First Schedule is the registered proprietor of the undermentioned estate in the land within described subject nevertheless to such exceptions encumbrances and interests as are shown in the Second Schedule.

Registrar General.

CANCELLED

(Page 1) Vol. 11732 Fol. 3

ESTATE AND LAND REFERRED TO

Estate in Fee Simple in Lot 2 in Deposited Plan 549610 at Marrickville in the Municipality of Marrickville Parish of Petersham and County of Cumberland being part of 470 acres granted to Thomas Moore on 5-10-1799.

FIRST SCHEDULE

MALCO INDUSTRIES LIMITED, as to the parts of the land above described formerly comprised in Certificates of Title Volume 1413 Folio 121, Volume 2498 Folio 132 and Volume 7516 Folio 113 and MALLEABLE CASTINGS PTY. LIMITED, as to the parts formerly comprised in Certificates of Title Volume 1413 Folio 122, Volume 2498 Folio 141, Volume 2618 Folio 239 and Volume 3366 Folio 203.

Registrar General.

SECOND SCHEDULE

1. Reservations and conditions, if any, contained in the Crown Grant above referred to.
2. Easements created by Transfers Nos. C959120, C966756 and D244998 (and more fully set out therein) affecting the part of the land above described 6'9" wide shown in the plan hereon.
3. Easement for ~~Drainage~~ Electricity Purposes created by Transfer No.F382650 affecting the part of the land above described 5' wide shown in the plan hereon.
4. Easement for Drainage created by Transfer No.G254463 affecting the part of the land above described 9¾" wide shown in the plan hereon.
5. ~~Mortgage No.G286345 of that part of the land above described formerly comprised in Certificates of Title Volume 2498 Folio 141 and Volume 3366 Folio 203 to Australian Mutual Provident Society. Entered 5-5-1955.~~ Discharged N297334.
6. ~~Mortgage No.H800754 of that part of the land above described formerly comprised in Certificate of Title Volume 2618 Folio 239 to Australian Mutual Provident Society. Entered 16-6-1961.~~ Discharged N297334.

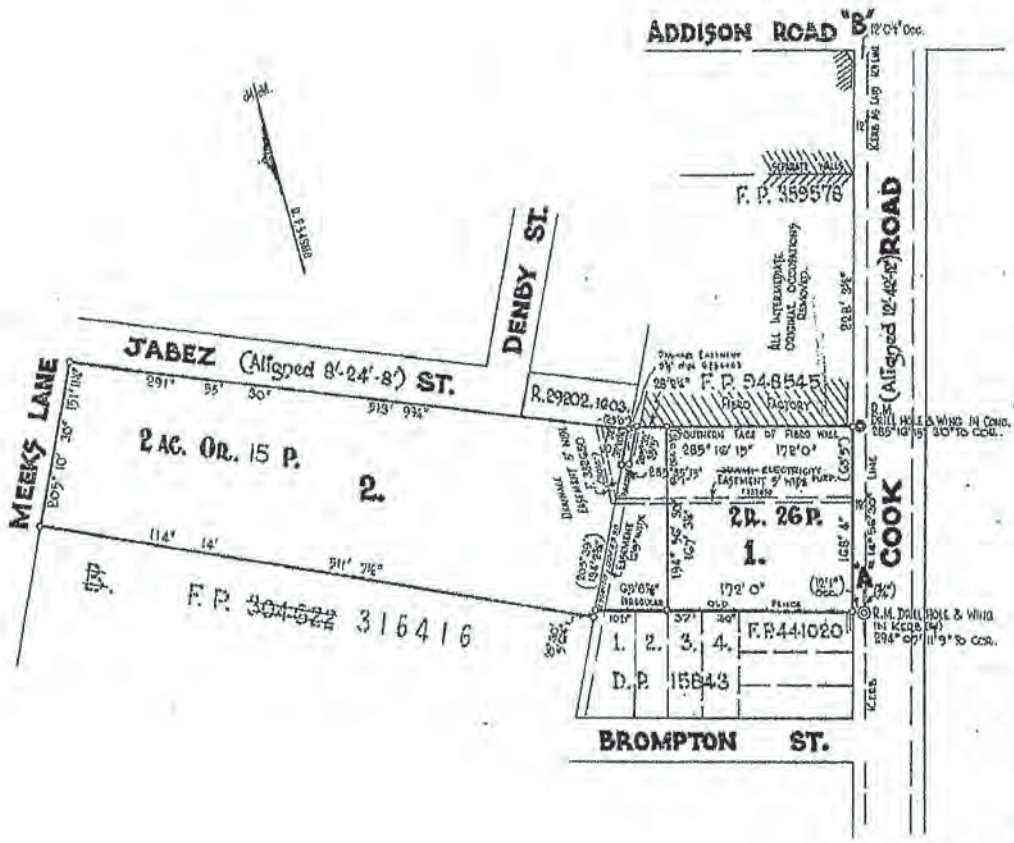
17.8.1984

Registrar General.

PERSONS ARE CAUTIONED AGAINST ALTERING OR ADDING TO THIS CERTIFICATE OR ANY NOTIFICATION HEREON

WARNING: THIS DOCUMENT MUST NOT BE REMOVED FROM THE LAND TITLES OFFICE.

NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR GENERAL ARE CANCELLED.



FIRST SCHEDULE (continued)

REGISTERED PROPRIETOR	INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	ENTERED	Signature of Registrar General
The name of the secondly mentioned registered proprietor is now Malco Industries (Operations) Pty. Limited	Change of Name	N297386		12-6-1974	

This deed is cancelled as to the whole (or part)

New Certificates of Title have issued on 25-6-74

for lots in ~~proposed~~ Plan No. 569478 as follows:

Lots 1 to 4 Vol. 12467 Fol 157 to 160 respectively.

The residue of land in this folio comprises road dam in DP 569478 Entered 27th June 74

REGISTRAR GENERAL

REGISTRAR GENERAL

Dual Certificates Held in Delivery (Page 3 of 3 pages)

1467706 Pg 3

1467707 Pg 4

Unregistered Lease

N297386

CT 9-4-74

DP569478 @ 12/6/74

DP570499

SECOND SCHEDULE (continued)

INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	PARTICULARS	ENTERED	Signature of Registrar General	CANCELLATION
	N884472		Interests created pursuant to Section 88B Conveyancing Act, 1919, by the registration of Deposited Plan 569478	11-6-1974		
			The interest of the Council of the Municipality of Marrickville in the addition to existing road shown on DP 569478.	11-6-1974		

NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR GENERAL ARE CANCELLED

Vol. 11732 Fol. 3

FIRST SCHEDULE (continued)

REGISTERED PROPRIETOR	INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	ENTERED	Signature of Registrar General

SECOND SCHEDULE (continued)

INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	PARTICULARS	ENTERED	Signature of Registrar General	CANCELLATION		

NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR GENERAL ARE CANCELLED

[redacted]ICATE OF TITLE

NEW SOUTH WALES — [redacted] PROPERTY ACT, 1900

12467160

Appln. No.18062

Vol. 12467 Fol. 160

Prior Titles Vol. 3973 Fol.65
Vol.11732 Fol. 3

Edition issued 25-6-1974

CANCELLED W

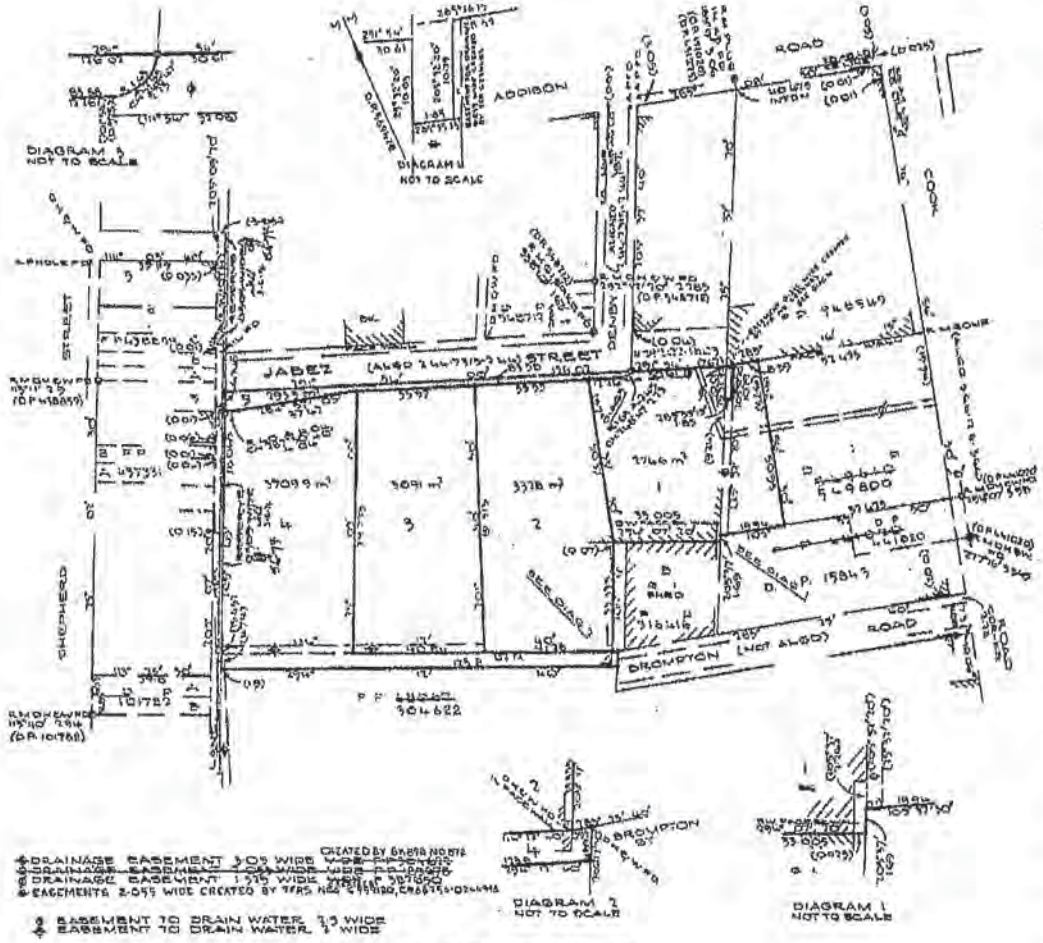
I certify that the person described in the First Schedule is the registered proprietor of the undermentioned estate in the land within described subject nevertheless to such exceptions encumbrances and interests as are shown in the Second Schedule.

Registrar General.

(Page 1) Vol. 12467 Fol. 160

PLAN SHOWING LOCATION OF LAND

LENGTHS ARE IN METRES



ESTATE AND LAND REFERRED TO

Estate in Fee Simple in Lot 4 in Deposited Plan 569478 in the Municipality of Marrickville Parish of Petersham and County of Cumberland being part of 190.2 hectares granted to Thomas Moore on 5-10-1799.

FIRST SCHEDULE

MALCO INDUSTRIES (OPERATIONS) PTY. LIMITED.

X565754

SECOND SCHEDULE

1. Reservations and conditions, if any, contained in the Crown Grant above referred to.
2. Easement for Drainage created by Conveyance Book 898 No.872 affecting the part of the land above described shown as "Drainage Easement 3.05 wide" in the plan hereon.
3. Easement to Drain Water affecting the part of the land above described shown in the plan hereon as "Easement to Drain Water 2 wide" created by the registration of Deposited Plan 569478. See N884972.

NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR GENERAL ARE CANCELLED.

Vol. 12467 Fol. 160

FIRST SCHEDULE (continued)

REGISTERED PROPRIETOR	INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	ENTERED	Signature of Registrar General
DP 773622 Registered 10-3-1988 This folio is cancelled as to whole upon creation of computer folios for lots 1 & 2 in the abovementioned plan.					

The residue of land in this folio comprises road in DP 578091

C.T. - 4 JAN 1984

C446-75
~~DP578091~~
Q440234 M.M.
T925004 Flg
DP 773622

SECOND SCHEDULE (continued)

INSTRUMENT NATURE	INSTRUMENT NUMBER	INSTRUMENT DATE	PARTICULARS	ENTERED	Signature of Registrar General	CANCELLATION
			The interest of the council of the Municipality of Merrickville with addition to existing road shown DP 578091	15-7-1975		
Mortgage	Q440234	———	to The Commercial Bank of Australia Limited	2-12-1977		
T925004	Transfer - Easement for services affecting the part of the land above described shown in the plan with T925004. Registered 21-2-1984.					

(Page 2 of 2 pages)

NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR GENERAL ARE CANCELLED

APPENDIX K

PREVIOUS REPORTS

ENVIRONMENTAL ASSESSMENT REPORT

LOT 54 RICH STREET AND SHEPHERD STREET MARRICKVILLE

Prepared by

Aargus Pty Ltd

July 1999

Inquiries:
Nick Kariotoglou
PO Box 398 Drummoyne NSW 2047
02 9588 9030 (ph) 02 9588 9217 (fx)

CONTROLLED DOCUMENT
DISTRIBUTION AND REVISION REGISTER

DISTRIBUTION LIST

Copy No.	Custodian	Location
1	Nick Kariotoglou	Aargus (Library)
2&3	Nic Voulgarakis	Protea Holdings (NSW) Pty Ltd
4	Philip Mulvey	EPA accredited auditor

Note: This register identifies the current custodians of controlled copies of the subject document.

It is expected that these custodians would be responsible for:

- the storage of the document
- ensuring prompt incorporation of amendments
- making the document available to pertinent personnel within the organisation
- encouraging observance of the document by such personnel
- making the document available for audit

DOCUMENT HISTORY

Revision No.	Revision Date	Description
0	01/07/99	Initial Issue

Issued By: .....

Date: ...1/7/99...

CONTENTS

TABLE OF FIGURES

REFERENCES

1. EXECUTIVE SUMMARY

Aargus Pty Ltd has been asked by Protea Holdings (NSW) Pty Ltd to provide an Environmental Assessment Report for the proposed development at Lot 54 Rich and Shepherd Streets, Marrickville. The Environmental Assessment Report will assess the site's environmental characteristics in comparison to regulatory criteria and to determine the site's suitability for the proposed development. The Environmental Assessment Report is then to be assessed by an EPA accredited auditor who will provide a site audit statement and summary site audit report, confirming the suitability of the land for the land-use proposed.

A previous environmental report was carried out at the subject property by Douglas Partners in July 1996 which is supplemented by an AGC Woodward-Clyde Pty Ltd Geotechnical Investigation conducted in March 1998 (refer to Appendix F).

The objective of the project was to make the site acceptable for the proposed commercial development. The proposed development of the site is the construction of a two-storey factory and an additional two-storey unit adjacent to the factory (refer to Appendix D).

In proposing recommendations and/or remediation criteria for the site, the recently published NEHF F Health Based Investigation Levels are used. Due to the proposed development of the property, the NEHF F Health Based Investigation Levels allow higher levels of contaminants due to minimal exposures from the proposed commercial development.

The scope of work in preparing the Environmental Assessment Report included review of existing information, filling information gaps, systematic sampling and analysis, interpretation of results/findings and report generation in accordance with Guidelines for the NSW Site auditor scheme.

To reach our stated objective, a set of twelve (12) soil samples and one (1) groundwater sample were taken in total and analysed in a systematic pattern across the site. Analytes were tabulated and statistical analysis was undertaken to ascertain the 95% Upper Confidence Limit. The 95% Upper Confidence Limit of the average concentration for the analysed contaminants were then compared with the NEHF F Health Based Investigation Levels. The research levels looked at were for commercial or industrial soil (NSWEPA Guidelines for the NSW Site Auditor Scheme).

From our analysis of results and conclusions, all samples analysed have met Regulatory Acceptance Criteria and Data Quality Objectives. There is minimal environmental risk posed by the site so long as the site is used for its intended purpose for commercial development and appropriate measures for capping are conducted. The site is therefore suitable for its intended purpose as a commercial development.

2. OBJECTIVES

The objective of the project was to make the site acceptable for the proposed commercial development. An Environmental Assessment of the site is part of this process to provide statistical support for assessing the environmental characteristics of the site against set regulatory criteria.

3. SCOPE OF WORK

The scope of work in preparing the Environmental Assessment Report included review of existing information, filling information gaps, interviews and data gathering, conduct targeted and systematic sampling and analysis, interpretation of results/findings and report generation.

4. SITE INFORMATION

For further site information, please refer to the attached reports – Appendix F & G.

4.1 Site Description

The site is located at Rich and Shepherd Streets, Marrickville. The site is situated in the local government area of Marrickville, parish of Petersham and county of Cumberland. A locality map is set out in Appendix A. The existing property identified in the Certificate of Titles below, namely:

- Certificate of Title Volume 4033 Folio 200 of Lot 54 in DP868710
- Certificate of Title Volume 867 Folio 28 of Part of Lots 18 & 19 Section B in DP 718

- Certificate of Title Identifier 53/866480
- Certificate of Title Identifier 3/775440
- Certificate of Title Identifier 5/785028
- Certificate of Title Identifier 1/773622

The site is a rectangular shape and covers approximately 2500m^2. An open stormwater canal bounds the site in the west and south (refer to site diagram-Appendix A). Existing buildings associated with the former Malco Industries operations bound the site to the south and east. Most of these buildings are presently vacant. Shaw of Australia is located to the north of the site and Shepherd Street bounds the site to the west. Access to the site is off Rich Street in the south.

The site is relatively flat with a slight east decline of 2 degrees. From the Geotechnical Investigation (refer to Appendix F), visible water observations were made within the open boreholes during drilling. The closest water body is the canal bordering the site that runs into Cooks River. We can assume groundwater flow down-gradient towards the nearest water body (north) although a hydrogeological survey would be needed to verify this.

4.2 Regional Geology

The 1:100,000 Geological Map of Sydney, NSW, indicates that the site lies close to the boundary between the Triassic Age Ashfield Shale of the Wianamatta Group, that comprise black to dark grey shales silstone and laminites, and the underlying Hawkesbury Sandstone. Quartenary Age clayey alluvium is also known to overlie bedrock in the area. A summary of the sub-surface conditions disclosed by samples taken and as shown in borehole logs from the Geotechnical Report-Appendix F are summarised below.

Fill

South of the site

Comprising sand and gravel, fine to medium grained, dark grey and brown, to depths of 1.0 m,

South west corner of the site and along the access track to the west

Comprising very loose to loose dark grey and brown sand and gravel, with some building rubble of gravel size ranging in depths from 1.0 m to 2.0 m,

Central, eastern and northern part of the site

Comprising sandy gravel, gravelly sand and clayey sand with gravel, dark grey and brown in colour reflecting its foundry origin. Also contained assorted fragments of concrete, slag, glass and metal ranging in depths from 1.5 m to 2.5 m underlain by,

Residual Clays

Comprising of sandy clays of grey and orange/brown colour, stiff to very stiff consistency, and contain occasional fine iron-stone gravel fragments ranging in depths from 1.0 m to 2.0 m underlain by,

Weathered Siltstones and Laminites

Comprising of highly weathered brown siltstones and laminites, low to very low in strength that varies in thickness between 1.0 m and 3.0 m.

Hawkesbury Sandstone

Comprising of fine to medium grained, light grey, cross-bedded, slightly weathered, high strength rock inferred to be the top of the Hawkesbury Sandstone formation.

4.3 Site History

The earliest recorded date of ownership/occupation for the subject property was 1888. Presently, the property has been left uninhabited with no building structures on site other than concrete and brick foundations.

Inquiries made with Marrickville Council relating to previous land use suggested activities relating to a sand preparation plant (for bricklaying purposes) on the site in 1966. The use of the site prior to 1966 is unknown, but upon interviews with site personnel on the adjoining property and confirming with the title dated 1904, it is believed that the area was used as a brick operations. It is not known how much of the site was part of the pit as the brick pit was supposed to take up approximately 20 lots in the vicinity. An easement for stormwater channel was put in place in 1962. Afterwards a bridge across the stormwater channel was built in 1966. In 1970 the property was used as a foundry. In 1988 a plastic coat hanger manufacturer occupied the property for two years.

Prior to 1997, the purchase date, the property conducted various differing activities. A history of ownership can be cited below and titles can be viewed in Appendix H.

Table 1. Summary of Title Search

Certificate of Title Vol.867 Fol.28, being part of Lots 18 & 19 of Section B DP 718

18 January 1888	Transfer of Title to James Colgan
25 February 1925	Transfer of Title to Elizabeth Colgin and Jennie Oakshott as joint tenants

This deed is cancelled and Certificate of Title Vol.4033 Fol.200 issued.

Certificate of Title Vol.4033 Fol.200

18 December 1928	Transfer of title to Louisa Thomsen.
21 May 1936	Transfer of title to Charles Makin (Clerk).
6 April 1962	Transfer of title to Malco Industries Limited.
8 February 1989	Transfer of title to E.W. Fittings Pty Limited.
14 November 1997	Transfer of title to Protea Holdings NSW Pty Limited.

Certificate of Title (Identifier 5/785028), Vol.1535 Fol.108

23 May 1904	Transfer of title to Rupert Cook (Brickmaker).
13 February 1913	Transfer of title to Jonathan Harrison (Estate Agent) and Alfred John Harrison as joint tenants

This deed is cancelled and the following Certificates of Title issued.

Certificate of Title Vol.2349 Fol.235 & Fol.236

25 April 1913	Transfer of title to Continental C&G Rubber Company Pty Limited.

This deed is cancelled and the following Certificate of Title issued.

Certificate of Title Vol.2365 Fol.220

11 March 1921	Transfer of title to J.C. Ludowici & Son Limited

This deed is cancelled and the following Certificate of Title issued.

Certificate of Title Vol.3262 Fol.200

13 August 1925	Transfer of title to Malleable Castings Limited

This deed is cancelled and the following Certificates of Title issued.

Certificate of Title Vol.3776 Fol.130 & Vol.3777 Fol.55

13 August 1925	Transfer of title to Malleable Castings Limited
30 December 1960	Transfer of title to Malco Industries (Operations) Limited

Certificate of Title Vol.3391 Fol.23

22 November 1920	Transfer of title to Edward Weir (Iron Founder).
20 September 1922	Transfer of title to Bridget Cordingley.
16 March 1923	Transfer of title back to Edward Weir
6 January 1926	Transfer of title to Edward Weir Limited from Edward Weir.
9 May 1944	Name of Company referred to as Edward Weir Limited has been changed to E.W. Fittings Limited.

This deed is cancelled and the following Certificate of Title issued.

Certificate of Title Vol.7049 Fol.170 & Vol.161 Fol.16

25 October 1960	Transfer of title & grant (with consent of Mortgage) to Metropolitan Water Sewerage & Drainage Board
28 June 1961	Transfer of title to E.W. Fittings Limited excepting thereabout the stormwater channel and reserving an easement for stormwater drainage.

In reviewing the historical occupations of the subject property, together with discussions held with neighboring employees who had worked on the adjoining properties for over 50 years, two industries of potential concern were identified. Firstly, the extensive area of the site and the adjacent properties were used as a clay quarry for brick making purposes. Secondly, the site was used as a foundry and metal castings premise by Malco Industries with the former clay pit areas reclaimed by backfilling with foundry wastes and other materials such as construction rubble, scrap metal and bricks. Particular chemicals of concern are heavy metals associated with the foundry and the light industries, machinery storage and maintenance operations. In addition, hydrocarbons from fuel, waste oil storage and use, improper disposal and/or leakage of oil.

Aerial photographs reviewed indicated relatively few changes at the site since 1951 (earliest available photographs). From these observations, no noticeable activity was witnessed nearby and no major change in site construction was witnessed.

4.4 Drainage and Surface Water

A site drainage diagram was not available. Surface water run-off is split between Shepherd and Rich Streets. Drainage lines on the site were maintained and kept clear from debris and blockages. Viewing of drainage was conducted during a heavy rainfall period. Generally, surface water ran in an east direction along with the gradient towards Rich Street and into the adjoining canal.

4.5 Local Land Uses

The site is located in an industrial area in the suburb of Marrickville. Existing buildings, currently unoccupied associated with the former Malco Industries bound the site to the south and east. Shaw of Australia is found to the northeast of the site and Shepherd Street bounds the site to the west. Land uses surrounding the site are as follows:

Northern Boundary	Metal Recyclers (G&V Ferraro Pty Ltd) formally part of the Malco Industries site and currently undertaking scrap metal recycling (now phasing out operations).
Eastern Boundary	An industrial warehouse owned by Shaw of Australia (curtain and blind manufacturer) that is located to the north of the property.
South/Eastern Boundary	Existing buildings, presently vacant are located to the south and east of the property.
Western Boundary	Shepherd Street is located to the west of the property.

We can assume that the only land use showing a potential area of environmental concern would be the adjoining metal recycler.

4.6 Hydrogeology

Groundwater was encountered at all boreholes during previous and current site sampling and we would expect groundwater to be a potential source of contaminant migration. Exposure to groundwater may occur due to the relative high permeability of fill, and geotechnical boreholes indicated groundwater was encountered up to two (2) metres under the current ground level. Due to the historical brick pit that had been excavated in a clay medium, it is thought that the watertable is perched and forms part of an underground reservoir that has saturated the fill layer within the pit. The area closest to the canal has clay at relatively shallow levels with the pit tapering from approximately 1.5 metres near the canal to about 9.3 metres in depth at the furthest portion of the site. Due to the unknown properties of the contaminants mixing with groundwater, a groundwater well was constructed and one sample tested.

4.7 Chemical Storage

There was no chemical storage present on site, however, from our historical searches and discussions with employees fuel, waste oil storage and gearbox oil were held on site.

4.8 Trade Waste

There is no trade waste notice held by the site. The site is not a scheduled premise under NSW legislation, thus does not warrant a licence unless the water effluent does not meet the Sydney Water Corporation Category One Classification.

4.9 EPA Notices

Our inquiries with Marrickville Council have verified no outstanding pollution abatement or clean up notices on this site. Hence, there is no title affectation with respect to the subject property.

4.10 Underground Storage Tanks

Our inquiries with the Workcover Chemical Safety Unit showed no indication of Underground Storage Tanks.

4.11 Proposed Development

The proposed development of the site involves the construction of a two-storey factory and an additional two-storey unit adjacent to the factory but as yet, a development application has to be lodged (refer to Appendix D).

5. POTENTIAL AREAS AND CHEMICALS OF CONCERN

The previous environmental report conducted by Douglas Partners (Appendix G) had indicated Contaminant concentrations of Copper, Lead and Zinc well above regulatory criteria. In review of their analyses, only one sample was taken on the subject property (BH6). In light of these findings, the delineation of heavy metal contamination was needed to be obtained through further sampling.

Our desk study findings indicate that operations conducted on site were of a potential environmental concern, and operations for most years could be accounted for. No USTs were visible or registered on site. Previous operations posed significant environmental concern to the site especially the operations utilised by Malco Industries for the production and treatment of metal castings and the foundry. Our site inspection indicated no hazardous materials were kept on-site although there were visible signs of foundry slag on the surface.

From our review of historical information and records, the following areas and environmental concerns were found:

- Analyte levels from previous environmental reports
- Previous waste oil storage on site
- Historical storage area utilised for the storage of scrap, timber, bricks and machinery
- Former clay pit areas reclaimed by backfilling with foundry wastes
- Use of the site as a foundry
- Adjoining metal recycling operations

6. Regulatory Criteria

EPA policy on contaminated sites is based on the January 1992 Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites. This policy is prepared by the Australian and New Zealand Environment and Conservation Council (ANZECC) and the National Health and Medical Research Council (NH&MRC). In addition, the 1994 NSW EPA Guidelines for Assessing Services Station Sites are applicable to Hydrocarbon contaminated sites.

For contaminants not covered by the ANZECC and EPA documents, Environmental Quality Objectives from the Netherlands (Dutch Guidelines) can be adopted. Guideline levels for organic and inorganic soil contaminants are summarised in Appendix E – Regulatory Sampling Criteria.

The proceedings of the Third National Workshop on the Health Risk Assessment and Management of Contaminated Sites, Imray & Langley, 1996 (12), proposed health based soil investigation levels. These guideline levels are summarised in Appendix E. The paper on Health Based Soil Investigation Levels, published in the above workshop proceedings, is a technical draft endorsed by the ANZECC/NH&MRC Contaminated Sites Technical Review Committee.

In addition, contaminant concentrations slightly in excess of the investigation levels do not pose an environmental or health hazard. At or below the investigation levels, the soil is not considered to pose an environmental or health hazard and the site is considered safe for any use. Domestic single dwelling use is considered to be the most sensitive land use and the investigation level guidelines are commonly adopted as limits for such sites. The ANZECC health and environmental investigation levels are generally appropriate to the proposed development site.

The ANZECC guidelines indicate that the assessment of soil test results and comparison with defined soil criteria should include consideration of a number of factors such as:

1. Land uses, e.g. Residential, agricultural/horticultural, recreation or commercial/industrial.
2. Potential child occupancy.
3. Potential environmental effects including leaching into groundwater.
4. Single or multiple contaminants.
5. Depth of contamination.
6. Level and distribution of contamination.
7. Bioavailability of contaminant(s), e.g. Related to speciation, route of exposure.
8. Toxicological assessment of the contaminant(s), e.g. Toxicokinetics, carcinogenicity, acute and chronic toxicity.
9. Physico-chemical properties of the contaminant(s).
10. State of the site surface, e.g. paved or grassed exposed.
11. Potential exposure pathways.
12. Uncertainties with the sampling methodology and toxicological assessment.

As an outcome from these proceedings, the new Health Based Guidelines for the NSW Site Auditor Scheme, 1998 can be used for residual soil Environmental Assessment.

In proposing recommendations for this site, the above factors have been considered and the recently published NEHF F Health Based Investigation Levels will be used. It should be noted that the allowable levels of NEHF F fall into the category of commercial premises.

The groundwater contamination assessment is based on:

- ANZECC and Australian Water Resources Council (AWRC) National Water Quality Management Strategy (1992), and NHMRC Australian Marine Water Guidelines (1994). The assessment is based on guidelines set out in the ANZECC/AWRC document *"Australian Water Quality Guidelines For Fresh and Marine Waters "* and the *"Australian Drinking Water Guidelines "*. The documents provide criteria for water quality in various categories including:

  - Protection of Aquatic Ecosystems (Fresh and Marine Waters)
  - Drinking Water Supply

- Dutch criteria ((Intervention + Target)/2) have been used for parameters not covered by the Australian Guidelines.

The critical destination of groundwater contamination migrating from the Marrickville site will be the adjoining Canal to the northwest leading to Cooks River. No recreational or bathing takes place in these waters. The guidelines for *"Protection of Aquatic Ecosystems - Marine Waters"* are therefore applicable to the site. It should be noted that the criteria provided are for the receiving waters and it is therefore appropriate to allow for attenuation of contaminant concentrations in the groundwater before reaching Cooks River.

The Australian guidelines, Dutch criteria, and Site Assessment Guidelines (SAGs) for groundwater for the parameters of interest are listed in the appendices. The SAGs have been set to comply with Australian Guidelines where available.

6.1 Environmental Assessment Criteria

In order for the site to be considered suitable, the 95% Upper Confidence Limit of the average concentration for the analysed contaminants will need to comply with the NEHF F Health based Investigation Levels. These research levels looked at were for

industrial/commercial premises (NSW EPA Guidelines for the NSW Site Auditor Scheme).

Soils meeting all these criteria will be considered suitable for the proposed commercial land-use. Individual analytes may be accepted if results exceeding the adopted clean up criteria are discussed to determine the nature and extent of these remaining hotspots. Should the explanation be acceptable, then the hotspot will be considered localised and the original sample will be accepted as long as the exceeded value detected was less than 250% of the set regulatory criteria.

6.2 Sampling Program and Procedures

The sampling objective was to assess the site in accordance with the set regulatory criteria. Samples were taken to provide statistical support for assessing the environmental character of the site. Systematic sampling was undertaken where points were selected at regular and even intervals to provide statistically unbiased conclusions.

The minimum number of samples required as stated in the NSW EPA Sampling Design Guidelines, 1995, is nine (9) for a site of approximately 2500m^2. However, twelve samples were collected of which three were at depth. Then the 95% UCL values were calculated with confidence.

6.3 Field Quality Assurance/ Quality Control

It is important that the data generated in any environmental study is of a quality that suitably meets the objectives of a particular study. This is normally achieved by the use of an appropriate quality assurance/quality control (QA/QC) program. Possible sources of error in an environmental study arise in the collection, handling and

analysis of samples. An effective QA/QC program aims to minimise these sources of error and check the reliability of results.

QA practices were applied to all stages of data gathering and subsequent handling, and were designed to provide control over both field and laboratory operations.

The analytical laboratory used on this project utilised their personal internal QA procedures for analysis of environmental samples (discussed in section 8.3). Methods of field and laboratory quality assurance include:

- NATA registration of laboratory methods
- Application of the correct method analysis
- Analysis of samples within the recommended holding times
- Analysis of samples to a suitably low detection limit
- Documentation of field information
- Environmental field measurements
- Decontamination procedures
- Selection of suitable containers
- Sample handling, preservation and documentation

7. Environmental Assessment of Work

The grid spacing corresponds to the number of samples required. A sample size, nine plus three at depth (total 12) had been calculated using the NSW EPA Sampling Design Guidelines, 1995 section 4.2 pp10 by determining the arithmetic average concentration of contaminants.

For site Environmental Assessment, the number of Environmental Assessment samples required relates to the acceptance criteria of the remediation. This in turn

depends on how a contaminant distribution is to compare with an acceptable limit. Given the uncertain nature of sampling, Environmental Assessment is to occur using the arithmetic average concentration of the contaminant(s) which should be less than an acceptable limit, at a given confidence level.

7.1 Calculation for samples required for determining the average concentration

reference: Method for evaluating the attainment of clean-up standards, Box 6.3, Chapter 6 (EPA 230/02-89-042), Office of Policy, Planning and Evaluation, United States Environmental protection Agency, 1989.

The method requires that the probable average concentration and standard deviation of the contaminant be known. This method is most applicable for Environmental Assessment sampling, where the mean concentration and the standard deviation can be estimated from the previous sampling results.

Equation used

$$\text{UCL average} = \text{mean} + t_{\alpha,n-1}\frac{\textit{std deviation}}{\sqrt{n}}$$

Where

UCL average=	Upper confidence limit
n=	number of sample measurements (12)
a=	The probability that the 'true' average concentration of the sampling area might exceed the UCL average determined by the above equation (0.05)
mean=	Arithmetic average of all sample measurements
$t_{\alpha,n-1}$=	A test statistic (Student's t at an a level of significance and n-1 degrees of freedom (1.796)
std deviation=	Standard deviation of the sample measurements

This would mean that the diameter of the hot spot could be detected with 95% confidence was 21.5 metres. Samples were analysed for a general suite of chemicals including:

- Aluminium (Al)
- Arsenic (As)
- Cadmium (Cd)
- Chromium (Cr)
- Cobalt (Co)
- Copper (Cu)
- Iron (Fe)
- Manganese (Mn)
- Nickel (Ni)
- Lead (Pb)
- Zinc (Zn)
- Mercury (Hg)
- BTEX
- TPH
- PAH
- Phenols (Total)
- OCP

A general scan was conducted by ICPMS and GCMS to detect any irregular peaks for metals or chlorinated organic compounds that were not specifically sampled for. Three leachate analyses were also undertaken on the metals with highest concentration levels.

7.2 Sampling Methodology & Procedures

Twelve (12) samples were taken in total. Refer to site plan for locality of each Environmental Assessment sample – Appendix A.

Experienced Aargus professionals undertook all fieldwork in general accordance with the Aargus QA/QC manual.

Due to client financial constraints, two sets of samples were taken, seven (7) samples in Stage I and five (5) samples in Stage II. The groundwater sampling was later conducted. For the purpose of this report, all samples will be treated as the sample set

of twelve. The twelve (12) soil samples, numbered BH1.0.5, BH2.0.5, BH2.1.4, BH3.0.5, BH3.1.5, BH4.0.5, BH4.1.1, BH5.0.4, BH5.1.1, BH6.0.55, BH6.1.8, and BH7.0.4 were collected over two separate days as follows:

- Selected soils were transferred using a stainless steel trowel. The trowel was effectively cleaned using an appropriate surfactant (Decon 90), then rinsed with distilled water
- Soils were quickly transferred into 250 g clean amber glass jars which had been acid washed and solvent rinsed. The jars were sealed with a screw-on teflon lined plastic lid, labelled indicating job number, date, sample number, depth interval, and placed for storage in an ice filled chest
- Samples were transported to GM Laboratories under chain of custody conditions (refer to Appendix C for CoC forms).

A concise soil sampling and analysis program verified the sub-surface condition at the nine locations. Soil samples were taken at both differing media to enable characterisation of the upper fill and clay layers. In general, samples were taken at ~0.5 metre and three (3) samples at depth ranging from 1.4 to 1.8 metres.

Standard Health and Safety procedures were observed. Tyvec suits were worn with rubber gloves to minimise exposure to any potential contaminants. Respirators were supplied but not used.

Standard QA/QC procedures were followed. Decontamination was conducted after the collection of samples at each sample location and medium. General requirements for sample container, preservation and holding time are listed in the Table below.

Table 2 – Analytical Methods, Detection Limits and Holding Times

Analyte	Analytical Method	Detection Limit	Holding Time
Metals	ICP/MS	0.5-1.0 mg/kg	6 months
Hg	CV-AAS	0.05 mg/kg	28 days
TPH (C6-C9)	USEPA 5030A purge and trap, USEPA 8260A GC/MS	10 mg/kg	7 days
TPH (C10-C36)	USEPAA GC/FID	220 mg/kg	7 days
BTEX	USEPA 5030A purge and trap, USEPA 8020 GC/MS	0.5-3.0 mg/kg	7 days
Phenols (Total)	Unavailable	1.0 mg/kg	7 days
Pesticides	USEPA 8081 GLC/ECD	0.1 mg/kg	14 days
PAH	USEPA 8270B GC/MS	0.5-1.0 mg/kg	7 days

Well Installation

The groundwater well was designed with the intention of collecting any groundwater present in the fill material or underlying natural soils. During drilling, groundwater was encountered in the natural soils at approximately 1.8 metres. The groundwater well was thus designed to be deep enough to allow collection of a sufficient volume of groundwater, and screened across the expected groundwater level.

The groundwater monitoring well was constructed from the following materials:

- Class 18, 50 mm inside diameter uPVC pressure pipe with hand-sawn slots (every 50 mm) and blank casing. The PVC was screw threaded in all cases;
- Well screen was covered with a filter sock;
- A filter pack comprising clean 2 mm graded sand;

- Bentonite seal overlain by cement/bentonite grout;
- Lockable well plug; and
- Road box.

Solid flight augers were used as no support was needed to hold the borehole walls while the well was installed. The casing was placed inside the finished hole and the filter pack and subsequent bentonite seal was installed. The purpose of this seal was:

1. To provide a barrier for the vertical movement of water along the well; and
2. To inhibit the downward movement of overlying grout seal into the filter pack

The bentonite seal was packed by slowly adding bentonite granules in a quantity sufficient to create a seal approximately 200 mm or greater in length.

A grout seal of cement and approximately 5% bentonite powder was mixed on site and was slowly poured into the annular space until it reached near the surface.

Well Development and Sampling

Prior to commencing field work, all groundwater sampling equipment was checked and calibrated. Decontamination procedures were followed in accordance with the Aargus QA/QC manual.

Well Development

Development of the monitoring well was undertaken on 19th of May 1999 and purged on the subsequent 4 days. The purpose of development was to:

1. maximise the ability of the well to produce water; and
2. remove fluids or materials introduced during drilling.

Monitoring well development involved agitation of and removal of water from the well using a stainless steel bailer. Approximately 50 litres of groundwater was withdrawn from the well (equivalent to between 5 and 10 well volumes of groundwater).

During development of the well, conductivity, pH and temperature were recorded. Sampling proceeded once measurements had stabilised.

Groundwater Sampling

The wells were sampled immediately after development on 24th of May 1999. Samples from the well was collected in order of most volatile to least volatile parameters, that is, chlorinated hydrocarbons, BTEX, TPH fractions followed by metals.

Samples were placed in appropriate sample containers with preservatives as follows:

- Chlorinated hydrocarbons, Light TPH fractions/ BTEX (40 ml glass vial with teflon-lined lid completely filled)
- Heavy TPH fractions (1 litre glass bottle acid washed and solvent rinsed)
- Metals (filtered sample, 250 ml plastic, nitric acid treated bottle).

Samples were labeled and placed in a chilled ice chest for transfer to the analytical laboratory. All samples were transported under chain of custody documentation.

8. LABORATORY RESULTS

8.1 Laboratory Analysis

The laboratory used, GM Laboratories, is NATA registered for all analytes to be tested for. Analyte analytical methods for each suite included:

ANALYTE	*METHOD CODE*
Al (Aluminium)	740
As (Arsenic)	741
Cd (Cadmium)	745
Co (Cobalt)	746
Cr (Chromium)	747
Cu (Copper)	748
Fe (Iron)	749
Mn (Manganese)	753
Ni (Nickel)	755
Pb (Lead) metals by ICP-AES	757
Zn (Zinc)	761
Hg (Mercury)	791
BTEX (purge and trap)	691
TPH (TAIM)	688
PAH (Poly Aromatic Hydrocarbons)	664
Phenols (Total)	673
OCP (Organochlorine Pesticides)	337

8.2 Laboratory Results

A summary of results from all samples taken can be cited below. The results have been split into Heavy Metals, BTEX, PAHs, B(a)P, TPH (all 4 fractions), Phenols (Total) and OCPs.

Table 3 – Summary of Laboratory Test Data Heavy Metals

Analyte	Al	As	Cd	Co	Cr	Cu	Fe	Mn	Ni	Pb	Zn	Hg
PQL			2		2	2				2	17	0.1
NEHF F		500	100		500	5000		7500	3000	1500	35000	75
Sample & Depth												
BH1.0.5 (0.5m)	-	8	45	-	33	310	-	-	23	210	2600	0.6
BH2.0.5 (0.5m)	-	4	<2	-	13	74	-	-	13	76	190	<0.1
BH2.1.4 (1.4m)	-	17	7	-	28	160	-	-	25	860	4400	0.7
BH3.0.5 (0.5m)	-	9	<2	-	18	7	-	-	7	15	230	<0.1
BH3.1.5 (1.5m)	-	<2	<2	-	5	5	-	-	<2	14	10	<0.1
BH4.0.5 (0.5m)	-	3	<2	-	5	10	-	-	3	11	37	<0.1
BH4.1.1 (1.1m)	-	12	4	-	26	97	-	-	28	55	550	0.3
BH5.0.4 (0.4m)	7700	3	510	3	28	330	17000	250	14	110	410	-
BH5.1.1 (1.1m)	3800	<2	3	2	12	28	12000	190	11	18	380	-
BH6.0.55 (0.55m)	9000	16	12	7	29	3400	60000	360	37	1500	1500	-
BH6.1.8 (1.8m)	6500	3	3	3	16	22	18000	220	19	11	67	-
BH7.0.4 (0.4m)	9300	11	8	9	50	110	58000	1200	25	76	460	-
No of Samples	5	12	12	5	12	12	5	5	12	12	12	7
Minimum Value	3800	<2	<2	2	5	5	12000	190	<2	11	10	<0.1
Maximum Value	9300	17	510	9	50	3400	60000	1200	37	1500	4400	0.7
Mean	7260	7.5	50	4.8	21.9	379.4	33000	444	17.3	246.3	902.8	0.3
Std Deviation	2232.3	5.5	145.4	3.0	13.0	957.8	23853.7	427.5	10.7	460.6	1331.8	0.3
Upper Level 95% Confidence Limit o Mean Value	8417.3	10.3	125.4	6.4	28.6	876.0	45367.2	665.6	22.8	485.1	1593.3	0.4

Table 4 – Summary of Laboratory Test Data BTEX, PAH, TPH, Phenols & OCP

Analyte	B	T	E	X	PAH	B(a)P	TPH C6-C9	TPH C10-C14	TPH C15-C28	TPH C29-C36	Phenols (Total)	OCP
PQL	0.1	0.1	0.1	0.3	0.2	0.2	10	50	100	100	1	
NEHF F*	1*	50*	130*	25*	100	5	65	1000	1000	1000	42500	
Sample & Depth												
BH1.0.5 (0.5m)	<0.1	<0.1	<0.1	<0.3	1.2-3.6	<0.2	<10	<50	<100	<100	3	-
BH2.0.5 (0.5m)	<0.1	<0.1	<0.1	<0.3	<3.2	<0.2	<10	<50	<100	<100	<1	-
BH2.1.4 (1.4m)	<0.1	<0.1	<0.1	<0.3	3.7-5.3	0.5	<10	<50	<100	<100	2	-
BH3.0.5 (0.5m)	<0.1	<0.1	<0.1	<0.3	0.62-3.4	<0.2	<10	<50	<100	<100	<1	-
BH3.1.5 (1.5m)	<0.1	<0.1	<0.1	<0.3	<3.2	<0.2	<10	<50	<100	<100	3	-
BH4.0.5 (0.5m)	<0.1	<0.1	<0.1	<0.3	<3.2	<0.2	<10	<50	<100	<100	18	-
BH4.1.1 (1.1m)	<0.1	<0.1	<0.1	<0.3	<3.2	<0.2	<10	<50	<100	<100	56	-
BH5.0.4 (0.4m)	<0.1	<0.1	<0.1	<0.3	<3.2	<0.2	<10	<50	<100	<100	1	<0.75
BH5.1.1 (1.1m)	<0.1	<0.1	<0.1	<0.3	<3.2	<0.2	<10	<50	<100	<100	<1	<0.75
BH6.0.55 (0.55m)	<0.1	<0.1	<0.1	<0.3	<3.2	<0.2	<10	<50	<100	<100	1	<0.75
BH6.1.8 (1.8m)	<0.1	<0.1	<0.1	<0.3	290	15	<10	<50	<100	<100	<1	<0.75
BH7.0.4 (0.4m)	<0.1	<0.1	0.2	0.4	3.8-5.8	<0.2	<10	70	1800	2500	<1	<0.75
No of Samples	12	12	12	12	12	12	12	12	12	12	12	5
Minimum Value	0.1	0.1	0.1	0.3	0.62	0.2	10	50	100	100	1	0.75
Maximum Value	0.1	0.1	0.2	0.4	5.8	15	10	70	1800	2500	56	0.75
Mean	0.1	0.1	0.1	0.3	27.2	1.5	10	51.7	241.7	300	7.4	0.75
Std Deviation	0	0	0.03	0.03	82.8	4.3	0	5.8	490.7	692.8	16.0	0
Upper Level 95% Confidence Limit or Mean Value	0.1	0.1	0.1	0.3	70.1	3.7	10	54.7	496.1	659.2	15.7	0.75

Notes:

- All data in mg/kg unless otherwise stated
- 95%UCLs were calculated using the methodology as described in the NSWEPA Sampling and Design Guidelines, 1995 Procedure D, pp22 (using 1.796 as the test statistic for n-1 degrees of freedom)
- * refers to NSW EPA Service Station Guidelines
- Figures of < were used statistically at the highest value (i.e. <2=2)
- Where standard deviation was zero, the result should be taken as the mean value
- Shaded region refers to individual figures above regulatory criteria

Table 5 - Summary of Groundwater Results

Analyte	Unit	Sample	Guideline
Phenols (total)	mg/L	<0.2*	0.001
Arsenic	µg/L	<3	50
Cadmium	µg/L	4	5
Chromium	µg/L	<1	50
Copper	µg/L	25	1000
Lead	µg/L	41	50
Zinc	µg/L	1800	5000
Mercury	µg/L	<0.1	1
PCB	µg/L	<50	NSL
TPH C6-C9	mg/L	<2	NSL
TPH C10-C14	mg/L	<5	325**
TPH C15-C28	mg/L	<10	
TPH C29-C36	mg/L	<10	
Benzene	µg/L	<1	10
Toluene	µg/L	<1	
Ethylbenzene	µg/L	<1	
Xylene	µg/L	<3	
PAH	mg/L	<0.08	NSL
B(a)P	mg/L	<0.005	NSL

Notes:

- Assessment Guidelines are ANZECC/NH&MRC Drinking Water Guidelines
- *refers to SAG = (Dutch target + Intervention)/2
- ** due to the time constraints and sample quantity, we were unable to conduct speciated phenols to an acceptable detection limit.
- NSL refers to No Set Limit

Table 6 – Leachate Results

Sample	BH1.0.5	BH2.1.4
Copper	0.84mg/kg	<0.5mg/kg
Lead	0.67mg/kg	0.53mg/kg
Zinc	11mg/kg	55mg/kg

8.3 Laboratory Quality Assurance/Quality Control

GM Laboratories using test methods accredited by the National Association of Testing Authorities (NATA) performed all analytical results.

Laboratory control samples included the preparation of surrogate recoveries and matrix spikes/matrix duplicates. The surrogate recoveries involved spiking every sample with surrogate compounds prior to analysis. The matrix spikes/matrix spike duplicates were prepared by treating a known amount of analytes with the sample batch. The recovery results detail the proportion of the known analytes concentration, which were detected during the laboratory analysis.

Surrogate spiking carried out by the laboratory as part of its QC program involved introducing a known quantity of analyte expected to be in the compound and comparing the amount detected within the spike. The surrogate recoveries were found to range between 77% to 127%, which is considered acceptable and satisfies DQOs. The Laboratory Spikes were prepared by spiking a certain quantity of material into the sample and determining the recovery percentages of the spiked material. The Laboratory Spikes were found between 40% to 128%. Generally, these results are acceptable, meet USEPA 8270 acceptance criteria, and satisfy our DQOs.

The relative percentage difference (RPD) of duplicate samples for selected analytes were considered acceptable. Spike samples were within their acceptable range for the analytical procedure undertaken.

The practical Quantitation Limits (PQLs) of the laboratory analyses are less than the threshold guidelines adopted for the purpose of this investigation, and therefore meet DQOs.

The following summarises Data Quality Objectives that were not met.

The duplicate result for Chromium on sample 149901 was 43mg/kg. The duplicate result for Zinc on sample 149901 was 580mg/kg. The spike recovery for phenolics was 52.6% on sample 149901. The duplicate result for Cadmium on sample 149901 was 940mg/kg.

The results of the laboratory duplicate for sample 149901 does not satisfy our DQOs. It is difficult to ascertain the non-conformance. Although most analytes bear no outcome on the final result, Cadmium has shown to be a hotspot at Borehole BH5.0.4. Whether the resultant concentration is 510 or 940mg/kg, Cadmium is considered to be a hotspot and the resultant 95%UCL has already been surpassed in either case.

No wash blanks or blind samples were taken for this project due to the financial constraints placed on the scope of works and it could be argued because of the matrix tested. Due to the inconsistency with the sample matrix, a blind sample may not have shown significant similarities between the duplicate field sample taken as the high occurrences of metals may differ in only slight variations of sample taken from the duplicate.

The results of all quality checking have been reviewed and are considered to satisfy the reliability of the results and meet Data Quality Objectives (DQOs). A summary of procedures can be seen below:

Table 7 – QA/QC Procedure

	QA/QC PROCEDURE			
Contaminant	Duplicate	Lab Spike	Lab Blank	Surrogate Spike
Metals	YES	YES	-	YES
TPH	YES	YES	-	YES
BTEX	YES	YES	-	YES
Pesticides	YES	YES	-	YES
Phenols	NO	YES	-	YES
PAH	YES	YES	-	YES

8.4 Assessment of Results

Data Quality Objectives are used to assess the effect of the site-sampling program on the useability of data. Data Quality is typically discussed in terms of precision, accuracy, representatives, comparability and completeness.

All DQOs are satisfactory for analyses undertaken for final interpretation of results.

Analytes were tabulated and statistical analysis was undertaken to ascertain the 95% Upper Confidence Limit. For the site to be considered suitable for its intended use, the 95% Upper Confidence Limit of the average concentration for the analysed contaminants will need to comply with the NEHF F Health Based Investigation Levels. The research levels looked at were for commercial and industrial use (NSW EPA Guidelines for the NSW Site Auditor Scheme).

Our results indicate that all 95%UCL values meet these criteria with the exception of Cadmium. All Cadmium results were well within the guidelines with the exception of only one hotspot (BH5.0.4). This one hotspot brought the average above the regulatory criteria.

The site is characteristic of variable fill containing metal scrap, foundry sands and building rubble. The adjoining properties are all subjected to similar characteristics with the entire block situated on the reclaimed brickpit. It would be unrealistic to consider remediation of one single lot within the block as contaminants seem to be contained within the filled brickpit. From information gained from boreholes from geotechnical and environmental fieldwork, it is evident that the canal area has been battered with clay which tapers deeper towards the northern part of the property away from the canal. Variable fill is located within this reclaimed pit with water percolating into the pit and becoming perched.

The results of geotechnical boreholes show the underlying soil to be relatively impermeable. We would expect that any contaminants would be contained within this pit. The potential for migration of contaminants could occur if the pit water overflowed causing any contaminants to move with it. The borehole logs suggest that clay near the canal was located at one metres depth. This would indicate that there is a one metre buffer for water to rise before it can flow over the clay layer and migrate through surface soils into the canal or adjoining properties. To limit the potential for this to occur, it is advisable to install permanent groundwater wells to measure the height of water and possible contaminant levels periodically. This could be achieved as part of the new proposed development as a way to monitor future migration. The site will also need to be sealed to restrict surface water from washing any potential contaminants into nearby properties or the canal. The surface seal would also ensure the restriction of percolation of rainwater into the underlying fill material.

Upon review of our analysis, the results indicate that the site is suitable for the proposed commercial development with the exception of Cadmium, which only exceeds regulatory criteria in one location. This location exceeds the 2.5 times ratio

for acceptable hotspots. However, with adequate protective procedures, the site poses minimal environmental concern.

9. CONCLUSION

Although the information provided by an ESA could reduce exposure to risks, no ESA, however diligently carried out, can eliminate them. It must be noted that these findings are professional findings and have limitations. Even a rigorous professional assessment may fail to 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.

The objective of the project was to make the site acceptable for the proposed commercial development. The Environmental Assessment of the site is part of this process to provide statistical support for assessing the environmental characteristics of the site against set regulatory criteria.

To reach our stated objective, a set of twelve (12) samples were taken and analysed in a systematic pattern across the site in order to characterise the site as an industrial/commercial premises. Analytes were tabulated and statistical analysis was undertaken to ascertain the 95% Upper Confidence Limit. The 95% Upper Confidence Limit of the average concentration for the analysed contaminants generally complied with the NEHF F Health Based Investigation Levels. The research levels looked at were for industrial/commercial premises (NSWEPA Guidelines for the NSW Site Auditor Scheme).

There is minimal environmental risk posed by the site so long as the site is used for its intended purpose for commercial development and appropriate measures for capping are conducted. The site is therefore suitable for its intended purpose as a commercial development.

If you require any further information or would like to discuss any matters, please contact Mr Nick Kariotoglou on the details provided.

For and on behalf of
AARGUS PTY LTD

VIVIENNE KEVGAS
Environmental Scientist

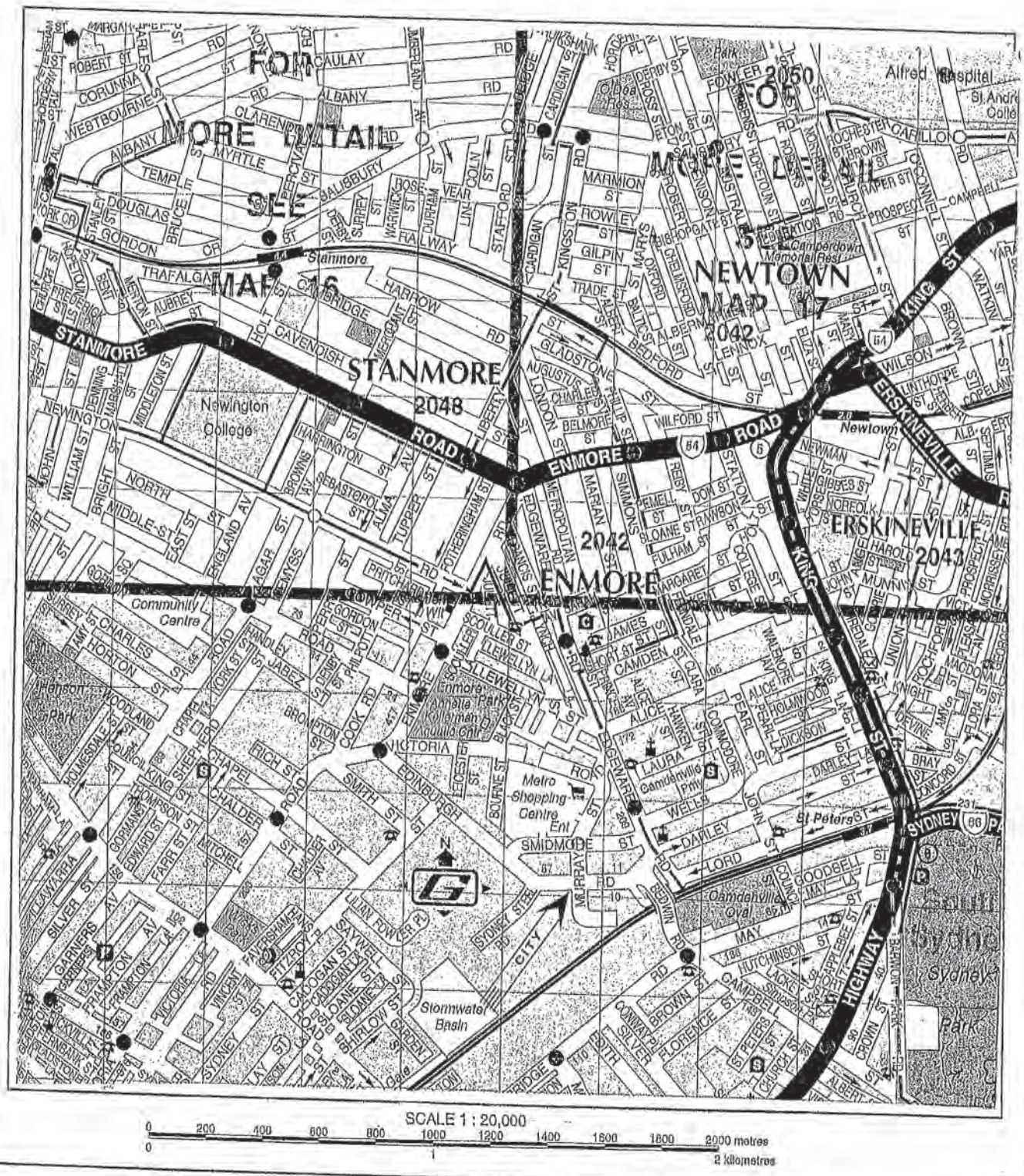
Reviewed By:

NICK KARIOTOGLOU
Managing Director

APPENDIX A

SITE PLAN & LOCALITY MAP

LOCALITY MAP



AARGUS PTY LIMITED

ACN 063 579 313

Services in EMS, Environmental Auditing, Project Management, Business Development & Marketing, Chemical Manufacturing

drawn	NC
approved	
date	11/7/99
scale	1:20,000

LOCALITY MAP

LOT 54 RICH STREET & SHEPHERD STREET MARRICKVILLE

Aargus

Figure 2

job no: EM266

BOREHOLE FIELD LOG

Aargus Pty Ltd

Aargus

BOREHOLE No:	BH1
CLIENT:	PROTEA HOLDINGS (NSW) PTY LTD
PROJECT	ENVIRONMENTAL ASSESSMENT REPORT
LOCATION	LOT 54 RICH STREET & SHEPHARD STREET
Job No.	EM266
Method	HAND AUGER
R.L. Surface:	7.9m
Date:	23-2-99
Log/Checked by:	VK/NK
Datum:	-

Ground water	Sample Taken	Depth	Graphic Log	Description	Hardness	Other
				Fill - sand, gravel & building rubble.	v stiff	
	0.5m			Foundry rubble drk grey + brown		
		1m				
N/A						N/A
		2m				

BOREHOLE FIELD LOG

Aargus Pty Ltd

Aargus

BOREHOLE No: BH2

CLIENT: PROTEA HOLDINGS (NSW) PTY LTD

PROJECT ENVIRONMENTAL ASSESSMENT REPORT

LOCATION LOT 54 RICH STREET & SHEPHARD STREET

Job No. EM266 Method HAND AUGER R.L. Surface: 7.9m

Date: 23-2-99 Log/Checked by: VK/NK Datum: -

Ground water	Sample Taken	Depth	Graphic Log	Description	Hardness	Other
				Fill - sand, gravel and building rubble. Foundry rubble + topsoil, drk brwn + grey	v stiff	
	0.5m					
		1m		Clay - firm light brown and orange brown clay	firm	
N/A						N/A
	1.4m			-traces of ironstone gravel		
		2m			soft to firm	
			end			

BOREHOLE FIELD LOG

Aargus Pty Ltd

Aargus

BOREHOLE No: BH3

CLIENT: PROTEA HOLDINGS (NSW) PTY LTD

PROJECT ENVIRONMENTAL ASSESSMENT REPORT

LOCATION LOT 54 RICH STREET & SHEPHARD STREET

Job No. EM266 Method HAND AUGER R.L. Surface: 7.9m

Date: 23-2-99 Log/Checked by: VK/NK Datum: -

Ground water	Sample Taken	Depth	Graphic Log	Description	Hardness	Other
				Fill - sand, gravel + building rubble.	stiff	
	0.5m			Topsoil, tree roots dk brown/grey		
		1m		Clay - firm light brown and orange brown clay	firm	
	1.5m					
N/A				- traces of iron stone gravel in clay	firm	N/A
		2m				
				end		

BOREHOLE FIELD LOG

Aargus Pty Ltd

Aargus

BOREHOLE No: BH4

CLIENT: PROTEA HOLDINGS (NSW) PTY LTD

PROJECT ENVIRONMENTAL ASSESSMENT REPORT

LOCATION LOT 54 RICH STREET & SHEPHARD STREET

Job No. EM266 Method HAND AUGER R.L. Surface: 7.9m

Date: 23-2-99 Log/Checked by: VK/NK Datum: -

Ground water	Sample Taken	Depth	Graphic Log	Description	Hardness	Other
				Fill - sand, gravel, building rubble + foundry waste. Metal clumps + foundry sand.	v.stiff	
	0.5m	1m				
	1.1m			Fill - gravel + sandy clay, building rubble + foundry sand	v.stiff	
▶			end	auger refusal		moist
		2m				

BOREHOLE FIELD LOG

Aargus Pty Ltd

Aargus

BOREHOLE No: BH5

CLIENT: PROTEA HOLDINGS (NSW) PTY LTD

PROJECT ENVIRONMENTAL ASSESSMENT REPORT

LOCATION LOT 54 RICH STREET & SHEPHARD STREET

Job No. EM266 Method HAND AUGER R.L. Surface: 7.9m

Date: 14-4-99 Log/Checked by: VK/NK Datum: -

Ground water	Sample Taken	Depth	Graphic Log	Description	Hardness	Other
				- Fill - sand, gravel building rubble + foundry waste all mixed. Traces of scrap metal, wood and bricks. Ork brown / grey / black		
	0.4m					
		1m			v.stiff	
	1.1m					
▼	GW. 1.7m				medium to firm	moist
		2m				
				end well construction		

BOREHOLE FIELD LOG

Aargus Pty Ltd

Aargus

BOREHOLE No: BH6

CLIENT: PROTEA HOLDINGS (NSW) PTY LTD

PROJECT ENVIRONMENTAL ASSESSMENT REPORT

LOCATION LOT 54 RICH STREET & SHEPHARD STREET

Job No. EM266 Method HAND AUGER R.L. Surface: 7.9m

Date: 14-4-99 Log/Checked by: VK/NK Datum: -

Ground water	Sample Taken	Depth	Graphic Log	Description	Hardness	Other
				Fill - sand, gravel building rubble concrete, glass and foundry slag. Some traces of metal fragments. Drk brown/grey.		
	0.55m					
		1m			v. stiff	
▶	1.8m					moist
		2m		Clay + fill with traces of ironstone gravel		
			end	auger refusal	firm	

BOREHOLE FIELD LOG

Aargus Pty Ltd

Aargus

BOREHOLE No: BH7

CLIENT: PROTEA HOLDINGS (NSW) PTY LTD

PROJECT ENVIRONMENTAL ASSESSMENT REPORT

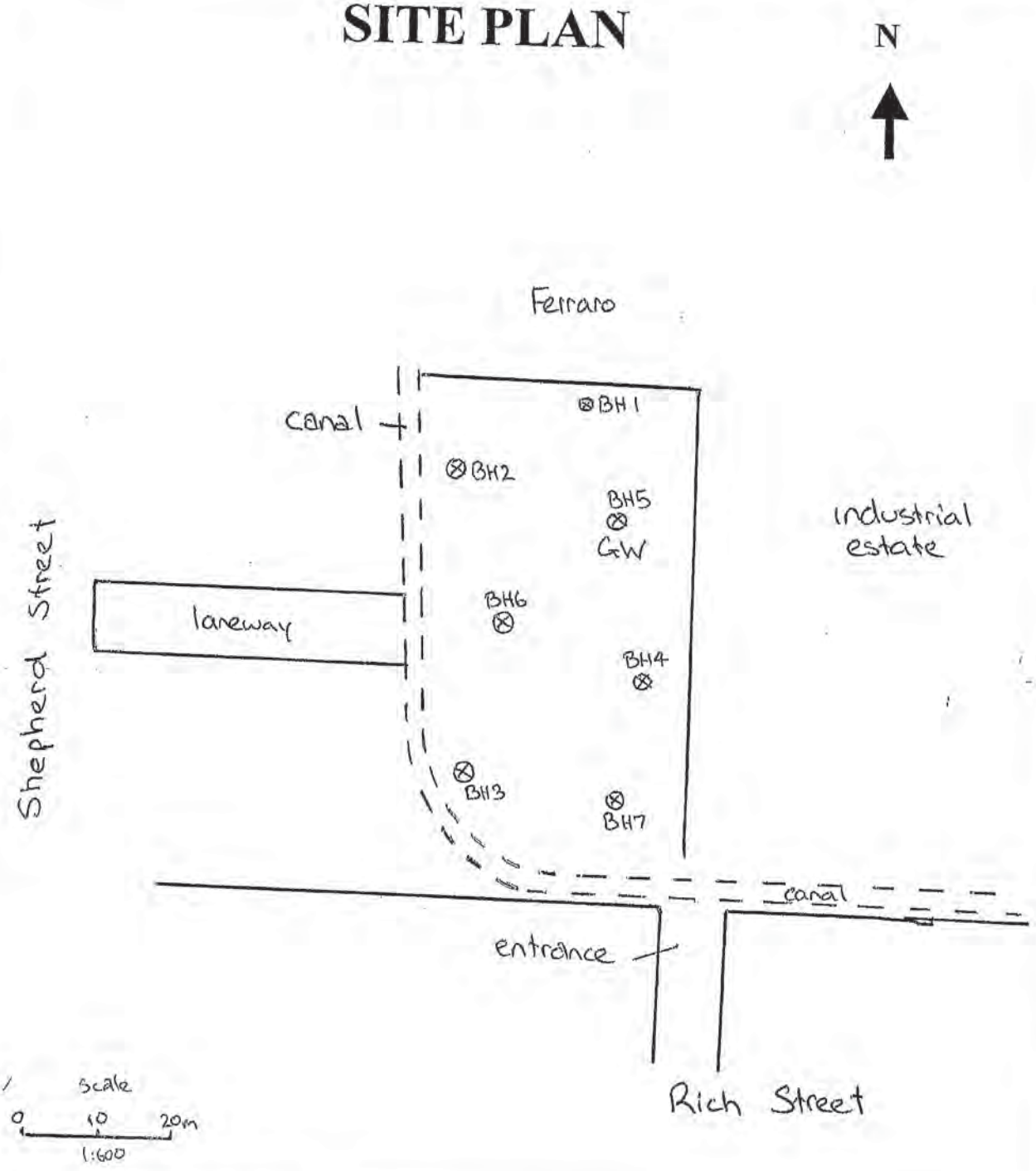
LOCATION LOT 54 RICH STREET & SHEPHARD STREET

Job No. EM266 Method HAND AUGER R.L. Surface: 7.9m

Date: 14-4-99 Log/Checked by: VK/NK Datum: -

Ground water	Sample Taken	Depth	Graphic Log	Description	Hardness	Other
				Fill - sand, gravel + foundry slag.	v Stiff	
	0.4m -			auger refusal		
			end			
		1m -				
		2m -				

SITE PLAN



ACN 063 579 313	Aargus Pty Limited	Environment – Chemicals – Business Development	
Drawn	NK	SITE PLAN	Figure
Approved	AD	Lot 54 Shepherd & Rich Streets, Marrickville	1
Date		Aargus	Job No: EM266
Scale	1:600		

Douglas Partners
Geotechnics · Environment · Groundwater

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KML:lp
Project 28552
12 October 1999

The Portland House Group Pty Ltd
8 Collins Street
MELBOURNE VIC 3000

Attn: Mr John Phillips

Dear Sir

STAGE 1 CONTAMINATION ASSESSMENT
MACHINE SHOP 1
9 RICH STREET, MARRICKVILLE

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1. INTRODUCTION

This letter provides results of a preliminary contamination inspection conducted by Douglas Partners Pty Ltd at the above site. This assessment was requested by Mr John Phillips of MIP Products Pty Ltd (formally Malco industrial Products). It is understood that the assessment is required to obtain development approval from Marrickville Council for use of the site by a food distribution company.

The scope of the current assessment comprised a site inspection and a review of previous contamination assessments in the vicinity. No intrusive sampling was conducted in the course of this assignment and accordingly the assessment and the related conclusions are limited in this regard.

Machine Shop 1 is located in the north-east corner of 9 Rich Street, Marrickville. The subject area is rectangular with an area of approximately 0.1 ha. The site is also part of a larger commercial/industrial site referred to as 61-65 Shepherd Street, Marrickville.

The general area was until the 1930's used as a clay quarry for brick making purposes. The site was then developed into a foundry and the pit areas reclaimed by filling with foundry wastes.

2. PREVIOUS INVESTIGATIONS

The subject site was part of a 2 ha area subject to a Contamination Assessment conducted by Douglas Partners for Barclay Mowlem Construction in 1996 (DP Report 23711).

Ten sampling bores were constructed during the assessment, however, none of the bores were located on the subject area. One of the bores (B1) was, however, constructed in the Merchandise Store, adjacent the north-west wall of the subject area. Bore logs indicate a 0.5 m layer of filling underlain by natural clays. None of the samples from B1 were analysed for contamination.

Samples from the remainder of the above site were analysed, however, and hydrocarbon and heavy metal contamination of filling material was identified.

Recommendations regarding remediation of hydrocarbon impacted areas were made, while the heavy metals were considered to be relatively stable and therefore considered to not be of significant environmental risk. It was recommended that the site be sealed by a suitable pavement to prevent casual access by site users, animals or plants, to the contaminated areas.

3. CURRENT SITE DESCRIPTION

At the time of the site inspection the subject area, and the remainder of 9 Rich Street (Administration building, Machine Shop 1 and Machine Shop 2) were vacant.

The subject area is covered by a single warehouse/factory of prefabricated concrete panel and steel frame construction. An internal office area is present in the southern corner of the building.

The floor area is covered by a single concrete slab which was observed to be in a generally good condition.

The remains of pipes and fittings were observed on the north-western wall. Adjacent these fittings there are two small areas of concrete which have been resealed and exhibit a dark red-brown stain of unknown origin.

Numerous markings are present on the concrete pavement where machinery mounting brackets were previously located.

During the site inspection it was noted that a small gap (20 to 30 mm) exists between the edge of the slab and the concrete wall panels, infiltration of floor drainage could occur at this junction.

No evidence of USTs or other potential sources of contamination were observed during the site inspection

4. CONCLUSIONS AND RECOMMENDATIONS

On the basis of the Stage 1 Contamination Assessment inspection it is considered that there is a low risk to human health or the environment as a result of past or future site use providing that the site remains sealed with the current paving arrangements.

The current concrete slab was observed to be in good condition and to provide a satisfactory barrier to the potential heavy metal contamination and possible hydrocarbon contamination beneath the site. In addition the slab provides protection from further contamination of the subsurface from current and future site uses.

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However, the space between the slab and the concrete wall does present a potential path for contamination of the subsurface from infiltration of materials spilled on floor being washed from the factory floor. It is understood that it is proposed to use the site for the distribution of packaged foods and that no manufacturing or packaging will be conducted onsite. As a result it is considered that there is a low risk of subsurface contamination as a result of the proposed site use, however, if in the future site use is to change it is recommended that the space is sealed to prevent contamination of the subsurface.

On the basis of site observations and previous work conducted in this area, it is considered that the site is suitable for the proposed use and that no further assessment is warranted unless a change of land-use occurs, or substantial redevelopment of the site is planned, particularly, whereby the pavement is to be removed. Suitable precautions should be taken if the slab is to be interrupted or removed for any reason.

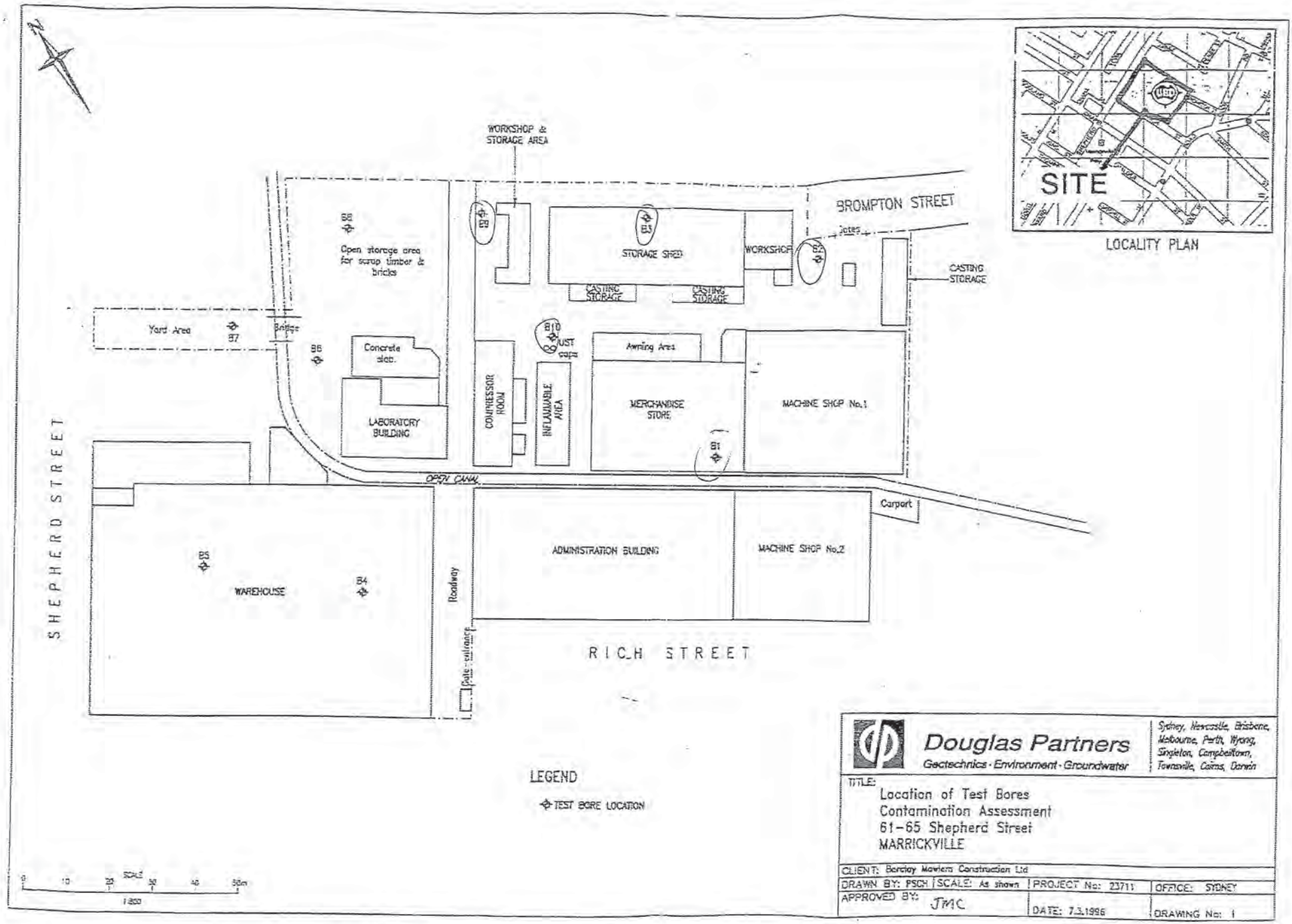
Yours faithfully
DOUGLAS PARTNERS PTY LTD

Reviewed by:

Khyng

Kate Lyng
Environmental Engineer

J M Nash
Environmental Director



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Sydney, Newcastle, Brisbane, Melbourne, Perth, Wyong, Singleton, Campbelltown, Townsville, Cairns, Darwin

TITLE:
Location of Test Bores
Contamination Assessment
61–65 Shepherd Street
MARRICKVILLE

CLIENT: Barclay Mowlem Construction Ltd			
DRAWN BY: PSCH	SCALE: As shown	PROJECT No: 23711	OFFICE: SYDNEY
APPROVED BY: JMC		DATE: 7.3.1996	DRAWING No: 1

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REPORT ON CONTAMINATION ASSESSMENT

61 - 65 SHEPHERD STREET MARRICKVILLE

prepared for
BARCLAY MOWLEM CONSTRUCTION LTD

MARCH 1996
PROJECT NO 23711

JMC:RMcL
19 March, 1996
Project No 23711

REPORT ON CONTAMINATION ASSESSMENT
61 - 65 SHEPHERD STREET
MARRICKVILLE

1. INTRODUCTION

This report details the findings of a contamination assessment carried out at the above site by Douglas Partners Pty Ltd (DP) on 6 March, 1996 at the request of Ms. Kristen Froome of Barclay Mowlem Construction Ltd. The subject site is to be redeveloped for industrial purposes and this assessment is required to determine the extent, if any of contamination. It is understood that redevelopment includes demolishing several existing buildings on the site to allow for the construction of four new buildings and associated driveways and carparking areas. The development will only affect a portion of the total site.

2. SITE DESCRIPTION

The site is located at 61 - 65 Shepherd Street, Marrickville and comprises an area of approximately 2 ha. It has a gentle slope to the east and is bisected by an open brick lined drain. The site is bordered by the following :

- Shaw of Australia Pty Limited premises to the north;
- Rich Street to the south;
- Victoria Road to the east; and
- Shepherd Street to the west.

The site comprises several warehouse buildings, dilapidated outhouses and derelict office accommodation. Many of the buildings on the site are very old comprising single storey brick or

steel frame factory or warehouse type structures with concrete ground slabs. More recent structures include a double storey brick administration building in the south eastern corner of the Machine Shop No. 1 of concrete panel construction situated directly to the north of the administration building.

The original foundry building was in the south western corner of the site. During the mid 1960s, this building was extended to the east and associated smaller buildings were constructed immediately to the north. Most open areas are extensively covered by concrete or bitumen paving except for an unsealed storage area in the north western corner of the site.

Certain portions of the site are utilised for different activities, these include:

1. a warehouse in the north western portion of the site - currently leased to a waste disposal company for the storage of skips and bins;

2. former foundry buildings, located adjacent to the warehouse and an open, unsealed area in the north eastern corner - utilised for storage of a variety of materials, including scrap timber, and old metal presses;

3. an administration building with frontage onto Rich Street - is divided into two sections, one being used for the marketing, storage and distribution of different types of chain products. The remaining area is used for the storage and sale of engineered tools, including mops, buckets and handtools. No manufacturing processes occur in this area;

4. a workshop area - used for general vehicle servicing and maintenance;

5. sheds in the eastern portion of the site - utilised for the storage, machining and assembly of iron castings. Some painting of castings also occurs within this area.

A site drawing and photographs are included in Appendix A.

3. GEOLOGY AND HYDROGEOLOGY

Reference to Sydney 1:100 000 Geological Series maps indicate the site would be expected to be underlain by black to dark-grey shale and laminite which weathers to form clay rich soils.

The site slopes gently in an easterly direction. Groundwater is expected to be encountered at depths of less than 4 m.

4. SITE HISTORY

Previous reports indicate that up until the 1930s, the general area was used as a clay quarry for brick making purposes. The site is currently utilised by Malco Industries for the production and treatment of metal castings. It is understood that prior to current site use, Malco Industries utilised the site as a foundry, with former clay pit areas reclaimed by backfilling with foundry wastes.

5. POTENTIAL FOR CONTAMINATION

On the basis of the available information on previous and current activities of the site, it is anticipated that potential contaminants may include:

- heavy metals including mercury, arsenic, copper, zinc, chromium, cadmium, lead and nickel from various sources such as metal residues from teh foundry and the light industries, the filling material (foundry sand) disposed on site and from machinery storage and maintenance operations,
- hydrocarbon contamination from fuel, waste oil storage and use, improper disposal or leakage of lube-oil and gearbox oil, or due to leakage of underground storage tanks (USTs) and oil sumps. Contaminants could include; Polyaromatic Aromatic Hydrocarbons (PAHs), Phenols, Total Petroleum Hydrocarbons (TPH) and Benzene, Toluene, Ethylbenzene and Xylene (BTEX),

6. SCOPE OF WORK

The study comprised the following elements:

1. A preliminary site inspection and investigation to assess and ascertain the actual site conditions.

2. Drilling of ten test bores, using a 200 mm diameter auger mounted on a backhoe to depths of 2 and 3 m or prior refusal.

3. Collection of soil samples at the soil surface or immediately below sealed surfaces and at 1.0 m intervals to the bottom of test bores.

4. Collection of up to two groundwater samples where groundwater is encountered.

5. Screening of all samples with a Photoionisation Detector (PID), used to detect over 300 volatile organic compounds. In this way, analysis of volatile organics may be carried out if the results of PID screening indicate the presence of these contaminants.

6. Chemical analysis of 7 selected samples for the following parameters:

Organics
- Polycyclic aromatic hydrocarbons (PAHs)
- Total Petroleum Hydrocarbons, Benzene, Toluene, Ethylbenzene and Xylene (TPH and BTEX)
- Phenols

Inorganics
- Copper (Cu)
- Arsenic (As)
- Cadmium (Cd)
- Chromium (Cr)
- Mercury (Hg)
- Nickel (Ni)
- Zinc (Zn)
- Lead (Pb)

7. Preparation of detailed contamination assessment report.

8. Storage of remaining samples for a period of one month pending the need for further chemical analysis.

7. FIELD INVESTIGATION

7.1 Field Methods

Sampling was undertaken from auger returns from test bores constructed to depths of 2 and 3 m or prior auger refusal. Two test bores were located within sheds in the eastern portion of the site, two within the warehouse in the south western corner and the remaining boreholes were drilled in open, unsealed areas.

Soils were sampled at the surface or immediately below sealed surfaces and at 1 m intervals to test bore completion. Two samples were collected at each sampling point. One of these was placed on ice for transport to the laboratory, while the other was allowed to equilibrate at ambient temperature and screened for TOPIC in the headspace of the sample container, using a PID.

All sampling data was recorded on DP chain of custody sheets, and the general sampling procedure comprised:

- cleaning of glass jars and aluminium foil, according to internationally accepted procedures prior to arrival on site;
- washing the sampling equipment in a 3% solution of phosphate free detergent (Decon 90) then rinsing with distilled water prior to each sample being taken;
- transfer of the sample into prepared glass jars, immediately capped with precleaned aluminium foil and a screw top lid;
- collection of at least 10% duplicate samples; and
- placement of the glass jars into a cooled, insulated and sealed container for transport to the laboratory

Additionally, laboratories certified by the National Association of Testing Authorities (NATA) are employed to conduct sample analysis, and are required to carry out in house QC procedures.

7.2 Field Results

Filling generally consisted of loose dark grey foundry sand within the area surrounding the former foundry buildings (marked as concrete slab in Drawing 1) and the large warehouse situated in the south western portion of the site. Crushed sandstone was encountered at Bore 4, loated in the same warehouse. Sand was encountered to depths of 2.0 m below concrete floors in the eastern portion of the site and in the unsealed area in the north western corner.

Natural material encountered below filling consisted of firm red brown and grey clays. Shale was encountered at 2.8 m depth, causing auger refusal at Borehole 1.

8. LABORATORY RESULTS

8.1 Results

Summary results of the laboratory analysis are shown below. Detailed laboratory reports are given in Appendix C.

8.1.1 TOPIC Results

All soil samples were screened at the DP laboratory by headspace analysis using the PID. Results of this screening are shown in Table 1.

TABLE 1 - TOPIC RESULTS

Location/ Depth	TOPIC (ppm)	Location/ Depth	TOPIC (ppm)	Location/ Depth	TOPIC (ppm)	Location/ Depth	TOPIC (ppm)
B1/0.3	12	B3/0.3	24	B5/2.0	16	B8/2.0	12
B1/1.0	16	B3/1.0	30	B6/0.2	7	B9/0.05	8
B1/2.0	16	B3/2.0	20	B6/1.0	6	B9/1.0	12
B1/2.8	13	B3/3.0	20	B7/0.05	13	B9/2.0	11
B2/0.05	14	B4/0.1	16	B7/1.0	15	B10/0.05	16
B2/1.0	13	B4/1.0	17	B7/2.0	15	B10/1.0	23
B2/2.2	14	B5/0.3	13	B8/0.05	15	B10/2.0	110
B2/3.0	15	B5/1.0	15	B8/1.0	12		

Exceeds Screening Threshold Limit

PID screening indicated samples contain concentrations of volatile organics in the background to low range, with the exception of sample B10/2.0. Sample B10/2.0 gave PID readings in excess of 100 ppm, suggesting volatile organics may be present. A strong hydrocarbon odour was also observed at this location during drilling, consequently the sample was selected for laboratory analysis. Based on the presence of oil, noted during field work at Bore 3, sample B3/3.0 was also selected for further laboratory analysis.

8.1.2 Laboratory Analysis

One groundwater sample from Bore 1 and six soil/fill samples were selected for laboratory analysis to detect the presence of organic and inorganic contaminants. Results of these analyses are given in Tables 2a, 2b, 3a and 3b. A summary of significant results is provided below:

- significantly elevated hydrocarbon (PAHs and TPHs) concentrations were detected in soil/fill samples B3/3.0 and B10/1.0. Bore 3 was located near an oil sump and oil was observed in auger returns from 2 to 3 m depth during drilling. Bore 10 was located downgradient from USTs. The number and capacities of USTs on site is not known.

- elevated levels of heavy metal, including cadmium, chromium, copper, lead, nickel and zinc were detected in fill samples. Results indicate significantly elevated concentrations of copper (6 200 mg/kg), lead (130 000 mg/kg) and zinc (51 000 mg/kg) in foundry sand (sample B6/2.0). Concentrations of lead and zinc exceeded ANZECC threshold levels in sample B3/3.0, these results are probably associated with oil leakage from the adjacent oil sump.

- results of analysis of the groundwater sample collected from Bore 1 indicate that concentrations of organic and inorganic contaminants are low and within Dutch guidelines.

TABLE 2a - PAH, PHENOLS, TPH, BTEX RESULTS - SOIL/FILL

Sample No. /Depth (m)	PAHs (mg/kg)	Phenols (mg/kg)	Total Petroleum Hydrocarbons C_6-C_9 (mg/kg)	C_{10}-C_{14} (mg/kg)	C_{15}-C_{28} (mg/kg)	C_{29}-C_{36} (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-benzene (mg/kg)	Xylene (mg/kg)
B3/3.0	172	3.9	<20	170	3200	700	<0.5	<0.5	<0.5	<1.5
B4/1.0	<1.5	<0.5	-	-	-	-	-	-	-	-
B5/2.0	1.45	<0.5	-	-	-	-	-	-	-	-
B6/0.2	1.37	<0.5	-	-	-	-	-	-	-	-
B9/1.0	1.37	<0.5	-	-	-	-	-	-	-	-
B10/1.0	411	2.3	<20	1200	2900	510	<0.5	<0.5	<0.5	<1.5
Guideline Thresholds	20[1]	20[2]	65[3]	1000[3] (total)			1[3]	1.4[3]	3.1[3]	14[3]

1. ANZECC Guidelines for the Assessment and Management of Contaminated Sites, 1992
2. Revised Dutch Investigation Threshold Values for Soils, 1994
3. NSW EPA Guidelines for Assessing Service Station Sites, 1994
- = Not analysed

TABLE 2b - PAH, PHENOLS, TPH, BTEX RESULTS - GROUNDWATER

Sample No.	PAHs (µg/L)	Phenols (µg/L)	Total Petroleum Hydrocarbons C_6-C_9 (µg/L)	C_{10}-C_{14} (µg/L)	C_{15}-C_{28} (µg/L)	C_{29}-C_{36} (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Xylene (µg/L)
W/B1	<8	<50	<40	<100	<200	<200	<1	2	<1	<3
Revised Dutch Investigation Threshold Values for Groundwater, 1994	Not defined	1000	Not defined	Not defined			15	500	75	35
ANZECC Guidelines for the Protection of Aquatic Ecosystems (fresh water), 1992	3	50	Not defined	Not defined			300	300	140	Not defined

Exceeds Threshold

TABLE 3a - HEAVY METAL RESULTS - SOIL/FILL

Sample No.	Heavy Metals							
	Arsenic (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	Nickel (mg/kg)	Zinc (mg/kg)
B3/3.0	8.9	9.1	44	440	1 500	0.13	22	2400
B4/1.0	3.7	<2	-	5.8	16	-	<5	<5
B5/2.0	2.5	1.6	17	34	39	0.04	17	200
B6/0.2	7.2	<2	650	6200	13 000	0.07	120	51 000
B9/1.0	4.8	4.6	17	110	110	0.05	18	780
B10/1.0	9.9	10	42	78	180	0.14	22	4100
ANZECC Guidelines (1992)	20	3	50	60	300	1	60	200

Exceeds ANZECC Guidelines

TABLE 3b - HEAVY METAL RESULTS - GROUNDWATER

Sample No.	Heavy Metals							
	Arsenic (µg/L)	Cadmium (µg/L)	Chromium (µg/L)	Copper (µg/L)	Lead (µg/L)	Mercury (µg/L)	Nickel (µg/L)	Zinc (µg/L)
W/B1	2	<10	<50	<30	<50	<0.5	<50	48
Revised Dutch Investigation Threshold Values for Groundwater, 1994	35	3.2	15.5	45	45	0.18	45	432.5
ANZECC Guidelines for the Protection of Aquatic Ecosystem (fresh water), 1992	50	1.1	10	3.5	3	0.1	82.5	27.5

Exceeds ANZECC Guidelines

9. CONCLUSIONS AND RECOMMENDATIONS

Based on the analytical results of the soil/fill and groundwater samples analysed in this preliminary investigation, hydrocarbon contamination has been identified in soil/fill immediately adjacent to USTs and an oil sump and some heavy metal contamination has been detected in filling containing foundry sand.

In regard to material affected by hydrocarbons, excavation of obviously contaminated material from the vicinity of Bores 3 and 10 is recommended. It is suggested that the two excavations are inspected with appropriate gas monitoring instrumentation by an experienced person while earthmoving machinery is available on site in order to advise if further excavations are required. Upon satisfactory completion of excavations based on visual evidence and preliminary gas

monitoring, it is recommended that removal of contaminated material is further confirmed through a validation assessment.

Validation assessments involve the collection and analysis of samples from the floors and walls of excavations resulting from the removal of contaminated material. This procedure is outlined by the NSW Environmental Protection Authority (EPA) (Guideline for Assessing Service Station Sites, 1994).

It is recommended that excavated contaminated material is disposed of at a secure landfill. Please note that an application for disposal, including a description of contaminated material must be submitted to the NSW Environmental Protection Authority (EPA) prior to disposal.

With regard to heavy metal contamination, heavy metals are relatively stable contaminants in the solid form and therefore the elevated concentrations of inorganics detected in filling are not likley to pose a significant threat to underlying groundwater. However, to reduce exposure to future site users contaminated areas should be sealed with suitable pavement. It is understood that the proposed site use is for industrial purposes and future developments include construction of four factory buildings. On this basis, it is recommended that construction designs incorporate secure containment by sealing off areas of heavy metal contaminated filling with concrete.

DOUGLAS PARTNERS PTY LTD.

Reviewed by:

JENNIFER CROOK
Environmental Scientist

J MICHAEL NASH
Manager - Environmental Services

APPENDIX A
Drawing and Photographs

Plate 1: Former foundry buildings with warehouse in background, viewed from the north

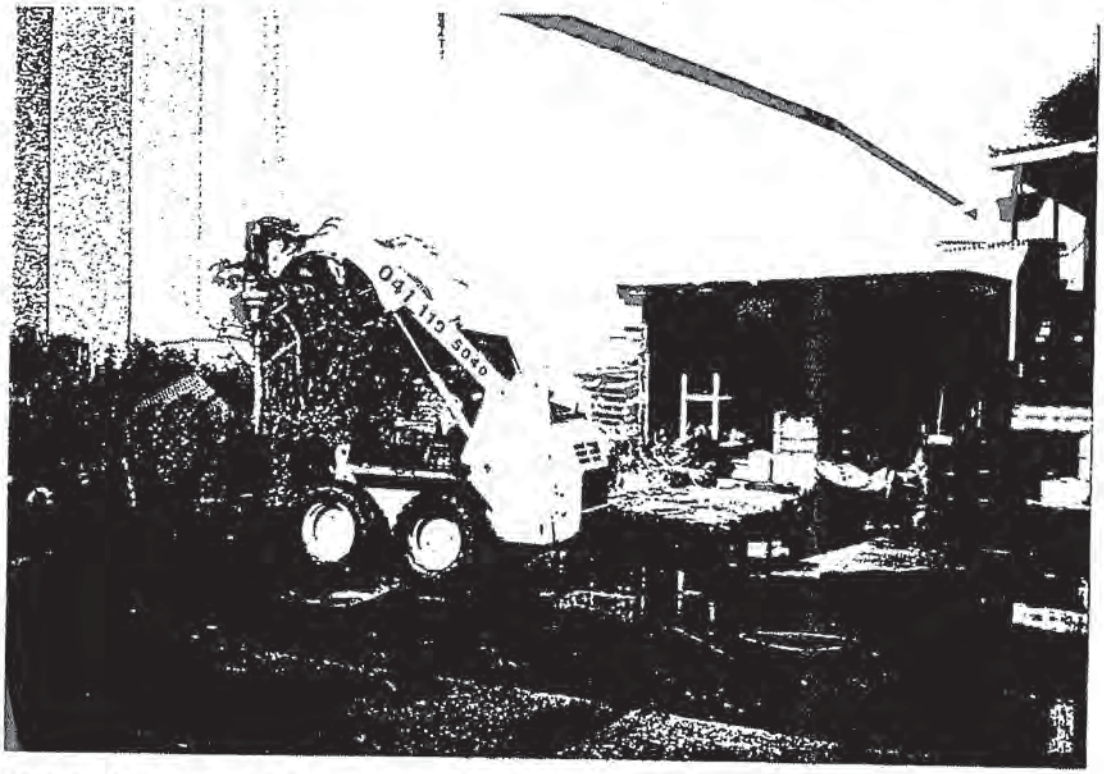

Plate 2: Drilling at Bore 9 (viewed from the west). Note black foundry sand from drilling returns

CONTAMINATION ASSESSMENT
61 - 65 SHEPHERD STREET, MARRICKVILLE

Project No: 23711 March 1996	Plates 1 and 2

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APPENDIX B
Results of Fieldwork

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NOTES RELATING TO THIS REPORT

Introduction

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

Geotechnical reports are based on information gained from limited subsurface test boring and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretative rather than factual documents, limited to some extent by the scope of information on which they rely.

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 S.A.A. Site Investigation Code. In general, descriptions cover the following properties — strength or density, colour, structure, soil or rock type and inclusions.

Soil types are described according to the predominating particle size, qualified by the grading of other particles present (e.g. sandy clay) on the following bases:

Soil Classification	Particle Size
Clay	less than 0.002 mm
Silt	0.002 to 0.06 mm
Sand	0.06 to 2.00 mm
Gravel	2.00 to 60.00 mm

Cohesive soils are classified on the basis of strength either by laboratory testing or engineering examination. The strength terms are defined as follows.

Classification	Undrained Shear Strength kPa
Very soft	less than 12
Soft	12—25
Firm	25—50
Stiff	50—100
Very stiff	100—200
Hard	Greater than 200

Non-cohesive soils are classified on the basis of relative density, generally from the results of standard penetration tests (SPT) or Dutch cone penetrometer tests (CPT) as below:

Relative Density	SPT "N" Value (blows/300 mm)	CPT Cone Value (q_c — MPa)
Very loose	less than 5	less than 2
Loose	5—10	2—5
Medium dense	10—30	5—15
Dense	30—50	15—25
Very dense	greater than 50	greater than 25

Rock types are classified by their geological names. Where relevant, further information regarding rock classification is given on the following sheet.

Sampling

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

Disturbed samples taken during drilling provide information on colour, type, inclusions and, depending upon the degree of disturbance, some information on strength and structure.

Undisturbed samples are taken by pushing a thin-walled sample tube into the soil and withdrawing with a sample of the soil 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 are given in the report.

Drilling Methods.

The following is a brief summary of drilling methods currently adopted by the Company and some comments on their use and application.

Test Pits — these are excavated with a backhoe or a tracked excavator, allowing close examination of the in-situ soils if it is safe to descend into the pit. The depth of penetration is limited to about 3 m for a backhoe and up to 6 m for an excavator. A potential disadvantage is the disturbance caused by the excavation.

Large Diameter Auger (e.g. Pengo) — the hole is advanced by a rotating plate or short spiral auger, generally 300 mm or larger in diameter. The cuttings are returned to the surface at intervals (generally of not more than 0.5 m) and are disturbed but usually unchanged in moisture content. Identification of soil strata is generally much more reliable than with continuous spiral flight augers, and is usually supplemented by occasional undisturbed tube sampling.

Continuous Sample Drilling — the hole is advanced by pushing a 100 mm diameter socket into the ground and withdrawing it at intervals to extrude the sample. This is the most reliable method of drilling in soils, since moisture content is unchanged and soil structure, strength, etc. is only marginally affected.

Continuous Spiral Flight Augers — the hole is advanced using 90—115 mm diameter continuous spiral flight augers which are withdrawn at intervals to allow

sampling or in-situ testing. This is a relatively economical means of drilling in clays and in sands above the water table. Samples are returned to the surface, or may be collected after withdrawal of the auger flights, but they are very disturbed and may be contaminated. Information from the drilling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively lower reliability, due to remoulding, contamination or softening of samples by ground water.

Non-core Rotary Drilling — the hole is 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.

Rotary Mud Drilling — similar to rotary drilling, but using drilling mud as a circulating fluid. The mud tends to mask the cuttings and reliable identification is again only possible from separate intact sampling (e.g. from SPT).

Continuous Core Drilling — a continuous core sample is obtained using a diamond tipped core barrel, usually 50 mm internal diameter. Provided full core recovery is achieved (which is not always possible in very weak rocks and granular soils), this technique provides a very reliable (but relatively expensive) method of investigation.

Standard Penetration Tests

Standard penetration tests are used mainly in non-cohesive soils, but occasionally also in cohesive soils as a means of determining 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 50 mm diameter split sample tube under the impact of a 63 kg hammer with a free fall of 760 mm. It is normal for the tube to be driven in three successive 150 mm increments and the 'N' value is taken as the number of blows for the last 300 mm. In dense sands, very hard clays or weak rock, the full 450 mm 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 150 mm of say 4, 6 and 7 blows

  as 4, 6, 7
  N = 13

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

  as 15, 30/40 mm.

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

Occasionally, the test method is used to obtain samples in 50 mm diameter thin walled sample tubes in clays. In such circumstances, the test results are shown on the borelogs in brackets.

Cone Penetrometer Testing and Interpretation

Cone penetrometer testing (sometimes referred to as Dutch cone — abbreviated as CPT) described in this report has been carried out using an electrical friction cone penetrometer. The test is described in Australian Standard 1289, Test F4.1.

In the tests, a 35 mm diameter rod with a cone tipped end 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 friction resistance on a separate 130 mm long sleeve, immediately behind the cone. Transducers in the tip of the assembly are connected by electrical 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 20 mm per second) the information is output on continuous chart recorders. The plotted results given in this report have been traced from the original records.

The information provided on the charts comprises:—

- 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 in percent.

There are two scales available for measurement of cone resistance. The lower (A) scale (0—5 MPa) is used in very soft soils where increased sensitivity is required and is shown in the graphs as a dotted line. The main (B) scale (0—50 MPa) is less sensitive and is shown as a full line.

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%—2% are commonly encountered in sands and very soft clays rising to 4%—10% in stiff clays.

In sands, the relationship between cone resistance and SPT value is commonly in the range:—

$$q_c \text{ (MPa)} = (0.4 \text{ to } 0.6)\ N \text{ (blows per 300 mm)}$$

In clays, the relationship between undrained shear strength and cone resistance is commonly in the range:—

$$q_c = (12 \text{ to } 18)\ c_u$$

Interpretation of CPT values can also be made to allow estimation of modulus or compressibility values to allow calculation of foundation settlements.

Inferred stratification as shown on the attached reports is assessed from the cone and friction traces and from experience and information from nearby boreholes, etc. This information is presented for general guidance, but must be regarded as being to some extent interpretive. The test method provides a continuous profile of engineering properties, and where precise information on

soil classification is required, direct drilling and sampling may be preferable.

Hand Penetrometers

Hand penetrometer tests are carried out by driving a rod into the ground with a falling weight hammer and measuring the blows for successive 150 mm increments of penetration. Normally, there is a depth limitation of 1.2 m but this may be extended in certain conditions by the use of extension rods.

Two, relatively similar tests are used.

- Perth sand penetrometer — a 16 mm diameter flat ended rod is driven with a 9 kg hammer, dropping 600 mm (AS 1289, Test F 3.3). This test was developed for testing the density of sands (originating in Perth) and is mainly used in granular soils and filling.
- Cone penetrometer (sometimes known as the Scala Penetrometer) — a 16 mm rod with a 20 mm diameter cone end is driven with a 9 kg hammer dropping 510 mm (AS 1289, Test F3.2). The test was developed initially for pavement subgrade investigations, and published correlations of the test results with California bearing ratio have been published by various Road Authorities.

Laboratory Testing

Laboratory testing is 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.

Bore Logs

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

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes, the frequency of sampling and the possibility of other than 'straight line' variations between the boreholes.

Ground Water

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

- In low permeability soils, ground water although present, 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 prior weather changes. They may not be the same at the time of construction as are indicated in the report.
- The use of water or mud as a drilling fluid will mask any ground water inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water observations are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or 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 a perched water table.

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 (e.g. a three storey building) the information and interpretation may not be relevant if the design proposal is changed (e.g. 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 condition, 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 depend partly on bore spacing and sampling frequency.
- changes in policy or interpretation of policy by statutory authorities.
- the actions of contractors responding to commercial pressures.

If these occur, the Company will be pleased to assist with investigation or advice to resolve the matter.

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 than 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 assit in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The Company will always be pleased to provide engineering inspection services for geotechnical aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

GRAPHIC SYMBOLS FOR SOIL & ROCK

SOIL

BITUMINOUS CONCRETE

CONCRETE

TOPSOIL

FILLING

PEAT

CLAY

SILTY CLAY

SANDY CLAY

GRAVELLY CLAY

SHALY CLAY

SILT

CLAYEY SILT

SANDY SILT

SAND

CLAYEY SAND

SILTY SAND

GRAVEL

SANDY GRAVEL

COBBLES/BOULDERS

TALUS

SEDIMENTARY ROCK

BOULDER CONGLOMERATE

CONGLOMERATE

CONGLOMERATIC SANDSTONE

SANDSTONE FINE GRAINED

SANDSTONE COARSE GRAINED

SILTSTONE

LAMINITE

MUDSTONE, CLAYSTONE, SHALE

COAL

LIMESTONE

METAMORPHIC ROCK

SLATE, PHYLLITE, SCHIST

GNEISS

QUARTZITE

IGNEOUS ROCK

GRANITE

DOLERITE, BASALT

TUFF

PORPHYRY

SEAMS

SEAM
> 10 mm

SEAM
< 10 mm

TEST BORE REPORT

CLIENT: BARCLAY MOWLEM CONSTRUCTION LIMITED
PROJECT: CONTAMINATION ASSESSMENT
LOCATION: 61-65 SHEPHERD STREET, MARRICKVILLE

DATE: 6 MARCH 1996
PROJECT No.: 23711
SURFACE LEVEL:

BORE No. 1
SHEET 1 OF 1

Depth m	Description of Strata	Sampling & In Situ Testing: Type	Depth (m)	Results	Headspace PID (ppm)
0	CONCRETE				
0.1	FILLING - loose dark grey sand with some gravel	A	0.3		12
0.5	CLAY - firm orange brown and grey clay	A	1.0		16
1	- becoming red brown at 1.6m				
2	- red brown and grey with some ironstone and gravel at 2.0m	A	2.0		18
2.8	TEST BORE DISCONTINUED AT 2.8 METRES - due to refusal	A	2.8		13
3					

RIG: BOBCAT WITH AUGER DRILLER: ELLIS LOGGED: CROOK CASING:

TYPE OF BORING: 200mm DIAMETER AUGERING

GROUND WATER OBSERVATIONS: FREE GROUND WATER OBSERVED AT 2.0m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A auger sample
B bulk sample
C core drilling
PP pocket penetration (kPa)
PL point load strength I_{s} (50)MPa
S standard penetration test
U× mm dia. tube
V shear vane (kPa)

CHECKED:
Initials: JMC
Date: 12/3/96

Douglas Partners
Geotechnics · Environment · Groundwater

TEST BORE REPORT

CLIENT: BARCLAY MOWLEM CONSTRUCTION LIMITED. DATE: 6 MARCH 1996 BORE No. 2
PROJECT: CONTAMINATION ASSESSMENT PROJECT No.: 23711 SHEET 1 OF 1
LOCATION: 61-65 SHEPHERD STREET, MARRICKVILLE SURFACE LEVEL:

Depth m	Description of Strata	Sampling & In Situ Testing: Type	Depth (m)	Results	Headspace PID (ppm)
0					
0.1	FILLING - loose yellow brown medium grained sand	A	0.05		14
0.3	ROADBASE - loose black and grey coarse grained sand with blue metal gravel				
	FILLING - soft brown and red brown clay with some sand and fine gravel				
1	- slight odour (possibly napthalene) noted at 1.0m	A	1.0		13
1.2	CLAY - firm red brown and grey clay				
2		A*	2.0		14
	- becoming grey at 2.8m				
3 3.0	TEST BORE DISCONTINUED AT 3.0 METRES	A	3.0		15

RIG: BOBCAT WITH AUGER DRILLER: ELLIS LOGGED: CROOK CASING:
TYPE OF BORING: 200mm DIAMETER AUGERING
GROUND WATER OBSERVATIONS: FREE GROUND WATER OBSERVED AT 2.2m
REMARKS: * DUPLICATE SAMPLE (Z1) COLLECTED AT 2.0m

SAMPLING & IN SITU TESTING LEGEND

A auger sample
B bulk sample
C core drilling
PP Pocket Penetration (kPa)
PL point load strength I_s (50)MPa
S standard penetration test
Ux x mm dia. tube
V shear vane (kPa)

CHECKED:
Initials: JMC
Date: 12/3/96

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TEST BORE REPORT

CLIENT: BARCLAY MOWLEM CONSTRUCTION LIMITED
PROJECT: CONTAMINATION ASSESSMENT
LOCATION: 61-65 SHEPHERD STREET, MARRICKVILLE

DATE: 6 MARCH 1996
PROJECT No.: 23711
SURFACE LEVEL:

BORE No. 3
SHEET 1 OF 1

Depth m	Description of Strata	Sampling & In Situ Testing: Type	Depth (m)	Results	Headspace PID (ppm)
0	CONCRETE				
0.2	FILLING – loose yellow brown and medium grained sand with blue metal gravel	A	0.3		24
	– becoming black at 0.3m				
1	– hydrocarbon odour observed at 1.0m	A	1.0		30
1.8	FILLING – soft grey clay with some sand and gravel				
2	– oily substance encountered from 2.0–3.0m	A	2.0		20
3		A	3.0		20
3.0	TEST BORE DISCONTINUED AT 3.0 METRES				

RIG: BOBCAT WITH AUGER DRILLER: ELLIS LOGGED: CROOK CASING:

TYPE OF BORING: 200mm DIAMETER AUGERING

GROUND WATER OBSERVATIONS: FREE GROUND WATER OBSERVED AT 2.0m

REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A auger sample
B bulk sample
C core drilling
PL point load strength I_s (50)MPa
S standard penetration test
Ux x mm dia. tube

CHECKED:
Initials: JMC
17/3/96

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TEST BORE REPORT

CLIENT: BARCLAY MOWLEM CONSTRUCTION LIMITED
PROJECT: CONTAMINATION ASSESSMENT
LOCATION: 61-65 SHEPHERD STREET, MARRICKVILLE

DATE: 6 MARCH 1996
PROJECT No.: 23711
SURFACE LEVEL:

BORE No. 4
SHEET 1 OF 1

Depth m	Description of Strata	Sampling & In Situ Testing: Type	Depth (m)	Results	Headspace PID (ppm)
0	FILLING - loose grey silty sand with some gravel	A	0.1		16
0.4	FILLING - soft to firm red brown and grey clay (crushed sandstone)				
1.0	TEST BORE DISCONTINUED AT 1.0 METRE - due to refusal (most likely on sandstone blocks)	A*	1.0		17
2					
3					

RIG: BOBCAT WITH AUGER DRILLER: ELLIS LOGGED: CROOK CASING:
TYPE OF BORING: 200mm DIAMETER AUGERING
GROUND WATER OBSERVATIONS: NO FREE GROUND WATER OBSERVED
REMARKS: * DUPLICATE SAMPLE (Z2) COLLECTED AT 1.0m

SAMPLING & IN SITU TESTING LEGEND

A auger sample
B bulk sample
C core drilling
PL point load strength I_s (50)MPa
S standard penetration test

CHECKED:
Initials: JMC

Douglas Partners

TEST BORE REPORT

CLIENT: BARCLAY MOWLEM CONSTRUCTION LIMITED
PROJECT: CONTAMINATION ASSESSMENT
LOCATION: 61-65 SHEPHERD STREET, MARRICKVILLE

DATE: 6 MARCH 1996
PROJECT No.: 23711
SURFACE LEVEL:

BORE No. 5
SHEET 1 OF 1

Depth m	Description of Strata	Sampling & In Situ Testing: Type	Depth (m)	Results	Headspace PID (ppm)
0	FILLING – loose black coarse grained sand with some gravel	A	0.3		13
1	– becoming moist at 1.0m	A	1.0		15
2 2.0	TEST BORE DISCONTINUED AT 2.0 METRES – due to refusal on concrete	A	2.0		16
3					

RIG: BOBCAT WITH AUGER DRILLER: ELLIS LOGGED: CROOK CASING:
TYPE OF BORING: 200mm DIAMETER AUGERING
GROUND WATER OBSERVATIONS: FREE GROUND WATER OBSERVED AT 1.0m
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A auger sample
B bulk sample
C core drilling
PL point load strength I_s (50)MPa
S standard penetration test
Ux x mm dia. tube

CHECKED:
Initials: JMC
17/2/96

Douglas Partners

TEST BORE REPORT

CLIENT: BARCLAY MOWLEM CONSTRUCTION LIMITED
PROJECT: CONTAMINATION ASSESSMENT
LOCATION: 61-65 SHEPHERD STREET, MARRICKVILLE

DATE: 6 MARCH 1996
PROJECT No.: 23711
SURFACE LEVEL:

BORE No. 8
SHEET 1 OF 1

Depth m	Description of Strata	Sampling & In Situ Testing: Type	Depth (m)	Results	Headspace PID (ppm)
0	FILLING – loose black silty sand with some organic matter, fine rootlets and fine fragments of timber	A	0.2		7
0.4	FILLING – loose black fine grained sand with some gravel				
1.0	TEST BORE DISCONTINUED AT 1.0 METRE – due to refusal on concrete	A	1.0		8
2					
3					

RIG: BOBCAT WITH AUGER DRILLER: ELLIS LOGGED: CROOK CASING:
TYPE OF BORING: 200mm DIAMETER AUGERING
GROUND WATER OBSERVATIONS: NO FREE GROUND WATER OBSERVED
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A auger sample
B bulk sample
C core drilling
pp Pocket Penetration (kPa)
PL point load strength I_s (50)MPa
S standard penetration test
Ux x mm dia. tube
V shear vane (kPa)

CHECKED:
Initials:
Date:

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TEST BORE REPORT

CLIENT: BARCLAY MOWLEM CONSTRUCTION LIMITED
PROJECT: CONTAMINATION ASSESSMENT
LOCATION: 61-65 SHEPHERD STREET, MARRICKVILLE

DATE: 6 MARCH 1996
PROJECT No.: 23711
SURFACE LEVEL:

BORE No. 9
SHEET 1 OF 1

Depth m	Description of Strata	Sampling & In Situ Testing: Type	Depth (m)	Results	Headspace PID (ppm)
0	FILLING – loose dark brown fine grained sand with some gravel	A	0.05		8
0.1	FILLING – loose black medium to coarse grained sand with fine gravel	A	1.0		12
1.6	CLAY – soft light grey, dark grey and orange brown sand with some gravel	A	2.0		11
2.0	TEST BORE DISCONTINUED AT 2.0 METRES				
3					

RIG: BOBCAT WITH AUGER DRILLER: ELLIS LOGGED: CROOK CASING:
TYPE OF BORING: 200mm DIAMETER AUGERING
GROUND WATER OBSERVATIONS: NO FREE GROUND WATER OBSERVED
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A auger sample
B bulk sample
C core drilling
PP Pocket Penetration (kPa)
PL point load strength I_s (50)MPa
S standard penetration test
Ux x mm dia. tube
V shear vane (kPa)

CHECKED:
Initials: JMC
Date: 12/3/96

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TEST BORE REPORT

CLIENT: BARCLAY MOWLEM CONSTRUCTION LIMITED DATE: 6 MARCH 1996 BORE No. 10
PROJECT: CONTAMINATION ASSESSMENT PROJECT No.: 23711 SHEET 1 OF 1
LOCATION: 61-65 SHEPHERD STREET, MARRICKVILLE SURFACE LEVEL:

Depth m	Description of Strata	Sampling & In Situ Testing			
		Type	Depth (m)	Results	Headspace PID (ppm)
0	FILLING - loose light brown medium grained sand	A*	0.05		16
0.1	FILLING - loose grey medium grained sand with gravel				
1	- becoming moist at 1.0m	A	1.0		23
1.8	CLAY - firm grey and red brown clay with gravel				
2 2.0	TEST BORE DISCONTINUED AT 2.0 METRES - oil observed at 2.0m	A	2.0		110
3					

RIG: BOBCAT WITH AUGER DRILLER: ELLIS LOGGED: CROOK CASING:
TYPE OF BORING: 200mm DIAMETER AUGERING
GROUND WATER OBSERVATIONS: FREE GROUND WATER OBSERVED AT 1.0m
REMARKS: * DUPLICATE SAMPLE (Z4) COLLECTED AT 0.05m

SAMPLING & IN SITU TESTING LEGEND

A auger sample
B bulk sample
C core drilling
PP Pocket Penetration (kPa)
PL point load strength I_s (50)MPa
S standard penetration test
Ux x mm dia. tube
V shear vane (kPa)

CHECKED:
Initials: JMC
Date: 12/3/96

Douglas Partners
Geotechnics · Environment · Groundwater

APPENDIX C
Results of Laboratory Testing

Analabs

Analabs Pty. Ltd.
ACN 004 591 664
12 Excell St. Banksmeadow
New South Wales. 2019
Telephone: (61 2) 316 4255
Facsimile: (61 2) 316 5541

14 March, 1996

Douglas Partners
96 Hermitage Road
WEST RYDE NSW 2114

Your Reference: Marrickville 23711
Our Reference: 2848

Attention: Jennie Crook

Dear Madam,

We received 1 water & 6 soil samples on the 6th March 1996. The samples were analysed in accordance with your instructions and the results are contained in this report.

Results are reported on an as received basis for waters and a dry weight basis for soils.

Yours faithfully
Analabs

Tania Notaras
Laboratory Manager

Melanie Murray
Senior Organic Chemist

National Association of Testing Authorities, Australia

DOUGLAS PARTNERS
Project: MARRICKVILLE (23711)

OUR REFERENCE	2848-1	2848-1Rpt	2848-2	2848-3	2848-4	2848-5	2848-6	2848-7	BLANK
YOUR REFERENCE	B4/1.0	B4/1.0	B6/0.2	B9/1.0	B5/2.0	B10/1.0	B3/3.0	W/B1	-
SAMPLE TYPE	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	WATER	SOIL
UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/L	mg/kg
Arsenic, As	3.4	3.7	7.5	4.8	2.5	9.9	8.9	0.002	<0.05
Cadmium, Cd	<2	<2	<2	4.6	1.6	10	9.1	<0.01	<2
Chromium, Cr	7.5	-	650	17	17	42	44	<0.05	<5
Copper, Cu	4.5	6.8	6200	110	34	78	440	<0.03	<3
Lead, Pb	15	16	13000	110	39	180	1500	<0.05	<5
Mercury, Hg	0.01	-	0.07	0.05	0.04	0.14	0.13	<0.0005	<0.01
Nickel, Ni	<5	<5	120	18	17	22	22	<0.05	<3
Zinc, Zn	<5	<5	51000	780	200	4100	2400	0.048	<5
Total Phenol	<0.5	<0.5	<0.5	<0.5	<0.5	2.3	3.9	<0.05	<0.5

Method Codes : SEP-011/SEP-032, SEM-001, SEM-002, SEI-065

DOUGLAS PARTNERS
Project: MARRICKVILLE (23711)

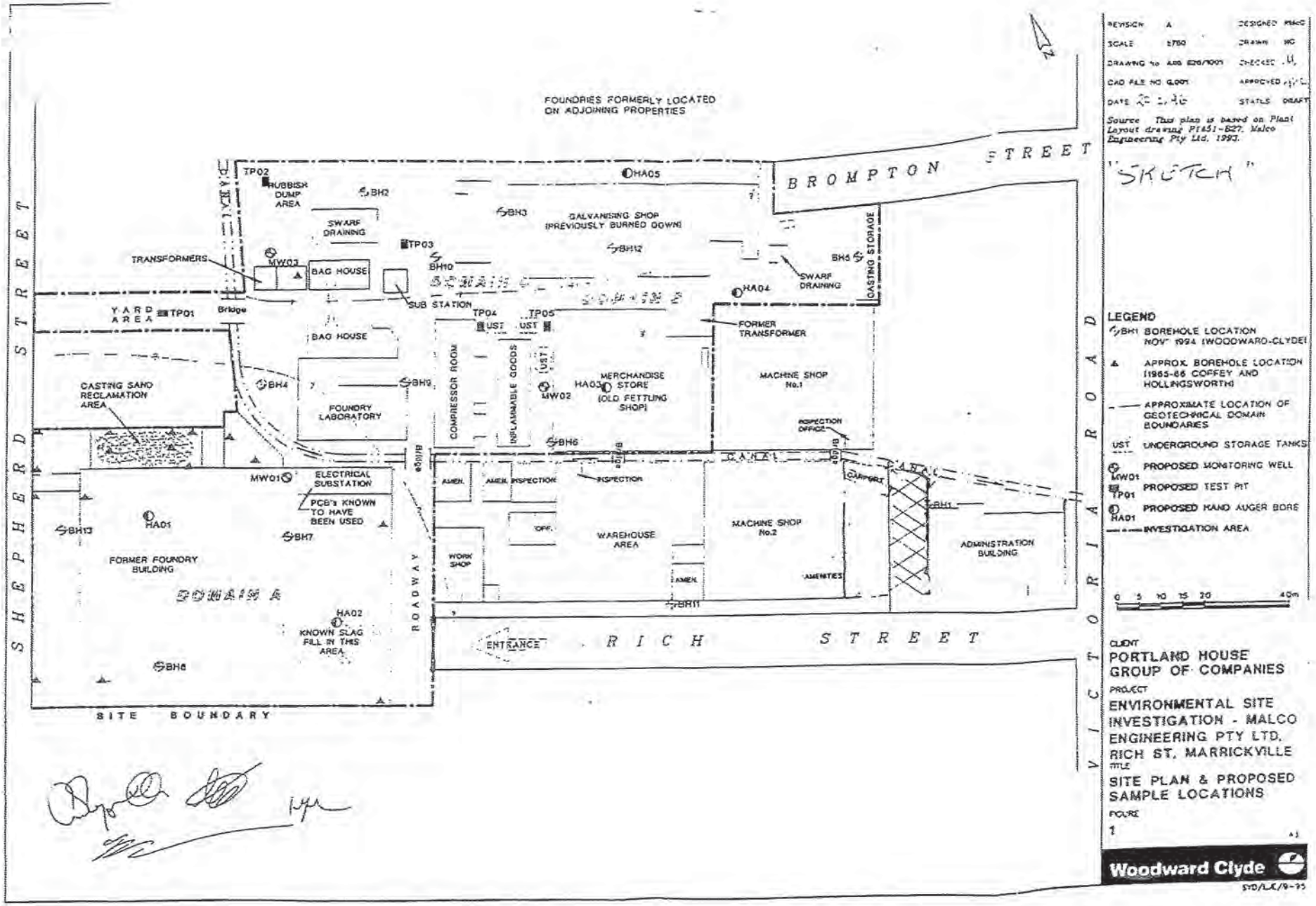
OUR REFERENCE	2848-5	2848-6	2848-7	.BLANK	.BLANK	SPIKE
YOUR REFERENCE	B10/1.0	B3/3.0	W/B1	-	-	-
SAMPLE TYPE	SOIL	SOIL	WATER	SOIL	WATER	SOIL
UNITS	mg/kg	mg/kg	mg/L	mg/kg	mg/L	%Recovery
Hydrocarbons C6-C9	<20	<20	<0.04	<20	<0.04	103
Hydrocarbons C10-C14	1200	170	<0.1	<20	<0.1	97
Hydrocarbons C15-C28	2900	3200	<0.2	<50	<0.2	99
Hydrocarbons C29-C36	510	700	<0.2	<50	<0.2	94
Benzene	<0.5	<0.5	<0.001	<0.5	<0.001	87
Toluene	<0.5	<0.5	0.002	<0.5	<0.001	87
Ethyl Benzene	<0.5	<0.5	<0.001	<0.5	<0.001	85
Xylenes	<1.5	<1.5	<0.003	<1.5	<0.003	86

Method Codes : SEO-020
BTEX Analysed by Analabs Melbourne Report No. 14245

DOUGLAS PARTNERS
Project: MARRICKVILLE (23711)

OUR REFERENCE	2848-1	2848-1 Rpt	2848-2	2848-3	2848-4	2848-5	2848-6	2848-7	.BLANK	.BLANK	SPIKE
YOUR REFERENCE	B4/1.0	B4/1.0	B6/0.2	B9/1.0	B5/2.0	B10/1.0	B3/3.0	W/B1	-	-	-
SAMPLE TYPE	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	WATER	SOIL	WATER	SOIL
UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/L	mg/kg	mg/L	%Recovery
Naphthalene	<0.1	<0.1	0.26	0.20	0.80	5.5	2.1	<0.0005	<0.1	<0.0005	-
Acenaphthylene	<0.1	<0.1	<0.1	<0.1	<0.1	6.3	2.4	<0.0005	<0.1	<0.0005	92
Acenaphthene	<0.1	<0.1	<0.1	<0.1	<0.1	4.0	1.3	<0.0005	<0.1	<0.0005	93
Fluorene	<0.1	<0.1	<0.1	<0.1	<0.1	9.4	2.5	<0.0005	<0.1	<0.0005	89
Phenanthrene	<0.1	<0.1	0.33	0.22	<0.1	63	16	<0.0005	<0.1	<0.0005	106
Anthracene	<0.1	<0.1	<0.1	<0.1	0.34	18	5.0	<0.0005	<0.1	<0.0005	90
Fluoranthene	<0.1	<0.1	0.16	0.22	<0.1	68	29	<0.0005	<0.1	<0.0005	107
Pyrene	<0.1	<0.1	0.14	0.22	0.18	67	30	<0.0005	<0.1	<0.0005	102
Benzo (a) anthracene	<0.1	<0.1	0.12	0.12	0.13	28	13	<0.0005	<0.1	<0.0005	96
Chrysene	<0.1	<0.1	0.12	0.12	<0.1	27	12	<0.0005	<0.1	<0.0005	102
Benzo (b) fluoranthene	<0.1	<0.1	0.12	0.15	<0.1	32	17	<0.0005	<0.1	<0.0005	103
Benzo (k) fluoranthene	<0.1	<0.1	0.12	<0.1	<0.1	12	6.0	<0.0005	<0.1	<0.0005	96
Benzo (a) pyrene	<0.1	<0.1	<0.1	0.12	<0.1	32	16	<0.0005	<0.1	<0.0005	101
Dibenzo (ah) anthracene	<0.1	<0.1	<0.1	<0.1	<0.1	0.75	1.0	<0.0005	<0.1	<0.0005	-
Benzo (ghi) perylene	<0.1	<0.1	<0.1	<0.1	<0.1	17	8.4	<0.0005	<0.1	<0.0005	93
Indeno(1,2,3-cd)pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	21	10	<0.0005	<0.1	<0.0005	125

Method Codes : SEO-029



REVISION A
SCALE 1:750
DRAWING No A00 626/1001
CAD FILE NO GL001
DATE 22.2.96
DESIGNED MMC
DRAWN MC
CHECKED
APPROVED
STATUS DRAFT

Source This plan is based on Plant Layout drawing P1651-B27, Malco Engineering Pty Ltd, 1993.

"SKETCH"

LEGEND

- BH1 BOREHOLE LOCATION NOV 1994 (WOODWARD-CLYDE)
- APPROX. BOREHOLE LOCATION (1985-86 COFFEY AND HOLLINGSWORTH)
- APPROXIMATE LOCATION OF GEOTECHNICAL DOMAIN BOUNDARIES
- UST UNDERGROUND STORAGE TANKS
- MW01 PROPOSED MONITORING WELL
- TP01 PROPOSED TEST PIT
- HA01 PROPOSED HAND AUGER BORE
- INVESTIGATION AREA

0 5 10 15 20 40m

CLIENT
PORTLAND HOUSE GROUP OF COMPANIES

PROJECT
ENVIRONMENTAL SITE INVESTIGATION - MALCO ENGINEERING PTY LTD, RICH ST, MARRICKVILLE

TITLE
SITE PLAN & PROPOSED SAMPLE LOCATIONS

FIGURE
1

A3

Woodward Clyde

SYD/LC/9-95

APPENDIX L

NSW WORKCOVER RECORDS

NSW GOVERNMENT WorkCover

WorkCover NSW
92-100 Donnison Street, Gosford, NSW 2250
Locked Bag 2906, Lisarow, NSW 2252
T 02 4321 5000 F 02 4325 4145
WorkCover Assistance Service 13 10 50
DX 731 Sydney workcover.nsw.gov.au

Our Ref: D13/104066
Your Ref: Susie Danias

23 August 2013

Attention: Susie Danias
E & D Danias
PO Box 3247
Marrickville Metro NSW 2204

Dear Ms Danias,

RE SITE: 1 Rich St Marrickville NSW

I refer to your site search request received by WorkCover NSW on 20 August 2013 requesting information on licences to keep dangerous goods for the above site.

A search of the Stored Chemical Information Database (SCID) and the microfiche records held by WorkCover NSW has not located any records pertaining to the above mentioned premises.

If you have any further queries please contact the Dangerous Goods Licensing Team on (02) 4321 5500.

Yours Sincerely

Brent Jones
Senior Licensing Officer
Dangerous Goods Team

APPENDIX M

SECTION 149 CERTIFICATES

PLANNING CERTIFICATE UNDER SECTION 149 OF THE ENVIRONMENTAL PLANNING & ASSESSMENT ACT, 1979.

Cert. No.: PC201301464
Page No: 1 of 19
Date: 21/08/2013

APPLICANT
AARGUS PTY LTD
446 Parramatta Road
PETERSHAM NSW 2049

PROPERTY
10 Brompton Street
MARRICKVILLE NSW 2204
Lot 53 DP 868710

PROPERTY NO.
32118

REFERENCE

In accordance with the requirements of section 149 of the Environmental Planning and Assessment Act 1979, the following prescribed matters relate to the land at the date of this certificate.

ITEM 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.

1. The following environmental planning instruments apply to the land:

- Marrickville Local Environmental Plan 2011
- S.E.P.P. No. 6 Number of Storeys in a Building
- S.E.P.P. No. 19 Bushland in Urban Areas
- S.E.P.P. No. 21 Caravan Parks
- S.E.P.P. No. 22 Shops and Commercial Premises
- S.E.P.P. No. 30 Intensive Agricultures
- S.E.P.P. No. 32 Urban Consolidation (Redevelopment of Urban Land)
- S.E.P.P. No. 33 Hazardous and Offensive Development
- S.E.P.P. No. 50 Canal Estates
- S.E.P.P. No. 53 Transitional Provisions
- S.E.P.P. No. 55 Remediation of Land
- S.E.P.P. No. 62 Sustainable Aquaculture
- S.E.P.P. No. 64 Advertising and Signage
- S.E.P.P. No. 65 Design Quality of Residential Flat Development

- S.E.P.P. (Housing for Seniors or People with a Disability) 2004
- S.E.P.P. (Building Sustainability Index: BASIX) 2004
- S.E.P.P. (Major Development) 2005
- S.E.P.P. (Mining, Petroleum Production and Extractive Industries) 2007
- S.E.P.P. (Temporary Structures) 2007
- S.E.P.P. (Infrastructure) 2007
- S.E.P.P. (Exempt and Complying Development Codes) 2008
- S.E.P.P. (Affordable Rental Housing) 2009

Any enquiries regarding these State Planning Policies should be directed to the Department of Planning on: ***1300 305 695 or 02 9228 6333.*** *Information can also be obtained from the Department's website at http://www.planning.nsw.gov.au*

(1) 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).

2. The following proposed environmental planning instruments apply to the land:

- Draft Marrickville Local Environmental Plan 2011 Amendment No. 1

Any enquiries regarding Draft Marrickville Local Environmental Plan 2011 Amendment No. 1 should be directed to Marrickville Council on (02) 9335 2222.

(2) The name of each development control plan that applies to the carrying out of development on the land.

3. The following development control plans (D.C.P's) apply to the land:

- Marrickville Development Control Plan 2011

ITEM 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):

(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)"),

(b) the purposes for which the instrument provides that development may be carried out within the zone without the need for development consent,

(c) the purposes for which the instrument provides that development may not be carried out within the zone except with development consent,

(d) the purposes for which the instrument provides that development is prohibited within the zone,

(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,

(f) whether the land includes or comprises critical habitat,

(g) whether the land is in a conservation area (however described),

(h) whether an item of environmental heritage (however described) is situated on the land.

* Note: The relevant current environmental planning instrument is Marrickville Local Environmental Plan 2011

** Note: The relevant proposed environmental planning instrument is Draft Marrickville Local Environmental Plan 2011 Amendment No. 1

Item 2 (a), (b), (c) & (d) – Zoning and Land use table

CURRENT ENVIRONMENTAL PLANNING INSTRUMENT:

MARRICKVILLE LOCAL ENVIRONMENTAL PLAN 2011

IN1 - General Industrial

1 **Objectives of zone**

- To provide a wide range of industrial and warehouse land uses.
- To encourage employment opportunities.
- To minimise any adverse effect of industry on other land uses.
- To support and protect industrial land for industrial uses.
- To protect industrial land in proximity to Sydney Airport and Port Botany.
- To enable a purpose built dwelling house to be used in certain circumstances as a dwelling house.

2 **Permitted without consent**

Home occupations

3 **Permitted with consent**

Agricultural produce industries; Depots; Dwelling houses; Freight transport facilities; General industries; Industrial training facilities; Intensive plant agriculture; Kiosks; Light industries; Markets; Neighbourhood shops; Roads; Take away food and drink premises; Timber yards; Warehouse or distribution centres; Any other development not specified in item 2 or 4

4 **Prohibited**

Agriculture; Air transport facilities; Airstrips; Amusement centres; Animal boarding or training establishments; Boat launching ramps; Boat sheds; Camping grounds; Caravan parks; Cemeteries; Charter and tourism boating facilities; Child care centres; Commercial premises; Community facilities; Correctional centres; Eco-tourist facilities; Educational establishments; Environmental facilities; Exhibition homes; Exhibition villages; Extractive industries; Farm buildings; Forestry; Function centres; Health services facilities; Heavy industrial storage establishments; Heavy industries; Helipads; Highway service centres; Home occupations (sex services); Information and education facilities; Jetties; Marinas; Mooring pens; Moorings; Offensive industries; Open cut mining; Passenger transport facilities; Places of public worship; Port facilities; Public administration buildings; Recreation facilities (major); Recreation facilities (outdoor); Registered clubs; Research stations; Residential accommodation; Respite day care centres; Restricted premises; Rural industries; Tourist and visitor accommodation; Transport depots; Veterinary hospitals; Water recreation structures; Water supply systems; Wholesale supplies

PROPOSED ENVIRONMENTAL PLANNING INSTRUMENT:

DRAFT MARRICKVILLE LOCAL ENVIRONMENTAL PLAN 2011 AMENDMENT No. 1

There are NO proposed changes to the current Marrickville Local Environmental Plan 2011 to this land(s) for this item.

Item 2 (e) – Minimum land dimensions

CURRENT ENVIRONMENTAL PLANNING INSTRUMENT:

MARRICKVILLE LOCAL ENVIRONMENTAL PLAN 2011

There are NO minimum land dimensions for the erection of a dwelling house on the land. All applications for the erection of a dwelling house will be assessed in accordance with the Environmental Planning and Assessment Act, 1979.

PROPOSED ENVIRONMENTAL PLANNING INSTRUMENT:

DRAFT MARRICKVILLE LOCAL ENVIRONMENTAL PLAN 2011 AMENDMENT No. 1

There are NO proposed changes to the current Marrickville Local Environmental Plan 2011 for this land(s) for this item.

Item 2 (f) – Critical habitat

CURRENT ENVIRONMENTAL PLANNING INSTRUMENT:

MARRICKVILLE LOCAL ENVIRONMENTAL PLAN 2011

The land DOES NOT include or comprise critical habitat.

PROPOSED ENVIRONMENTAL PLANNING INSTRUMENT:

DRAFT MARRICKVILLE LOCAL ENVIRONMENTAL PLAN 2011 AMENDMENT No. 1

There are NO proposed changes to the current Marrickville Local Environmental Plan 2011 for this land(s) for this item.

Item 2 (g) – Conservation Area

CURRENT ENVIRONMENTAL PLANNING INSTRUMENT:

MARRICKVILLE LOCAL ENVIRONMENTAL PLAN 2011

The land IS NOT within a heritage conservation area referred to in Schedule 5 of Marrickville Local Environmental Plan 2011

PROPOSED ENVIRONMENTAL PLANNING INSTRUMENT:

DRAFT MARRICKVILLE LOCAL ENVIRONMENTAL PLAN 2011 AMENDMENT No. 1

There are NO proposed changes to the current Marrickville Local Environmental Plan 2011 to this land(s) for this item.

Item 2 (h) – Heritage Item

CURRENT ENVIRONMENTAL PLANNING INSTRUMENT:

MARRICKVILLE LOCAL ENVIRONMENTAL PLAN 2011

An item of environmental heritage IS NOT situated on the land under Marrickville Local Environmental Plan 2011

PROPOSED ENVIRONMENTAL PLANNING INSTRUMENT:

DRAFT MARRICKVILLE LOCAL ENVIRONMENTAL PLAN 2011 AMENDMENT No. 1

There are NO proposed changes to the current Marrickville Local Environmental Plan 2011 to this land(s) for this item.

ITEM 2A

Zoning and land use under State Environmental Planning Policy (Sydney Region Growth Centres) 2006

To the extent that the land is within any zone (however described) under:
(a) Part 3 of the *State Environmental Planning Policy (Sydney Region Growth Centres) 2006* (**the 2006 SEPP**), or
(b) a Precinct Plan (within the meaning of the 2006 SEPP), or
(c) a proposed Precinct Plan that is or has been the subject of community consultation or on public exhibition under the Act,
the particulars referred to in clause 2 (a)–(h) in relation to that land (with a reference to "the instrument" in any of those paragraphs being read as a reference to Part 3 of the 2006 SEPP, or the Precinct Plan or proposed Precinct Plan, as the case requires).

The land IS NOT land to which State Environmental Planning Policy (Sydney Region Growth Centres) 2006 applies.

ITEM 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.

General Housing Code

No. Complying Development under State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 may not be carried out on this land.

The land is excluded land identified as being within ANEF 25 or higher, unless the development is for the erection of ancillary development

The land is excluded land identified on an Acid Sulfate Soils map as being Class 2

Housing Alterations Code

Yes. Complying Development under State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 may be carried out on this land subject to an assessment of compliance with the requirements of the SEPP.

General Development Code

Yes. Complying Development under State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 may be carried out on this land subject to an assessment of compliance with the requirements of the SEPP.

General Commercial and Industrial Code

Yes. Complying Development under State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 may be carried out on this land subject to an assessment of compliance with the requirements of the SEPP.

Subdivisions Code

Yes. Complying Development under State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 may be carried out on this land subject to an assessment of compliance with the requirements of the SEPP.

Demolitions Code

Yes. Complying Development under State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 may be carried out on this land subject to an assessment of compliance with the requirements of the SEPP.

ITEM 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 so notified by the Department of Services, Technology and Administration.

No.

ITEM 4A

Certain information relating to beaches and coasts

(1) In relation to a costal council – whether an order has been made under Part 4D of the *Coastal Protection Act 1979* in relation to temporary coastal protection works (within the meaning of that Act) on the land (or on public land adjacent to that land), except where the council is satisfied that such an order has been fully complied with.

NO order has been made under Part 4D of the *Coastal Protection Act 1979.*

(2) In relation to a costal council:
(a) whether the council has been notified under section 55X of the *Coastal Protection Act 1979* that temporary coastal protection works (within the meaning of that Act) have been placed on the land (or on public land adjacent to that land), and

Council HAS NOT been notified under Section 55X of the *Coastal Protection Act 1979.*

(b) if works have been so placed – whether the council is satisfied that the works have been removed and the land restored in accordance with that Act.

Not Applicable

(3) (Repealed)

ITEM 4B

Annual charges under Local Government Act 1993 for coastal protection services that relate to the existing coastal protection works

In relation to a coastal council – whether the owner (or any previous owner) of the land has consented in writing to the land being subject to annual charges under section 496B of the *Local Government Act 1993* for coastal protection services that relate to existing coastal protection works (within the meaning of section 553B of that Act).

The land IS NOT subject to any annual charges under Section 496B of the *Local Government Act 1993.*

ITEM 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.*

No.

ITEM 6

Road widening and road realignment

Whether or not the land is affected by any road widening or road realignment under:
(a) Division 2 of Part 3 of the Roads Act 1993, or
(b) any environmental planning instrument, or
(c) any resolution of the council.

The land IS NOT affected by a road widening or road realignment under:
(i) Part 3 Division 2 of the Roads Act 1993
(ii) any environmental planning instrument; or
(iii) any resolution of the Council

ITEM 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).

- Council HAS adopted by resolution and in accordance with S.72 of the Environmental Planning & Assessment Act, 1979 a development control plan incorporating Council's policy on contaminated land. The Plan has been prepared substantially in accordance with State Environmental Planning Policy No. 55, and the Contaminated Land Planning Guidelines. This policy may affect development of land:

  (a) which is affected by contamination;
  (b) which has been used for certain purposes;
  (c) in respect of which there is not sufficient information about contamination;

(d) which is proposed to be used for certain purposes;
(e) in other circumstances contained in the development control plan and policy;

and in some cases may restrict the development of land.

- The land IS identified as being subject to acid sulfate soil risk under clause 6.2 of Marrickville Local Environmental Plan 2011. Development on land that is subject to acid sulphate soil risk requires development consent and the preparation of an acid sulphate soils management plan subject to a preliminary assessment of the proposed works prepared in accordance with the Acid Sulfate Soils Manual. Development consent is not required where the works involve the disturbance of less than 1 tonne of soil or are not likely to lower the watertable.

- The land IS identified as being subject to acid sulfate soil risk under clause 6.2 of Marrickville Local Environmental Plan 2011. Development on land that is subject to acid sulphate soil risk requires development consent and the preparation of an acid sulphate soils management plan subject to a preliminary assessment of the proposed works prepared in accordance with the Acid Sulfate Soils Manual. Development consent is not required where the works involve the disturbance of less than 1 tonne of soil or are not likely to lower the watertable.

- Council HAS NOT by resolution (aside from the matters raised in the above item(s)) adopted a policy to restrict the development of the land because of the likelihood of land slip, bushfire, tidal inundation, subsidence, acid sulfate soils or any other risk (other than flooding).

- Council HAS received no notification of the type described in item 7(b) from a public authority of a policy adopted by that authority that restricts the development of the land because of land slip, bushfire, tidal inundation, subsidence, acid sulfate soils or any other risk (other than flooding).

ITEM 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.

Yes.

(2)	Whether or not development on that land or part of the land for any other purpose is subject to flood related development controls.

Yes.

(3) Words and expressions in this clause have the same meaning as in the instrument set out in the Schedule to the *Standard Instrument (Local Environmental Plan) Order 2006.*

ITEM 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.

CURRENT ENVIRONMENTAL PLANNING INSTRUMENT:

MARRICKVILLE LOCAL ENVIRONMENTAL PLAN 2011

The land IS NOT reserved, in part or whole, for acquisition by a public authority, as referred to in section 27 of the Act, under:

(i) any environmental planning instrument
(ii) deemed environmental planning instrument; or
(iii) draft environmental planning instrument

PROPOSED ENVIRONMENTAL PLANNING INSTRUMENT:

DRAFT MARRICKVILLE LOCAL ENVIRONMENTAL PLAN 2011 AMENDMENT No. 1

There are NO proposed changes to the current Marrickville Local Environmental Plan 2011 to this land(s) for this item.

ITEM 9

Contributions plans

The name of each contributions plan applying to the land.

Marrickville Section 94 Contributions Plan 2004.

ITEM 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).

ITEM 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).

The land IS NOT land to which a biobanking agreement under Part 7A of the Threatened Species Conservation Act 1995 relates.

ITEM 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 NOT bush fire prone land.

ITEM 12

Property vegetation plans

If 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 that Act).

No.

ITEM 13

Orders 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.

ITEM 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.

ITEM 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

(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.

Item 15(a)

There IS NOT a current site compatibility certificate (seniors housing) relating to the land

Item 15(b)

There ARE NO applicable 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

ITEM 16

Site compatibility certificate 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, the 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 current site compatibility certificate (infrastructure) relating to the land

ITEM 17

Site compatibility certificate and conditions affecting 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, the 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.

(2) A statement setting out any terms of a kind referred to in clause 17 (1) or 38 (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.

Item 17(1)

There IS NOT a current site compatibility certificate (affordable rental housing) relating to the land

Item 17(2)

There ARE NO applicable terms of a kind referred to in clause 17(1) or 38(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

OTHER ITEMS (i)

Section 23 exemption or Section 24 authorisation

Whether an exemption under Section 23 or an authorisation under section 24 of the *Nation Building and Jobs Plan (State Infrastructure Delivery) Act 2009* No 1 has been issued by the Co-ordinator General in relation to the land.

An exemption under Section 23 or an authorisation under Section 24 of the Nation Building and Jobs Plan (State Infrastructure Delivery) Act 2009 No 1 HAS NOT been issued by the Co-ordinator General in relation to the land.

OTHER ITEMS (ii)

Matters arising under the Contaminated Land Management Act 1997

Section 59(2) of the *Contaminated Land Management Act 1997* prescribes the following additional matters that are 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 the 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 the 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 the Act - if a copy of such a statement has been provided at any time to the local authority issuing the certificate.

No.

ADDITIONAL INFORMATION PURSUANT TO S.149(5) OF THE ENVIRONMENTAL PLANNING AND ASSESSMENT ACT, 1979.

a) The property IS NOT listed on the State Heritage Register.

The Register is a list of places and items of State heritage significance which has been endorsed by the NSW Heritage Council and the Assistant Minister for Infrastructure and Planning (Planning Administration), and came into effect through a legislative amendment of the Heritage Act 1977 on 2 April 1999.

Further information about items on the State Heritage Register can be obtained from the NSW Heritage Office web site at www.heritage.nsw.gov.au <http://www.heritage.nsw.gov.au>

b) Australian Noise Exposure Forecast ANEF 2033:

Some land within the Marrickville Local Government area is subject to aircraft noise associated with Sydney Airport. Council has maps which indicate the land that is subject to noise exposure from aircraft and which contain information as to future levels of noise and related matters. Development within these areas may require noise and acoustic attenuation treatment. If you consider that the subject land is, or is likely to be affected by aircraft noise, or if you wish to ascertain whether the subject land is, or is likely to be affected by aircraft noise, please contact the Development and Environmental Services Division of Council on 9335 2222.

For further information concerning the Australian Noise Exposure Forecast (ANEF), as it relates to Sydney Airport and the Marrickville Local Government area please contact Airservices Australia, Customer and Community Relations, P.O. Box 211, Mascot, NSW 1460 or telephone 1300 302 240.

c) Contaminated Land:

Marrickville Development Control Plan 2011 lists sources of information for investigating potential land contamination, including information that the Council may possess. Persons should make their own enquiries in accordance with the procedures specified in Marrickville DCP. The Council can provide access to information in Council's possession in relation to the land use history for a particular parcel of land.

d) ***Flooding:***

Council has undertaken a flood drainage study of the catchment area within which this property is located. The results of this study indicate that the property may be affected by local flooding arising from the surcharge of the local drainage system. Council may place restrictions on the minimum floor levels of new building works where it is considered that the flood level so requires. New building works may be required to be constructed from flood-compatible materials. Therefore, it is recommended that interested

persons make and rely upon their own enquiries as to the likelihood and extent of flooding affecting this property. Development controls and guidelines for development within flood affected areas are within section 2.22 of Marrickville Development Control Plan 2011. Further information is available from Council's Planning and Environmental Services Directorate on ph. 9335 2222.

Information provided in this planning certificate is in accordance with the matters prescribed under Schedule 4 of the Environmental Planning and Assessment Regulation 2000.

When information pursuant to Section 149 (5) is requested, the Council is under no obligation to furnish any particular information pursuant to that Section. The absence of any reference to any matters affecting the land shall not imply that the land is not affected by any matter not referred to in this Certificate.

Council draws your attention to Section 149 (6) which states that a Council shall not incur any liability in respect of any advice provided in good faith pursuant to subsection (5).

Please contact the Planning Services Section for further information about any instruments or affectations referred to in the Certificate.

MARCUS ROWAN
MANAGER, PLANNING SERVICES

PLANNING CERTIFICATE UNDER SECTION 149 OF THE ENVIRONMENTAL PLANNING & ASSESSMENT ACT, 1979.

Cert. No.: PC201301462
Page No: 1 of 19
Date: 21/08/2013

APPLICANT
AARGUS PTY LTD
446 Parramatta Road
PETERSHAM NSW 2049

PROPERTY
Rich Street
MARRICKVILLE NSW 2204
Lot 5 DP 63446

PROPERTY NO.
21757

REFERENCE

In accordance with the requirements of section 149 of the Environmental Planning and Assessment Act 1979, the following prescribed matters relate to the land at the date of this certificate.

ITEM 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.

1. The following environmental planning instruments apply to the land:

- Marrickville Local Environmental Plan 2011
- S.E.P.P. No. 6 Number of Storeys in a Building
- S.E.P.P. No. 19 Bushland in Urban Areas
- S.E.P.P. No. 21 Caravan Parks
- S.E.P.P. No. 22 Shops and Commercial Premises
- S.E.P.P. No. 30 Intensive Agricultures
- S.E.P.P. No. 32 Urban Consolidation (Redevelopment of Urban Land)
- S.E.P.P. No. 33 Hazardous and Offensive Development
- S.E.P.P. No. 50 Canal Estates
- S.E.P.P. No. 53 Transitional Provisions
- S.E.P.P. No. 55 Remediation of Land
- S.E.P.P. No. 62 Sustainable Aquaculture
- S.E.P.P. No. 64 Advertising and Signage
- S.E.P.P. No. 65 Design Quality of Residential Flat Development

- S.E.P.P. (Housing for Seniors or People with a Disability) 2004
- S.E.P.P. (Building Sustainability Index: BASIX) 2004
- S.E.P.P. (Major Development) 2005
- S.E.P.P. (Mining, Petroleum Production and Extractive Industries) 2007
- S.E.P.P. (Temporary Structures) 2007
- S.E.P.P. (Infrastructure) 2007
- S.E.P.P. (Exempt and Complying Development Codes) 2008
- S.E.P.P. (Affordable Rental Housing) 2009

Any enquiries regarding these State Planning Policies should be directed to the Department of Planning on: ***1300 305 695 or 02 9228 6333.*** *Information can also be obtained from the Department's website at http://www.planning.nsw.gov.au*

(1) 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).

2. The following proposed environmental planning instruments apply to the land:

- Draft Marrickville Local Environmental Plan 2011 Amendment No. 1

Any enquiries regarding Draft Marrickville Local Environmental Plan 2011 Amendment No. 1 should be directed to Marrickville Council on (02) 9335 2222.

(2) The name of each development control plan that applies to the carrying out of development on the land.

3. The following development control plans (D.C.P's) apply to the land:

- Marrickville Development Control Plan 2011

ITEM 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):

(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)"),

(b) the purposes for which the instrument provides that development may be carried out within the zone without the need for development consent,

(c) the purposes for which the instrument provides that development may not be carried out within the zone except with development consent,

(d) the purposes for which the instrument provides that development is prohibited within the zone,

(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,

(f) whether the land includes or comprises critical habitat,

(g) whether the land is in a conservation area (however described),

(h) whether an item of environmental heritage (however described) is situated on the land.

* Note: The relevant current environmental planning instrument is Marrickville Local Environmental Plan 2011

** Note: The relevant proposed environmental planning instrument is Draft Marrickville Local Environmental Plan 2011 Amendment No. 1

Item 2 (a), (b), (c) & (d) – Zoning and Land use table

CURRENT ENVIRONMENTAL PLANNING INSTRUMENT:

MARRICKVILLE LOCAL ENVIRONMENTAL PLAN 2011

IN1 - General Industrial

1 **Objectives of zone**

- To provide a wide range of industrial and warehouse land uses.
- To encourage employment opportunities.
- To minimise any adverse effect of industry on other land uses.
- To support and protect industrial land for industrial uses.
- To protect industrial land in proximity to Sydney Airport and Port Botany.
- To enable a purpose built dwelling house to be used in certain circumstances as a dwelling house.

2 **Permitted without consent**

Home occupations

3 **Permitted with consent**

Agricultural produce industries; Depots; Dwelling houses; Freight transport facilities; General industries; Industrial training facilities; Intensive plant agriculture; Kiosks; Light industries; Markets; Neighbourhood shops; Roads; Take away food and drink premises; Timber yards; Warehouse or distribution centres; Any other development not specified in item 2 or 4

4 **Prohibited**

Agriculture; Air transport facilities; Airstrips; Amusement centres; Animal boarding or training establishments; Boat launching ramps; Boat sheds; Camping grounds; Caravan parks; Cemeteries; Charter and tourism boating facilities; Child care centres; Commercial premises; Community facilities; Correctional centres; Eco-tourist facilities; Educational establishments; Environmental facilities; Exhibition homes; Exhibition villages; Extractive industries; Farm buildings; Forestry; Function centres; Health services facilities; Heavy industrial storage establishments; Heavy industries; Helipads; Highway service centres; Home occupations (sex services); Information and education facilities; Jetties; Marinas; Mooring pens; Moorings; Offensive industries; Open cut mining; Passenger transport facilities; Places of public worship; Port facilities; Public administration buildings; Recreation facilities (major); Recreation facilities (outdoor); Registered clubs; Research stations; Residential accommodation; Respite day care centres; Restricted premises; Rural industries; Tourist and visitor accommodation; Transport depots; Veterinary hospitals; Water recreation structures; Water supply systems; Wholesale supplies

PROPOSED ENVIRONMENTAL PLANNING INSTRUMENT:

DRAFT MARRICKVILLE LOCAL ENVIRONMENTAL PLAN 2011 AMENDMENT No. 1

There are NO proposed changes to the current Marrickville Local Environmental Plan 2011 to this land(s) for this item.

Item 2 (e) – Minimum land dimensions

CURRENT ENVIRONMENTAL PLANNING INSTRUMENT:

MARRICKVILLE LOCAL ENVIRONMENTAL PLAN 2011

There are NO minimum land dimensions for the erection of a dwelling house on the land. All applications for the erection of a dwelling house will be assessed in accordance with the Environmental Planning and Assessment Act, 1979.

PROPOSED ENVIRONMENTAL PLANNING INSTRUMENT:

DRAFT MARRICKVILLE LOCAL ENVIRONMENTAL PLAN 2011 AMENDMENT No. 1

There are NO proposed changes to the current Marrickville Local Environmental Plan 2011 for this land(s) for this item.

Item 2 (f) – Critical habitat

CURRENT ENVIRONMENTAL PLANNING INSTRUMENT:

MARRICKVILLE LOCAL ENVIRONMENTAL PLAN 2011

The land DOES NOT include or comprise critical habitat.

PROPOSED ENVIRONMENTAL PLANNING INSTRUMENT:

DRAFT MARRICKVILLE LOCAL ENVIRONMENTAL PLAN 2011 AMENDMENT No. 1

There are NO proposed changes to the current Marrickville Local Environmental Plan 2011 for this land(s) for this item.

Item 2 (g) – Conservation Area

CURRENT ENVIRONMENTAL PLANNING INSTRUMENT:

MARRICKVILLE LOCAL ENVIRONMENTAL PLAN 2011

The land IS NOT within a heritage conservation area referred to in Schedule 5 of Marrickville Local Environmental Plan 2011

PROPOSED ENVIRONMENTAL PLANNING INSTRUMENT:

DRAFT MARRICKVILLE LOCAL ENVIRONMENTAL PLAN 2011 AMENDMENT No. 1

There are NO proposed changes to the current Marrickville Local Environmental Plan 2011 to this land(s) for this item.

Item 2 (h) – Heritage Item

CURRENT ENVIRONMENTAL PLANNING INSTRUMENT:

MARRICKVILLE LOCAL ENVIRONMENTAL PLAN 2011

An item of environmental heritage IS NOT situated on the land under Marrickville Local Environmental Plan 2011

PROPOSED ENVIRONMENTAL PLANNING INSTRUMENT:

DRAFT MARRICKVILLE LOCAL ENVIRONMENTAL PLAN 2011 AMENDMENT No. 1

There are NO proposed changes to the current Marrickville Local Environmental Plan 2011 to this land(s) for this item.

ITEM 2A

Zoning and land use under State Environmental Planning Policy (Sydney Region Growth Centres) 2006

To the extent that the land is within any zone (however described) under:
(a) Part 3 of the *State Environmental Planning Policy (Sydney Region Growth Centres) 2006* **(the 2006 SEPP)**, or
(b) a Precinct Plan (within the meaning of the 2006 SEPP), or
(c) a proposed Precinct Plan that is or has been the subject of community consultation or on public exhibition under the Act,
the particulars referred to in clause 2 (a)–(h) in relation to that land (with a reference to "the instrument" in any of those paragraphs being read as a reference to Part 3 of the 2006 SEPP, or the Precinct Plan or proposed Precinct Plan, as the case requires).

The land IS NOT land to which State Environmental Planning Policy (Sydney Region Growth Centres) 2006 applies.

ITEM 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.

General Housing Code

No. Complying Development under State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 may not be carried out on this land.

The land is excluded land identified as being within ANEF 25 or higher, unless the development is for the erection of ancillary development

The land is excluded land identified on an Acid Sulfate Soils map as being Class 2

Housing Alterations Code

Yes. Complying Development under State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 may be carried out on this land subject to an assessment of compliance with the requirements of the SEPP.

General Development Code

Yes. Complying Development under State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 may be carried out on this land subject to an assessment of compliance with the requirements of the SEPP.

General Commercial and Industrial Code

Yes. Complying Development under State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 may be carried out on this land subject to an assessment of compliance with the requirements of the SEPP.

Subdivisions Code

Yes. Complying Development under State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 may be carried out on this land subject to an assessment of compliance with the requirements of the SEPP.

Demolitions Code

Yes. Complying Development under State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 may be carried out on this land subject to an assessment of compliance with the requirements of the SEPP.

ITEM 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 so notified by the Department of Services, Technology and Administration.

No.

ITEM 4A

Certain information relating to beaches and coasts

(1) In relation to a costal council – whether an order has been made under Part 4D of the *Coastal Protection Act 1979* in relation to temporary coastal protection works (within the meaning of that Act) on the land (or on public land adjacent to that land), except where the council is satisfied that such an order has been fully complied with.

NO order has been made under Part 4D of the *Coastal Protection Act 1979.*

(2) In relation to a costal council:
(a) whether the council has been notified under section 55X of the *Coastal Protection Act 1979* that temporary coastal protection works (within the meaning of that Act) have been placed on the land (or on public land adjacent to that land), and

Council HAS NOT been notified under Section 55X of the *Coastal Protection Act 1979.*

(b) if works have been so placed – whether the council is satisfied that the works have been removed and the land restored in accordance with that Act.

Not Applicable

(3) (Repealed)

ITEM 4B

Annual charges under Local Government Act 1993 for coastal protection services that relate to the existing coastal protection works

In relation to a coastal council – whether the owner (or any previous owner) of the land has consented in writing to the land being subject to annual charges under section 496B of the *Local Government Act 1993* for coastal protection services that relate to existing coastal protection works (within the meaning of section 553B of that Act).

The land IS NOT subject to any annual charges under Section 496B of the *Local Government Act 1993.*

ITEM 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.*

No.

ITEM 6

Road widening and road realignment

Whether or not the land is affected by any road widening or road realignment under:
(a) Division 2 of Part 3 of the Roads Act 1993, or
(b) any environmental planning instrument, or
(c) any resolution of the council.

The land IS NOT affected by a road widening or road realignment under:
(i) Part 3 Division 2 of the Roads Act 1993
(ii) any environmental planning instrument; or
(iii) any resolution of the Council

ITEM 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).

- Council HAS adopted by resolution and in accordance with S.72 of the Environmental Planning & Assessment Act, 1979 a development control plan incorporating Council's policy on contaminated land. The Plan has been prepared substantially in accordance with State Environmental Planning Policy No. 55, and the Contaminated Land Planning Guidelines. This policy may affect development of land:

  (a) which is affected by contamination;
  (b) which has been used for certain purposes;
  (c) in respect of which there is not sufficient information about contamination;

(d) which is proposed to be used for certain purposes;
(e) in other circumstances contained in the development control plan and policy;

and in some cases may restrict the development of land.

- The land IS identified as being subject to acid sulfate soil risk under clause 6.2 of Marrickville Local Environmental Plan 2011. Development on land that is subject to acid sulphate soil risk requires development consent and the preparation of an acid sulphate soils management plan subject to a preliminary assessment of the proposed works prepared in accordance with the Acid Sulfate Soils Manual. Development consent is not required where the works involve the disturbance of less than 1 tonne of soil or are not likely to lower the watertable.

- The land IS identified as being subject to acid sulfate soil risk under clause 6.2 of Marrickville Local Environmental Plan 2011. Development on land that is subject to acid sulphate soil risk requires development consent and the preparation of an acid sulphate soils management plan subject to a preliminary assessment of the proposed works prepared in accordance with the Acid Sulfate Soils Manual. Development consent is not required where the works involve the disturbance of less than 1 tonne of soil or are not likely to lower the watertable.

- Council HAS NOT by resolution (aside from the matters raised in the above item(s)) adopted a policy to restrict the development of the land because of the likelihood of land slip, bushfire, tidal inundation, subsidence, acid sulfate soils or any other risk (other than flooding).

- Council HAS received no notification of the type described in item 7(b) from a public authority of a policy adopted by that authority that restricts the development of the land because of land slip, bushfire, tidal inundation, subsidence, acid sulfate soils or any other risk (other than flooding).

ITEM 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.

Yes.

(2)	Whether or not development on that land or part of the land for any other purpose is subject to flood related development controls.

Yes.

(3) Words and expressions in this clause have the same meaning as in the instrument set out in the Schedule to the *Standard Instrument (Local Environmental Plan) Order 2006.*

ITEM 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.

CURRENT ENVIRONMENTAL PLANNING INSTRUMENT:

MARRICKVILLE LOCAL ENVIRONMENTAL PLAN 2011

The land IS NOT reserved, in part or whole, for acquisition by a public authority, as referred to in section 27 of the Act, under:

(i) any environmental planning instrument
(ii) deemed environmental planning instrument; or
(iii) draft environmental planning instrument

PROPOSED ENVIRONMENTAL PLANNING INSTRUMENT:

DRAFT MARRICKVILLE LOCAL ENVIRONMENTAL PLAN 2011 AMENDMENT No. 1

There are NO proposed changes to the current Marrickville Local Environmental Plan 2011 to this land(s) for this item.

ITEM 9

Contributions plans

The name of each contributions plan applying to the land.

Marrickville Section 94 Contributions Plan 2004.

ITEM 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).

ITEM 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).

The land IS NOT land to which a biobanking agreement under Part 7A of the Threatened Species Conservation Act 1995 relates.

ITEM 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 NOT bush fire prone land.

ITEM 12

Property vegetation plans

If 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 that Act).

No.

ITEM 13

Orders 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.

ITEM 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.

ITEM 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

(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.

Item 15(a)

There IS NOT a current site compatibility certificate (seniors housing) relating to the land

Item 15(b)

There ARE NO applicable 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

ITEM 16

Site compatibility certificate 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, the 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 current site compatibility certificate (infrastructure) relating to the land

ITEM 17

Site compatibility certificate and conditions affecting 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, the 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.

(2) A statement setting out any terms of a kind referred to in clause 17 (1) or 38 (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.

Item 17(1)

There IS NOT a current site compatibility certificate (affordable rental housing) relating to the land

Item 17(2)

There ARE NO applicable terms of a kind referred to in clause 17(1) or 38(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

OTHER ITEMS (i)

Section 23 exemption or Section 24 authorisation

Whether an exemption under Section 23 or an authorisation under section 24 of the *Nation Building and Jobs Plan (State Infrastructure Delivery) Act 2009* No 1 has been issued by the Co-ordinator General in relation to the land.

An exemption under Section 23 or an authorisation under Section 24 of the Nation Building and Jobs Plan (State Infrastructure Delivery) Act 2009 No 1 HAS NOT been issued by the Co-ordinator General in relation to the land.

OTHER ITEMS (ii)

Matters arising under the Contaminated Land Management Act 1997

Section 59(2) of the *Contaminated Land Management Act 1997* prescribes the following additional matters that are 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 the 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 the 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 the Act - if a copy of such a statement has been provided at any time to the local authority issuing the certificate.

No.

ADDITIONAL INFORMATION PURSUANT TO S.149(5) OF THE ENVIRONMENTAL PLANNING AND ASSESSMENT ACT, 1979.

a) The property IS NOT listed on the State Heritage Register.

The Register is a list of places and items of State heritage significance which has been endorsed by the NSW Heritage Council and the Assistant Minister for Infrastructure and Planning (Planning Administration), and came into effect through a legislative amendment of the Heritage Act 1977 on 2 April 1999.

Further information about items on the State Heritage Register can be obtained from the NSW Heritage Office web site at www.heritage.nsw.gov.au <http://www.heritage.nsw.gov.au>

b) Australian Noise Exposure Forecast ANEF 2033:

Some land within the Marrickville Local Government area is subject to aircraft noise associated with Sydney Airport. Council has maps which indicate the land that is subject to noise exposure from aircraft and which contain information as to future levels of noise and related matters. Development within these areas may require noise and acoustic attenuation treatment. If you consider that the subject land is, or is likely to be affected by aircraft noise, or if you wish to ascertain whether the subject land is, or is likely to be affected by aircraft noise, please contact the Development and Environmental Services Division of Council on 9335 2222.

For further information concerning the Australian Noise Exposure Forecast (ANEF), as it relates to Sydney Airport and the Marrickville Local Government area please contact Airservices Australia, Customer and Community Relations, P.O. Box 211, Mascot, NSW 1460 or telephone 1300 302 240.

c) Contaminated Land:

Marrickville Development Control Plan 2011 lists sources of information for investigating potential land contamination, including information that the Council may possess. Persons should make their own enquiries in accordance with the procedures specified in Marrickville DCP. The Council can provide access to information in Council's possession in relation to the land use history for a particular parcel of land.

d) ***Flooding:***

Council has undertaken a flood drainage study of the catchment area within which this property is located. The results of this study indicate that the property may be affected by local flooding arising from the surcharge of the local drainage system. Council may place restrictions on the minimum floor levels of new building works where it is considered that the flood level so requires. New building works may be required to be constructed from flood-compatible materials. Therefore, it is recommended that interested

persons make and rely upon their own enquiries as to the likelihood and extent of flooding affecting this property. Development controls and guidelines for development within flood affected areas are within section 2.22 of Marrickville Development Control Plan 2011. Further information is available from Council's Planning and Environmental Services Directorate on ph. 9335 2222.

Information provided in this planning certificate is in accordance with the matters prescribed under Schedule 4 of the Environmental Planning and Assessment Regulation 2000.

When information pursuant to Section 149 (5) is requested, the Council is under no obligation to furnish any particular information pursuant to that Section. The absence of any reference to any matters affecting the land shall not imply that the land is not affected by any matter not referred to in this Certificate.

Council draws your attention to Section 149 (6) which states that a Council shall not incur any liability in respect of any advice provided in good faith pursuant to subsection (5).

Please contact the Planning Services Section for further information about any instruments or affectations referred to in the Certificate.

MARCUS ROWAN
MANAGER, PLANNING SERVICES

PLANNING CERTIFICATE UNDER SECTION 149 OF THE ENVIRONMENTAL PLANNING & ASSESSMENT ACT, 1979.

Cert. No.: PC201301459
Page No: 1 of 19
Date: 20/08/2013

APPLICANT
AARGUS PTY LTD
446 Parramatta Road
PETERSHAM NSW 2049

PROPERTY
Rich Street
MARRICKVILLE NSW 2204
Lot A DP 178259

PROPERTY NO.
21757

REFERENCE

In accordance with the requirements of section 149 of the Environmental Planning and Assessment Act 1979, the following prescribed matters relate to the land at the date of this certificate.

ITEM 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.

1. The following environmental planning instruments apply to the land:

- Marrickville Local Environmental Plan 2011
- S.E.P.P. No. 6 Number of Storeys in a Building
- S.E.P.P. No. 19 Bushland in Urban Areas
- S.E.P.P. No. 21 Caravan Parks
- S.E.P.P. No. 22 Shops and Commercial Premises
- S.E.P.P. No. 30 Intensive Agricultures
- S.E.P.P. No. 32 Urban Consolidation (Redevelopment of Urban Land)
- S.E.P.P. No. 33 Hazardous and Offensive Development
- S.E.P.P. No. 50 Canal Estates
- S.E.P.P. No. 53 Transitional Provisions
- S.E.P.P. No. 55 Remediation of Land
- S.E.P.P. No. 62 Sustainable Aquaculture
- S.E.P.P. No. 64 Advertising and Signage
- S.E.P.P. No. 65 Design Quality of Residential Flat Development

- S.E.P.P. (Housing for Seniors or People with a Disability) 2004
- S.E.P.P. (Building Sustainability Index: BASIX) 2004
- S.E.P.P. (Major Development) 2005
- S.E.P.P. (Mining, Petroleum Production and Extractive Industries) 2007
- S.E.P.P. (Temporary Structures) 2007
- S.E.P.P. (Infrastructure) 2007
- S.E.P.P. (Exempt and Complying Development Codes) 2008
- S.E.P.P. (Affordable Rental Housing) 2009

Any enquiries regarding these State Planning Policies should be directed to the Department of Planning on: ***1300 305 695 or 02 9228 6333.*** *Information can also be obtained from the Department's website at http://www.planning.nsw.gov.au*

(1) 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).

2. The following proposed environmental planning instruments apply to the land:

- Draft Marrickville Local Environmental Plan 2011 Amendment No. 1

Any enquiries regarding Draft Marrickville Local Environmental Plan 2011 Amendment No. 1 should be directed to Marrickville Council on (02) 9335 2222.

(2) The name of each development control plan that applies to the carrying out of development on the land.

3. The following development control plans (D.C.P's) apply to the land:

- Marrickville Development Control Plan 2011

ITEM 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):

(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)"),

(b) the purposes for which the instrument provides that development may be carried out within the zone without the need for development consent,

(c) the purposes for which the instrument provides that development may not be carried out within the zone except with development consent,

(d) the purposes for which the instrument provides that development is prohibited within the zone,

(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,

(f) whether the land includes or comprises critical habitat,

(g) whether the land is in a conservation area (however described),

(h) whether an item of environmental heritage (however described) is situated on the land.

* Note: The relevant current environmental planning instrument is Marrickville Local Environmental Plan 2011

** Note: The relevant proposed environmental planning instrument is Draft Marrickville Local Environmental Plan 2011 Amendment No. 1

Item 2 (a), (b), (c) & (d) – Zoning and Land use table

CURRENT ENVIRONMENTAL PLANNING INSTRUMENT:

MARRICKVILLE LOCAL ENVIRONMENTAL PLAN 2011

IN1 - General Industrial

1 **Objectives of zone**

- To provide a wide range of industrial and warehouse land uses.
- To encourage employment opportunities.
- To minimise any adverse effect of industry on other land uses.
- To support and protect industrial land for industrial uses.
- To protect industrial land in proximity to Sydney Airport and Port Botany.
- To enable a purpose built dwelling house to be used in certain circumstances as a dwelling house.

2 **Permitted without consent**

Home occupations

3 **Permitted with consent**

Agricultural produce industries; Depots; Dwelling houses; Freight transport facilities; General industries; Industrial training facilities; Intensive plant agriculture; Kiosks; Light industries; Markets; Neighbourhood shops; Roads; Take away food and drink premises; Timber yards; Warehouse or distribution centres; Any other development not specified in item 2 or 4

4 **Prohibited**

Agriculture; Air transport facilities; Airstrips; Amusement centres; Animal boarding or training establishments; Boat launching ramps; Boat sheds; Camping grounds; Caravan parks; Cemeteries; Charter and tourism boating facilities; Child care centres; Commercial premises; Community facilities; Correctional centres; Eco-tourist facilities; Educational establishments; Environmental facilities; Exhibition homes; Exhibition villages; Extractive industries; Farm buildings; Forestry; Function centres; Health services facilities; Heavy industrial storage establishments; Heavy industries; Helipads; Highway service centres; Home occupations (sex services); Information and education facilities; Jetties; Marinas; Mooring pens; Moorings; Offensive industries; Open cut mining; Passenger transport facilities; Places of public worship; Port facilities; Public administration buildings; Recreation facilities (major); Recreation facilities (outdoor); Registered clubs; Research stations; Residential accommodation; Respite day care centres; Restricted premises; Rural industries; Tourist and visitor accommodation; Transport depots; Veterinary hospitals; Water recreation structures; Water supply systems; Wholesale supplies

PROPOSED ENVIRONMENTAL PLANNING INSTRUMENT:

DRAFT MARRICKVILLE LOCAL ENVIRONMENTAL PLAN 2011 AMENDMENT No. 1

There are NO proposed changes to the current Marrickville Local Environmental Plan 2011 to this land(s) for this item.

Item 2 (e) – Minimum land dimensions

CURRENT ENVIRONMENTAL PLANNING INSTRUMENT:

MARRICKVILLE LOCAL ENVIRONMENTAL PLAN 2011

There are NO minimum land dimensions for the erection of a dwelling house on the land. All applications for the erection of a dwelling house will be assessed in accordance with the Environmental Planning and Assessment Act, 1979.

PROPOSED ENVIRONMENTAL PLANNING INSTRUMENT:

DRAFT MARRICKVILLE LOCAL ENVIRONMENTAL PLAN 2011 AMENDMENT No. 1

There are NO proposed changes to the current Marrickville Local Environmental Plan 2011 for this land(s) for this item.

Item 2 (f) – Critical habitat

CURRENT ENVIRONMENTAL PLANNING INSTRUMENT:

MARRICKVILLE LOCAL ENVIRONMENTAL PLAN 2011

The land DOES NOT include or comprise critical habitat.

PROPOSED ENVIRONMENTAL PLANNING INSTRUMENT:

DRAFT MARRICKVILLE LOCAL ENVIRONMENTAL PLAN 2011 AMENDMENT No. 1

There are NO proposed changes to the current Marrickville Local Environmental Plan 2011 for this land(s) for this item.

Item 2 (g) – Conservation Area

CURRENT ENVIRONMENTAL PLANNING INSTRUMENT:

MARRICKVILLE LOCAL ENVIRONMENTAL PLAN 2011

The land IS NOT within a heritage conservation area referred to in Schedule 5 of Marrickville Local Environmental Plan 2011

PROPOSED ENVIRONMENTAL PLANNING INSTRUMENT:

DRAFT MARRICKVILLE LOCAL ENVIRONMENTAL PLAN 2011 AMENDMENT No. 1

There are NO proposed changes to the current Marrickville Local Environmental Plan 2011 to this land(s) for this item.

Item 2 (h) – Heritage Item

CURRENT ENVIRONMENTAL PLANNING INSTRUMENT:

MARRICKVILLE LOCAL ENVIRONMENTAL PLAN 2011

An item of environmental heritage IS NOT situated on the land under Marrickville Local Environmental Plan 2011

PROPOSED ENVIRONMENTAL PLANNING INSTRUMENT:

DRAFT MARRICKVILLE LOCAL ENVIRONMENTAL PLAN 2011 AMENDMENT No. 1

There are NO proposed changes to the current Marrickville Local Environmental Plan 2011 to this land(s) for this item.

ITEM 2A

Zoning and land use under State Environmental Planning Policy (Sydney Region Growth Centres) 2006

To the extent that the land is within any zone (however described) under:
(a) Part 3 of the *State Environmental Planning Policy (Sydney Region Growth Centres) 2006* (**the 2006 SEPP**), or
(b) a Precinct Plan (within the meaning of the 2006 SEPP), or
(c) a proposed Precinct Plan that is or has been the subject of community consultation or on public exhibition under the Act,
the particulars referred to in clause 2 (a)–(h) in relation to that land (with a reference to "the instrument" in any of those paragraphs being read as a reference to Part 3 of the 2006 SEPP, or the Precinct Plan or proposed Precinct Plan, as the case requires).

The land IS NOT land to which State Environmental Planning Policy (Sydney Region Growth Centres) 2006 applies.

ITEM 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.

General Housing Code

No. Complying Development under State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 may not be carried out on this land.

The land is excluded land identified as being within ANEF 25 or higher, unless the development is for the erection of ancillary development

The land is excluded land identified on an Acid Sulfate Soils map as being Class 2

Housing Alterations Code

Yes. Complying Development under State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 may be carried out on this land subject to an assessment of compliance with the requirements of the SEPP.

General Development Code

Yes. Complying Development under State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 may be carried out on this land subject to an assessment of compliance with the requirements of the SEPP.

General Commercial and Industrial Code

Yes. Complying Development under State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 may be carried out on this land subject to an assessment of compliance with the requirements of the SEPP.

Subdivisions Code

Yes. Complying Development under State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 may be carried out on this land subject to an assessment of compliance with the requirements of the SEPP.

Demolitions Code

Yes. Complying Development under State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 may be carried out on this land subject to an assessment of compliance with the requirements of the SEPP.

ITEM 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 so notified by the Department of Services, Technology and Administration.

No.

ITEM 4A

Certain information relating to beaches and coasts

(1) In relation to a costal council – whether an order has been made under Part 4D of the *Coastal Protection Act 1979* in relation to temporary coastal protection works (within the meaning of that Act) on the land (or on public land adjacent to that land), except where the council is satisfied that such an order has been fully complied with.

NO order has been made under Part 4D of the *Coastal Protection Act 1979.*

(2) In relation to a costal council:
(a) whether the council has been notified under section 55X of the *Coastal Protection Act 1979* that temporary coastal protection works (within the meaning of that Act) have been placed on the land (or on public land adjacent to that land), and

Council HAS NOT been notified under Section 55X of the *Coastal Protection Act 1979.*

(b) if works have been so placed – whether the council is satisfied that the works have been removed and the land restored in accordance with that Act.

Not Applicable

(3) (Repealed)

ITEM 4B

Annual charges under Local Government Act 1993 for coastal protection services that relate to the existing coastal protection works

In relation to a coastal council – whether the owner (or any previous owner) of the land has consented in writing to the land being subject to annual charges under section 496B of the *Local Government Act 1993* for coastal protection services that relate to existing coastal protection works (within the meaning of section 553B of that Act).

The land IS NOT subject to any annual charges under Section 496B of the *Local Government Act 1993.*

ITEM 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.*

No.

ITEM 6

Road widening and road realignment

Whether or not the land is affected by any road widening or road realignment under:
(a) Division 2 of Part 3 of the Roads Act 1993, or
(b) any environmental planning instrument, or
(c) any resolution of the council.

The land IS NOT affected by a road widening or road realignment under:
(i) Part 3 Division 2 of the Roads Act 1993
(ii) any environmental planning instrument; or
(iii) any resolution of the Council

ITEM 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).

- Council HAS adopted by resolution and in accordance with S.72 of the Environmental Planning & Assessment Act, 1979 a development control plan incorporating Council's policy on contaminated land. The Plan has been prepared substantially in accordance with State Environmental Planning Policy No. 55, and the Contaminated Land Planning Guidelines. This policy may affect development of land:

  (a) which is affected by contamination;
  (b) which has been used for certain purposes;
  (c) in respect of which there is not sufficient information about contamination;

(d) which is proposed to be used for certain purposes;
(e) in other circumstances contained in the development control plan and policy;

and in some cases may restrict the development of land.

- The land IS identified as being subject to acid sulfate soil risk under clause 6.2 of Marrickville Local Environmental Plan 2011. Development on land that is subject to acid sulphate soil risk requires development consent and the preparation of an acid sulphate soils management plan subject to a preliminary assessment of the proposed works prepared in accordance with the Acid Sulfate Soils Manual. Development consent is not required where the works involve the disturbance of less than 1 tonne of soil or are not likely to lower the watertable.

- Council HAS NOT by resolution (aside from the matters raised in the above item(s)) adopted a policy to restrict the development of the land because of the likelihood of land slip, bushfire, tidal inundation, subsidence, acid sulfate soils or any other risk (other than flooding).

- Council HAS received no notification of the type described in item 7(b) from a public authority of a policy adopted by that authority that restricts the development of the land because of land slip, bushfire, tidal inundation, subsidence, acid sulfate soils or any other risk (other than flooding).

ITEM 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.

Yes.

(2)	Whether or not development on that land or part of the land for any other purpose is subject to flood related development controls.

Yes.

(3)	Words and expressions in this clause have the same meaning as in the instrument set out in the Schedule to the *Standard Instrument (Local Environmental Plan) Order 2006.*

ITEM 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.

CURRENT ENVIRONMENTAL PLANNING INSTRUMENT:

MARRICKVILLE LOCAL ENVIRONMENTAL PLAN 2011

The land IS NOT reserved, in part or whole, for acquisition by a public authority, as referred to in section 27 of the Act, under:

(i) any environmental planning instrument
(ii) deemed environmental planning instrument; or
(iii) draft environmental planning instrument

PROPOSED ENVIRONMENTAL PLANNING INSTRUMENT:

DRAFT MARRICKVILLE LOCAL ENVIRONMENTAL PLAN 2011 AMENDMENT No. 1

There are NO proposed changes to the current Marrickville Local Environmental Plan 2011 to this land(s) for this item.

ITEM 9

Contributions plans

The name of each contributions plan applying to the land.

Marrickville Section 94 Contributions Plan 2004.

ITEM 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).

ITEM 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).

The land IS NOT land to which a biobanking agreement under Part 7A of the Threatened Species Conservation Act 1995 relates.

ITEM 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 NOT bush fire prone land.

ITEM 12

Property vegetation plans

If 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 that Act).

No.

ITEM 13

Orders 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.

ITEM 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.

ITEM 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

(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.

Item 15(a)

There IS NOT a current site compatibility certificate (seniors housing) relating to the land

Item 15(b)

There ARE NO applicable 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

ITEM 16

Site compatibility certificate 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, the 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 current site compatibility certificate (infrastructure) relating to the land

ITEM 17

Site compatibility certificate and conditions affecting 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, the 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.

(2) A statement setting out any terms of a kind referred to in clause 17 (1) or 38 (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.

Item 17(1)

There IS NOT a current site compatibility certificate (affordable rental housing) relating to the land

Item 17(2)

There ARE NO applicable terms of a kind referred to in clause 17(1) or 38(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

OTHER ITEMS (i)

Section 23 exemption or Section 24 authorisation

Whether an exemption under Section 23 or an authorisation under section 24 of the *Nation Building and Jobs Plan (State Infrastructure Delivery) Act 2009* No 1 has been issued by the Co-ordinator General in relation to the land.

An exemption under Section 23 or an authorisation under Section 24 of the Nation Building and Jobs Plan (State Infrastructure Delivery) Act 2009 No 1 HAS NOT been issued by the Co-ordinator General in relation to the land.

OTHER ITEMS (ii)

Matters arising under the Contaminated Land Management Act 1997

Section 59(2) of the *Contaminated Land Management Act 1997* prescribes the following additional matters that are 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 the 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 the 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 the Act - if a copy of such a statement has been provided at any time to the local authority issuing the certificate.

No.

ADDITIONAL INFORMATION PURSUANT TO S.149(5) OF THE ENVIRONMENTAL PLANNING AND ASSESSMENT ACT, 1979.

a) The property IS NOT listed on the State Heritage Register.

The Register is a list of places and items of State heritage significance which has been endorsed by the NSW Heritage Council and the Assistant Minister for Infrastructure and Planning (Planning Administration), and came into effect through a legislative amendment of the Heritage Act 1977 on 2 April 1999.

Further information about items on the State Heritage Register can be obtained from the NSW Heritage Office web site at www.heritage.nsw.gov.au <http://www.heritage.nsw.gov.au>

b) Australian Noise Exposure Forecast ANEF 2033:

Some land within the Marrickville Local Government area is subject to aircraft noise associated with Sydney Airport. Council has maps which indicate the land that is subject to noise exposure from aircraft and which contain information as to future levels of noise and related matters. Development within these areas may require noise and acoustic attenuation treatment. If you consider that the subject land is, or is likely to be affected by aircraft noise, or if you wish to ascertain whether the subject land is, or is likely to be affected by aircraft noise, please contact the Development and Environmental Services Division of Council on 9335 2222.

For further information concerning the Australian Noise Exposure Forecast (ANEF), as it relates to Sydney Airport and the Marrickville Local Government area please contact Airservices Australia, Customer and Community Relations, P.O. Box 211, Mascot, NSW 1460 or telephone 1300 302 240.

c) Contaminated Land:

Marrickville Development Control Plan 2011 lists sources of information for investigating potential land contamination, including information that the Council may possess. Persons should make their own enquiries in accordance with the procedures specified in Marrickville DCP. The Council can provide access to information in Council's possession in relation to the land use history for a particular parcel of land.

d) *Flooding:*

Council has undertaken a flood drainage study of the catchment area within which this property is located. The results of this study indicate that the property may be affected by local flooding arising from the surcharge of the local drainage system. Council may place restrictions on the minimum floor levels of new building works where it is considered that the flood level so requires. New building works may be required to be constructed from flood-compatible materials. Therefore, it is recommended that interested

persons make and rely upon their own enquiries as to the likelihood and extent of flooding affecting this property. Development controls and guidelines for development within flood affected areas are within section 2.22 of Marrickville Development Control Plan 2011. Further information is available from Council's Planning and Environmental Services Directorate on ph. 9335 2222.

Information provided in this planning certificate is in accordance with the matters prescribed under Schedule 4 of the Environmental Planning and Assessment Regulation 2000.

When information pursuant to Section 149 (5) is requested, the Council is under no obligation to furnish any particular information pursuant to that Section. The absence of any reference to any matters affecting the land shall not imply that the land is not affected by any matter not referred to in this Certificate.

Council draws your attention to Section 149 (6) which states that a Council shall not incur any liability in respect of any advice provided in good faith pursuant to subsection (5).

Please contact the Planning Services Section for further information about any instruments or affectations referred to in the Certificate.

MARCUS ROWAN
MANAGER, PLANNING SERVICES

APPENDIX N

SITE ASSESSMENT CRITERIA

Aargus

TABLE N1 – SOIL ASSESSMENT CRITERIA

Contaminant	Assessment Criteria (mg/kg)			Source
	HIL 'D'	HIL 'F'	NSW EPA	
Inorganics				
Arsenic	400	500	-	NEPM, 1999
Cadmium	80	100	-	NEPM, 1999
Chromium (III)	480,000	600,000	-	NEPM, 1999
Copper	4,000	5,000	-	NEPM, 1999
Lead	1,200	1,500	-	NEPM, 1999
Zinc	28,000	35,000	-	NEPM, 1999
Nickel	2400	3000	-	NEPM, 1999
Mercury	60	75	-	NEPM, 1999
Organics				
TPH/BTEX				
C_6 to C_9 Fraction	-	-	65	NSW EPA, 1994
C_{10} to C_{36}	-	-	1,000	NSW EPA, 1994
Benzene	-	-	1	NSW EPA, 1994
Toluene	-	-	1.4	NSW EPA, 1994
Ethylbenzene	-	-	3.1	NSW EPA, 1994
Total Xylenes	-	-	14	NSW EPA, 1994
PAH				
Benzo(a)pyrene	4	5	-	NEPM, 1999
Total PAH	80	100	-	NEPM, 1999
OCP				
Aldrin + Dieldrin	40	50	-	NEPM, 1999
Chlordane	200	250	-	NEPM, 1999
DDT+DDD+DD	800	1000	-	NEPM, 1999
Heptachlor	40	50	-	NEPM, 1999
PCB (Total)	40	50	-	NEPM, 1999
Total Phenols	34,000		-	NEPM, 1999
Cyanides	1,000	50	-	NEPM, 1999

TABLE N2- GROUNDWATER VALIDATION CRITERIA (GILs)

Analyte	ANZECC 2000 Freshwater 95%	ANZECC 2000 Recreational Water & Aesthetics	Dutch Intervention Value
HEAVY METALS			
Arsenic (III)	24	50	
Arsenic (V)	13	50	
Cadmium	0.2	5	
Chromium (III)	3.3[a]	-	
Chromium (VI)	1	50	
Copper	1.4	1,000	
Lead	3.4	50	
Mercury (Inorganic)	0.6	-	
Mercury (Total)	-	1	
Nickel	11	100	
Zinc	8	5,000	
TOTAL PETROLEUM HYDROCARBONS			
(C10-C36)	-	-	600
BTEX			
Benzene	950	10	
Toluene	180[a]	-	
Ethyl Benzene	80[a]	-	
Xylene (m)	75[a]	-	
Xylene (o)	350	-	
Xylene (p)	200	-	
Total Xylene	-	-	
POLYCYCLIC AROMATIC HYDROCARBONS (PAH)			
Anthracene	0.4[a]	-	
Benzo(a)pyrene	0.2[a]	0.01	
Fluoranthene	1.4[a]	-	
Naphthalene	16	-	
Phenanathrene	2[a]	-	
PAH Total	-	-	

Notes:
All units for trigger values are in µg/L
a = Interim working values (low reliability) in the absence of reliable trigger values (as referenced from the ANZECC 2000 Guidelines - Section 8.3.7).
ID = Insufficient Data to derive a reliable trigger value
'* = 99% protection level for slightly to moderately disturbed ecosystem value (as referenced from ANZECC 2000 Guidelines)

Table 1: Contaminant threshold values (CT1 & CT2) for classifying waste by chemical assessment without the leaching (TCLP) test

For disposal requirements for organic and inorganic chemical contaminants not listed below, contact DECC. Aluminium, barium, boron, chromium (0 and III oxidation states), cobalt, copper, iron, manganese, vanadium and zinc have not been listed with values in this table and need not be tested for.

	Maximum values of *specific contaminant concentration* (SCC) for classification without TCLP		
	General solid waste[1]	**Restricted solid waste**	
Contaminant	**CT1 (mg/kg)**	**CT2 (mg/kg)**	**CAS Registry Number**
Arsenic	100	400	
Benzene	10	40	71-43-2
Benzo(a)pyrene[2]	0.8	3.2	50-32-8
Beryllium	20	80	
Cadmium	20	80	
Carbon tetrachloride	10	40	56-23-5
Chlorobenzene	2000	8000	108-90-7
Chloroform	120	480	67-66-3
Chlorpyrifos	4	16	2921-88-2
Chromium (VI)[3]	100	400	
m-Cresol	4000	16000	108-39-4
o-Cresol	4000	16000	95-48-7
p-Cresol	4000	16000	106-44-5
Cresol (total)	4000	16000	1319-77-3
Cyanide (amenable)[4]	70	280	
Cyanide (total)	320	1280	
2,4-D	200	800	94-75-7
1,2-Dichlorobenzene	86	344	95-50-1
1,4-Dichlorobenzene	150	600	106-46-7
1,2-Dichloroethane	10	40	107-06-2
1,1-Dichloroethylene	14	56	75-35-4
Dichloromethane	172	688	75-09-2
2,4-Dinitrotoluene	2.6	10.4	121-14-2
Endosulfan[5]	60	240	See below[5]
Ethylbenzene	600	2400	100-41-4
Fluoride	3000	12000	
Fluroxypyr	40	160	69377-81-7

	Maximum values of *specific contaminant concentration* (SCC) for classification without TCLP		
	General solid waste[1]	Restricted solid waste	
Contaminant	CT1 (mg/kg)	CT2 (mg/kg)	CAS Registry Number
Lead	100	400	
Mercury	4	16	
Methyl ethyl ketone	4000	16000	78-93-3
Moderately harmful pesticides[6] (total)	N/A[7]	N/A[7]	See below[6]
Molybdenum	100	400	
Nickel	40	160	
Nitrobenzene	40	160	98-95-3
C6-C9 petroleum hydrocarbons	N/A[7]	N/A[7]	
C10-C36 petroleum hydrocarbons	N/A[7]	N/A[7]	
Phenol (non-halogenated)	288	1152	108-95-2
Picloram	60	240	1918-02-1
Plasticiser compounds[8]	20	80	See below[8]
Polychlorinated biphenyls	N/A[7]	N/A[7]	1336-36-3
Polycyclic aromatic hydrocarbons (total)	N/A[7]	N/A[7]	
Scheduled chemicals	N/A[7]	N/A[7]	
Selenium	20	80	
Silver	100	400	
Styrene (vinyl benzene)	60	240	100-42-5
Tebuconazole	128	512	107534-96-3
1,2,3,4-Tetrachlorobenzene	10	40	634-66-2
1,1,1,2-Tetrachloroethane	200	800	630-20-6
1,1,2,2-Tetrachloroethane	26	104	79-34-5
Tetrachloroethylene	14	56	127-18-4
Toluene	288	1152	108-88-3
1,1,1-Trichloroethane	600	2400	71-55-6
1,1,2-Trichloroethane	24	96	79-00-5
Trichloroethylene	10	40	79-01-6
2,4,5-Trichlorophenol	8000	32000	95-95-4
2,4,6-Trichlorophenol	40	160	88-06-2

	Maximum values of *specific contaminant concentration* (SCC) for classification without TCLP		
	General solid waste[1]	Restricted solid waste	
Contaminant	**CT1 (mg/kg)**	**CT2 (mg/kg)**	**CAS Registry Number**
Triclopyr	40	160	55335-06-3
Vinyl chloride	4	16	75-01-4
Xylenes (total)	1000	4000	1330-20-7

Notes

1. Values are the same for both general solid waste (putrescible) and general solid waste (non-putrescible).

2. There may be a need for the laboratory to concentrate the sample to achieve the TCLP limit value for benzo(a)pyrene with confidence.

3. These limits apply to chromium in the +6 oxidation state only.

4. Analysis for cyanide (amenable) is the established method for assessing potentially leachable cyanide. DECC may consider other methods if it can be demonstrated that these methods yield the same information.

5. Endosulfan (CAS Registry Number 115-29-7) means the total of Endosulfan I (CAS Registry Number 959-98-8), Endosulfan II (CAS Registry Number 891-86-1) and Endosulfan sulfate (CAS Registry Number 1031-07-8).

6. The following moderately harmful pesticides (CAS Registry Number) are to be included in the total values specified:

   Atrazine (1912-24-9), Azoxystrobin (131860-33-8), Bifenthrin (82657-04-3), Brodifacoum (56073-10-0), Carboxin (5234-68-4), Copper naphthenate (1338-02-9), Cyfluthrin (68359-37-5), Cyhalothrin (68085-85-8), Cypermethrin (52315-07-08), Deltamethrin (52918-63-5), Dichlofluanid (1085-98-9), Dichlorvos (62-73-7), Difenoconazole (119446-68-3), Dimethoate (60-51-5), Diquat dibromide (85-00-7), Emamectin benzoate (137515-75-4 & 155569-91-8), Ethion (563-12-2), Fenthion (55-38-9), Fenitrothion (122-14-5), Fipronil (120068-37-3), Fluazifop-P-butyl (79241-46-6), Fludioxonil (131341-86-1), Glyphosate (1071-83-6), Imidacloprid (138261-41-3), Indoxacarb (173584-44-6), Malathion (Maldison) (121-75-5), Metalaxyl (57837-19-1), Metalaxyl-M (70630-17-0), Methidathion (950-37-8), 3-Methyl-4-chlorophenol (59-50-7), Methyl chlorpyrifos (5598-13-0), N-Methyl pyrrolidone (872-50-4), 2-octylthiazol-3-one (26530-20-1), Oxyfluorfen (42874-03-3), Paraquat dichloride (1910-42-5), Parathion methyl (298-00-0), Permethrin (52645-53-1), Profenofos (41198-08-7), Prometryn (7287-19-6), Propargite (2312-35-8), Pentachloronitrobenzene (Quintozene) (82-68-8), Simazine (122-34-9), Thiabendazole (148-79-8),Thiamethoxam (153719-23-4), Thiodicarb (59669-26-0) and Thiram (137-26-8).

7. N/A means not applicable, because these contaminants are only assessed using SCC - see Table 2 for SCC criteria.

8. Plasticiser compounds means the total of di-2-ethyl hexyl phthalate (CAS Registry Number 117-81-7) and di-2-ethyl hexyl adipate (CAS Registry Number 103-23-1) contained within a waste.

Table 2: Leachable concentration (TCLP) and specific contaminant concentration (SCC) values for classifying waste by chemical assessment

For disposal requirements for organic and inorganic chemical contaminants not listed below, contact DECC. Aluminium, barium, boron, chromium (0 and III oxidation states), cobalt, copper, iron, manganese, vanadium and zinc have not been listed with values in this table and need not be tested for.

	Maximum values for *leachable concentration* and *specific contaminant concentration* when used together				
	General solid waste[1]		**Restricted solid waste**		
Contaminant	**Leachable concentration**	**Specific contaminant concentration**	**Leachable concentration**	**Specific contaminant concentration**	**CAS Registry Number**
	TCLP1 (mg/L)	**SCC1 (mg/kg)**	**TCLP2 (mg/L)**	**SCC2 (mg/kg)**	
Arsenic	5.0[2]	500	20	2000	
Benzene	0.5[2]	18	2	72	71-43-2
Benzo(a)pyrene[3]	0.04[4]	10	0.16	23	50-32-8
Beryllium	1.0[5]	100	4	400	
Cadmium	1.0[2]	100	4	400	
Carbon tetrachloride	0.5[2]	18	2	72	56-23-5
Chlorobenzene	100[2]	3600	400	14400	108-90-7
Chloroform	6[2]	216	24	864	67-66-3
Chlorpyrifos	0.2	7.5	0.8	30	2921-88-2
Chromium (VI)[6]	5[2]	1900	20	7600	
m-Cresol	200[2]	7200	800	28800	108-39-4
o-Cresol	200[2]	7200	800	28800	95-48-7
p-Cresol	200[2]	7200	800	28800	106-44-5
Cresol (total)	200[2]	7200	800	28800	1319-77-3
Cyanide (amenable)[7, 8]	3.5[7]	300	14	1200	
Cyanide (total)[7]	16[7]	5900	64	23600	
2,4-D	10[2]	360	40	1440	94-75-7
1,2-Dichlorobenzene	4.3[2]	155	17.2	620	95-50-1
1,4-Dichlorobenzene	7.5[2]	270	30	1080	106-46-7
1,2-Dichloroethane	0.5[2]	18	2	72	107-06-2
1,1-Dichloro-ethylene	0.7[2]	25	2.8	100	75-35-4
Dichloromethane	8.6[2]	310	34.4	1240	75-09-2

	Maximum values for *leachable concentration* and *specific contaminant concentration* when used together				
	General solid waste[1]		Restricted solid waste		
Contaminant	Leachable concentration	Specific contaminant concentration	Leachable concentration	Specific contaminant concentration	CAS Registry Number
	TCLP1 (mg/L)	SCC1 (mg/kg)	TCLP2 (mg/L)	SCC2 (mg/kg)	
2,4-Dinitrotoluene	0.13[2]	4.68	0.52	18.7	121-14-2
Endosulfan[9]	3	108	12	432	See below[9]
Ethylbenzene	30[10]	1080	120	4320	100-41-4
Fluoride	150[10]	10000	600	40000	
Fluroxypyr	2	75	8	300	69377-81-7
Lead	5[2]	1500	20	6000	
Mercury	0.2[2]	50	0.8	200	
Methyl ethyl ketone	200[2]	7200	800	28800	78-93-3
Moderately harmful pesticides[11](total)	N/A[12]	250	N/A[12]	1000	See below[11]
Molybdenum	5[10]	1000	20	4000	
Nickel	2[10]	1050	8	4200	
Nitrobenzene	2[2]	72	8	288	98-95-3
C6-C9 petroleum hydrocarbons[13]	N/A[12]	650	N/A[12]	2600	
C10-C36 petroleum hydrocarbons[13]	N/A[12]	10000	N/A[12]	40000	
Phenol (non-halogenated)	14.4[14]	518	57.6	2073	108-95-2
Picloram	3	110	12	440	1918-02-1
Plasticiser compounds[15]	1	600	4	2400	See below[15]
Polychlorinated biphenyls[12]	N/A[12]	< 50	N/A[12]	< 50	1336-36-3
Polycyclic aromatic hydrocarbons (total)[16]	N/A[12]	200	N/A[12]	800	
Scheduled chemicals[17]	N/A[12]	< 50	N/A[12]	< 50	See below[17]
Selenium	1[2]	50	4	200	

	Maximum values for *leachable concentration* and *specific contaminant concentration* when used together				
	General solid waste[1]		Restricted solid waste		
Contaminant	Leachable concentration	Specific contaminant concentration	Leachable concentration	Specific contaminant concentration	CAS Registry Number
	TCLP1 (mg/L)	SCC1 (mg/kg)	TCLP2 (mg/L)	SCC2 (mg/kg)	
Silver	5.0[2]	180	20	720	
Styrene (vinyl benzene)	3[10]	108	12	432	100-42-5
Tebuconazole	6.4	230	25.6	920	107534-96-3
1,2,3,4-Tetrachloro-benzene	0.5	18	2	72	634-66-2
1,1,1,2-Tetrachloro-ethane	10[2]	360	40	1440	630-20-6
1,1,2,2-Tetrachloro-ethane	1.3[2]	46.8	5.2	187.2	79-34-5
Tetrachloro-ethylene	0.7[2]	25.2	2.8	100.8	127-18-4
Toluene	14.4[14]	518	57.6	2073	108-88-3
1,1,1-Trichloroethane	30[2]	1080	120	4320	71-55-6
1,1,2-Trichloroethane	1.2[2]	43.2	4.8	172.8	79-00-5
Trichloroethylene	0.5[2]	18	2	72	79-01-6
2,4,5-Trichlorophenol	400[2]	14400	1600	57600	95-95-4
2,4,6-Trichlorophenol	2[2]	72	8	288	88-06-2
Triclopyr	2	75	8	300	55335-06-3
Vinyl chloride	0.2[2]	7.2	0.8	28.8	75-01-4
Xylenes (total)	50[18]	1800	200	7200	1330-20-7

Notes

1. Values are the same for general solid waste (putrescible) and general solid waste (non-putrescible).

2. See *Hazardous Waste Management System: Identification and Listing of Hazardous Waste – Toxicity Characteristics Revisions, Final Rule* (USEPA 1990) for TCLP levels.

3. There may be a need for the laboratory to concentrate the sample to achieve the TCLP limit value for benzo(a)pyrene with confidence.

4. Calculated from *Hazardous Waste: Identification and Listing – Proposed Rule* (USEPA 1995)

5. Calculated from 'Beryllium' in *The Health Risk Assessment and Management of Contaminated Sites* (DiMarco & Buckett 1996)

6. These limits apply to chromium in the +6 oxidation state only.

7. Taken from the *Land Disposal Restrictions for Newly Identified and Listed Hazardous Wastes and Hazardous Soil: Proposed Rule* (USEPA 1993)

8. Analysis for cyanide (amenable) is the established method used to assess the potentially leachable cyanide. DECC may consider other methods if it can be demonstrated that these methods yield the same information.

9. Endosulfan (CAS Registry Number 115-29-7) means the total of Endosulfan I (CAS Registry Number 959-98-8), Endosulfan II (CAS Registry Number 891-86-1) and Endosulfan sulfate (CAS Registry Number 1031-07-8).

10. Calculated from *Australian Drinking Water Guidelines* (NHMRC 1994)

11. The following moderately harmful pesticides (CAS Registry Number) are to be included in the total values specified:

    Atrazine (1912-24-9), Azoxystrobin (131860-33-8), Bifenthrin (82657-04-3), Brodifacoum (56073-10-0), Carboxin (5234-68-4), Copper naphthenate (1338-02-9), Cyfluthrin (68359-37-5), Cyhalothrin (68085-85-8), Cypermethrin (52315-07-08), Deltamethrin (52918-63-5), Dichlofluanid (1085-98-9), Dichlorvos (62-73-7), Difenoconazole (119446-68-3), Dimethoate (60-51-5), Diquat dibromide (85-00-7), Emamectin benzoate (137515-75-4 & 155569-91-8), Ethion (563-12-2), Fenthion (55-38-9), Fenitrothion (122-14-5), Fipronil (120068-37-3), Fluazifop-P-butyl (79241-46-6), Fludioxonil (131341-86-1), Glyphosate (1071-83-6), Imidacloprid (138261-41-3), Indoxacarb (173584-44-6), Malathion (Maldison) (121-75-5), Metalaxyl (57837-19-1), Metalaxyl-M (70630-17-0), Methidathion (950-37-8), 3-Methyl-4-chlorophenol (59-50-7), Methyl chlorpyrifos (5598-13-0), N-Methyl pyrrolidone (872-50-4), 2-octylthiazol-3-one (26530-20-1), Oxyfluorfen (42874-03-3), Paraquat dichloride (1910-42-5), Parathion methyl (298-00-0), Permethrin (52645-53-1), Profenofos (41198-08-7), Prometryn (7287-19-6), Propargite (2312-35-8), Pentachloronitrobenzene (Quintozene) (82-68-8), Simazine (122-34-9), Thiabendazole (148-79-8),Thiamethoxam (153719-23-4), Thiodicarb (59669-26-0) and Thiram (137-26-8).

12. No TCLP analysis is required. Moderately harmful pesticides, petroleum hydrocarbons, polychlorinated biphenyls, polycyclic aromatic hydrocarbons and scheduled chemicals are assessed using SCC1 and SCC2.

13. Approximate range of petroleum hydrocarbon fractions: petrol C6-C9, kerosene C10-C18, diesel C12-C18, and lubricating oils above C18. Laboratory results are reported as four different fractions: C6-C9, C10-C14, C15-C28 and C29-C36. The results of total petroleum hydrocarbons (C10-C36) analyses are reported as a sum of the relevant three fractions. Please note that hydrocarbons are defined as molecules that only contain carbon and hydrogen atoms. Prior to TPH (C10-C36) analysis, cleanup may be necessary to remove non-petroleum hydrocarbon compounds. Where the presence of other materials that will interfere with the analysis may be present, such as oils and fats from food sources, you are advised to treat the extract that has been solvent exchanged to hexane with silica gel as described in *USEPA Method 1664A* (USEPA 1999).

14. Proposed level for phenol and toluene in *Hazardous Waste Management System: Identification and Listing of Hazardous Waste – Toxicity Characteristics Revisions, Final Rule* (USEPA 1990)

15. Plasticiser compounds means the total of di-2-ethyl hexyl phthalate (CAS Registry Number 117-81-7) and di-2-ethyl hexyl adipate (CAS Registry Number 103-23-1) contained within a waste.

16. The following polycyclic aromatic hydrocarbons (CAS number) are assessed as the total concentration of 16 USEPA Priority Pollutant PAHs, as follows:

Polycyclic aromatic hydrocarbons (total)			
PAH name	**CAS Registry Number**	**PAH name**	**CAS Registry Number**
Acenaphthene	83-32-9	Chrysene	218-01-9
Acenaphthylene	208-96-8	Dibenzo(a,h)anthracene	53-70-3
Anthracene	120-12-7	Fluoranthene	206-44-0
Benzo(a)anthracene	56-55-3	Fluorene	86-73-7
Benzo(a)pyrene	50-32-8	Indeno(1,2,3-cd)pyrene	193-39-5
Benzo(b)fluoranthene	205-99-2	Naphthalene	91-20-3
Benzo(ghi)perylene	191-24-2	Phenanthrene	85-01-8
Benzo(k)fluoranthene	207-08-9	Pyrene	129-00-0

17. The following Scheduled Chemicals (CAS Registry Number) are to be included in the total values specified:

    Aldrin (309-00-2), Alpha-BHC (319-84-6), Beta-BHC (319-85-7), Gamma-BHC (Lindane) (58-89-9), Delta-BHC (319-86-8), Chlordane (57-74-9), DDD (72-54-8), DDE (72-55-9), DDT (50-29-3), Dieldrin (60-57-1), Endrin (72-20-8), Endrin aldehyde (7421-93-4), Heptachlor (76-44-8), Heptachlor epoxide (1024-57-3), Hexachlorobenzene (118-74-1), Hexachlorophene (70-30-4), Isodrin (465-73-6), Pentachlorobenzene (608-93-5), Pentachloronitrobenzene (82-68-8), Pentachlorophenol (87-86-5), 1,2,4,5-Tetrachlorobenzene (95-94-3), 2,3,4,6 Tetrachlorophenol (58-90-2), 1,2,4-Trichlorobenzene (120-82-1), 2,4,5-Trichlorophenoxyacetic acid, salts and esters (93-76-5).

18. Calculated from *Guidelines for Drinking Water Quality* (WHO 1993)

Table 3: Summary of criteria for chemical assessment to determine waste classification

Waste classification[1]	Criteria[2] for classification by chemical assessment (any of the alternative options given)	Comments
General solid waste	1. SCC test values ≤ CT1	TCLP test not required
	2. TCLP test values ≤ TCLP1 and SCC test values ≤ SCC1	
	3. TCLP test values ≤ TCLP1 and SCC test values > SCC1 and DECC approves immobilisation[3]	Without DECC approval of immobilisation, classify as restricted solid or hazardous (as applicable)
Restricted solid waste	1. SCC test values ≤ CT2	TCLP test not required
	2. TCLP1 < TCLP test values ≤ TCLP2 and SCC test values ≤ SCC2	
	3.TCLP test values ≤ TCLP2 and SCC1 < SCC test values ≤ SCC2	
	4. TCLP1 < TCLP test values ≤ TCLP2 and SCC test values > SCC2 and DECC approves immobilisation[3]	Without DECC approval of immobilisation, classify as hazardous
Hazardous waste	1. TCLP test values > TCLP 2	
	2. TCLP test values ≤ TCLP2 and SCC test values > SCC2 and no DECC approval for immobilisation	

Notes:
1. See also the general waste classification principles on page 2 for other criteria that must be satisfied before the waste can be classified.
2. These criteria apply to each toxic and ecotoxic contaminant present in the waste (see Tables 1 and 2).
3. In certain cases DECC will consider specific conditions, such as segregation of the waste from all other types of waste in a monofill or monocell in order to achieve a greater margin of safety against a possible failure of the immobilisation in the future. Information about the construction and operation of a monofill/monocell is available in the *Draft Environmental Guidelines for Industrial Waste Landfilling* (EPA 1998).

APPENDIX O

FIELD RECORDS FORMS

Aargus

GROUNDWATER MONITORING RECORD FORM

PROJECT INFORMATION			
Client:	E & D Danias	Monitoring Well ID:	BH1 / GW1
Site Address:	Rich St Marrickville	Logged By:	M.S
Project:	TESA ES5544	Date:	8/8/13

MONITORING WELL DETAILS			
Depth (m) as constructed:	5.5m BGL	Depth (m) as measured:	5.25m BGL
Finish:	Gatic	Co-ordinates:	
Condition:	Good	Surveyed Levels:	

METHODOLOGY AND EQUIPMENT			
Water Measurement Device:	Dip Meter	Reference Point:	Top of Gatic
Water Quality Meter:	YSI	Reference Point to Ground Surface (mm):	"
GW Extraction Method:	Auto Bailer		

GROUNDWATER GAUGING (PRE-PURGE)		GROUNDWATER GAUGING (POST-PURGE)	
SWL (m bgl):	1.3m BGL	SWL (m bgl):	3.32m BGL
Depth to Product (m bgl):	N/A	Depth to Product (m bgl):	N/A
Product Thickness (mm):	"	Product Thickness (mm):	"
Time:	11:10am	Time:	11:30am

PURGING AND PHYSICO-CHEMICAL PARAMETERS

Time	Volume Purged	Pump Rate (mL/min)	Temperature (°C)	DO (mg/L)	pH (pH units)	EC (µS/cm)	Redox Potential (mV)
11:15	3L	Low	16.6	3.08	6.97	1087	-50.7
11:28	3L	"	17.8	1.80	7.16	556	-78
11:27	3L	"	17.6	3.31	7.19	986	-70
Stabilisation Criteria			± 0.2 °C	± 0.2 mg/L	± 0.1 pH units	± 5%	± 10 mV

OBSERVATIONS			
Odour:	No	Sheen:	No
Colour / Turbidity:	Light brown / Turbidity	Recent Rain (Days):	Yes

SAMPLING							
Samples Taken:	Primary	✓	Blind	—	Split	✓	Rinsate — TS/TB
Containers:	4						
Field Filtered:	No						
Preservation:	Yes						

Record Checked by:		Document Version:	0
Date:		Updated:	7/2/13

Aargus

GROUNDWATER MONITORING RECORD FORM

PROJECT INFORMATION			
Client:	EED Damas	Monitoring Well ID:	GW2 / BH7
Site Address:	Rich St Marrickville NSW	Logged By:	M·S
Project:	TESA / ES5544	Date:	8/8/13

MONITORING WELL DETAILS			
Depth (m) as constructed:	8·5m BGL	Depth (m) as measured:	8·45 BGL
Finish:	Gatic	Co-ordinates:	
Condition:	Good	Surveyed Levels:	

METHODOLOGY AND EQUIPMENT			
Water Measurement Device:	~~YSI~~ Dip Meter	Reference Point:	Top of Gatic
Water Quality Meter:	YSI	Reference Point to Ground Surface (mm):	Top of Gatic
GW Extraction Method:	Auto - Bailer		

GROUNDWATER GAUGING (PRE-PURGE)		GROUNDWATER GAUGING (POST-PURGE)	
SWL (m bgl):	1·77m BGL	SWL (m bgl):	3.43m BGL
Depth to Product (m bgl):	N/A	Depth to Product (m bgl):	0.0
Product Thickness (mm):	N/A	Product Thickness (mm):	0.0
Time:	10·27 am	Time:	10·48am

PURGING AND PHYSICO-CHEMICAL PARAMETERS							
Time	Volume Purged	Pump Rate (mL/min)	Temperature (°C)	DO (mg/L)	pH (pH units)	EC (µS/cm)	Redox Potential (mV)
10·30	3L	Low					
10·33	3L	"					
10·37	3L	"		YSI meter not working			
10·40	3L	"		needs batteries, will get			
				before next hole/well			
		Stabilisation Criteria	± 0.2 °C	± 0.2 mg/L	± 0.1 pH units	± 5%	± 10 mV

OBSERVATIONS			
Odour:	Nil	Sheen:	No
Colour / Turbidity:	Brown	Recent Rain (Days):	Yes

SAMPLING							
Samples Taken:	Primary	1	Blind	—	Split	—	Rinsate —	TS/TB —
Containers:	4						
Field Filtered:	No						
Preservation:	Yes						

Record Checked by:		Document Version:	0
Date:		Updated:	7/2/13

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GROUNDWATER MONITORING RECORD FORM

PROJECT INFORMATION			
Client:	E & O Danias	Monitoring Well ID:	GW3 / BH9
Site Address:	Rich St Marrickville	Logged By:	M·S
Project:	TESA ES6544	Date:	8/8/13

MONITORING WELL DETAILS			
Depth (m) as constructed:	9·5 BGL	Depth (m) as measured:	9·6m BGL
Finish:	Gatic	Co-ordinates:	
Condition:	Good	Surveyed Levels:	

METHODOLOGY AND EQUIPMENT			
Water Measurement Device:	Dip Meter	Reference Point:	Top of Gatic
Water Quality Meter:	YSI	Reference Point to Ground Surface (mm):	"
GW Extraction Method:	Auto Bailer		

GROUNDWATER GAUGING (PRE-PURGE)		GROUNDWATER GAUGING (POST-PURGE)	
SWL (m bgl):	1.55m	SWL (m bgl):	4.6m BGL
Depth to Product (m bgl):	N/I	Depth to Product (m bgl):	N/I
Product Thickness (mm):	N/I	Product Thickness (mm):	N/I
Time:	12·20pm	Time:	1·00pm

PURGING AND PHYSICO-CHEMICAL PARAMETERS

Time	Volume Purged	Pump Rate (mL/min)	Temperature (°C)	DO (mg/L)	pH (pH units)	EC (µS/cm)	Redox Potential (mV)
12·25pm	3L	Low	18·2	4·04	7·16	4082	22·3
12·27pm	3L	"	18·8	3·34	7·17	4478	26·8
12·32pm	3L	"	19·7	3·40	7·16	4405	26·8
12·38pm	3L	"	20.2	4·21	7·10	8028	27·4
Stabilisation Criteria			± 0.2 °C	± 0.2 mg/L	± 0.1 pH units	± 5%	± 10 mV

OBSERVATIONS			
Odour:	No	Sheen:	No
Colour / Turbidity:	Light brown	Recent Rain (Days):	Yes

SAMPLING							
Samples Taken:	Primary	/	Blind	—	Split	—	Rinsate —	TS/TB —
Containers:	4						
Field Filtered:	No						
Preservation:	Yes						

Record Checked by:		Document Version:	0
Date:		Updated:	7/2/13

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WELL CONSTRUCTION AND DEVELOPMENT RECORD FORM

PROJECT INFORMATION			
Client:	Danias	Monitoring Well ID:	BH1 / GW1
Site Address:	Rich St Mamichville	Logged By:	M.S
Project:	TESA	Date:	24/7/13

WELL CONSTRUCTION DETAILS			
Total Bore Depth (m):	5.5m	Screening Zone (m bgl):	~~5.5~~ 2.5–5.5
Borehole Diameter:	200mm	Finish:	Gatic
Standpipe Diameter:	60mm	Coordinates:	

METHODOLOGY AND EQUIPMENT			
Water Measurement Device:	Dip Meter	Reference Point:	Top of Gatic
Groundwater Extraction Method:	Hand Bail	Reference Point to Ground Surface (mm):	

GROUNDWATER GAUGING (PRE-DEVELOPMENT)		GROUNDWATER GAUGING (POST-DEVELOPMENT)	
SWL (m bgl):	~~4.7m~~ 4.1	SWL (m bgl):	~~3.1m~~ 4.7
Depth to Product (m bgl):		Depth to Product (m bgl):	
Product Thickness (mm):		Product Thickness (mm):	
Time:	1035	Time:	10.50
		Total GW Volume Extracted (L):	10L

OBSERVATIONS (PRE-DEVELOPMENT)		OBSERVATIONS (POST-DEVELOPMENT)	
Odour:	~~Nil~~ Nil	Odour:	~~Nil~~ Nil
Sheen:	~~No~~ Yes	Sheen:	~~No~~ Yes
Colour:	~~Brown / clear~~ Clear / Brown	Colour:	Brown / clear ✓
Turbidity:	~~Yes~~ Yes	Turbidity:	~~Yes~~ ✓
Other:		Other:	

Record Checked by:		Document Version:	0
Date:		Updated:	10/1/13

Aargus

WELL CONSTRUCTION AND DEVELOPMENT RECORD FORM

PROJECT INFORMATION			
Client:	Danias	Monitoring Well ID:	GW2 / BH7
Site Address:	Rich St, Marrickville	Logged By:	M.S
Project:	TESA	Date:	24/7/13

WELL CONSTRUCTION DETAILS			
Total Bore Depth (m):	8.5 BGL	Screening Zone (m bgl):	2.5-8.5m
Borehole Diameter:	200mm	Finish:	Gatic
Standpipe Diameter:	60mm	Coordinates:	

METHODOLOGY AND EQUIPMENT			
Water Measurement Device:	Dip Meter	Reference Point:	Top of Gatic
Groundwater Extraction Method:	Hand Bail	Reference Point to Ground Surface (mm):	

GROUNDWATER GAUGING (PRE-DEVELOPMENT)		GROUNDWATER GAUGING (POST-DEVELOPMENT)	
SWL (m bgl):	1.7	SWL (m bgl):	3.1
Depth to Product (m bgl):		Depth to Product (m bgl):	
Product Thickness (mm):		Product Thickness (mm):	
Time:	10.10	Time:	10.30
		Total GW Volume Extracted (L):	10L

OBSERVATIONS (PRE-DEVELOPMENT)		OBSERVATIONS (POST-DEVELOPMENT)	
Odour:	Nil	Odour:	Nil
Sheen:	No	Sheen:	No
Colour:	Brown / Light	Colour:	Light brown
Turbidity:	Yes	Turbidity:	Yes
Other:		Other:	

Record Checked by:		Document Version:	0
Date:		Updated:	10/1/13

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WELL CONSTRUCTION AND DEVELOPMENT RECORD FORM

PROJECT INFORMATION			
Client:	Denias	Monitoring Well ID:	GW3/BH9
Site Address:	Rich St Marrickville	Logged By:	M-S
Project:	TESA	Date:	25/7/13

WELL CONSTRUCTION DETAILS			
Total Bore Depth (m):	9.5 BGL	Screening Zone (m bgl):	6.5 - 9.5m
Borehole Diameter:	200mm	Finish:	Gatic
Standpipe Diameter:	60mm	Coordinates:	

METHODOLOGY AND EQUIPMENT			
Water Measurement Device:	Dip Meter	Reference Point:	Top of Gatic
Groundwater Extraction Method:	Hand Bail	Reference Point to Ground Surface (mm):	

GROUNDWATER GAUGING (PRE-DEVELOPMENT)		GROUNDWATER GAUGING (POST-DEVELOPMENT)	
SWL (m bgl):	1.6	SWL (m bgl):	5.2m
Depth to Product (m bgl):		Depth to Product (m bgl):	
Product Thickness (mm):		Product Thickness (mm):	
Time:	11.00	Time:	11.10 am
		Total GW Volume Extracted (L):	10L

OBSERVATIONS (PRE-DEVELOPMENT)		OBSERVATIONS (POST-DEVELOPMENT)	
Odour:	No	Odour:	No
Sheen:	No	Sheen:	No
Colour:	Clear	Colour:	Clear
Turbidity:	No	Turbidity:	No
Other:		Other:	

Aargus Pty Ltd

Sampling & Monitoring Details for Individual Determinants

Location/Address: Rich St, Marrickville NSW
Name of Officer Responsible: Michael Sills
Title of Officer Responsible: Enviro Scientist
Phone: _____ Fax: _____
Mobile: 0425 344 390 Other: _____

Other persons involved in inspection & monitoring (including laboratories, passed on information, electronic readings, etc) Terratest Drillers / Rig Labs

Date of Inspection: 23/1/13 Time of Start: 7.00am Finish: 4.30pm
Description of Weather: Fine Wind Direction: _____
Wind Speed: — Rainfall(mm): _____ Humidity: —

Odours present Y/N Location: _____ Time: _____
Odours spraying Y/N Location: _____ Time: _____
Environmental &/or other accidents/concerns:(details)

- TESA
- 11 locations (10 done) 1 to do tomorrow
- QA/QC

Actions:

Stormwater controls Y/N Location(s): Time:
Dust suppression Y/N Location(s): Time:
Traffic control Y/N Location(s): Time:
Equipment on site:
Drill Rig
Well Material
Jars
QA/QC
OH & S gear

Truck movement tally: N/A

Field Measurements None done

Location	PID level	Location	PID level	Location	PID level	Location	PID level
Location	PID level	Location	PID level	Location	PID level	Location	PID level
Location	PID level	Location	PID level	Location	PID level	Location	PID level
Location	PID level	Location	PID level	Location	PID level	Location	PID level
Location	PID level	Location	PID level	Location	PID level	Location	PID level
Location	Other	Location	Other	Location	Other	Location	Other
Location	Other	Location	Other	Location	Other	Location	Other
Location	Other	Location	Other	Location	Other	Location	Other
Location	Other	Location	Other	Location	Other	Location	Other

Aargus Pty Ltd

Sampling & Monitoring Details for Individual Determinants

Location/Address: Rich St Marrickville
Name of Officer Responsible: Michael Silk
Title of Officer Responsible: Enviro Sci
Phone: _____ Fax: _____
Mobile: 0425 344 390 Other: _____

Other persons involved in inspection & monitoring (including laboratories, passed on information, electronic readings, etc) Groundswell

Date of Inspection: 8/8/13 Time of Start: 10.0am Finish: 2pm
Description of Weather: Raining Wind Direction: —
Wind Speed: — Rainfall(mm): _____ Humidity: —

Odours present Y/(N) Location: _____ Time: _____
Odours spraying Y/(N) Location: _____ Time: _____
Environmental &/or other accidents/concerns:(details)

- Sampled 3 GW wells
- Used auto-bailer
- YSI did not work for GW2 (first well) no batteries, got some & used for GW1 & GW3

Actions:

Stormwater controls Y/(N) Location(s): _____ Time: _____
Dust suppression Y/(N) Location(s): _____ Time: _____
Traffic control Y/(N) Location(s): _____ Time: _____
Equipment on site: _____

- Auto-bailer
- Tubing
- Esky
-

Truck movement tally: N/A

Field Measurements N/A

Location	PID level	Location	PID level	Location	PID level	Location	PID level
Location	PID level	Location	PID level	Location	PID level	Location	PID level
Location	PID level	Location	PID level	Location	PID level	Location	PID level
Location	PID level	Location	PID level	Location	PID level	Location	PID level
Location	PID level	Location	PID level	Location	PID level	Location	PID level
Location	Other	Location	Other	Location	Other	Location	Other
Location	Other	Location	Other	Location	Other	Location	Other
Location	Other	Location	Other	Location	Other	Location	Other
Location	Other	Location	Other	Location	Other	Location	Other

APPENDIX P

QA/QC

Aargus

Contents
Field Duplicates

SOIL

Table I - Intra & Inter Laboratory Samples

SDG	25/07/2013	25/07/2013		25/07/2013	25/07/2013		25/07/2013	Interlab_D	
Field_ID	BH1_0.5-0.7	D1	RPD	BH7_0.4-0.6	D2	RPD	BH1_0.5-0.7	SS1	RPD
Sampled_Date-Time	23/07/2013	23/07/2013		23/07/2013	23/07/2013		23/07/2013	23/07/2013	
Filter	**Chem_Group**	**ChemName**	**Units**	**EQL**									
BTEX	BTEX	Benzene	mg/kg	0.1	<0.1	<0.1	0	**0.2**	**<0.1**	**67**	<0.1	<0.1	0
BTEX		Ethylbenzene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0
BTEX		Toluene	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0
BTEX		Xylene (m & p)	mg/kg	0.2	<0.2	<0.2	0	<0.2	<0.2	0	<0.2	<0.2	0
BTEX		Xylene (o)	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0
BTEX		Xylene Total	mg/kg	0.3	<0.3	<0.3	0	<0.3	<0.3	0	<0.3	<0.3	0
BTEX		C6-C10 less BTEX (F1)	mg/kg	20	<20.0	<20.0	0	<20.0	<20.0	0	<20.0	<20.0	0
BTEX													
Halogenated Phenols	Halogenated Phenols	2,4,5-trichlorophenol	mg/kg	0.5 (Primary): 1 (Interlab	<0.5	<0.5	0				<0.5	<1.0	0
Halogenated Phenols		2,4,6-trichlorophenol	mg/kg	0.5 (Primary): 1 (Interlab	<0.5	<0.5	0				<0.5	<1.0	0
Halogenated Phenols		2,4-dichlorophenol	mg/kg	0.5	<0.5	<0.5	0				<0.5	<0.5	0
Halogenated Phenols		2-chlorophenol	mg/kg	0.5	<0.5	<0.5	0				<0.5	<0.5	0
Halogenated Phenols		Pentachlorophenol	mg/kg	1	<1.0	<1.0	0				<1.0	<1.0	0
Halogenated Phenols													
Inorganics	Inorganics	Ammonia as N	mg/kg	0.1				**0.3**	**1.0**	**108**			
Inorganics		Moisture Content (dried @ 103°C)	%	0.1	9.8	9.4	4	**12.0**	**25.0**	**70**	9.8	10.0	2
Inorganics		Sulphate as S	mg/kg	10				<10.0	<10.0	0			
Inorganics													
Lead	Lead	Lead	mg/kg	5	**28.0**	**120.0**	**124**	**43.0**	**100.0**	**80**	28.0	29.0	4
Lead													
Metals	Metals	Aluminium	mg/kg	10	**8300.0**	**2700.0**	**102**	8000.0	7800.0	3	8300.0	7300.0	13
Metals		Arsenic	mg/kg	2	5.0	3.2	44	**4.2**	**7.4**	**55**	**5.0**	**<2.0**	**86**
Metals		Cadmium	mg/kg	0.4	**14.0**	**6.7**	**71**	0.4	<0.4	0	14.0	11.0	24
Metals		Chromium (III+VI)	mg/kg	5	**13.0**	**7.7**	**51**	12.0	16.0	29	13.0	17.0	27
Metals		Copper	mg/kg	5	47.0	41.0	14	**21.0**	**49.0**	**80**	47.0	54.0	14
Metals		Iron	mg/kg	5	**26000.0**	**9100.0**	**96**	26000.0	17000.0	42	26000.0	18000.0	36
Metals		Manganese	mg/kg	5	**420.0**	**190.0**	**75**	190.0	150.0	24	420.0	520.0	21
Metals		Mercury	mg/kg	0.05 (Primary): 0.1 (Inter	0.26	0.19	31	**0.09**	**<0.05**	**57**	0.26	0.2	26
Metals		Nickel	mg/kg	5	9.0	5.9	42	**<5.0**	**11.0**	**75**	9.0	9.4	4
Metals		Tin	mg/kg	10	<10.0	<10.0	0	<10.0	<10.0	0	<10.0	<10.0	0
Metals		Zinc	mg/kg	5	400.0	330.0	19	**69.0**	**130.0**	**61**	400.0	560.0	33
Metals													
PAH	PAH	Benzo[b+j]fluoranthene	mg/kg	0.5	<0.5	<0.5	0	<0.5	0.7	33	<0.5	<0.5	0
PAH													
PAH/Phenols	PAH/Phenols	2,4-dimethylphenol	mg/kg	0.5	<0.5	<0.5	0				<0.5	<0.5	0
PAH/Phenols		2-methylphenol	mg/kg	0.5 (Primary): 0.2 (Interla	<0.5	<0.5	0				<0.5	<0.2	0
PAH/Phenols		2-nitrophenol	mg/kg	0.5 (Primary): 1 (Interlab	<0.5	<0.5	0				<0.5	<1.0	0
PAH/Phenols		3-&4-methylphenol	mg/kg	1 (Primary): 0.4 (Interlab	<1.0	<1.0	0				<1.0	<0.4	0
PAH/Phenols		4-chloro-3-methylphenol	mg/kg	0.5 (Primary): 1 (Interlab	<0.5	<0.5	0				<0.5	<1.0	0
PAH/Phenols		Acenaphthene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0
PAH/Phenols		Acenaphthylene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0
PAH/Phenols		Anthracene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0
PAH/Phenols		Benz(a)anthracene	mg/kg	0.5	<0.5	<0.5	0	**<0.5**	**0.9**	**57**	<0.5	<0.5	0
PAH/Phenols		Benzo(a) pyrene	mg/kg	0.5	<0.5	<0.5	0	<0.5	0.8	46	<0.5	<0.5	0
PAH/Phenols		Benzo(g,h,i)perylene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0
PAH/Phenols		Benzo(k)fluoranthene	mg/kg	0.5	<0.5	<0.5	0	<0.5	0.5	0	<0.5	<0.5	0
PAH/Phenols		Chrysene	mg/kg	0.5	<0.5	<0.5	0	0.5	0.8	46	<0.5	<0.5	0
PAH/Phenols		Dibenz(a,h)anthracene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0
PAH/Phenols		Fluoranthene	mg/kg	0.5	<0.5	<0.5	0	**1.0**	**1.8**	**57**	<0.5	<0.5	0
PAH/Phenols		Fluorene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0
PAH/Phenols		Indeno(1,2,3-c,d)pyrene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0
PAH/Phenols		Naphthalene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0
PAH/Phenols		Naphthalene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0
PAH/Phenols		PAHs (Sum of total)	mg/kg	1 (Primary): 0.5 (Interlab	<0.5	<0.5	0	**3.1**	**7.9**	**87**	<0.5	<0.5	0
PAH/Phenols		Phenanthrene	mg/kg	0.5	<0.5	<0.5	0	0.6	0.7	15	<0.5	<0.5	0
PAH/Phenols		Phenol	mg/kg	0.5	<0.5	<0.5	0				<0.5	<0.5	0
PAH/Phenols		Pyrene	mg/kg	0.5	<0.5	<0.5	0	**1.0**	**1.7**	**52**	<0.5	<0.5	0
PAH/Phenols													
TPH	TPH	C10-C16	mg/kg	50	<50.0	<50.0	0	<50.0	<50.0	0	<50.0	<50.0	0
TPH		C16-C34	mg/kg	100	450.0	610.0	30	<100.0	140.0	33	450.0	740.0	49
TPH		C34-C40	mg/kg	100	490.0	620.0	23	<100.0	140.0	33	490.0	480.0	2
TPH		F2-NAPHTHALENE	mg/kg	50	<50.0	<50.0	0	<50.0	<50.0	0	<50.0	<50.0	0
TPH		C6 - C9	mg/kg	20	<20.0	<20.0	0	<20.0	<20.0	0	<20.0	<20.0	0
TPH		C10 - C14	mg/kg	20	<20.0	<20.0	0	<20.0	<20.0	0	<20.0	<20.0	0
TPH		C15 - C28	mg/kg	50	120.0	190.0	45	<50.0	<50.0	0	**120.0**	**300.0**	**86**
TPH		C29-C36	mg/kg	50	480.0	580.0	19	**54.0**	**150.0**	**94**	480.0	610.0	24
TPH		+C10 - C36 (Sum of total)	mg/kg	50	600.0	770.0	25	**54.0**	**150.0**	**94**	600.0	910.0	41
TPH		C6-C10	mg/kg	20	<20.0	<20.0	0	<20.0	<20.0	0	<20.0	<20.0	0

*RPDs have only been considered where a concentration is greater than 1 times the EQL.
**High RPDs are in bold (Acceptable RPDs for each EQL multiplier range are: 50 (1-10 x EQL); 50 (10-20 x EQL); 50 (> 20 x EQL))
***Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any methods in the row header relate to those used in the primary laboratory

Table J - Rinsate Sample

SDG	25/07/2013
Field_ID	R1
Sampled_Date-Time	23/07/2013
Sample_Type	Rinsate

Chem_Group	ChemName	Units	EQL	
BTEX	Benzene	µg/l	1	<1
	Ethylbenzene	µg/l	1	<1
	Toluene	µg/l	1	<1
	Xylene (m & p)	µg/l	2	<2
	Xylene (o)	µg/l	1	<1
	Xylene Total	µg/l	3	<3
	C6-C10 less BTEX (F1)	mg/l	0.02	<0.02
Lead	Lead (Filtered)	mg/l	0.001	<0.001
Metals	Aluminium (Filtered)	mg/l	0.01	**0.01**
	Arsenic (Filtered)	mg/l	0.001	<0.001
	Cadmium (Filtered)	mg/l	0.0001	<0.0001
	Chromium (III+VI) (Filtered)	mg/l	0.001	<0.001
	Copper (Filtered)	mg/l	0.001	<0.001
	Iron (Filtered)	mg/l	0.05	<0.05
	Manganese (Filtered)	mg/l	0.001	<0.001
	Mercury (Filtered)	mg/l	0.0001	<0.0001
	Nickel (Filtered)	mg/l	0.001	**0.002**
	Tin (Filtered)	mg/l	0.005	<0.005
	Zinc (Filtered)	mg/l	0.005	**0.011**
PAH	Benzo[b+j]fluoranthene	mg/l	0.001	<0.001
PAH/Phenols	Acenaphthene	µg/l	1	<1
	Acenaphthylene	µg/l	1	<1
	Anthracene	µg/l	1	<1
	Benz(a)anthracene	µg/l	1	<1
	Benzo(a) pyrene	µg/l	1	<1
	Benzo(g,h,i)perylene	µg/l	1	<1
	Benzo(k)fluoranthene	µg/l	1	<1
	Chrysene	µg/l	1	<1
	Dibenz(a,h)anthracene	µg/l	1	<1
	Fluoranthene	µg/l	1	<1
	Fluorene	µg/l	1	<1
	Indeno(1,2,3-c,d)pyrene	µg/l	1	<1
	Naphthalene	µg/l	1	<20
	PAHs (Sum of total)	µg/l	1	<1
	Phenanthrene	µg/l	1	<1
	Pyrene	µg/l	1	<1
TPH	C10-C16	mg/l	0.05	<0.05
	C16-C34	mg/l	0.1	<0.1
	C34-C40	mg/l	0.1	<0.1
	F2-NAPHTHALENE	mg/l	0.05	**0.03**
	C6 - C9	µg/l	20	<20
	C10 - C14	µg/l	50	<50
	C15 - C28	µg/l	100	<100
	C29-C36	µg/l	100	<100
	+C10 - C36 (Sum of total)	µg/l	100	<100
	C6-C10	mg/l	0.02	<0.02