ENVIRONMENTAL INVESTIGATION SERVICES

REPORT

TO

MERITON APARTMENTS PTY LTD

ON

STAGE 1 PRELIMINARY ENVIRONMENTAL SITE ASSESSMENT

FOR

PROPOSED COMMERCIAL/RESIDENTIAL DEVELOPMENT

AT

330 CHURCH STREET, PARRAMATTA

APRIIL 2011

REF: E24680KHrpt1.1

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EXECUTIVE SUMMARY

Meriton Apartments Pty Ltd commissioned Environmental Investigation Services (EIS), a division of Jeffery & Katauskas Pty Ltd (J&K), to undertake a preliminary Stage 1 environmental site assessment for the proposed commercial/residential development at 330 Church Street, Parramatta. A preliminary assessment of acid sulfate soil conditions was also undertaken as part of the site assessment.

The site is identified as Lots 2 and 3 DP 788637 and Lot 101 DP 1031459 and at the time of this investigation was occupied by a shopping centre.

The assessment included a review of historical information, site inspection, soil sampling from two locations and groundwater sampling from one monitoring well.

At the time of the investigation, the site was predominantly occupied by a multi-storey shopping centre building. The shopping centre was vacant, except for some office space in the north-west section and a café on the lower ground floor in the north-east section. A loading dock was located in the south-east corner of the building. A mobile grease trap (on wheels) was located inside the loading dock.

The search of historical information has indicated the following:

- The site was predominantly occupied by small to medium sized retail buildings in the early 1900's;
- The north and east sections of the site were vacant in the early 1900's;
- The existing shopping centre was most likely developed sometime between 1959 and 1961;
- There are no recorded notices listed on the NSW DECCW CLM or POEO register; and
- WorkCover have no records of underground storage tank licenses issued for the site.

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

Based on the results, EIS are of the opinion that the potential for significant widespread soil contamination at the site is relatively low. However, it should be noted that access to the site was very limited and the potential for highly variable conditions in the inaccessible area remains.

Elevated concentrations of contaminants were not encountered in the groundwater sample analysed for the investigation. All results were below the SAC (including hardness modified trigger values). A trace level of light fraction TPH was encountered in the groundwater. No guideline exists for TPH (C_6-C_9).

Based on the results of the assessment, EIS consider that the potential for significant, widespread groundwater contamination at the site is relatively low.

Based on the results of the assessment, the fill material is classified as 'General Solid Waste (non-putrescible)' according to the criteria outlined in Waste Classification Guidelines 2009. Further assessment will be required to classify the material beneath the existing building at the site.

The natural sand encountered in BH1 between 7.5m and 8.5m (approximately -0.4m to -1.4m AHD) is considered to be acid sulfate soil and, therefore, cannot be classified as VENM. Additional investigation should be undertaken through inaccessible areas of the site to better assess the extent of acid sulfate soils. Following additional investigation, the natural silty clayey sand and sandstone bedrock at the site can be considered to be virgin excavated natural material (VENM) provided they do not contain potential acid sulfate soil.

sPOCAS results for the BH1 (7.5-7.95m) sample identified acidic conditions greater than the site 'action criteria'. The TPA, TSA and S_{pos} results were above the 'action criteria'. The sand soil encountered in BH1 between 7.5m and 8.5m (approximately -0.4m to -1.4m AHD) is considered to be potential acid sulfate soil. As noted in the previous section, further investigation of the site should be undertaken to better assess the extent of the potential acid sulfate soil.

Preparation of an acid sulfate soil management plan will be required to manage the risks associated with the sand soil for the proposed development.

Based on the scope of work undertaken for this investigation, EIS consider that the site is unlikely to be impacted by widespread significant gross contamination.

Additional investigation should be undertaken in the existing shopping centre building footprint to better assess the potential for contamination in this area.

As the majority of fill/soil is likely to have been removed during construction of the shopping centre the risk of contamination associated with fill material and hazardous building materials are considered to be low.

As the entire floor of the shopping centre is paved with concrete the risk of contamination associated with dry cleaning chemicals and oil/grease are considered to be low.

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

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1 INTRODUCTION

Meriton Apartments Pty Ltd commissioned Environmental Investigation Services (EIS), a division of Jeffery & Katauskas Pty Ltd (J&K), to undertake a preliminary Stage 1 environmental site assessment for the proposed commercial/residential development at 330 Church Street, Parramatta.

A preliminary assessment of acid sulfate soil conditions was also undertaken as part of the site assessment.

The site is identified as Lots 2 and 3 DP 788637 and Lot 101 DP 1031459 and at the time of this investigation was occupied by a shopping centre. The site location is shown on Figure 1 and the investigation was confined to the site boundaries as shown on Figure 2.

The screening was undertaken generally in accordance with an EIS proposal (Ref: EP5409KH) of 9 February 2011 and written acceptance from Meriton Apartments Pty Ltd of 10 February 2011.

This report describes the investigation procedures and presents the results of the preliminary environmental site assessment, together with comments, discussion and recommendations.

A geotechnical investigation was undertaken in conjunction with the environmental site screening by J&K and the results are presented in a separate report (Ref. 24680Zrpt, dated 13 April 2011).

1.1 Proposed Development Details

The proposed development includes demolition of the existing shopping centre and construction of two tower buildings. The buildings will include commercial/retail space on the ground floor(s) and residential apartments of the upper levels. The development includes up to four storeys of basement carparking, which may require excavation up to depths of approximately 12m below the existing site levels.

2 OBJECTIVES AND SCOPE OF WORK

2.1 Objectives

The primary objectives of the investigation were to:

- Assess the potential risk of significant widespread contamination of the site;
- Assess the soil and groundwater contamination conditions at the site in relation to the proposed residential/commercial land use;
- Undertake a waste classification assessment for off-site disposal of excavated soil associated with the proposed development works; and
- Prepare a report presenting the results of the investigation generally in accordance with the *NSW EPA (now DECCW) Guidelines for Consultants Reporting on Contaminated Sites (1997[1])* and *State Environmental Planning Policy No.55 – Remediation of Land (1998[2])*.

A secondary objective was to assess the potential for occurrence of acid sulfate soils at the site.

2.2 Scope of Work

The scope of work undertaken to achieve the objective included:

1. Review of historical aerial photographs;
2. Review of historical land title records;
3. Search of the NSW DECCW notices for the site under Section 58 of the *Contaminated Land Management Act* (1997[3])[4];
4. Search of the NSW DECCW public register (POEO[5]) for licences, applications or notices for the site;
5. Search of WorkCover databases for licenses to store dangerous goods including underground fuel storage tanks (USTs);
6. Review of Parramatta Council historical development applications (DA) and building approvals (BA) records for the site;
7. Review of regional geology and groundwater conditions, including the location of registered groundwater bores and major underground services in the vicinity of the site;

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

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

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

[4] http://www.environment.nsw.gov.au/prclmapp/searchregister.aspx visited on 8 April 2011

[5] http://www.environment.nsw.gov.au/prpoeoapp/searchregister.aspx visited on 8 April 2011

8. Walkover inspection of the site and immediate surrounds to identify potential contamination sources;
9. Design and implementation of a field sampling program;
10. Laboratory analysis of selected soil and groundwater samples; and
11. Preparation of a report presenting the results of the assessment together with recommendations and comments on the suitability of the site for the proposed development.

Field work for this investigation was undertaken on the following dates:

- Drilling, soil sampling and installation of the groundwater monitoring well was undertaking on 29 and 30 March 2011;
- The groundwater monitoring well was developed on 1 April 2011; and
- Groundwater samples were obtained from the monitoring well on 5 April 2011.

3 SITE INFORMATION

3.1 Site Identification

The site identification details are summarised in the following table:

Site Owner:	Karimbla Properties (No. 22) Pty Ltd
Site Address:	330 Church Street, Parramatta
Lot & Deposited Plan:	Lots 2 and 3 DP 788637 and Lot 101 DP 1031459
Current Land Use:	Commercial/Retail
Proposed Land Use:	Commercial/Residential
Local Government Authority:	Parramatta City Council
Current Zoning:	B4 Mixed Use
Site Area:	Approximately 6,800m^2
AHD:	Approximately 2-6m
Geographical Location (MGA):	N: 6256960 E: 315340 (approximately)
Site Locality Plan:	Refer to Figure 1
Borehole Location Plan:	Refer to Figure 2

3.2 Site Description

The site is located to the east of Church Street and South of Parramatta River in a gently sloping area that typically falls north towards the river at approximately 1-2°. The site falls to the north and north-east at up to approximately 5°.

At the time of the investigation, the site was predominantly occupied by a multi-storey shopping centre building. The shopping centre was vacant, except for some office space in the north-west section and a café on the lower ground floor in the north-east section. The building appeared to be three to four storey, split level and partially cut into the hill slope. The building was of brick construction in the east section and pre-cast concrete panels in the west section. A walkway extended along the north side of the building and was retained above the river foreshore at heights of up to approximately 5m. The west and in particular the south-west sections of the site were considered likely to be filled based on regional conditions.

The upper levels of the building appeared to be occupied by retail premises and the lower levels included the café and storage. A loading dock was located in the south-east corner of the building. A mobile grease trap (on wheels) was located inside the loading dock. An asphaltic concrete (AC) carpark was located in the south-east section of the site, immediately south of the loading dock.

A multi-storey carpark was located east of the shopping centre and was connected by an elevated walkway to the building. An on-grade AC carpark was located immediately south of the multi-storey carpark. A grassed foreshore area was located immediately north of the site and extended to the Parramatta River. High rise residential apartment buildings were located on the north side of the river.

A restaurant was located immediately south of the west section of the shopping centre. The restaurant building adjoined the shopping centre building. An electrical substation was located south-east of the restaurant and abutted the carpark in the south-east section of the site. Buckets of used cooking oil were observed at the entrance of the substation and were considered likely to be sourced from the restaurant. The Park Royal Hotel was located to the south of the substation and AC carpark. Retail premises including several restaurants were located south of the west section of the site along Church Street and along the west side of Church Street. Similar retail premises were located south of the Park Royal Hotel, along Phillip Street.

Lennox Bridge (Church Street) was located immediately north-west of the site and crossed the Parramatta River. Filling was considered likely to have been undertaken to raise the bridge to the required levels at the riverbanks.

3.3 Regional Geology

The geological map of Sydney (1983/[6]) indicates the site to be underlain by Ashfield Shale of the Wianamatta Group, which typically consists of black to dark grey shale and laminite.

The acid sulfate soil risk maps indicate areas of high risk, low risk and no known occurrence of acid sulfate soils. The acid sulfate soil risk map for the Prospect/Parramatta River area[7] (9130N3 edition 2, December 1997) indicates that the site is located within an area of "disturbed terrain" to depths of approximately 4m.

The 'disturbed terrain' classification is adopted in large scale filled areas which often occur during reclamation of low lying swamps for urban development, in areas which may have been mined or dredged or have undergone heavy ground disturbance through general urban development or the construction of dams and levees. The majority of landforms within these areas are not expected to encounter acid sulfate soil materials;

[6] *1:100,000 Geological Map of Sydney (Series 9130),* Department of Mineral Resources (1983) [now Department of Primary Industries]

[7] *Acid Sulfate Soil Risk Maps* 1:25000, Department of Land and Soil Conservation

however, localised occurrences may be found at depth. Disturbance of these materials will result in a risk that will vary with elevation and depth of disturbance. Soil investigation is required to assess these areas for acid sulfate soil potential.

3.4 Hydrogeology

NSW Office of Water (formerly Department of Water and Energy[8]) records were researched for the investigation and indicated that four registered groundwater bores lie within 1km of the site. The groundwater works summaries and a map indicating the location of the bores in relation to the site are attached in Appendix C. The details are summarised in the following table:

Ref No	Approximate Distance from site (m)	Approximate Direction from site	Gradient from site	Depth (m)	Registered Purpose
GW108611	250	North-west	Across river	60.5	Domestic
GW110912	650	North-east	Across river	10	Monitoring Bore
GW110913	650	North-east	Across river	10	Monitoring Bore
GW110914	650	North-east	Across river	6	Monitoring Bore

The stratigraphy of the site is expected to consist of alluvial sandy soil associated with the river, overlying residual clayey soils overlying relatively deep bedrock. Based on these conditions and the results of the groundwater bore search groundwater may be considered to be a potential resource in the area, although contamination by industry may have occurred rendering use of the resource questionable.

[8] http://www.waterinfo.nsw.gov.au/gw/ visited on 6 April 2011

4 SITE HISTORY ASSESSMENT

4.1 Aerial Photographs

Aerial photographs of the site taken in 1930, 1951, 1961, 1972, 1978, 1986, 1994 and 2005 were obtained from the Department of Lands and were reviewed as part of the assessment of the site history. EIS has also reviewed the 1943 historical aerial photograph available for the site on the NSW Department of Lands SIX Viewer[9]. The information obtained from the photographs are summarised in the following table:

Year	Details
1930	The north and east sections of the site appeared to be grassed with some trees. A large building was located in the central section of the site. Smaller buildings were located to the north-west and south of the large building. The area appeared to be industrial. Church Street and Lennox Bridge had been constructed to the west and north-west of the site, respectively. The areas to the south of the site and west of Church Street appeared to be occupied by commercial/industrial premises and included several small to medium sized buildings. Some larger saw-tooth roofed warehouses were located to the south-east of the site. Grassed areas with scattered trees occupied the majority of the foreshore area to the east of the site. Some development had been undertaken on the north shore of the river.
1943	The site appeared similar to the 1930 photograph. A long, narrow building was located immediately south-east of the site.
1951	The site and immediate surrounds appeared similar to the 1943 photograph, except that the long, narrow building immediately south-east of the site had been partially demolished.
1961	All the buildings on the site had been demolished and a very large building had been constructed that appeared similar to the existing (2011) shopping centre. An on-grade carparking area was located in the south-east section of the site. The north-west corner of the building appeared to be 'open air'. A footpath had been constructed along the foreshore to the north of the site. Some construction appeared to be underway to the east of the site. The remainder of the area to the east was occupied by on-grade carparking. Some additional development had been undertaken on the north shore of the river.
1972	The site appeared similar to the 1961 photograph.

[9] https://six.maps.nsw.gov.au/wps/portal/SIXViewer

	A large, multi-storey carpark was located to the east of the site that appeared similar to the existing (2011) carpark. The saw-tooth roofed buildings had been demolished. Part of the area was occupied by an on-grade carpark and part by a new multi-storey building. Redevelopment appeared to have been undertaken along both sides of Church Street, to the south and west of the site. The area appeared similar to the existing retail area along Church Street.
1978	The site and immediate surrounding areas appeared similar to the 1972 photograph.
1986	The site appeared similar to the 1978 photograph. A large high rise building attached to a multi-storey building had been constructed to the south of the site and appeared similar to the existing (2011) Park Royal Hotel. A fenced, open-air area was located between the high rise and the on-grade carpark in the south-east corner of the site and appeared similar to the existing (2011) electrical substation. Construction and excavation works were apparent to the north-west of Lennox Bridge.
1994	The site appeared similar to the 1986 photograph. A new building had been constructed to the south-east of the site that appeared similar to the existing (2011) office building. Redevelopment had been undertaken on the north shore of the river that appeared similar to the existing (2011) Riverside Theatre complex and the Visitor Information Centre.
2005	The site and immediate surrounding areas appeared similar to the 1994 photograph.

4.2 Land Title Search

A limited historical land title search was performed on our behalf by Advance Legal Searchers Pty Ltd. The site includes three lots:

- Lot 2 DP 788637 – north-east corner (part of shopping centre);
- Lot 3 DP 788637 – majority of site (remainder of shopping centre); and
- Lot 101 DP 1031459 – south-east corner (carpark).

Copies of the title records are presented in Appendix C and a summary of the relevant information is provided in the following tables:

Lot 2 DP 788637

Registration Date	Proprietor
2004 – todate	Karimbla Properties (No. 22) Pty Ltd
2004 – 2004	Riverbank T'ee Pty Limited
2001 – 2004	Riverbank Corporate Centre Pty Limited
1999 – 2001	Claihope Pty Limited
1996 – 1999	Friendship Pty Limited
1989 – 1996	Scott's (Newcastle) Investments Limited
(2002 – todate)	*(various commercial leases shown on folio identifier A/c 8663-164 and historical search 2/788637)*
(Part of Lot A DP 274346 and other lands – CTVol 8454 Fol 215)	
1963 – 1989	Scott's (Newcastle) Investments Limited
(1963 – 1989)	*(various leases shown on CTVol 8454 Fol 215)*
(Part of Lot A DP 2743346 and other lands – Area 3 Roods 15 ½ Perches – CTVol 8414 Fol 91)	
1962 – 1963	Scott's (Newcastle) Investments Limited
(1962 – 1963)	*(various leases shown on CTVol 8414 Fol 91)*
(Part of Lot A DP 274346 – Area 3 Roods 23 ¾ Perches – CTVol 7124 Fol 235)	
1960 – 1962	Scott's (Newcastle) Investments Limited
1956 – 1960	James Keith Solling Houison, chartered accountant Gwenda Solling Houison, spinster
(Allotments 7, 8 & 20 Section 25 Parish of St John and other lands – Area 1 Acre 1 Rood 29 Perches – CTVol 1239 Fol 216)	
1954 – 1956	James Keith Solling Houison, chartered accountant Gwenda Solling Houison, spinster
1934 – 1954	Martha Florence Houison, spinster Maude Mary Houison, spinster
1898 – 1934	Fanny Eliza Housion, widow

Lot 3 DP 788637

Registration Date	Proprietor
(Lot 3 DP 788637 – Auto Consol 8663-164)	
2004 – todate	Karimbla Properties (No. 22) Pty Ltd
2004 – 2004	Riverbank T'ee Pty Limited
2001 – 2004	Riverbank Corporate Centre Pty Limited
1999 – 2001	Claihope Pty Limited
1996 – 1999	Friendship Pty Limited
1989 – 1996	Scott's (Newcastle) Investments Limited

(2002 – todate)	*(various commercial leases shown on folio identifier A/c 8663-164 and historical search 3/788637)*
Note (a)	
(Part of Allotment 18 Section 25 Parish of St John, Lots A & B DP 274346 – CTVol 8454 Fol 215)	
1963 – 1989	Scott's (Newcastle) Investments Limited
(Part of Lot A DP 2743346 and other lands – Area 3 Roods 15 ½ Perches – CTVol 8414 Fol 91)	
1962 – 1963	Scott's (Newcastle) Investments Limited
(1962 – 1963)	*(various leases shown on CTVol 8414 Fol 91)*
(Part of Lot A DP 274346 – Area 3 Roods 23 ¾ Perches – CTVol 7124 Fol 235)	
1960 – 1962	Scott's (Newcastle) Investments Limited
1956 – 1960	James Keith Solling Houison, chartered accountant Gwenda Solling Houison, spinster
Note (b)	
(Allotments 7, 8 & 20 Section 25 Parish of St John and other lands – Area 1 Acre 1 Rood 29 Perches – CTVol 1239 Fol 216)	
1954 – 1956	James Keith Solling Houison, chartered accountant Gwenda Solling Houison, spinster
1934 – 1954	Martha Florence Houison, spinster Maude Mary Houison, spinster
1898 – 1934	Fanny Eliza Housion, widow
(Part of Lot A DP 2743346 and other lands – Area 3 Roods 15 ½ Perches – CTVol 8414 Fol 91)	
1962 – 1963	Scott's (Newcastle) Investments Limited
(1962 – 1963)	*(various leases shown on CTVol 8414 Fol 91)*
(Part of Lot A DP 274346 – Area 1 Rood 6 Perches – CTVol 8384 Fol 250)	
1962 – 1962	Scott's (Newcastle) Investments Limited
(1962 – 1962)	*(lease shown on CTVol 8384 Fol 250)*
Note (bi)	
(Part of Allotment 18 Section 25 Parish of St John – Area 1 Rood 6 Perches – CTVol 6900 Fol 42)	
1959 – 1962	Scott's (Newcastle) Investments Limited
1959 – 1959	Percy Whitlam Leabeater, lime & cement merchant
1954 – 1956	Rhoda Leabeater, widow
(Part of Allotment 18 Section 25 Parish of St John – Area 1 Rood 6 Perches – CTVol 1541 Fol 99)	

1942 – 1954	Rhoda Leadbeater, widow
1906 – 1942	Alfred Thomas Leabeater, junior, lime merchant
1904 – 1906	William Richard Murray, ironmonger
Note (bii)	
(Part of Allotment 18 Section 25 Parish of St John – Area 17 ¾ Perches – CTVol 6900 Fol 43)	
1960 – 1962	Scott's (Newcastle) Investments Limited
1959 – 1960	Broadway Tailors Pty Limited
1957 – 1959	H & S Credits Pty Limited
1957 – 1957	Edward Moss Waxman, retailer
1957 – 1957	Femina Silk Store Pty Limited
1955 – 1957	Terence Patrick Gavan, general merchant
1954 – 1955	Rhoda Leabeater, widow
(Part of Allotment 18 Section 25 Parish of St John – Area 17 ¾ Perches – CTVol 1541 Fol 142)	
1942 – 1954	Rhoda Leadbeater, widow
1941 - 1941	Alfred Thomas Leabeater, junior, lime and cement merchant
1925 – 1941	Leslie Porter, master builder
1918 – 1925	Peter Murphy, master butcher
1910 – 1918	William Barkeley, butcher
1904 – 1910	William Richard Murray, storekeeper
Note (c)	
(Lots B & C DP 274346 – area 1 Rood 9 ¼ Perches – CTVol 8305 Fol 112)	
1961 – 1963	Scott's (Newcastle) Investments Limited
(1961 – 1963)	*(various leases shown on CTVol 8305 Fol 112)*
(Part of Lot 9 Section 25 Parish of St John – Area 3 Roods 39 ½ Perches – CTVol 2749 Fol 187)	
1961 – 1961	Scott's (Newcastle) Investments Limited
1935 – 1961	David Bruce Frater, retired grazier
1917 – 1935	Henry Edward Haddrill, produce merchant
(1937 – 1961)	*(various commercial leases shown on CTVol 2749 Fol 187)*
(Part of Lot 9 Section 25 Parish of St John and other lands – Area 1 Acre 1 Rood 31 ¾ Perches – CTVol 712 Fol 173)	
1917 – 1917	Henry Edward Haddrill, produce merchant
1894 – 1917	Emily Smith, widow

1891 – 1894	Emily Smith, widow George Phillips, civil engineer, Colony of Queensland John Jabez Phillips, bank manager
1884 – 1891	Shepherd Smith, esquire

Lot 101 DP 1031459

Registration Date	Proprietor
2004 – todate	Karimbla Properties (No. 22) Pty Ltd
2004 – 2004	Riverbank T'ee Pty Limited
2001 – 2004	Riverbank Corporate Centre Pty Limited
2001 – 2001	Scott's (Newcastle) Investments Limited
(2005 – todate)	*(various commercial leases shown on folio identifier A/c 8663-164 and historical search 101/1031459)*
(Lot 1 DP 724764)	
1988 – 2001	Scott's (Newcastle) Investments Limited
(1996 – 2001)	*(various commercial leases shown on historical search 1/724764)*
(Part of Lot 9 Section 25 Parish of St John – Area 3 Roods 39 ½ Perches – CTVol 2749 Fol 187)	
1961 – 1988	Scott's (Newcastle) Investments Limited
1935 – 1961	David Bruce Frater, retired grazier
1917 – 1935	Henry Edward Haddrill, produce merchant
(1937 – 1961)	*(various commercial leases shown on CTVol 2749 Fol 187)*
(Part of Lot 9 Section 25 Parish of St John and other lands - Area 1 Acre 1 Rood 31 ¾ Perches – CTVol 712 Fol 173)	
1917 – 1917	Henry Edward Haddrill, produce merchant
1894 – 1917	Emily Smith, widow
1891 – 1894	Emily Smith, widow George Phillips, civil engineer, Colony of Queensland John Jabez Phillips, bank manager
1884 – 1891	Shepherd Smith, esquire

The land search has not indicated that the majority of the site was occupied by retail premises in the early 1900's and was purchased and developed as a shopping centre from 1959 to 1961. No particular land use that may be considered to have resulted in significant contamination of the soil and groundwater at the site has been indicated.

4.3 Council Records

A search of Development Application (DA) and Building Approval (BA) records held by Parramatta City Council was undertaken by EIS. Copies of the documents are presented in Appendix C.

The records included multiple DA's for shop fitouts and conversion of retail premises to commercial premises from 1996 to 2009. One such fitout was a dry cleaners (Aladdins's Drycleaner) for shop 9A on the lower ground floor in 2001. As the dry

cleaners was likely to have been wholly contained within the existing shopping centre, including a concrete paved floor, it is considered that the risk of soil/groundwater contamination associated with the dry cleaners is very low.

The remaining records indicated some minor adjustments to the adjacent carpark and new signage. No records were available prior to 1996.

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

4.4 WorkCover Database Records

A records search for licenses to store dangerous goods was undertaken on our behalf by WorkCover. The records did not indicate the existence of any licences, including underground storage tanks, at this site.

4.5 NSW DECCW Records

A search of the NSW DECCW (EPA) on-line database did not indicate the existence of any EPA notices for the site under section 58 of the CLM Act 1997. A search of the List of NSW Contaminated Sites notified to DECCW[10] did not indicate the existence of any notices for the site.

A search of the NSW DECCW public register (POEO) did not indicate the existence of any EPA notices, applications and licenses for the site.

4.6 Assessment of Historical Information Integrity

The site history assessment has generally been obtained from: government records including the NSW land titles office, local government historical archives, historical aerial photographs and NSW WorkCover records. The veracity of the information from these sources is considered to be high, however, given the age of the development, the gap of up to 11 years between aerial photographs and the lack of information available on activities prior to 1930's, a certain degree of information loss is to be expected.

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

[10] http://www.environment.nsw.gov.au/clm/publiclist.htm visited on 8 April 2011

4.7 Summary of Historical Site Use

The search of historical information has indicated the following:

- The site was predominantly occupied by small to medium sized retail buildings in the early 1900's;
- The north and east sections of the site were vacant in the early 1900's;
- The existing shopping centre was most likely developed sometime between 1959 and 1961;
- There are no recorded notices listed on the NSW DECCW CLM or POEO register; and
- WorkCover have no records of underground storage tank licenses issued for the site.

5 POTENTIAL CONTAMINATION SOURCES

5.1 Potential Site Specific Contamination

Potential contamination at the site would be anticipated to be associated with:

- Potentially contaminated, imported fill material;
- Potential asbestos contamination associated with demolition of the former site buildings/sheds (although the majority of surface soils are likely to have been removed as part of the shopping centre development);
- Historical use of the site for commercial/industrial purposes; and
- Historical activities such as use of pesticides.

5.1.1 Site Specific Soil Contaminants of Concern

The compounds identified as soil contaminants of concern at the site include:

- Heavy metals: arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc;
- Total petroleum hydrocarbons (TPH);
- Monocyclic aromatic hydrocarbon compounds: benzene, toluene, ethylbenzene and xylenes (BTEX);
- Polycyclic aromatic hydrocarbons (PAHs) including benzo(a)pyrene;
- Organochlorine pesticides (OCPs) including Aldrin, dieldrin, chlordane, DDT, DDD, DDE and heptachlor;
- Organophosphorus pesticides (OPPs);
- Polychlorinated Biphenyls (PCBs); and
- Asbestos.

Secondary contaminants of concern such as Volatile Organic Compounds (VOCs) may be associated with use of part of the site as a drycleaner. There is, however, considered to be a low risk of contamination originating from the former dry cleaners. Therefore, VOCs have not been included in the analytical suite for this investigation.

5.1.2 Site Specific Groundwater Contaminants of Concern

The compounds identified as groundwater contaminants of concern at the site include:

- Heavy metals: arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc;
- TPH/BTEX; and
- PAHs.

5.2 Potential Receptors

The main potential contamination receptors are considered to include:

- Parramatta River located immediately north of the site;
- Site visitors, workers and adjacent property owners, who may come into contact with contaminated soil and/or be exposed to contaminated dust arising from construction activity; and
- Future site occupants.

5.3 Contaminant Laydown and Transport Mechanisms

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

6 ASSESSMENT CRITERIA DEVELOPMENT

6.1 Regulatory Background

In 1997 the NSW Government introduced the CLM Act. This Act has been amended by the *Contaminated Land Management Amendment Act* (2008[11]).

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

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

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

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

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

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

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

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

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

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

Off-site disposal of fill, contaminated material and excess soil/rock excavated as part of the proposed development works is regulated by the provisions of the *Protection of the Environment Operations Act* (1997[12]) and associated regulations and guidelines including the *NSW DECC (now DECCW) Waste Classification Guidelines - Part 1: Classifying Waste* (2009[13]). All materials should be classified in accordance with these guidelines prior to disposal.

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

6.2 Background on Acid Sulfate Soils

Acid sulfate soils (ASS) is the common term for naturally occurring soil and sediment that contains iron sulfides which, when exposed to oxygen generate sulfuric acid. These soils are formed from iron rich alluvial sediments and sulfate (found in seawater) in the presence of sulfate reducing bacteria and plentiful organic matter. These conditions are generally found in mangroves, salt marsh vegetation or tidal areas and at the bottom of coastal rivers and lakes.

[12] *Protection of Environment Operations Act,* NSW Government, 1997 (POEO Act 1997)
[13] *Waste Classification Guidelines, Part 1: Classifying Waste,* NSW DECC, 2009 (Waste Classification Guidelines 2009)

The NSW government formed the Acid Sulfate Soils Management Advisory Committee (ASSMAC) in 1994 to coordinate a response to acid sulfate soil issues. In 1998 this group released the Acid Sulfate Soil Manual[14] providing best practice advice for planning, assessment, management, laboratory methods, drainage, groundwater and the preparation of acid sulfate soil management plans.

In 1997 the Department of Land and Soil Conservation now part of DECCW developed two series of maps with respect to acid sulfate soils for use by council and technical staff implementing the Acid Sulfate Soil Manual:

- Acid Sulfate Soils Planning Maps – issued to councils and government units;
- Acid Sulfate Soils Risk Maps – issued to interested parties.

The acid sulfate soil planning maps provide an indication of the relative potential for disturbance of acid sulfate soils to occur at locations within the council area. These maps do not provide an indication of the actual occurrence of acid sulfate soils at a site or the likely severity of the conditions. The maps are divided into five classes dependent upon the type of activities/works that, if undertaken, may represent an environmental risk through the development of acidic conditions associated with acid sulfate soils:

- Class 1: all works;
- Class 2: all works below existing ground level and works by which the watertable is likely to be lowered;
- Class 3: Works at depths beyond 1m below existing ground level or works by which the water table is likely to be lowered beyond one metre below existing ground level;
- Class 4: Works at depths beyond 2m below existing ground level or works by which the water table is likely to be lowered beyond 2m below existing ground level; and
- Class 5: Works within 500m of adjacent Class 1,2,3,4 land which are likely to lower the water table below 1m AHD on the adjacent land.

The acid sulfate soil planning map for the Parramatta area, as available from Parramatta Council, indicates that the site is located within an area where no data was available at the time of mapping.

The acid sulfate soil risk maps, based on interpretation from geological and soil landscape maps provide an indication of the probability of occurrence of acid sulfate soils at a particular location. The maps provide classes based on high probability, low probability, no known occurrence and areas of disturbed terrain (site specific

[14] *Acid Sulfate Soil Manual*, Acid Sulfate Soils Management Advisory Committee 1998

assessment necessary) and the likely depth at which the acid sulfate soils are likely to be encountered.

6.2.1 Acid Sulfate Soil Assessment Criteria

Assessment of acid sulfate soil conditions and the impacts of the proposed development are based on information provided in the Acid Sulfate Soil Assessment Guidelines presented in the *Acid Sulfate Soil Manual* (1998). The guidelines include information on assessment of the likelihood that the site lies within an acid sulfate soil area, the need for an acid sulfate soil management plan, and the development of mitigation methods for the proposed development.

The assessment guidelines include recommendations for the density of sampling locations within the site. A minimum of four sampling locations should be undertaken for a site with an area up to 1 Ha in size to assess development constraints with a reduced density for sites greater than 4Ha of two locations per hectare. The sampling locations should include all areas where significant disturbance of soils will occur and/or areas with a high environmental sensitivity. In some instances a varied sampling plan may be more suitable, particularly for sites less than 1,000m^2 in area.

The depth of investigation should be at least one metre beyond the depth of proposed excavation/disturbance or estimated drop in watertable height, or to a minimum of two metres below existing ground level, whichever is greatest.

Standard methods for the laboratory analysis of samples are presented in the Australian Standard AS4969-2008/2009[15] (part 1 to 14). The principle analytical method is sPOCAS – suspension Peroxide Oxidation Combined Acidity and Sulfate.

The sPOCAS method specified in AS4969-2008/2009 has superseded the sPOCAS method specified in the ASSMAC Acid Sulfate Soil Manual. When S_{POS} (peroxide oxidisable sulfur) values are close to the action criteria conformation of the result can be undertaken by the chromium reducible sulfur (S_{CR}) method.

The ASSMAC (1998) present "action criteria" for the assessment of laboratory analysis results. These "action criteria" define the need to prepare a management plan and are based on the percentage of oxidisable sulfur (or equivalent Total Potential Acidity) for broad categories of soil types. Where disturbance of greater than 1,000 tonnes of acid sulfate soil is proposed, the action criteria for 'coarse' textured soils apply to all soil

[15] Australian Standard, Analysis of Acid Sulfate Soil - Dried Samples - Methods of Test

types. The action criteria presented within the guideline document for coarse textured soils (sands to loamy sands) are summarised below:

- pH - less than 5.
- TAA/TSA/TPA (pH5.5) – greater than 18mol H^+/tonne.
- S_{pos} – greater than 0.03% sulfur oxidisable.

It should note that the endpoint for the pH titration in AS4969-2009 is pH6.5 as opposed to pH5.5 in the ASSMAC *Acid Sulfate Soil Manual* (1998). Therefore the values for TAA, TSA and TPA will more conservative when analysed using the sPOCAS method specified AS4969-2008/2009.

6.3 Soil Contaminant Threshold Concentrations

The soil investigation levels adopted for this investigation are derived from the NSW DEC (now DECCW) document *Guidelines for the NSW Site Auditor Scheme, 2nd Edition* (2006[16]) and the National Environmental Protection Council document *National Environmental Protection (Assessment of Site Contamination) Measure* (1999[17]). The contaminant thresholds listed below are levels at which further investigation and evaluation is required to assess whether the site is considered suitable for the proposed urban land use.

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

Threshold concentrations for petroleum hydrocarbon contaminants including total TPH and BTEX compounds have previously been established in the *NSW EPA (now DECCW) Contaminated Sites: Guidelines for Assessing Service Station Sites* (1994[18]) publication and this document is referenced in the Site Auditor Guidelines 2006. Heavy fraction

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

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

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

petroleum hydrocarbon aliphatic/aromatic component threshold concentrations have also been introduced in NEPM 1999.

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

6.3.1 Provisional Phyto-toxicity Investigation Levels (PPILs)

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

6.3.2 Asbestos in Soil

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

The WorkCover publication *Working with Asbestos Guide* (2008[19]) states that, where buried asbestos is encountered, "A competent occupational hygienist should assess the site to determine:

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

"*Any asbestos cement products that have been subjected to weathering, or damaged by hail, fire or water blasting are considered to be friable asbestos and an asbestos removal contractor with a WorkCover license for friable asbestos removal is required for its removal*". Under the *NSW Occupational Health and Safety (OHS) Regulations 2001*[20] and WorkCover requirements all necessary disturbance works associated with

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

friable asbestos containing materials must be conducted by a licensed AS-1 Asbestos Removal Contractor.

6.3.3 Site Assessment Criteria (SAC) for Soil Contaminants

The 'residential with limited opportunities for access to soil' (Column D) exposure setting has been adopted for this assessment and the appropriate soil criteria are listed in the following table:

Contaminant	SAC - HILs Column D (mg/kg)	PPILs (mg/kg)
Heavy Metals		
Arsenic (total)	400	20
Cadmium	80	3
Chromium (III)	48%	400
Copper	4000	100
Lead	1200	600
Mercury (inorganic)	60	1
Nickel	2400	60
Zinc	28000	200
Petroleum Hydrocarbons		
TPH (C_6-C_9)	65 [a]	-
TPH (C_{10}-C_{36})	1000 [a]	-
Benzene	1 [a]	-
Toluene	1.4 [a]	-
Ethylbenzene	3.1 [a]	-
Total Xylenes	14 [a]	-
PAHs		
Total PAHs	80	-
Benzo(a)pyrene	4	-
Pesticides (OCPs & OPPs)		
Aldrin + Dieldrin	40	-
Chlordane	200	-
DDT + DDD + DDE	800	-
Heptachlor	40	-
Total OPPs	0.1 [b]	-
Others		
PCBs (Total)	40	-
Phenols	34000	-
Asbestos	NDLR [c]	-

Note:

[a] Service Station Guidelines 1994

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

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

6.3.4 Waste Classification Assessment Criteria

For the purpose of off-site disposal, the classification of soil into 'General Solid Waste (non-putrescible)', 'Restricted Solid Waste (non-putrescible)' and 'Hazardous Waste (non-putrescible)' categories is defined by chemical contaminant criteria outlined in the Waste Classification Guidelines 2009. The contaminant criteria are summarised in Table A-2.

6.4 Evaluation of Soil Analysis Data and Contaminant Threshold Concentrations

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

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

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

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

6.5 Groundwater Contaminant Trigger Values

Groundwater resources in NSW are managed and regulated by environmental and planning legislation which include the POEO Act 1997, *Environmental Planning and Assessment Act* (1979[21]) and the *Water Management Act* (2000[22]).

In 2000, Australian and New Zealand Environment Conservation Council (ANZECC) released the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (2000[23]) which superseded the previous guideline documents.

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

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

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

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

The National Health and Medical Research Council (NHMRC) released the *Australian Drinking Water Guidelines* (2004[24]). These guidelines are predominantly used to assess drinking water quality and have been referenced in some cases.

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

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

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

Guidance on the remediation and management of contaminated groundwater is presented in the document *NSW DECCW (EPA) Guidelines for the Assessment and Management of Groundwater Contamination (2007[25])*.

6.5.1 Petroleum Hydrocarbons in Groundwater

In the absence of locally endorsed guidelines for petroleum hydrocarbon compounds in water, the 'intervention value' concentration for mineral oil specified in the *Circular on Target Values and Intervention Values for Soil Remediation* (2000[26]) has been adopted.

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

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

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

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

6.5.2 Hardness Modified Trigger Values (HMTVs)

Water hardness can affect the bioavailability of metals/metalloids in fresh water. Consequently, Section 3.4.3.2 of the ANZECC 2000 guidelines includes algorithms to derive hardness modified trigger values (HMTVs) for metals/metalloid concentrations in fresh water. The calculations for the HMTVs are included in Appendix F and have been included in the SAC table below.

6.5.3 Site Assessment Criteria (SAC) for Groundwater Contaminants

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

Contaminant	Units	Fresh Water Criteria[1]	Hardness Modified Trigger Values	Drinking Water Criteria[2]	USEPA[5]
Metals					
Arsenic (total)[6]	µg/L	24	-	7	-
Cadmium	µg/L	0.2	0.9	2	-
Chromium (III)	µg/L	3.3[a]	4.1	50	-
Copper	µg/L	1.4	6.1	2000	-
Lead	µg/L	3.4	30.8	10	-
Mercury	µg/L	0.6	-	1	-
Nickel	µg/L	11	48.1	20	-
Zinc	µg/L	8	34.9	3000[d]	-
Petroleum Hydrocarbons					
TPH C_{10}-C_{36}	µg/L	600[b]	-	nsl	-
Benzene	µg/L	950[a]	-	1	-
Toluene	µg/L	180[a]	-	800	-
Ethylbenzene	µg/L	80[a]	-	300	-
o-Xylene	µg/L	350[a]	-	nsl	-
m+p Xylene	µg/L	75[a*]	-	nsl	-
PAHs					
Naphthalene	µg/L	16[a]	-	nsl	0.14
Anthracene	µg/L	0.01[c]	-	nsl	11000
Phenanthrene	µg/L	0.6[c]	-	nsl	-
Fluoranthene	µg/L	1[c]	-	nsl	1500
Benzo(a)pyrene	µg/L	0.1[c]	-	0.01	-
Others					
Oil and grease	mg/L	10 [h]	-	-	-
pH	-	6.5 – 8.5[i]	-	6.5 – 8.5[d]	nsl
EC	mS/cm	nsl	-	nsl	nsl

Notes:

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

[2] Australian Drinking Water Guidelines (NHMRC 2004)

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

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

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

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

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

[d] The aesthetic guideline concentration has been quoted

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

nsl – No set limit

7 ASSESSMENT PLAN

7.1 Soil Sampling Density

The *NSW EPA (now DECCW) Contaminated Sites Sampling Design Guidelines* (1995[27]) for contaminated site investigations state that samples should be obtained from a minimum of 17 evenly spaced sampling points for a site of this size (approximately 6,800m^2).

Samples were obtained from two sampling locations for this investigation. This density is approximately 12% of the minimum sampling density.

The boreholes were drilled in accessible areas of the site (south-east and north-west corners). This sampling plan was considered most appropriate for this investigation as:

- The investigation was design as a preliminary assessment only;
- no specific potential contaminant sources were identified by the available site history; and
- the distribution of contamination is expected to be associated with imported potentially contaminated fill material and is therefore likely to be random.

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

7.2 Groundwater Sampling

The assessment included the installation of one groundwater monitoring well in BH1 (MW1). The location of the groundwater monitoring well is shown on Figure 2.

7.3 Data Quality Objectives (DQOs)

The DQOs for the assessment were developed with reference to the US EPA document *Data Quality Objectives Process for Hazardous Waste Site Investigations* (2000[28]). The document includes seven steps as follows:

1. State the problem
2. Identify the decision
3. Identify inputs into the decision
4. Study Boundaries
5. Develop a Decision Rule

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

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

6. Specify Limits on Decision Errors
7. Optimise the Design for Obtaining data

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

7.4 Data Quality Indicators (DQIs) and Quality Assurance

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

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

Field QA/QC included collection and analysis of approximately 25% of field soil samples as intra-laboratory duplicates.

Success of field DQIs is based on the following criteria:

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

8 INVESTIGATION PROCEDURE

8.1 Soil Sampling Methods

Subsurface investigation at BH1 was undertaken using a track mounted hydraulically operated drill rig equipped with spiral flight augers. Soil samples were obtained from a Standard Penetration Test (SPT) sampler or directly from the auger when conditions did not allow use of the SPT sampler.

The SPT sampler was washed with phosphate free detergent and rinsed following each sampling event. The spiral flight augers were decontaminated using a scrubbing brush and potable water and Decon 90 solution (phosphate free detergent) followed by rinsing with potable water. Details of the decontamination procedure adopted during sampling are presented in Appendix D.

Due to access restrictions associated with the existing development, sampling location BH2 was undertaken using hand equipment. The hand equipment was decontaminated using a scrubbing brush, potable water and Decon 90 solution (phosphate free detergent) followed by rinsing with potable water after each sampling event. Details of the decontamination procedure adopted during sampling are presented in Appendix D.

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

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

During the investigation, soil samples were preserved by immediate storage in an insulated sample container with ice in accordance with AS 4482.1-2005[29] and AS 4482.2-1999[30] as summarised in the following table:

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

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

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

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

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

8.2 Photoionisation Detector (PID) Screening

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

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

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

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

8.3 Groundwater Monitoring Well Installation

One monitoring well was installed in borehole BH1 as shown on Figure 2. The monitoring well construction details are documented on the borehole log presented in Appendix A.

The well construction details are summarised below:

- The borehole was drilled to a depth of approximately 13.5m;
- The borehole collapsed after drilling;
- A 50mm diameter Class 18 machine slotted PVC screen was installed from approximately 10.4m to 1.4m and unslotted PVC casing from 1.4m to the surface;
- A 2mm graded sand filter pack was installed around the PVC to a height of approximately 0.4m above the slotted PVC section;
- A bentonite seal was installed above the sand filter pack;
- Borehole cuttings were installed above the bentonite seal to approximately 0.3m below the ground surface; and
- A concrete/cement grout was then used to seal the monitoring well with a gatic cover installed flush with the surrounding pavement.

8.4 Monitoring Well Development

Groundwater was purged from the monitoring well using a submersible electric pump. The pH, temperature, conductivity (EC), dissolved oxygen (DO) and redox potential (Eh) were monitored during development using calibrated field instruments to assess the development of steady state conditions.

Due to the relatively slow infiltration of groundwater into the monitoring well, groundwater was removed from the well until it was effectively 'dry'. Approximately 20L was removed from the well.

The monitoring well development sheet is presented in Appendix E and the equipment calibration records are presented in Appendix E.

The pump and hose were flushed prior to and following sampling with potable water followed by a pulse of demineralised water. Details of the decontamination procedure adopted during sampling are presented in Appendix D.

Groundwater removed from the wells during purging was transported to EIS, where the water is stored in a holding drum prior to collection by licensed waste water contractors. When the drum is filled a sample is analysed to classify the water for disposal.

8.5 Groundwater Sampling

Groundwater samples were obtained from the monitoring wells using micro-purge sampling equipment to reduce the disturbance of the water column and loss of volatiles.

The pH, temperature, EC, DO and Eh were monitored during sampling using calibrated field instruments to assess the development of steady state conditions.

The sampling data sheets are presented in Appendix E and the calibration documentation for the instruments are presented in Appendix E.

Once steady state conditions were considered to have been achieved, groundwater samples were obtained directly from the pump tubing and placed in appropriate glass bottles, BTEX vials or plastic bottles.

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

The samples were preserved in accordance with water sampling requirements detailed in NEPM 1999 and placed in an insulated container with ice. During the investigation, groundwater samples were preserved by immediate storage in an insulated sample container with ice in accordance with AS/NZS 5667.1:1998[31] as summarised in the following table:

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

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

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

8.6 Laboratory Analysis

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

8.6.1 Soil Samples

Soil samples were analysed using the following analytical methods detailed in Schedule B(3) of NEPM (1999[32]):

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

Analysis of soil samples for acid sulfate soils was undertaken by Envirolab Services Pty Ltd using sPOCAS analytical methods detailed in AS4969-2008/2009 (part 1 to 14).

8.6.2 Groundwater Samples

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

- Heavy metals – Direct injection. Analysis by ICP-AES.
- Low level mercury – Direct injection. Analysis by flow injection AAS.
- OC and OP pesticides and PCBs – GC/ECD.
- PAHs – Triple solvent (dichloromethane) extraction. Analysis by GC/MS.
- TPH (volatile) – P&T. Analysis by GC/MS.
- TPH – Solvent (dichloromethane) extraction. Analysis GC/FID.
- BTEX – Direct P&T. Analysis by GC/MS.
- Oil & Grease – Gravimetric. Hexane Extractable.

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

9 RESULTS OF INVESTIGATION

9.1 Subsurface Conditions

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

Pavement

Asphaltic concrete, approximately 30mm thick, was encountered at the surface in BH1 overlying concrete, approximately 130mm thick.

Fill

Silty sand and silty clayey sand were encountered in BH1 and BH2, respectively, and extended to depths of approximately 1m to 1.1m. BH2 was terminated in the fill at 1.1m. The fill was dark brown and contained inclusions of slag gravel, sandstone and ironstone gravel and ash.

Natural Soils

Silty clayey sand was encountered beneath the fill material in BH1 and extended to a depth of approximately 7.5m, where a sand profile approximately 1m thick was encountered overlying residual silty clay that extended to approximately 9.8m. The silty clayey sand was red-brown and light grey. The sand was brown and contained silt fines. The silty clay was grey.

Bedrock

Sandstone was encountered beneath the natural soil in BH1 and extended to the termination of the borehole at a depth of approximately 13.5m. The sandstone was light grey.

Groundwater

A groundwater monitoring well was installed in borehole BH1. Standing Water Level (SWL) measured in the monitoring well (from existing ground level) during the investigation is presented in the following table:

Monitoring Well	SWL (m) on 1/4/2011	SWL (m) on 5/4/2011	Groundwater RL (m AHD)
MW1	3.85	3.84	3.25

9.2 Laboratory Results - Soil

9.2.1 Contamination

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

9.2.2 Soil Samples

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

Heavy Metals

Three fill samples and one natural soil sample were analysed for heavy metals. The results of the analyses were below the SAC.

Waste Classification:

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

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

PID soil sample headspace readings were all zero ppm equivalent isobutylene. These results indicate a lack of PID detectable volatile organic contaminants.

Three fill samples and one natural soil sample were analysed for TPH and BTEX compounds. The results of the analyses were below the SAC.

Waste Classification:

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

Polycyclic Aromatic Hydrocarbons (PAHs)

Three fill samples and one natural soil sample were analysed for a range of PAHs including Benzo(a)pyrene. The results of the analyses were less than the SAC.

Waste Classification:

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

Organochlorine (OCPs) and Organophosphorous (OPPs) Pesticides

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

Waste Classification:

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

Polychlorinated Biphenyls (PCBs)

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

Waste Classification:

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

Asbestos

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

pH

Three fill samples and one natural soil sample were analysed for pH. The results ranged from 6.2 to 8.3 and were indicative of approximately neutral to slightly alkaline soils.

9.2.3 Acid Sulfate Soils

In order to assess the presence of actual or potential acid sulfate soil, suspension Peroxide Oxidation-Combined Acidity and Sulfate (sPOCAS) analyses was undertaken on five soil samples:

- BH1 (1.0-1.3) – silty clayey sand;
- BH1 (4.0-4.45) – silty clayey sand;
- BH1 (6.0-6.45) – silty clayey sand;
- BH1 (7.5-7.95) – sand; and
- BH2 (0.2-0.3) – fill: silty clayey sand.

The laboratory results were compared to the action criteria presented in the Acid Sulfate Soil Manual (1998) and presented in Section 6.2.1 of this report. These action criteria define the need to prepare a management plan and are based on the percentage

of oxidisable sulfur (or equivalent Total Potential Acidity) for broad categories of soil types. As a general rule the highest result from either the "acid trail" or "sulfur trail" should be used as the action criteria.

The results of the laboratory analysis are summarised in the following table:

Sample Location	Depth (metres)	pH KCl	pHOX	TAA mol H^+/tonne	TPA mol H^+/tonne	TSA mol H^+/tonne	SPOS %w/w
BH1	1.0-1.3	7.4	5.7	<5	<5	<5	<0.005
BH1	4.0-4.45	6.3	4.5	<5	<5	<5	<0.005
BH1	6.0-6.45	6.3	4.3	<5	<5	<5	<0.005
BH1	7.5-7.95	5.2	2.6	6	**25**	**19**	**0.16**
BH2	0.2-0.3	8.2	5.4	<5	<5	<5	0.005

BOLD: Value exceedes 'action criteria' specified in Section 6.2.1 of this report.

- The pH_{KCl} results for the soil ranged from 5.2 to 7.4. These results are indicative of acidic to neutral conditions in the soil/potassium chloride suspension prior to oxidation.

- Following oxidation, the pH_{ox} results for the soil samples ranged from 2.6 to 5.7. These results are generally acidic to very acidic. The pH of the samples dropped by a maximum of 2.8 units following oxidiation.

Acid Trail

- Titratable actual acidity (TAA) results indicated that the soils in the samples were generally non-acidic prior to oxidation.

- Total potential acidity (TPA) result for the BH1 (7.5-7.95m) sample of 25mol H^+/tonne was above the site assessment criteria of 18 mol H^+/tonne. The remaining TPA results were less than the site assessment criteria.

- Titratable sulfidic acidity (TSA) results for the BH1 (7.5-7.95m) sample of 19mol H^+/tonne was above the site assessment criteria of 18 mol H^+/tonne. The remaining TSA results were less than the site assessment criteria.

Sulfur Trail

- The S_{pos}% result for the BH1 (7.5-7.95m) sample of 0.16% was above the site assessment criteria of 0.03%. The remaining S_{pos} results were less than the site assessment criteria.

9.3 Laboratory Results - Groundwater

The groundwater laboratory results are presented in Table D. The results of the analysis are summarised below:

Heavy Metals

One groundwater sample was analysed for heavy metals. The results of the analyses were below the SAC (Hardness Modified Trigger Values).

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

One groundwater sample was analysed for TPH and BTEX compounds. The results of the analyses were below the SAC.

A trace (90µg/Ll) of light fraction TPH (C_6-C_9) was encountered in the MW1 sample (and the duplicate sample – 0.94µg/L). There is no DECCW endorsed guideline for light fraction TPH in groundwater.

Polycyclic Aromatic Hydrocarbons (PAHs)

One groundwater sample was analysed for a range of PAHs including Benzo(a)pyrene. The results of the analyses were below the laboratory PQL and generally less than the SAC. It should be noted that some detection limits were above the SAC.

Other Parameters

One groundwater sample was analysed for pH, EC, TDS and hardness. The results were 6.5, 820μS/cm, 580mg/kg and 170mg$CaCO_3$/L, respectively.

Field Measurements

Field measurements recorded during sampling are as follows:

- pH of 6.19;
- EC of 806μS/cm;
- Eh of 87.1mV; and
- DO of 1.0ppm.

10 ASSESSMENT OF ANALYTICAL QA/QC

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

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

- Envirolab Services Pty Ltd
  NATA Accreditation No. 2901
  Report numbers: 53640 and 53873

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

DQO	Number of Samples	DQI
Precision:		
Intra-laboratory duplicate Sample Reference: Dup 1 is a duplicate of soil sample BH1 (0.2-0.5m) Dup A is a duplicate of groundwater sample MW1	Soil: 1 Groundwater: 1	The intra-laboratory RPD values indicated that field precision was acceptable.
Laboratory duplicate RPD values	Soil: 1	Laboratory duplicate RPD results for the soil analysis were generally within the acceptance criteria adopted by the laboratory/laboratory.
Accuracy:		
Surrogate Spikes	All organic analytes	Laboratory accuracy was good and that no outliers were reported.
Laboratory Control Sample (LCS)	Soil: 2 Groundwater: 2	Laboratory accuracy was good and that no outliers were reported.
Representativeness:		
Samples extracted and analysed within holding time	All Samples	All samples were extracted and analysed within the appropriate holding times outlined in the investigation procedure.
Analysis of Laboratory Blanks	Soil: 2 Groundwater: 2	All laboratory blanks were found to be free of analyte concentrations above the PQLs.
Comparability:		
EIS sampling protocols	All Samples	Sampling was undertaken in accordance with the EIS sampling protocols outlined in Appendix D
Standard laboratory analytical methods used	All Samples	All Samples
Samples obtained by qualified staff	All Samples	All Samples
Completeness:		
Documentation (including site notes, borehole logs and COC etc) was correctly maintained	All Samples	All Samples
Samples obtained were analysed for the contaminants of concern	All Samples	All Samples
Appropriate analytical methods used by the laboratory.	All Samples	All Samples

11 DISCUSSION

The environmental site assessment undertaken for the proposed commercial/residential development was designed to: assess the suitability of the site for the proposed land use; indicate the likely waste classification of fill/soil; and assess the risk of occurrence of potential acid sulfate soils.

11.1 Summary of Soil Contamination Conditions

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

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

Based on the results, EIS are of the opinion that the potential for significant widespread soil contamination at the site is relatively low. However, it should be noted that access to the site was very limited and the potential for highly variable conditions in the inaccessible area remains.

Low concentrations of PAHs (less than the SAC) were encountered in the fill material in both boreholes. EIS consider that the source of the PAHs is likely to be associated with the ash and slag material encountered in the fill material matrix during the investigation. Based on the typically insoluble nature of PAHs in this form, EIS consider the potential for leaching of PAHs into the groundwater to be very low.

As no assessment of subsurface conditions beneath the existing shopping centre building could be undertaken, EIS consider that further subsurface investigations should be undertaken to better assess the building footprint.

11.1.1 PPILs

The results of the analyses were all less than the PPILs. The PPIL criteria are principally concerned with phytotoxicity (i.e. adverse effects on plant growth in established and proposed areas of landscaping) and are described in NEPM 1999 as "*somewhat arbitrary*", as the effect of these compounds on plant growth will depend on the soil and plant type.

11.1.2 Asbestos in Soil

Asbestos was not detected above the reporting limit in the soil samples analysed for the investigation.

11.2 Summary of Groundwater Conditions

A groundwater monitoring well was installed in borehole BH1. Standing Water Level (SWL) measured in the monitoring well (from existing ground level) during the investigation is presented in the following table:

Monitoring Well	SWL (m) on 1/4/2011	SWL (m) on 5/4/2011	Groundwater RL (m AHD)
MW1	3.85	3.84	3.25

11.2.1 Groundwater Flow

Based on regional topographic conditions the groundwater at the site is expected to flow generally to the north and north-east, towards Parramatta River.

Monitoring well MW1 is considered to be representative of groundwater conditions flowing onto the site from the south and south-west.

The movement of contaminants would generally be expected to be associated with groundwater flow and movement through the soils.

11.2.2 Groundwater Contamination

One groundwater sample was analysed for the potential contaminants of concern identified at the site.

Elevated concentrations of contaminants were not encountered in the groundwater sample analysed for the investigation. All results were below the SAC (including hardness modified trigger values).

A trace level of light fraction TPH was encountered in the groundwater. No guideline exists for TPH (C_6-C_9).

Based on the results of the assessment, EIS consider that the potential for significant, widespread groundwater contamination at the site is relatively low.

EIS further consider the risk of groundwater contamination at the site to be low due to the following:

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

EIS consider that further assessment should be undertaken to better assess groundwater conditions beneath the existing shopping centre building and in the north section of the site.

11.2.3 Dewatering During Development

The requirement for dewatering should be further assessed during the additional investigations recommended above.

In the event groundwater is intercepted during excavation works, dewatering will be required. Council and other relevant approvals will be required prior to disposal of groundwater into the stormwater system.

11.3 Waste Classification

11.3.1 Classification of Fill Soils

Based on the results of the assessment, the fill material is classified as 'General Solid Waste (non-putrescible)' according to the criteria outlined in Waste Classification Guidelines 2009. Further assessment will be required to classify the material beneath the existing building at the site.

The 'General Solid Waste (non-putrescible)' should be disposed of to a suitably licensed NSW DECCW (EPA) landfill.

11.3.2 Classification of Natural Soil and Bedrock

The natural sand encountered in BH1 between 7.5m and 8.5m (approximately -0.4m to -1.4m AHD) is considered to be acid sulfate soil (see section below) and, therefore, cannot be classified as VENM. Additional investigation should be undertaken through inaccessible areas of the site to better assess the extent of acid sulfate soils. The waste classification of this material should be confirmed following completion of the additional investigation, preparation of an acid sulfate soil management plan and

treatment. The natural sand is likely to be classified as 'General Solid Waste (non-putrescible)'.

Following additional investigation to better assess the extent of acid sulfate soil, the natural silty clayey sand and sandstone bedrock at the site can be considered to be virgin excavated natural material (VENM). The material is considered suitable for re-use on-site, or alternatively, the information obtained may be used to assess whether the material is suitable for beneficial reuse at another site as fill material. Where doubt exists about the difference between fill and VENM material an environmental/geotechnical engineer should be contacted.

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

In the event the VENM requires disposal to a NSW DECCW (EPA) licensed landfill, the material can be disposed as 'General Solid Waste (non-putrescible)'.

11.4 Acid Sulfate Soils

The investigation included drilling and sampling of two boreholes to a maximum depth of 13.5m below the existing site level. The proposed development includes excavation to a maximum depth of approximately 12m for a basement carpark (to RL -3m).

Samples from two boreholes (BH1 and BH2) were analysed using the sPOCAS method.

sPOCAS results for the BH1 (7.5-7.95m) sample identified acidic conditions greater than the site 'action criteria'. The TPA, TSA and S_{pos} results were above the 'action criteria'. The sand soil encountered in BH1 between 7.5m and 8.5m (approximately -0.4m to -1.4m AHD) is considered to be potential acid sulfate soil. As noted in the previous section, further investigation of the site should be undertaken to better assess the extent of the potential acid sulfate soil.

The sPOCAS results for the remaining samples were less than the site 'action criteria'.

Preparation of an acid sulfate soil management plan will be required to manage the risks associated with the sand soil for the proposed development.

Concrete that may come into contact with the site soils (i.e. piled footings and floor slabs) should be designed to resist acid attack given the potentially aggressive soil pH conditions. Reference should be made to the Cement and Concrete Association of

Australia TN57[33] and TN68[34] for appropriate precautionary measures. Reference may also be made to AS2159[35], regarding exposure classification for concrete piles.

11.5 Conclusion

Based on the scope of work undertaken for this investigation, EIS consider that the site is unlikely to be impacted by widespread significant gross contamination.

Additional investigation should be undertaken in the existing shopping centre building footprint to better assess the potential for contamination in this area. The contamination risks identified in this area include:

- Imported fill material;
- Hazardous building materials associated with demolition of former buildings;
- Chemicals associated with a former dry cleaner; and
- Storage of oils/grease associated with restaurants and fast food outlets.

As the majority of fill/soil is likely to have been removed during construction of the shopping centre the risk of contamination associated with fill material and hazardous building materials are considered to be low.

As the entire floor of the shopping centre is paved with concrete the risk of contamination associated with dry cleaning chemicals and oil/grease are considered to be low.

Based on the results of the Stage 1 assessment, no Stage 2 assessment is considered to be required at this time. Further investigation, however, should be undertaken to better assess the remaining contamination risks following removal of the existing hardstand.

Additional investigations should, as a minimum, include inspection of the site following removal of the hardstand and assessment of the need to undertake additional sampling and analyses. A validation report will be required containing the results of the additional assessment that will state whether the site is suitable for the proposed development.

[33] *Durable Concrete Structures, Technical Note 57* - Cement and Concrete Association of Australia

[34] *Sulfate-resisting Concrete, Technical Note 68* - Cement Concrete and Aggregates Australia

[35] Australian Standards 2159: 1995 Piling - Design and Installation

Inspections should be undertaken during demolition and excavation works to assess any unexpected conditions or subsurface facilities that may be discovered between investigation locations. This should facilitate appropriate adjustment of the works programme and schedule in relation to the changed site conditions. Inspections should be undertaken by experienced environmental personnel.

11.6 Regulatory Requirement

At this stage, EIS consider that there is no requirement to notify the DECCW (EPA) of any site contamination under Section 60 of the CLM Amendment Act 2008. All soil and groundwater results were less than the Notification Triggers specified in the *Guidelines on the Duty to Report Contamination*[36] under the CLM Amendment Act 2008.

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

12 LIMITATIONS

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Yours faithfully
For and on behalf of
ENVIRONMENTAL INVESTIGATION SERVICES

Todd Hore
Senior Environmental Engineer

Adrian Kingswell
Senior Associate

ABBREVIATIONS

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

IMPORTANT INFORMATION ABOUT THE SITE ASSESSMENT REPORT

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

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

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

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

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

Changes in Subsurface Conditions

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

This Assessment is Based on Professional Interpretations of Factual Data

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

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

Environmental Site Assessment Limitations

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

Misinterpretation of Environmental Site Assessments by Design Professionals

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

Logs Should not be Separated from the Environmental Assessment Report

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

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

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

Read Responsibility Clauses Closely

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

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

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

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

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

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

ANALYTE			HEAVY METALS								PAHs		ORGANOCHLORINE PESTICIDES				OP PESTICIDES	PCBs	PETROLEUM HYDROCARBONS								PID VALUES	ASBESTOS FIBRES
			Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	Total PAHs	B(a)P	Aldrin & Dieldrin	Chlordane	DDT, DDD & DDE	Heptachlor			Petroleum Hydrocarbons					Benzene	Toluene	Ethyl benzene	Total Xylenes		
																			C_6-C_9	C_{10}-C_{14}	C_{15}-C_{28}	C_{29}-C_{36}	C_{10} - C_{36}						
PQL - Envirolab Services			4	0.5	1	1	1	0.1	1	1	-	0.05	0.1	0.1	0.1	0.1	0.1	0.1	25	50	100	100	250	0.5	0.5	1	3		100
Site Assessment Criteria ^			400 *	80 *	48% *	4000 *	1200 *	60 *	2400 *	28000 *	80 *	4 *	40 *	200 *	800 *	40 *	0.1 ^^	40 *	65 #	nsl	nsl	nsl	1000 #	1 #	1.4 #	3.1 #	14 #		100^^
PPILs			20 **	3 **	400 **	100 **	600 **	1 **	60 **	200 **	nsl	nsl	nsl	nsl	nsl	nsl	nsl	nsl	nsl	nsl	nsl	nsl	nsl	nsl	nsl	nsl	nsl		-
General Solid Waste CT1+			100	20	100	nsl	100	4	40	nsl	nsl	0.8	nsl					nsl	nsl	nsl			nsl	10	288	600	1000	-	-
General Solid Waste SCC1+			500	100	1900	nsl	1500	50	1050	nsl	200	10	50					50	650	nsl			10000	18	518	1080	1800	-	-
Sample Reference	**Sample Depth**	**Sample Description**																											
BH1	0.2-0.5	Fill: silty sand	LPQL	LPQL	9	24	19	LPQL	26	35	2.39	0.19	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	0	LPQL
BH1	0.5-0.95	Fill: silty sand	LPQL	LPQL	6	14	19	LPQL	18	21	0.18	0.08	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	0	LPQL
BH1	1.5-1.95	Silty clayey sand	LPQL	LPQL	7	9	11	LPQL	4	14	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	0	LPQL
BH2	0.2-0.3	Fill: silty clayey sand	LPQL	LPQL	8	14	26	LPQL	6	43	2.14	0.24	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	0	LPQL
Total Number of samples			4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Maximum Value			LPQL	LPQL	9	24	26	LPQL	26	43	2.39	0.24	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	LPQL	0	nc

EXPLANATION:

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

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

ABBREVIATIONS:

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

TABLE C
SOIL INTRA-LABORATORY DUPLICATE RESULTS
QA/QC - RELATIVE PERCENTAGE DIFFERENCES
All results in mg/kg unless stated otherwise

SAMPLE	ANALYSIS	Envirolab PQL	INITIAL	REPEAT	MEAN	RPD %
Intra-laboratory	Arsenic	4	LPQL	LPQL	LPQL	NC
Soil	Cadmium	0.5	LPQL	LPQL	LPQL	NC
sample ID = BH1 (1.5-1.95m)	Chromium	1	7	6	6.5	15
Dup ID = Dup 1	Copper	1	9	7	8	25
	Lead	1	11	8	9.5	32
Envirolab Report: 53640	Mercury	0.1	LPQL	LPQL	LPQL	NC
	Nickel	1	4	3	3.5	29
	Zinc	1	14	12	13	15

EXPLANATION:

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

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

RPD Results Above the Acceptance Criteria **VALUE**

ABBREVIATIONS:

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

TABLE D
GROUNDWATER MONITORING ANALYSIS
All results in µg/L unless stated otherwise.

ANALYTE	PQL Envirolab Services	SAC ANZECC 2000 Fresh Waters[1]	SAC HMTV	SAC US EPA[4]	SAC Drinking Water[2]	SAMPLES MW1
Field Measurements *						
Dissolved oxygen (ppm)	-	nsl	-	nsl	>85%[d]	1
Redox potential (mV)	-	nsl	-	nsl	nsl	87.1
pH	-	6.5 - 8.5[f]	-	nsl	6.5 - 8.5[d]	6.19
Conductivity (µS/cm)	-	nsl	-	nsl	nsl	806
Temperature C°	-	nsl	-	nsl	nsl	21.8
Inorganic Compounds and Parameters						
Oil and Grease (mg/L)	5	10[e]	-	nsl	nsl	LPQL
pH	0.1	6.5 - 8.5[f]	-	nsl	6.5 - 8.5[d]	6.5
Electrical Conductivity (µS/cm)	0.001	nsl	-	nsl	nsl	820
Hardness (mgCaCo3/L)	1	nsl	-	nsl	200[d]	170
Total Dissolved Solids (mg/L)	5.0	nsl	-	nsl	500[d]	580
Heavy Metals						
Arsenic (As III)	1	24	-	-	7	LPQL
Cadmium	0.1	0.2	0.9	-	2	0.1
Chromium (Total)	1	3.3[a]	4.1	-	50	LPQL
Copper	1	1.4	6.1	-	2000	2
Lead	1	3.4	30.8	-	10	LPQL
Mercury (inorganic)	0.4	0.6	-	-	1	LPQL
Nickel	1	11	48.1	-	20	9
Zinc	1	8	34.9	-	3000[d]	11
Petroleum Hydrocarbons						
Hydrocarbons C6-C9	10	nsl	-	-	nsl	**90**
Hydrocarbons C10-C14	50	nsl	-	-	nsl	LPQL
Hydrocarbons C15-C28	100	nsl	-	-	nsl	LPQL
Hydrocarbons C29-C36	100	nsl	-	-	nsl	LPQL
Total Hydrocarbons C10-C36	-	600[b]	-	-	nsl	LPQL
BTEX						
Benzene	1	950[a]	-	-	1	LPQL
Toluene	1	180[a]	-	-	800	LPQL
Ethylbenzene	1	80[a]	-	-	300	LPQL
m+p-xylene	2	75[a]	-	-	nsl	LPQL
o-xylene	1	350[a]	-	-	nsl	LPQL
Polycyclic Aromatic Hydrocarbons (PAHs)						
Naphthalene	1	16[a]	-	0.14	nsl	LPQL
Phenanthrene	1	0.6[c]	-	nsl	nsl	LPQL
Anthracene	1	0.01[c]	-	11000	nsl	LPQL
Fluoranthene	1	1[c]	-	1500	nsl	LPQL
Benzo(a)pyrene	1	0.1[c]	-	-	0.01	LPQL

EXPLANATION:

1 - ANZECC Australian Water Quality Guidelines for Fresh Waters, 2000 - Trigger Values for protection of 95% of species
2 - NHMRC Australian Drinking Water Guidelines (2004)
3 - Hardness Modified Trigger Values (HMTV)

4 - In the absence of Australian guidelines, the USEPA (2010) Region 9 Screening Levels for tapwater have been adopted as a preliminary screening tool
a - In the absence of a high reliability guideline concentration, the moderate or low reliability guideline concentration has been quoted
b - In the absence of locally endorsed guidelines, the Dutch intervention levels (Ministry of Housing and the Environment 2000) have been quoted
c - 99% trigger values adopted due to the potential for bioaccumulation effects
d - In the absence of a health guideline the aesthetic guideline concentration has been quoted
e - NSW EPA (DECCW) Guidelines for Assessing Service Station Sites (1994)
f - ANZECC Australian Water Quality Guidelines for Fresh and Marine Waters, 2000 - Level for NSW Lowland Rivers.

* Field Measurements Undertaken on 5 April 2011

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

ABBREVIATIONS:

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

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

SAMPLE	ANALYSIS	Envirolab PQL	INITIAL	REPEAT	MEAN	RPD %
Intra-laboratory	C_6-C_9 TPH	10	90	94	92	4
Water	C_{10}-C_{14} TPH	50	LPQL	LPQL	LPQL	NC
sample ID = MW1	C_{15}-C_{28} TPH	100	LPQL	LPQL	LPQL	NC
Dup ID = Dup A	C_{29}-C_{36} TPH	100	LPQL	LPQL	LPQL	NC
	Benzene	1	LPQL	LPQL	LPQL	NC
Envirolab Report: 53873	Toluene	1	LPQL	LPQL	LPQL	NC
	Ethylbenzene	1	LPQL	LPQL	LPQL	NC
	Total Xylenes	1	LPQL	LPQL	LPQL	NC

EXPLANATION:

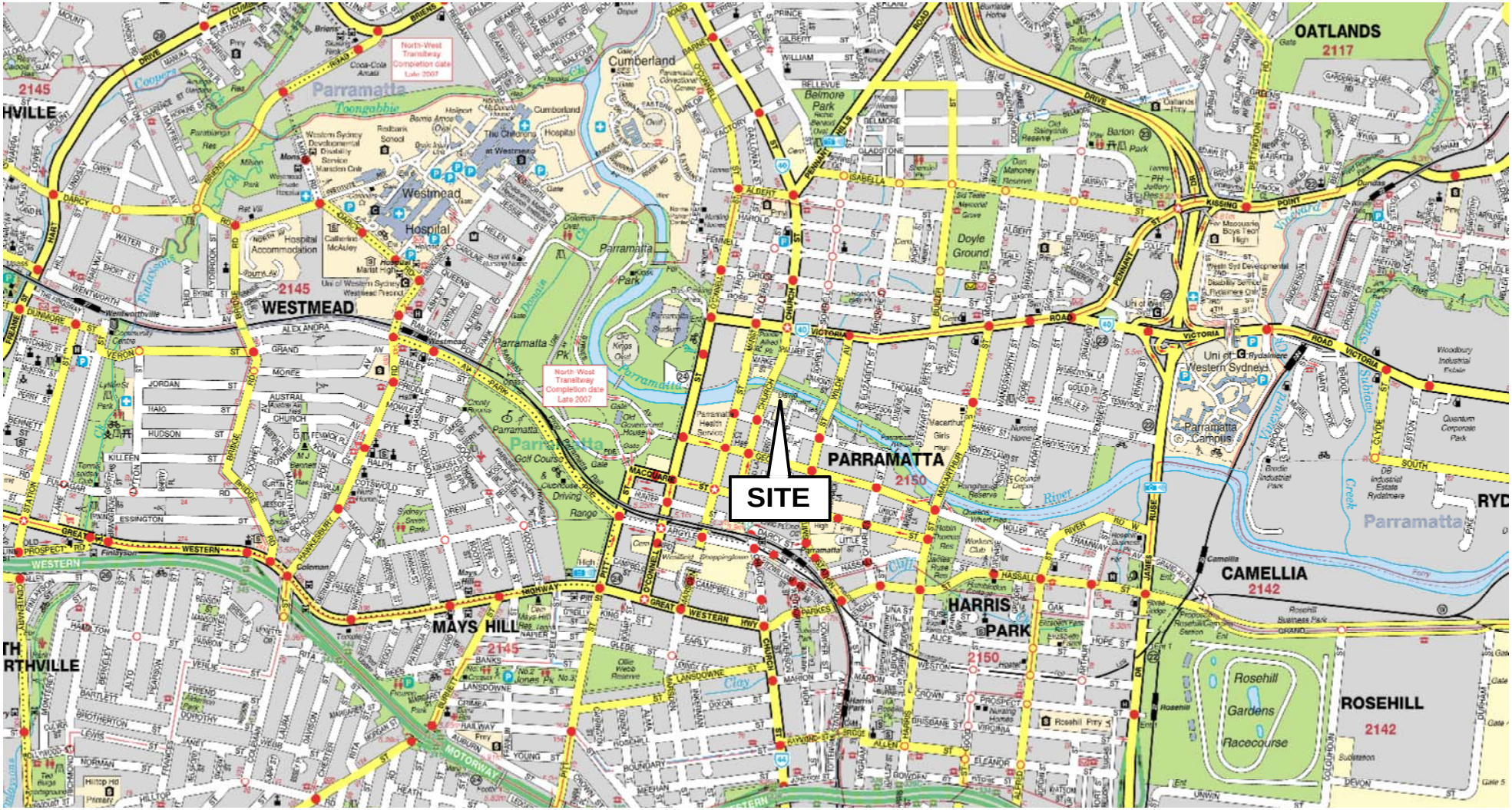
The RPD value is calculated as the absolute value of the difference between the initial and repeat results divided by the average value expressed as a percentage. The following acceptance criteria will be used to assess the RPD results:

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

RPD Results Above the Acceptance Criteria **VALUE**

ABBREVIATIONS:

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



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

UBD Map ref: 211 C1-2

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

EIS ENVIRONMENTAL INVESTIGATION SERVICES	Project Number: **E24680KH**	Title: **SITE LOCATION PLAN**
	Figure: **1**	Address: **330 CHURCH STREET, PARRAMATTA, NSW**

LEGEND:

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

NOTES:
Figure 2 has been recreated from Google Earth Pro

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

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

Approximate Scale (m): 0 5 10 15 20 25

ENVIRONMENTAL INVESTIGATION SERVICES

Project Number:	Title:
E24680KH	BOREHOLE LOCATION PLAN
Figure: 2	Address: 330 CHURCH STREET, PARRAMATTA, NSW

APPENDIX A

(Borehole Logs and Geotechnical Explanatory Notes)

Jeffery and Katauskas Pty Ltd
CONSULTING GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

Borehole No. 1
1/2

BOREHOLE LOG

Client: MERITON APARTMENTS PTY LTD

Project: PROPOSED RESIDENTIAL DEVELOPMENT

Location: 330 CHURCH STREET, PARRAMATTA, NSW

Job No. 24680ZN **Method:** SPIRAL AUGER JK300 **R.L. Surface:** ≈ 7.1

Date: 28-3-11 **Datum:** AHD

Logged/Checked by: H.W./

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
						0			ASPHALTIC CONCRETE: 30mm.t over CONCRETE: 130mm.t				NO OBSERVED REINFORCEMENT
					N = 7 4,3,4				FILL: Silty sand, fine to coarse grained, dark brown, with a trace of slag gravel.	M	-	-	APPEARS POORLY COMPACTED
					N = 7 3,4,3	1		SP	SILTY CLAYEY SAND: fine to medium grained, red brown.	M	L	-	ALLUVIAL
					N = 12 6,6,6	2							
ON 1-4-11 ▼						3			as above, but mottled light grey.		MD		
ON COMP. AUGERING ▶					N = 11 2,5,6	4				W			
						5			as above, but fine to coarse grained.				
					N = 2 1,1,1	6					VL		
						7							

Jeffery and Katauskas Pty Ltd
CONSULTING GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

Borehole No. 1 2/2

BOREHOLE LOG

Client: MERITON APARTMENTS PTY LTD

Project: PROPOSED RESIDENTIAL DEVELOPMENT

Location: 330 CHURCH STREET, PARRAMATTA, NSW

Job No. 24680ZN **Method:** SPIRAL AUGER JK300 **R.L. Surface:** ≈ 7.1

Date: 28-3-11 **Datum:** AHD

Logged/Checked by: H.W./

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
								SP	SILTY CLAYEY SAND: fine to coarse grained, light grey.	W	L		
					N = 7 4,3,4				SAND: fine to medium grained, brown, with silt fines.				
						8							
								CL	SILTY CLAY: medium plasticity, grey.	MC>PL	St	-	RESIDUAL
					N = 10 3,4,6	9						100 190 150	
						10		-	SANDSTONE: fine to medium grained, light grey.	SW	L-M	-	BANDED LOW TO MODERATE 'TC' BIT RESISTANCE
						11							
						12							50mm DIAMETER PVC STANDPIPE PIEZOMETER INSTALLED TO10. 4m DEPTH, 9m SLOTTED, 1.4m CASING. 2mm SAND FILTER PACK TO 1m DEPTH, BENTONITE SEAL TO 0.1m DEPTH. CAST IRON GATIC COVER CONCRETED AT SURFACE.
						13					M		
									END OF BOREHOLE AT 13.5m				
						14							

Jeffery and Katauskas Pty Ltd
CONSULTING GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

Borehole No. **2** 1/1

BOREHOLE LOG

Client: MERITON APARTMENTS PTY LTD

Project: PROPOSED RESIDENTIAL DEVELOPMENT

Location: 330 CHURCH STREET, PARRAMATTA, NSW

Job No. 24680ZN **Method:** HAND AUGER **R.L. Surface:** ≈ 3.7

Date: 29-3-11 **Datum:** AHD

Logged/Checked by: H.W./

Groundwater Record	SAMPLES ES	SAMPLES ASS	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION					REFER TO DCP TEST RESULTS	0			FILL: Silty clayey sand, fine to medium grained, dark brown, with fine to medium grained sandstone gravel, and a trace of root fibres and ironstone gravel.	D			GRASSS COVER APPEARS POORLY COMPACTED
						1			as above, but with cemented sandy clay nodules.				
									as above, but with slag gravel and ash.				HAND AUGER REFUSAL ON OBSTRUCTION IN FILL
									END OF BOREHOLE AT 1.1m				
						2							
						3							
						4							
						5							
						6							
						7							

Jeffery and Katauskas Pty Ltd

CONSULTING GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
ABN 17 003 550 801

REPORT EXPLANATION NOTES

INTRODUCTION

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

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

DESCRIPTION AND CLASSIFICATION METHODS

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

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

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

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

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

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

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

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

SAMPLING

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

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

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

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

INVESTIGATION METHODS

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

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

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

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

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

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

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

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

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

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

The test results are reported in the following form:

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

  N = 13
  4, 6, 7

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

  N>30
  15, 30/40mm

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

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

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

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

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

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

The information provided on the charts comprise:

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

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

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

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

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

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

Two relatively similar tests are used:

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

LOGS

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

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

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

GROUNDWATER

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

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

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

FILL

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

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

LABORATORY TESTING

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

ENGINEERING REPORTS

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

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

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

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

SITE ANOMALIES

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

REPRODUCTION OF INFORMATION FOR CONTRACTUAL PURPOSES

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

Copyright in all documents (such as drawings, borehole or test pit logs, reports and specifications) provided by the Company shall remain the property of Jeffery and Katauskas Pty Ltd. Subject to the payment of all fees due, the Client alone shall have a licence to use the documents provided for the sole purpose of completing the project to which they relate. License to use the documents may be revoked without notice if the Client is in breach of any objection to make a payment to us.

REVIEW OF DESIGN

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

SITE INSPECTION

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

Requirements could range from:

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

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

iii) full time engineering presence on site.

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CONSULTING GEOTECHNICAL & ENVIRONMENTAL ENGINEERS

GRAPHIC LOG SYMBOLS FOR SOILS AND ROCKS

SOIL


FILL


TOPSOIL


CLAY (CL, CH)


SILT (ML, MH)


SAND (SP, SW)


GRAVEL (GP, GW)


SANDY CLAY (CL, CH)


SILTY CLAY (CL, CH)


CLAYEY SAND (SC)


SILTY SAND (SM)


GRAVELLY CLAY (CL, CH)


CLAYEY GRAVEL (GC)


SANDY SILT (ML)


PEAT AND ORGANIC SOILS

ROCK


CONGLOMERATE


SANDSTONE


SHALE


SILTSTONE, MUDSTONE, CLAYSTONE


LIMESTONE


PHYLLITE, SCHIST


TUFF


GRANITE, GABBRO


DOLERITE, DIORITE


BASALT, ANDESITE


QUARTZITE

DEFECTS AND INCLUSIONS


CLAY SEAM


SHEARED OR CRUSHED SEAM


BRECCIATED OR SHATTERED SEAM/ZONE


IRONSTONE GRAVEL


ORGANIC MATERIAL

OTHER MATERIALS


CONCRETE


BITUMINOUS CONCRETE, COAL


COLLUVIUM

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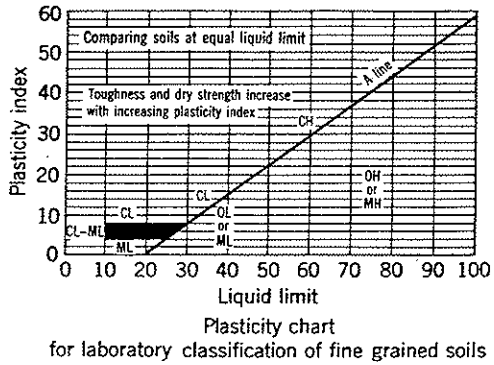
UNIFIED SOIL CLASSIFICATION TABLE

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



Plasticity chart
for laboratory classification of fine grained soils

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

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

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LOG SYMBOLS

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

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ABN 17 003 550 801

LOG SYMBOLS

ROCK MATERIAL WEATHERING CLASSIFICATION

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

ROCK STRENGTH

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

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

ABBREVIATIONS USED IN DEFECT DESCRIPTION

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

APPENDIX B

(Laboratory Reports and Chain of Custody Documents)

Envirolab Services Pty Ltd
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CERTIFICATE OF ANALYSIS 53640

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

Attention: Todd Hore

Sample log in details:

Your Reference:	**E24680KH, Parramatta**
No. of samples:	14 Soils
Date samples received / completed instructions received	30/03/11 / 30/03/11

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

Report Details:

Date results requested by: / Issue Date:	7/04/11 / 6/04/11
Date of Preliminary Report:	Not Issued

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

Results Approved By:

Jacinta Hurst
Laboratory Manager

Nancy Zhang
Chemist

Rhian Morgan
Reporting Supervisor

Giovanni Agosti
Technical Manager

Matt Mansfield
Approved Signatory

vTRH & BTEX in Soil					
Our Reference:	UNITS	53640-1	53640-2	53640-3	53640-4
Your Reference	----------	BH1	BH1	BH1	BH2
Depth	----------	0.2-0.5	0.5-0.95	1.5-1.95	0.2-0.3
Date Sampled		29/03/2011	29/03/2011	29/03/2011	29/03/2011
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	01/04/2011	01/04/2011	01/04/2011	01/04/2011
Date analysed	-	04/04/2011	04/04/2011	04/04/2011	04/04/2011
vTRH C_6 - C_9	mg/kg	<25	<25	<25	<25
Benzene	mg/kg	<0.5	<0.5	<0.5	<0.5
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	91	92	92	98

sTRH in Soil (C10-C36)					
Our Reference:	UNITS	53640-1	53640-2	53640-3	53640-4
Your Reference	----------	BH1	BH1	BH1	BH2
Depth	----------	0.2-0.5	0.5-0.95	1.5-1.95	0.2-0.3
Date Sampled		29/03/2011	29/03/2011	29/03/2011	29/03/2011
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	01/04/2011	01/04/2011	01/04/2011	01/04/2011
Date analysed	-	02/04/2011	02/04/2011	02/04/2011	02/04/2011
$TRHC_{10}$ - C_{14}	mg/kg	<50	<50	<50	<50
$TRHC_{15}$ - C_{28}	mg/kg	<100	<100	<100	<100
$TRHC_{29}$ - C_{36}	mg/kg	<100	<100	<100	<100
Surrogate o-Terphenyl	%	87	87	87	86

PAHs in Soil					
Our Reference:	UNITS	53640-1	53640-2	53640-3	53640-4
Your Reference	----------	BH1	BH1	BH1	BH2
Depth	----------	0.2-0.5	0.5-0.95	1.5-1.95	0.2-0.3
Date Sampled		29/03/2011	29/03/2011	29/03/2011	29/03/2011
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	01/04/2011	01/04/2011	01/04/2011	01/04/2011
Date analysed	-	01/04/2011	01/04/2011	01/04/2011	01/04/2011
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.5	<0.1	<0.1	0.1
Anthracene	mg/kg	0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.5	<0.1	<0.1	0.4
Pyrene	mg/kg	0.4	0.1	<0.1	0.4
Benzo(a)anthracene	mg/kg	0.2	<0.1	<0.1	0.2
Chrysene	mg/kg	0.2	<0.1	<0.1	0.2
Benzo(b+k)fluoranthene	mg/kg	0.3	<0.2	<0.2	0.4
Benzo(a)pyrene	mg/kg	0.19	0.08	<0.05	0.24
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	0.1
Surrogate p-Terphenyl-d_{14}	%	87	88	87	89

Organochlorine Pesticides in soil					
Our Reference:	UNITS	53640-1	53640-2	53640-3	53640-4
Your Reference	----------	BH1	BH1	BH1	BH2
Depth	----------	0.2-0.5	0.5-0.95	1.5-1.95	0.2-0.3
Date Sampled		29/03/2011	29/03/2011	29/03/2011	29/03/2011
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	01/04/2011	01/04/2011	01/04/2011	01/04/2011
Date analysed	-	02/04/2011	02/04/2011	02/04/2011	02/04/2011
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	97	102	104	113

Organophosphorus Pesticides					
Our Reference:	UNITS	53640-1	53640-2	53640-3	53640-4
Your Reference	----------	BH1	BH1	BH1	BH2
Depth	----------	0.2-0.5	0.5-0.95	1.5-1.95	0.2-0.3
Date Sampled		29/03/2011	29/03/2011	29/03/2011	29/03/2011
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	01/04/2011	01/04/2011	01/04/2011	01/04/2011
Date analysed	-	02/04/2011	02/04/2011	02/04/2011	02/04/2011
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	97	102	104	113

PCBs in Soil					
Our Reference:	UNITS	53640-1	53640-2	53640-3	53640-4
Your Reference	----------	BH1	BH1	BH1	BH2
Depth	----------	0.2-0.5	0.5-0.95	1.5-1.95	0.2-0.3
Date Sampled		29/03/2011	29/03/2011	29/03/2011	29/03/2011
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	01/04/2011	01/04/2011	01/04/2011	01/04/2011
Date analysed	-	02/04/2011	02/04/2011	02/04/2011	02/04/2011
Arochlor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1
Arochlor 1221*	mg/kg	<0.1	<0.1	<0.1	<0.1
Arochlor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1
Arochlor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1
Arochlor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1
Arochlor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1
Arochlor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	97	102	104	113

Acid Extractable metals in soil						
Our Reference:	UNITS	53640-1	53640-2	53640-3	53640-4	53640-5
Your Reference	----------	BH1	BH1	BH1	BH2	DUP1
Depth	----------	0.2-0.5	0.5-0.95	1.5-1.95	0.2-0.3	-
Date Sampled		29/03/2011	29/03/2011	29/03/2011	29/03/2011	29/03/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date digested	-	01/04/2011	01/04/2011	01/04/2011	01/04/2011	01/04/2011
Date analysed	-	01/04/2011	01/04/2011	01/04/2011	01/04/2011	01/04/2011
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	mg/kg	9	6	7	8	6
Copper	mg/kg	24	14	9	14	7
Lead	mg/kg	19	19	11	26	8
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	26	18	4	6	3
Zinc	mg/kg	35	21	14	43	12

Miscellaneous Inorg - soil						
Our Reference:	UNITS	53640-6	53640-9	53640-11	53640-12	53640-14
Your Reference	----------	BH1	BH1	BH1	BH1	BH2
Depth	----------	1.0-1.3	4.0-4.45	6.0-6.45	7.5-7.95	0.2-0.3
Date Sampled		29/03/2011	29/03/2011	29/03/2011	29/03/2011	29/03/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	04/04/2011	04/04/2011	04/04/2011	04/04/2011	04/04/2011
Date analysed	-	04/04/2011	04/04/2011	04/04/2011	04/04/2011	04/04/2011
pH 1:5 soil:water	pH Units	8.3	7.7	7.3	6.2	8.0

sPOCAS Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- ----------	53640-6 BH1 1.0-1.3 29/03/2011 Soil	53640-9 BH1 4.0-4.45 29/03/2011 Soil	53640-11 BH1 6.0-6.45 29/03/2011 Soil	53640-12 BH1 7.5-7.95 29/03/2011 Soil	53640-14 BH2 0.2-0.3 29/03/2011 Soil
Date prepared	-	31/3/2011	31/3/2011	31/3/2011	31/3/2011	31/3/2011
Date analysed	-	31/3/2011	31/3/2011	31/3/2011	31/3/2011	31/3/2011
pH $_{kcl}$	pH units	7.4	6.3	6.3	5.2	8.2
TAA pH 6.5	moles H^+/t	<5	<5	<5	6	<5
s-TAA pH 6.5	%w/w S	<0.01	<0.01	<0.01	0.01	<0.01
pH $_{Ox}$	pH units	5.7	4.5	4.3	2.6	5.4
TPA pH 6.5	moles H^+/t	<5	<5	<5	25	<5
s-TPA pH 6.5	%w/w S	<0.01	<0.01	<0.01	0.04	<0.01
TSA pH 6.5	moles H^+/t	<5	<5	<5	19	<5
s-TSA pH 6.5	%w/w S	<0.01	<0.01	<0.01	0.03	<0.01
ANC_E	% $CaCO_3$	<0.05	<0.05	<0.05	<0.05	<0.05
a-ANC_E	moles H^+/t	<5	<5	<5	<5	<5
s-ANC_E	%w/w S	<0.05	<0.05	<0.05	<0.05	<0.05
S_{KCl}	%w/w S	<0.005	<0.005	0.008	0.02	<0.005
S_P	%w/w	<0.005	<0.005	0.005	0.18	0.007
S_{POS}	%w/w	<0.005	<0.005	<0.005	0.16	0.005
a-S_{POS}	moles H^+/t	<5	<5	<5	99	<5
Ca_{KCl}	%w/w	0.10	0.06	0.07	0.01	0.12
Ca_P	%w/w	0.12	0.08	0.08	0.02	0.14
Ca_A	%w/w	0.017	0.021	0.013	0.005	0.015
Mg_{KCl}	%w/w	0.007	0.031	0.027	0.006	<0.005
Mg_P	%w/w	0.012	0.036	0.042	0.007	0.006
Mg_A	%w/w	<0.005	0.005	0.015	<0.005	<0.005
SRAS	%w/w	<0.005	<0.005	<0.005	<0.005	<0.005
S_{HCl}	%w/w S	<0.005	<0.005	0.019	0.013	<0.005
S_{NAS}	%w/w S	<0.005	<0.005	0.011	<0.005	<0.005
a-S_{NAS}	moles H^+/t	<5	<5	5	<5	<5
s-S_{NAS}	%w/w S	<0.01	<0.01	<0.01	<0.01	<0.01
a-Net Acidity	moles H^+/t	<10	<10	<10	110	<10
Liming rate	kg $CaCO_3$/t	<0.75	<0.75	<0.75	7.9	<0.75
a-Net Acidity without ANCE	moles H^+/t	NA	NA	NA	NA	NA
Liming rate without ANCE	kg $CaCO_3$/t	NA	NA	NA	NA	NA

Moisture						
Our Reference:	UNITS	53640-1	53640-2	53640-3	53640-4	53640-5
Your Reference	----------	BH1	BH1	BH1	BH2	DUP1
Depth	----------	0.2-0.5	0.5-0.95	1.5-1.95	0.2-0.3	-
Date Sampled		29/03/2011	29/03/2011	29/03/2011	29/03/2011	29/03/2011
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	1/04/2011	1/04/2011	1/04/2011	1/04/2011	1/04/2011
Date analysed	-	4/01/2011	4/01/2011	4/01/2011	4/01/2011	4/01/2011
Moisture	%	16	9.5	9.2	9.0	8.7

Asbestos ID - soils					
Our Reference:	UNITS	53640-1	53640-2	53640-3	53640-4
Your Reference	----------	BH1	BH1	BH1	BH2
Depth	----------	0.2-0.5	0.5-0.95	1.5-1.95	0.2-0.3
Date Sampled		29/03/2011	29/03/2011	29/03/2011	29/03/2011
Type of sample		Soil	Soil	Soil	Soil
Date analysed	-	31/3/2011	31/3/2011	31/3/2011	31/3/2011
Sample mass tested	g	Approx 40g	Approx 40g	Approx 40g	Approx 40g
Sample Description	-	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil
Asbestos ID in soil	-	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg	No asbestos found at reporting limit of 0.1g/kg
Trace Analysis	-	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected	Respirable fibres not detected

Method ID	Methodology Summary
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID.
Org-012 subset	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-008	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA 21st ED, 4500-H+.
Inorg-064	sPOCAS determined using titrimetric and ICP-AES techniques. Based on Acid Sulfate Soils Laboratory Methods Guidelines, Version 2.1 - June 2004.
Inorg-008	Moisture content determined by heating at 105 deg C for a minimum of 4 hours.
AS4964-2004	Asbestos ID - Qualitative identification of asbestos type fibres in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques.

QUALITY CONTROL vTRH & BTEX in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			01/04/2011	[NT]	[NT]	LCS-1	01/04/2011
Date analysed	-			04/04/2011	[NT]	[NT]	LCS-1	04/04/2011
vTRH C_6 - C_9	mg/kg	25	Org-016	<25	[NT]	[NT]	LCS-1	100%
Benzene	mg/kg	0.5	Org-016	<0.5	[NT]	[NT]	LCS-1	117%
Toluene	mg/kg	0.5	Org-016	<0.5	[NT]	[NT]	LCS-1	104%
Ethylbenzene	mg/kg	1	Org-016	<1	[NT]	[NT]	LCS-1	95%
m+p-xylene	mg/kg	2	Org-016	<2	[NT]	[NT]	LCS-1	93%
o-Xylene	mg/kg	1	Org-016	<1	[NT]	[NT]	LCS-1	94%
Surrogate aaa-Trifluorotoluene	%		Org-016	105	[NT]	[NT]	LCS-1	93%

QUALITY CONTROL sTRH in Soil (C10-C36)	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			01/04/2011	[NT]	[NT]	LCS-1	01/04/2011
Date analysed	-			01/04/2011	[NT]	[NT]	LCS-1	01/04/2011
TRH C_{10} - C_{14}	mg/kg	50	Org-003	<50	[NT]	[NT]	LCS-1	84%
TRH C_{15} - C_{28}	mg/kg	100	Org-003	<100	[NT]	[NT]	LCS-1	91%
TRH C_{29} - C_{36}	mg/kg	100	Org-003	<100	[NT]	[NT]	LCS-1	86%
Surrogate o-Terphenyl	%		Org-003	86	[NT]	[NT]	LCS-1	85%

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			01/04/2011	[NT]	[NT]	LCS-1	01/04/2011
Date analysed	-			01/04/2011	[NT]	[NT]	LCS-1	01/04/2011
Naphthalene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-1	90%
Acenaphthylene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Acenaphthene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Fluorene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-1	88%
Phenanthrene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-1	92%
Anthracene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Fluoranthene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-1	87%
Pyrene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-1	90%
Benzo(a)anthracene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Chrysene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	LCS-1	102%
Benzo(b+k)fluoranthene	mg/kg	0.2	Org-012 subset	<0.2	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene	mg/kg	0.05	Org-012 subset	<0.05	[NT]	[NT]	LCS-1	96%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012 subset	<0.1	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012 subset	90	[NT]	[NT]	LCS-1	86%
QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			01/04/2011	[NT]	[NT]	LCS-1	01/04/2011
Date analysed	-			02/04/2011	[NT]	[NT]	LCS-1	02/04/2011
HCB	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-1	98%
gamma-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
beta-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-1	78%
Heptachlor	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-1	90%
delta-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
Aldrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-1	86%
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-1	94%
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
pp-DDE	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-1	76%
Dieldrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-1	92%
Endrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-1	93%
pp-DDD	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-1	81%
Endosulfan II	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
pp-DDT	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-1	92%
Methoxychlor	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
Surrogate TCLMX	%		Org-005	100	[NT]	[NT]	LCS-1	73%

QUALITY CONTROL Organophosphorus Pesticides	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			01/04/2011	[NT]	[NT]	LCS-1	01/04/2011
Date analysed	-			02/04/2011	[NT]	[NT]	LCS-1	02/04/2011
Diazinon	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NR]	[NR]
Dimethoate	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NR]	[NR]
Chlorpyriphos-methyl	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NR]	[NR]
Ronnel	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NR]	[NR]
Chlorpyriphos	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	LCS-1	129%
Fenitrothion	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	LCS-1	98%
Bromophos-ethyl	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NR]	[NR]
Ethion	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	LCS-1	120%
Surrogate TCLMX	%		Org-008	100	[NT]	[NT]	LCS-1	70%
QUALITY CONTROL PCBs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			01/04/2011	[NT]	[NT]	LCS-1	01/04/2011
Date analysed	-			02/04/2011	[NT]	[NT]	LCS-1	02/04/2011
Arochlor 1016	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Arochlor 1221*	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Arochlor 1232	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Arochlor 1242	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Arochlor 1248	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Arochlor 1254	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	LCS-1	98%
Arochlor 1260	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Surrogate TCLMX	%		Org-006	100	[NT]	[NT]	LCS-1	107%
QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date digested	-			01/04/2011	[NT]	[NT]	LCS-1	01/04/2011
Date analysed	-			01/04/2011	[NT]	[NT]	LCS-1	01/04/2011
Arsenic	mg/kg	4	Metals-020 ICP-AES	<4	[NT]	[NT]	LCS-1	101%
Cadmium	mg/kg	0.5	Metals-020 ICP-AES	<0.5	[NT]	[NT]	LCS-1	106%
Chromium	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-1	103%
Copper	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-1	104%
Lead	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-1	102%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Mercury	mg/kg	0.1	Metals-021 CV-AAS	<0.1	[NT]	[NT]	LCS-1	116%
Nickel	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-1	104%
Zinc	mg/kg	1	Metals-020 ICP-AES	<1	[NT]	[NT]	LCS-1	102%
QUALITY CONTROL Miscellaneous Inorg - soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			04/04/2011	[NT]	[NT]	LCS-1	04/04/2011
Date analysed	-			04/04/2011	[NT]	[NT]	LCS-1	04/04/2011
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	[NT]	[NT]	LCS-1	102%
QUALITY CONTROL sPOCAS	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			31/3/2011	53640-6	31/3/2011 || 31/3/2011	LCS	31/3/2011
Date analysed	-			31/3/2011	53640-6	31/3/2011 || 31/3/2011	LCS	31/3/2011
pH_{kcl}	pH units		Inorg-064	5.7	53640-6	7.4 || 7.7 || RPD: 4	LCS	101%
TAA pH 6.5	moles H^+/t	5	Inorg-064	<5	53640-6	<5 || <5	LCS	105%
s-TAA pH 6.5	%w/w S	0.01	Inorg-064	<0.01	53640-6	<0.01 || <0.01	LCS	102%
pH_{Ox}	pH units		Inorg-064	3.4	53640-6	5.7 || 5.5 || RPD: 4	LCS	105%
TPA pH 6.5	moles H^+/t	5	Inorg-064	<5	53640-6	<5 || <5	LCS	90%
s-TPA pH 6.5	%w/w S	0.01	Inorg-064	<0.01	53640-6	<0.01 || <0.01	LCS	90%
TSA pH 6.5	moles H^+/t	5	Inorg-064	<5	53640-6	<5 || <5	LCS	87%
s-TSA pH 6.5	%w/w S	0.01	Inorg-064	<0.01	53640-6	<0.01 || <0.01	LCS	87%
ANC_E	% $CaCO_3$	0.05	Inorg-064	<0.05	53640-6	<0.05 || <0.05	[NR]	[NR]
a-ANC_E	moles H^+/t	5	Inorg-064	<5	53640-6	<5 || <5	[NR]	[NR]
s-ANC_E	%w/w S	0.05	Inorg-064	<0.05	53640-6	<0.05 || <0.05	[NR]	[NR]
S_{KCl}	%w/w S	0.005	Inorg-064	<0.005	53640-6	<0.005 || <0.005	LCS	114%
S_P	%w/w	0.005	Inorg-064	<0.005	53640-6	<0.005 || <0.005	LCS	102%
S_{POS}	%w/w	0.005	Inorg-064	<0.005	53640-6	<0.005 || <0.005	LCS	98%
a-S_{POS}	moles H^+/t	5	Inorg-064	<5	53640-6	<5 || <5	LCS	99%

QUALITY CONTROL sPOCAS	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Ca_{KCl}	%w/w	0.005	Inorg-064	<0.005	53640-6	0.10 || 0.11 || RPD: 10	LCS	86%
Ca_{P}	%w/w	0.005	Inorg-064	<0.005	53640-6	0.12 || 0.12 || RPD: 0	LCS	72%
Ca_{A}	%w/w	0.005	Inorg-064	<0.005	53640-6	0.017 || 0.008 || RPD: 72	[NR]	[NR]
Mg_{KCl}	%w/w	0.005	Inorg-064	<0.005	53640-6	0.007 || 0.008 || RPD: 13	LCS	86%
Mg_{P}	%w/w	0.005	Inorg-064	<0.005	53640-6	0.012 || 0.012 || RPD: 0	LCS	89%
Mg_{A}	%w/w	0.005	Inorg-064	<0.005	53640-6	<0.005 || <0.005	[NR]	[NR]
SRAS	%w/w	0.005	Inorg-064	<0.005	53640-6	<0.005 || <0.005	[NR]	[NR]
S_{HCl}	%w/w S	0.005	Inorg-064	<0.005	53640-6	<0.005 || <0.005	LCS	100%
S_{NAS}	%w/w S	0.005	Inorg-064	<0.005	53640-6	<0.005 || <0.005	[NR]	[NR]
a-S_{NAS}	moles H^+/t	5	Inorg-064	<5	53640-6	<5 || <5	[NR]	[NR]
s-S_{NAS}	%w/w S	0.01	Inorg-064	<0.01	53640-6	<0.01 || <0.01	[NR]	[NR]
a-Net Acidity	moles H^+/t	10	Inorg-064	<10	53640-6	<10 || <10	LCS	98%
Liming rate	kg $CaCO_3$/t	0.75	Inorg-064	<0.75	53640-6	<0.75 || <0.75	LCS	98%
a-Net Acidity without ANCE	moles H^+/t	10	Inorg-064	<10	53640-6	NA || NA	[NR]	[NR]
Liming rate without ANCE	kg $CaCO_3$/t	0.75	Inorg-064	<0.75	53640-6	NA || NA	[NR]	[NR]

QUALITY CONTROL Moisture	UNITS	PQL	METHOD	Blank
Date prepared	-			01/04/2011
Date analysed	-			04/04/2011
Moisture	%	0.1	Inorg-008	<0.1

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

Report Comments:

Asbestos ID was analysed by Approved Identifier: Matt Mansfield
Asbestos ID was authorised by Approved Signatory: Matt Mansfield

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

Quality Control Definitions

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

Laboratory Acceptance Criteria

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

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

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

SAMPLE RECEIPT ADVICE

Client:

Environmental Investigation Services
PO Box 976
North Ryde BC NSW 1670

ph: 02 9888 5000
Fax: 02 9888 5001

Attention: Todd Hore

Sample log in details:

Your reference:	**E24680KH, Parramatta**
Envirolab Reference:	**53640**
Date received:	30/03/11
Date results expected to be reported:	**7/04/11**

Samples received in appropriate condition for analysis:	YES
No. of samples provided	14 Soils
Turnaround time requested:	Standard
Temperature on receipt	Cool
Cooling Method:	Ice Pack

Comments:

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

Contact details:

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

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
Envirolab Services Pty Ltd 12 Ashley Street Chatswood NSW 2067 Phone: (02) 99106200 Fax: (02) 99106201 Attention: Aileen	EIS Job Number: E24680KH Date Results Required: Standard Sheet 1 / 1	Environmental Investigation Services Rear 115 Wicks Road Macquarie Park NSW 2113 Phone: (02) 9888 5000 Fax: (02) 9888 5004 Contact: Todd Hore

Project: Proposed Development
Location: Parramatta
Sampler: HW

Sample Preservation: In esky on ice

Tests Required

Date Sampled	Lab Ref:	Borehole/ Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 6	Combo 6a	Combo 13	8 Metals	TPH	BTEX	PAHs	OCP/OPP/ PCBs	Asbestos	TCLP 6 Metals	TCLP PAHs	sPOCAS + pH
29/3/11	1	BH1	0.2/0.5	Glass jar + Asb Bag	0	Fill Silty sand		X										
	2	BH1	0.5/0.95	Glass jar + Asb Bag	0	"		X										
	3	BH1	1.5/1.95	Glass jar + Asb Bag	0	Silty Clayey sand		X										
	4	BH2	0.2/0.3	Glass jar + Asb Bag	0	Fill: Silty Clayey sand		X										
	5	Dup 1	–	Glass jar + Asb Bag	–	–				X								
	6	BH1	1.0/1.3	~~Glass jar +~~ ~~Asb~~ Bag	–	Silty Clayey sand												X
	7	BH1	2.5/3.0	~~Glass jar +~~ ~~Asb~~ Bag	–	"												
	8	BH1	3.0/3.45	~~Glass jar +~~ ~~Asb~~ Bag	–	"												
	9	BH1	4.0/4.45	~~Glass jar +~~ ~~Asb~~ Bag	–	"												X
	10	BH1	4.5/4.95	~~Glass jar +~~ ~~Asb~~ Bag	–	"												
	11	BH1	6.0/6.45	~~Glass jar +~~ ~~Asb~~ Bag	–	"												X
	12	BH1	7.5/7.95	~~Glass jar +~~ ~~Asb~~ Bag	–	Sand												X
	13	BH1	9.0/9.45	~~Glass jar +~~ ~~Asb~~ Bag	–	silty clay												
↓	14	BH2	0.2/0.3	~~Glass jar +~~ ~~Asb~~ Bag	–	Fill silty Clayey sand												X
				Glass jar + Asb Bag														
				Glass jar + Asb Bag														
				Glass jar + Asb Bag														
				Glass jar + Asb Bag														
				Glass jar + Asb Bag														
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				Glass jar + Asb Bag														
				Glass jar + Asb Bag														

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: 9910 6200
Job No: 53640
Date received: 30-3-11
Time received: 5pm
Received by: SS
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Remarks (comments/detection limits required):

Relinquished By:	Date:	Time:	Received By:	
[signature]	30/3/11		[signature] (ELS)	

30-3-11.
5pm.

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

CERTIFICATE OF ANALYSIS 53873

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

Attention: Todd Hore

Sample log in details:

Your Reference:	**E24680KH, Parramatta**
No. of samples:	2 Waters
Date samples received / completed instructions received	05/04/11 / 05/04/11

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

Report Details:

Date results requested by: / Issue Date:	12/04/11 / 12/04/11
Date of Preliminary Report:	Not Issued

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

Results Approved By:

Jacinta Hurst
Laboratory Manager

Nick Sarlamis
Inorganics Supervisor

Kasjan Paciuszkiewicz
Chemist

Jeremy Faircloth
Chemist

vTRH & BTEX in Water Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- ----------	53873-1 MW1 5/04/2011 Water	53873-2 Dup A 5/04/2011 Water
Date extracted	-	09/04/2011	09/04/2011
Date analysed	-	09/04/2011	09/04/2011
TRHC$_6$ - C$_9$	µg/L	90	94
Benzene	µg/L	<1	<1
Toluene	µg/L	<1	<1
Ethylbenzene	µg/L	<1	<1
m+p-xylene	µg/L	<2	<2
o-xylene	µg/L	<1	<1
Surrogate Dibromofluoromethane	%	90	91
Surrogate toluene-d8	%	100	100
Surrogate 4-BFB	%	91	91

sTRH in Water (C10-C36)			
Our Reference:	UNITS	53873-1	53873-2
Your Reference	----------	MW1	Dup A
Date Sampled	----------	5/04/2011	5/04/2011
Type of sample		Water	Water
Date extracted	-	06/04/2011	06/04/2011
Date analysed	-	07/04/2011	07/04/2011
$TRHC_{10}$ - C_{14}	µg/L	<50	<50
$TRHC_{15}$ - C_{28}	µg/L	<100	<100
$TRHC_{29}$ - C_{36}	µg/L	<100	<100
Surrogate o-Terphenyl	%	101	103

PAHs in Water		
Our Reference:	UNITS	53873-1
Your Reference	----------	MW1
Date Sampled	----------	5/04/2011
Type of sample		Water
Date extracted	-	06/04/2011
Date analysed	-	06/04/2011
Naphthalene	µg/L	<1
Acenaphthylene	µg/L	<1
Acenaphthene	µg/L	<1
Fluorene	µg/L	<1
Phenanthrene	µg/L	<1
Anthracene	µg/L	<1
Fluoranthene	µg/L	<1
Pyrene	µg/L	<1
Benzo(a)anthracene	µg/L	<1
Chrysene	µg/L	<1
Benzo(b+k)fluoranthene	µg/L	<2
Benzo(a)pyrene	µg/L	<1
Indeno(1,2,3-c,d)pyrene	µg/L	<1
Dibenzo(a,h)anthracene	µg/L	<1
Benzo(g,h,i)perylene	µg/L	<1
Surrogate p-Terphenyl-d_{14}	%	100

HM in water - dissolved		
Our Reference:	UNITS	53873-1
Your Reference	----------	MW1
Date Sampled	----------	5/04/2011
Type of sample		Water
Date prepared	-	7/4/2011
Date analysed	-	11/4/2011
Arsenic-Dissolved	µg/L	<1
Cadmium-Dissolved	µg/L	0.1
Chromium-Dissolved	µg/L	<1
Copper-Dissolved	µg/L	2
Lead-Dissolved	µg/L	<1
Mercury-Dissolved	µg/L	<0.4
Nickel-Dissolved	µg/L	9
Zinc-Dissolved	µg/L	11

Miscellaneous Inorganics		
Our Reference:	UNITS	53873-1
Your Reference	----------	MW1
Date Sampled	----------	5/04/2011
Type of sample		Water
Date prepared	-	05/04/2011
Date analysed	-	11/04/2011
pH	pH Units	6.5
Electrical Conductivity	µS/cm	820
Total Dissolved Solids (grav)	mg/L	580
Hardness	mgCaCO3 /L	170
Calcium - Dissolved	mg/L	32
Magnesium - Dissolved	mg/L	22
Oil & Grease (LLE)	mg/L	<5

Method ID	Methodology Summary
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID.
Org-012 subset	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.
Metals-022 ICP-MS	Determination of various metals by ICP-MS.
Metals-021 CV-AAS	Determination of Mercury by Cold Vapour AAS.
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA 21st ED, 4500-H+.
Inorg-002	Conductivity and Salinity - measured using a conductivity cell and dedicated meter, in accordance with APHA 21st ED 2510 and Rayment & Higginson.
Inorg-018	Total Dissolved Solids - determined gravimetrically in accordance with APHA 21st ED, 2540-C.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Inorg-003	Oil & Grease - determine gravimetrically following extraction with Hexane, in accordance with APHA 21st ED, 5220-B.

QUALITY CONTROL vTRH & BTEX in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			09/04/2011	[NT]	[NT]	LCS-W1	09/04/2011
Date analysed	-			09/04/2011	[NT]	[NT]	LCS-W1	09/04/2011
TRHC$_6$ - C$_9$	µg/L	10	Org-016	<10	[NT]	[NT]	LCS-W1	103%
Benzene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W1	104%
Toluene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W1	105%
Ethylbenzene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W1	102%
m+p-xylene	µg/L	2	Org-016	<2	[NT]	[NT]	LCS-W1	102%
o-xylene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W1	100%
Surrogate Dibromofluoromethane	%		Org-016	93	[NT]	[NT]	LCS-W1	93%
Surrogate toluene-d8	%		Org-016	101	[NT]	[NT]	LCS-W1	100%
Surrogate 4-BFB	%		Org-016	91	[NT]	[NT]	LCS-W1	100%
QUALITY CONTROL sTRH in Water (C10-C36)	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			06/04/2011	[NT]	[NT]	LCS-W2	06/04/2011
Date analysed	-			06/04/2011	[NT]	[NT]	LCS-W2	06/04/2011
TRHC$_{10}$ - C$_{14}$	µg/L	50	Org-003	<50	[NT]	[NT]	LCS-W2	71%
TRHC$_{15}$ - C$_{28}$	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W2	117%
TRHC$_{29}$ - C$_{36}$	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W2	87%
Surrogate o-Terphenyl	%		Org-003	97	[NT]	[NT]	LCS-W2	99%
QUALITY CONTROL PAHs in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			06/04/2011	[NT]	[NT]	LCS-W1	06/04/2011
Date analysed	-			06/04/2011	[NT]	[NT]	LCS-W1	06/04/2011
Naphthalene	µg/L	1	Org-012 subset	<1	[NT]	[NT]	LCS-W1	90%
Acenaphthylene	µg/L	1	Org-012 subset	<1	[NT]	[NT]	[NR]	[NR]
Acenaphthene	µg/L	1	Org-012 subset	<1	[NT]	[NT]	[NR]	[NR]
Fluorene	µg/L	1	Org-012 subset	<1	[NT]	[NT]	LCS-W1	91%
Phenanthrene	µg/L	1	Org-012 subset	<1	[NT]	[NT]	LCS-W1	96%
Anthracene	µg/L	1	Org-012 subset	<1	[NT]	[NT]	[NR]	[NR]
Fluoranthene	µg/L	1	Org-012 subset	<1	[NT]	[NT]	LCS-W1	90%

QUALITY CONTROL PAHs in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Pyrene	µg/L	1	Org-012 subset	<1	[NT]	[NT]	LCS-W1	92%
Benzo(a)anthracene	µg/L	1	Org-012 subset	<1	[NT]	[NT]	[NR]	[NR]
Chrysene	µg/L	1	Org-012 subset	<1	[NT]	[NT]	LCS-W1	104%
Benzo(b+k)fluoranthene	µg/L	2	Org-012 subset	<2	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene	µg/L	1	Org-012 subset	<1	[NT]	[NT]	LCS-W1	90%
Indeno(1,2,3-c,d)pyrene	µg/L	1	Org-012 subset	<1	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene	µg/L	1	Org-012 subset	<1	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene	µg/L	1	Org-012 subset	<1	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d_{14}	%		Org-012 subset	98	[NT]	[NT]	LCS-W1	102%
QUALITY CONTROL HM in water - dissolved	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			7/4/2011	[NT]	[NT]	LCS-W1	7/4/2011
Date analysed	-			11/4/2011	[NT]	[NT]	LCS-W1	11/4/2011
Arsenic-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W1	95%
Cadmium-Dissolved	µg/L	0.1	Metals-022 ICP-MS	<0.1	[NT]	[NT]	LCS-W1	96%
Chromium-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W1	89%
Copper-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W1	87%
Lead-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W1	102%
Mercury-Dissolved	µg/L	0.4	Metals-021 CV-AAS	<0.4	[NT]	[NT]	LCS-W1	104%
Nickel-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W1	88%
Zinc-Dissolved	µg/L	1	Metals-022 ICP-MS	<1	[NT]	[NT]	LCS-W1	96%

Client Reference: E24680KH, Parramatta

QUALITY CONTROL Miscellaneous Inorganics	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			05/04/2011	[NT]	[NT]	LCS-W2	05/04/2011
Date analysed	-			11/04/2011	[NT]	[NT]	LCS-W2	11/04/2011
pH	pH Units		Inorg-001	[NT]	[NT]	[NT]	LCS-W2	102%
Electrical Conductivity	µS/cm	1	Inorg-002	<1	[NT]	[NT]	LCS-W2	103%
Total Dissolved Solids (grav)	mg/L	5	Inorg-018	<5	[NT]	[NT]	LCS-W2	105%
Hardness	mgCaCO3/L	3		3.0	[NT]	[NT]	[NR]	[NR]
Calcium - Dissolved	mg/L	0.5	Metals-020 ICP-AES	<0.5	[NT]	[NT]	LCS-W2	91%
Magnesium - Dissolved	mg/L	0.5	Metals-020 ICP-AES	<0.5	[NT]	[NT]	LCS-W2	89%
Oil & Grease (LLE)	mg/L	5	Inorg-003	<5	[NT]	[NT]	LCS-W2	86%

Report Comments:

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

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

Quality Control Definitions

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

Laboratory Acceptance Criteria

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

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

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

SAMPLE RECEIPT ADVICE

Client:

Environmental Investigation Services
PO Box 976
North Ryde BC NSW 1670

ph: 02 9888 5000
Fax: 02 9888 5001

Attention: Todd Hore

Sample log in details:

Your reference:	**E24680KH, Parramatta**
Envirolab Reference:	**53873**
Date received:	05/04/11
Date results expected to be reported:	**12/04/11**

Samples received in appropriate condition for analysis:	YES
No. of samples provided	2 Waters
Turnaround time requested:	Standard
Temperature on receipt	Cool
Cooling Method:	Ice

Comments:

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

Contact details:

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

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

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

Attention: Aileen

Date Results Required: standard turnaround

SAMPLE AND CHAIN OF CUSTODY FORM

EIS Job Number: E24680KH

Sheet 1 /1

FROM:
Environmental Investigation Services

Rear 115 Wicks Road
Macquarie Park NSW 2113

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

Contact: Todd Hore

Project: Proposed Commercial/Residential Development
Location: Parramatta
Sampler: TH

Sample Preservation:
In esky on ice

	Date Sampled	Time Sampled	Location	Sample/ Borehole Number	Sample Container	PID (ppm/ Odour)	Sample Description	Tests Required: Combo 3	Heavy metals	TPH/BTEX	VOCs	PAHs	pH / EC / TDS / Hardness	Oil & Grease			Comments/Detection Limits Required
1	5/4/11			MW1	2 * 1L Amber Bottle 2 BTEX Vials HDPE Plastic Bottle		Water	X					X	X			
2	5/4/11			Dup A	2 * 1L Amber Bottle 2 BTEX Vials HDPE Plastic Bottle		Water			X							

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: 9910 6200

Job No: 53873 (W)
Date received: 5/4/11
Time received: 1520
Received by:
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Relinquished By:	Date: 5/4/11	Received By: (W) 5/4/11
	Time: 11am	
Relinquished By:	Date:	Received By:
	Time:	

Remarks:

All analysis PQLs to ANZECC (2000) Detection Limits Please
Low level PAHs

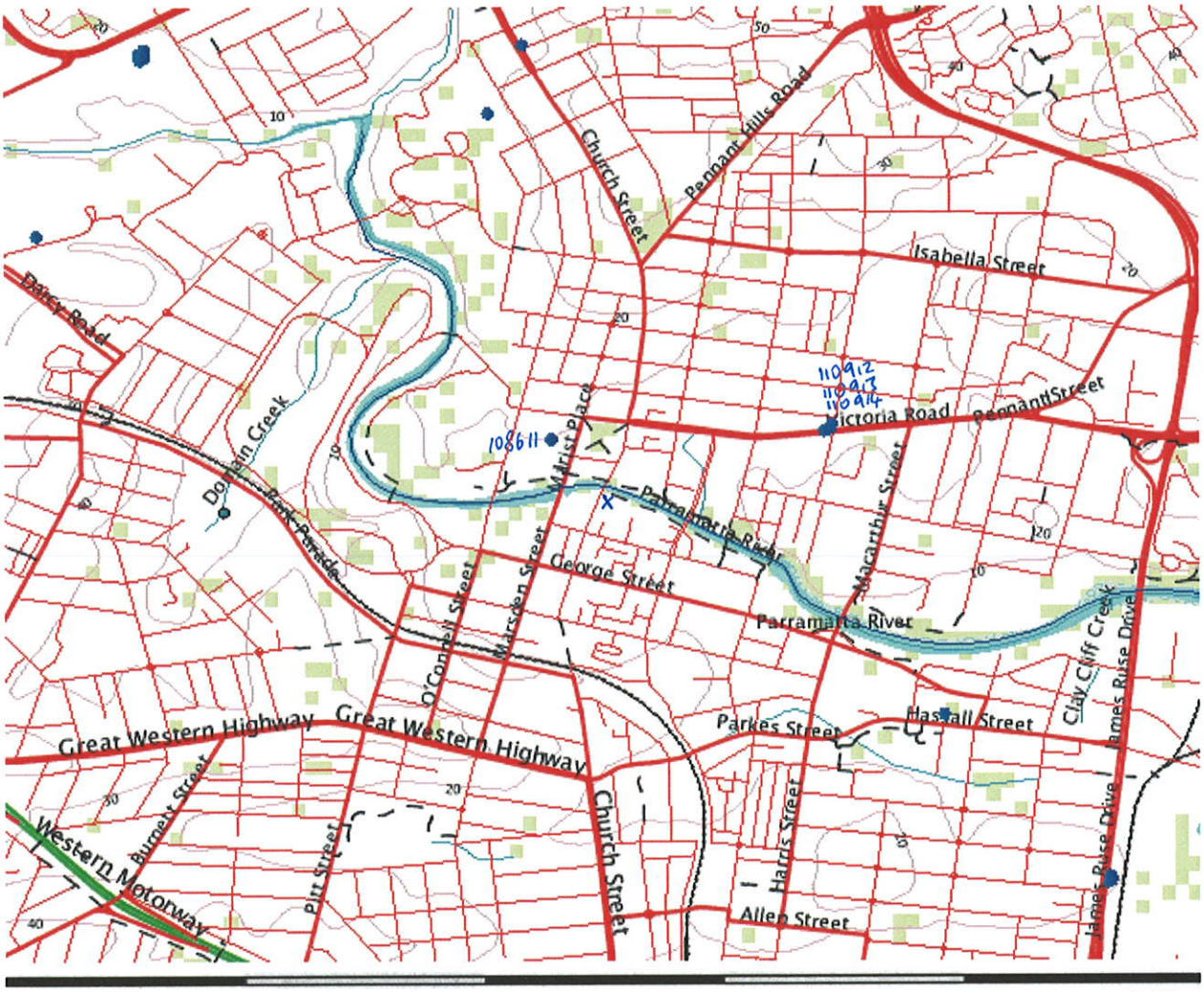
APPENDIX C

(Site History Documents – Groundwater Bore Records)

E24680KH, Parramatta

Map created with NSW Natural Resource Atlas - http://www.nratlas.nsw.gov.au

Wednesday, April 06, 2011



0 3 Km

Legend

Symbol	Layer	Custodian
	Groundwater Bores	
	Catchment Management Authority boundaries	
	Major rivers	
Primary/arterial road Motorway/freeway Railway Runway Contour Background	Topographic base map	

Groundwater Works Summary

For information on the meaning of fields please see Glossary
Document Generated on Wednesday, April 6, 2011

Print Report

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

Work Requested -- GW108611

Works Details (top)

GROUNDWATER NUMBER	GW108611
LIC-NUM	10BL162941
AUTHORISED-PURPOSES	DOMESTIC
INTENDED-PURPOSES	DOMESTIC
WORK-TYPE	Bore
WORK-STATUS	Supply Obtained
CONSTRUCTION-METHOD	Down Hole Hammer
OWNER-TYPE	Private
COMMENCE-DATE	
COMPLETION-DATE	2005-04-20
FINAL-DEPTH (metres)	60.50
DRILLED-DEPTH (metres)	60.50
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	ROMAN CATHOLIC CHURCH
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	6.20
SALINITY	5300.00
YIELD	5.50

Site Details (top)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	212 - HAWKESBURY RIVER
AREA-DISTRICT	
CMA-MAP	9130-3N
GRID-ZONE	56/1
SCALE	1:25,000
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6257213.00
EASTING	315129.00
LATITUDE	33 48' 33"
LONGITUDE	151 0' 10"
GS-MAP	

AMG-ZONE	56
COORD-SOURCE	GIS - Geographic Information System
REMARK	

Form-A (top)

COUNTY	CUMBERLAND
PARISH	FIELD OF MARS
PORTION-LOT-DP	1//1034092

Licensed (top)

COUNTY	CUMBERLAND
PARISH	FIELD OF MARS
PORTION-LOT-DP	1 1034092

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	11.50	206			Down Hole Hammer
1		Hole	Hole	11.50	60.50	165			Down Hole Hammer
1	1	Casing	Steel	-0.50	11.50	168	158.4		Welded; Driven into Hole; Open End
1	1	Casing	PVC Class 9	-0.50	29.50	140			Screwed and Glued; Suspended in Clamps
1		Annulus	Concrete	-0.10	11.50	206			

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
46.10	46.30	0.20				5.00			4650.00
56.50	56.60	0.10		6.20		0.20			5300.00

Drillers Log (top)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	1.00	1.00	Fill		
1.00	3.00	2.00	Clay, brown		
3.00	5.50	2.50	Shale		

5.50	7.00	1.50	Sandstone, with Shale bedding
7.00	22.00	15.00	Sandstone, grey
22.00	23.30	1.30	Sandstone, soft
23.30	46.10	22.80	Sandstone, grey
46.10	46.30	0.20	Sandstone, fractured
46.30	47.50	1.20	Sandstone, grey
47.50	47.70	0.20	Sandstone, fractured
47.70	56.50	8.80	Sandstone, grey
56.50	56.60	0.10	Sandstone, fractured
56.60	60.50	3.90	Sandstone, grey

Groundwater Works Summary

For information on the meaning of fields please see Glossary
Document Generated on Wednesday, April 6, 2011

Print Report

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

Work Requested -- GW110912

Works Details (top)

GROUNDWATER NUMBER	GW110912
LIC-NUM	10BL603583
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	2010-01-20
FINAL-DEPTH (metres)	10.00
DRILLED-DEPTH (metres)	10.00
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	AVIS RENT A CAR SYSTEM PTY LTD
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	7.00
SALINITY	
YIELD	

Site Details (top)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6257285.00
EASTING	315997.00
LATITUDE	33 48' 31"
LONGITUDE	151 0' 44"
GS-MAP	

AMG-ZONE	56
COORD-SOURCE	
REMARK	

Form-A (top)

COUNTY	CUMBERLAND
PARISH	FIELD OF MARS
PORTION-LOT-DP	1//509643

Licensed (top)

COUNTY	CUMBERLAND
PARISH	FIELD OF MARS
PORTION-LOT-DP	1 509643

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	10.00	125			Auger - Solid Flight
1	1	Opening	Screen	3.00	10.00	50			PVC Class 18; A: 1mm; Screwed
1		Annulus	Waterworn/Rounded	0.00	0.00				Graded; GS: 2-3mm

Water Bearing Zones (top)

FROM-DEPTH (metres)	TO-DEPTH (metres)	THICKNESS (metres)	ROCK-CAT-DESC	S-W-L	D-D-L	YIELD	TEST-HOLE-DEPTH (metres)	DURATION	SALINITY
7.00	10.00	3.00		7.00				0.25	

Drillers Log (top)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	0.10	0.10	CONCRETE		
0.10	0.50	0.40	FILL,SILTY CLAY, GRAVEL		
0.50	1.80	1.30	CLAY SANDY GREY RED		
1.80	2.50	0.70	CLAY SANDY GREY BROWN		
2.50	3.00	0.50	CLAY SANDY GREY		

3.00	3.50	0.50	CLAY SANDY SOME SHALE FRAGMENTS
3.50	4.30	0.80	SHALE CLAY BROWN
4.30	5.00	0.70	SHALE LOW STRENGTH,IRONSTONE,SANDSTONE
5.00	5.20	0.20	SHALE LOW STRENGTH DARK GREY
5.20	6.50	1.30	SHALE LOW STRENGTH BROWN SANDSTONE BANDS
6.50	6.80	0.30	SANDSTONE LOW STRENGTH WHITE
6.80	10.00	3.20	SANDSTONE MEDIUM STRENGTH WHITE

Groundwater Works Summary

For information on the meaning of fields please see Glossary
Document Generated on Wednesday, April 6, 2011

Print Report

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

Work Requested -- GW110913

Works Details (top)

GROUNDWATER NUMBER	GW110913
LIC-NUM	10BL603583
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	2010-01-20
FINAL-DEPTH (metres)	10.00
DRILLED-DEPTH (metres)	
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	AVIS RENT A CAR SYSTEM PTY LTD
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	7.00
SALINITY	
YIELD	

Site Details (top)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6257267.00
EASTING	315992.00
LATITUDE	33 48' 32"
LONGITUDE	151 0' 43"
GS-MAP	

AMG-ZONE 56
COORD-SOURCE
REMARK

Form-A (top)

COUNTY CUMBERLAND
PARISH FIELD OF MARS
PORTION-LOT-DP 1//509643

Licensed (top)

COUNTY CUMBERLAND
PARISH FIELD OF MARS
PORTION-LOT-DP 1 509643

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	10.00	125			Auger - Solid Flight
1	1	Opening	Screen	6.00	10.00	50			PVC Class 18; A: 1mm; Screwed
1		Annulus	Waterworn/Rounded	0.00	0.00				GS: 2-3mm

Water Bearing Zones (top)

FROM-DEPTH (metres)	TO-DEPTH (metres)	THICKNESS (metres)	ROCK-CAT-DESC	S-W-L	D-D-L	YIELD	TEST-HOLE-DEPTH (metres)	DURATION	SALINITY
7.00	10.00	3.00		7.00					

Drillers Log (top)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	0.10	0.10	CONCRETE		
0.10	0.20	0.10	CLAY SILTY RED BROWN		
0.20	1.20	1.00	CLAY SANDY RED BROWN		
1.20	2.00	0.80	CLAY SANDY RED		
2.00	3.50	1.50	CLAY SANDY BROWN		
3.50	4.50	1.00	CLAY SANDY BROWN/SHALE		
4.50	4.90	0.40	SANDSTONE BROWN LOW STRENGTH		

4.90	6.00	1.10	CLAY SANDY BROWN SHALE FRAGMENTS
6.00	6.20	0.20	SANDSTONE WEATHERED GREY WHITE
6.20	10.00	3.80	SANDSTONE WHITE

Groundwater Works Summary

For information on the meaning of fields please see Glossary
Document Generated on Wednesday, April 6, 2011

Print Report

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

Work Requested -- GW110914

Works Details (top)

GROUNDWATER NUMBER	GW110914
LIC-NUM	10BL603583
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	2010-01-20
FINAL-DEPTH (metres)	6.00
DRILLED-DEPTH (metres)	6.00
CONTRACTOR-NAME	
DRILLER-NAME	
PROPERTY	AVIS RENT A CAR SYSTEM PTY LTD
GWMA	-
GW-ZONE	-
STANDING-WATER-LEVEL	5.00
SALINITY	
YIELD	

Site Details (top)

REGION	10 - SYDNEY SOUTH COAST
RIVER-BASIN	
AREA-DISTRICT	
CMA-MAP	
GRID-ZONE	
SCALE	
ELEVATION	
ELEVATION-SOURCE	
NORTHING	6257260.00
EASTING	315973.00
LATITUDE	33 48' 32"
LONGITUDE	151 0' 43"
GS-MAP	

AMG-ZONE 56
COORD-SOURCE
REMARK

Form-A (top)

COUNTY CUMBERLAND
PARISH FIELD OF MARS
PORTION-LOT-DP 1//509643

Licensed (top)

COUNTY CUMBERLAND
PARISH FIELD OF MARS
PORTION-LOT-DP 1 509643

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	125			Auger - Solid Flight
1	1	Opening	Screen	2.50	6.00	50			PVC Class 18; A: 1mm; Screwed
1		Annulus	Waterworn/Rounded	0.00	0.00				Graded; GS: 2-3mm

Water Bearing Zones (top)

FROM-DEPTH (metres)	TO-DEPTH (metres)	THICKNESS (metres)	ROCK-CAT-DESC	S-W-L	D-D-L	YIELD	TEST-HOLE-DEPTH (metres)	DURATION	SALINITY
5.00	6.00	1.00		5.00				0.25	

Drillers Log (top)

FROM	TO	THICKNESS	DESC	GEO-MATERIAL	COMMENT
0.00	0.20	0.20	FILL, SILTY SAND BROWN		
0.20	0.40	0.20	FILL,SANDY CLAY RED GREY		
0.40	1.10	0.70	FILL SANDY CLAY RED		
1.10	2.50	1.40	CLAY SANDY RED		
2.50	3.20	0.70	CLAY RED		
3.20	5.00	1.80	SILTSTONE, SHALE FRAGMENTS		

5.00	5.50	0.50	CLAY SANDY BROWN
5.50	6.00	0.50	SANDSTONE BROWN LOW STRENGTH

(Site History Documents – Historical Land Title Records)

TH 30 MAR 2011

ADVANCE LEGAL SEARCHERS PTY LIMITED

(ACN 147 943 842)
ABN 82 147 943 842

P.O. Box 149
Yagoona NSW 2199

Telephone: +612 9754 1590
Mobile: 0412 169 809
Facsimile: +612 9754 1364
Email: alsearch@optusnet.com.au

26th March, 2011

ENVIRONMENTAL INVESTIGATION SERVICES
PO BOX 976,
NORTH RYDE BC NSW **1670**

Attention: Todd Hore,

RE: **330 Church Street, Parramatta**
Job No. E24680KH

Note 1: **Auto Consol 8663-164 (Lot 2 DP 788637)**
Note 2: **Auto Consol 8663-164 (Lot 3 DP 788637)**
Note 3: **Auto Consol 8663-164 (Lot 101 DP 1031459)**

Note 1

Current Search

Folio Identifier Auto Consol 8663-164 (title attached)
DP 788637 (plan attached)
Dated 23rd March, 2011
Registered Proprietor:
KARIMBLA PROPERTIES (NO. 22) PTY LTD

Title Tree
Auto Consol 8663-164

Auto Consol 8663-164

Folio Identifier 2/788637

Certificate of Title Volume 8454 Folio 215

Certificate of Title Volume 8414 Folio 91

Certificate of Title Volume 7124 Folio 235

Certificate of Title Volume 1239 Folio 216

PA 8520

****

Summary of proprietor(s)
Auto Consol 8663-164
Lot 2 DP 788637

Year	Proprietor
	(Lot 2 DP 788637 – Auto Consol 8663-164)
2004 – todate	Karimbla Properties (No. 22) Pty Ltd
2004 – 2004	Riverbank T'ee Pty Limited
2001 – 2004	Riverbank Corporate Centre Pty Limited
1999 – 2001	Claihope Pty Limited
1996 – 1999	Friendship Pty Limited
1989 – 1996	Scott's (Newcastle) Investments Limited
(2002 – todate)	*(various commercial leases shown on folio identifier A/c 8663-164 and historical search 2/788637)*
	(Part of Lot A DP 274346 and other lands – CTVol 8454 Fol 215)
1963 – 1989	Scott's (Newcastle) Investments Limited
(1963 – 1989)	*(various leases shown on CTVol 8454 Fol 215)*
	(Part of Lot A DP 2743346 and other lands – Area 3 Roods 15 ½ Perches – CTVol 8414 Fol 91)
1962 – 1963	Scott's (Newcastle) Investments Limited
(1962 – 1963)	*(various leases shown on CTVol 8414 Fol 91)*
	(Part of Lot A DP 274346 – Area 3 Roods 23 ¾ Perches – CTVol 7124 Fol 235)
1960 – 1962	Scott's (Newcastle) Investments Limited
1956 – 1960	James Keith Solling Houison, chartered accountant Gwenda Solling Houison, spinster
	(Allotments 7, 8 & 20 Section 25 Parish of St John and other lands – Area 1 Acre 1 Rood 29 Perches – CTVol 1239 Fol 216)
1954 – 1956	James Keith Solling Houison, chartered accountant Gwenda Solling Houison, spinster
1934 – 1954	Martha Florence Houison, spinster Maude Mary Houison, spinster
1898 – 1934	Fanny Eliza Housion, widow

*****

Note 2

Current Search

Folio Identifier Auto Consol 8663-164 (title attached)
DP 788637 (plan attached)
Dated 23rd March, 2011
Registered Proprietor:
KARIMBLA PROPERTIES (NO. 22) PTY LTD

Title Tree
Auto Consol 8663-164

Auto Consol 8663-164

Folio Identifier 3/788637

Certificate of Title Volume 8454 Folio 215

See Notes (a), (b) & (c)

(a)

CTVol 8414 Fol 91

CTVol 7124 Fol 235

CTVol 1239 Fol 216

PA 8520

***

(b)

CTVol 8384 Fol 250

(bi)

CTVol 6900 Fol 42

CTVol 1541 Fol 99

PA 11438

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(bii)

CTVol 6900 Fol 43

CTVol 1541 Fol 142

PA 11726

***

(c)

Certificate of Title Volume 8305 Folio 112

Certificate of Title Volume 2749 Folio 187

Certificate of Title Volume 712 Folio 173

PA 5910

*****

Summary of proprietor(s)
Auto Consol 8663-164

Year	Proprietor
	(Lot 3 DP 788637 – Auto Consol 8663-164)
2004 – todate	Karimbla Properties (No. 22) Pty Ltd
2004 – 2004	Riverbank T'ee Pty Limited
2001 – 2004	Riverbank Corporate Centre Pty Limited
1999 – 2001	Claihope Pty Limited
1996 – 1999	Friendship Pty Limited
1989 – 1996	Scott's (Newcastle) Investments Limited
(2002 – todate)	*(various commercial leases shown on folio identifier A/c 8663-164 and historical search 3/788637)*
	(Part of Allotment 18 Section 25 Parish of St John, Lots A & B DP 274346 – CTVol 8454 Fol 215)
1963 – 1989	Scott's (Newcastle) Investments Limited

See Notes (a), (b) & (c)

Note (a)

	(Part of Lot A DP 2743346 and other lands – Area 3 Roods 15 ½ Perches – CTVol 8414 Fol 91)
1962 – 1963	Scott's (Newcastle) Investments Limited
(1962 – 1963)	*(various leases shown on CTVol 8414 Fol 91)*
	(Part of Lot A DP 274346 – Area 3 Roods 23 ¾ Perches – CTVol 7124 Fol 235)
1960 – 1962	Scott's (Newcastle) Investments Limited
1956 – 1960	James Keith Solling Houison, chartered accountant Gwenda Solling Houison, spinster
	(Allotments 7, 8 & 20 Section 25 Parish of St John and other lands – Area 1 Acre 1 Rood 29 Perches – CTVol 1239 Fol 216)
1954 – 1956	James Keith Solling Houison, chartered accountant Gwenda Solling Houison, spinster
1934 – 1954	Martha Florence Houison, spinster Maude Mary Houison, spinster
1898 – 1934	Fanny Eliza Housion, widow

*****

Note (b)

	(Part of Lot A DP 2743346 and other lands – Area 3 Roods 15 ½ Perches – CTVol 8414 Fol 91)
1962 – 1963	Scott's (Newcastle) Investments Limited
(1962 – 1963)	*(various leases shown on CTVol 8414 Fol 91)*
	(Part of Lot A DP 274346 – Area 1 Rood 6 Perches – CTVol 8384 Fol 250)
1962 – 1962	Scott's (Newcastle) Investments Limited
(1962 – 1962)	*(lease shown on CTVol 8384 Fol 250)*

See Notes (bi) & (bii)

Note (bi)

	(Part of Allotment 18 Section 25 Parish of St John – Area 1 Rood 6 Perches – CTVol 6900 Fol 42)
1959 – 1962	Scott's (Newcastle) Investments Limited
1959 – 1959	Percy Whitlam Leabeater, lime & cement merchant
1954 – 1956	Rhoda Leabeater, widow
	(Part of Allotment 18 Section 25 Parish of St John – Area 1 Rood 6 Perches – CTVol 1541 Fol 99)
1942 – 1954	Rhoda Leadbeater, widow
1906 – 1942	Alfred Thomas Leabeater, junior, lime merchant
1904 – 1906	William Richard Murray, ironmonger

*****

Note (bii)

	(Part of Allotment 18 Section 25 Parish of St John – Area 17 ¾ Perches – CTVol 6900 Fol 43)
1960 – 1962	Scott's (Newcastle) Investments Limited
1959 – 1960	Broadway Tailors Pty Limited
1957 – 1959	H & S Credits Pty Limited
1957 – 1957	Edward Moss Waxman, retailer
1957 – 1957	Femina Silk Store Pty Limited
1955 – 1957	Terence Patrick Gavan, general merchant
1954 – 1955	Rhoda Leabeater, widow
	(Part of Allotment 18 Section 25 Parish of St John – Area 17 ¾ Perches – CTVol 1541 Fol 142)
1942 – 1954	Rhoda Leadbeater, widow
1941 - 1941	Alfred Thomas Leabeater, junior, lime and cement merchant
1925 – 1941	Leslie Porter, master builder
1918 – 1925	Peter Murphy, master butcher
1910 – 1918	William Barkeley, butcher
1904 – 1910	William Richard Murray, storekeeper

*****

Note (c)

	(Lots B & C DP 274346 – area 1 Rood 9 ¼ Perches – CTVol 8305 Fol 112)
1961 – 1963	Scott's (Newcastle) Investments Limited
(1961 – 1963)	*(various leases shown on CTVol 8305 Fol 112)*
	(Part of Lot 9 Section 25 Parish of St John – Area 3 Roods 39 ½ Perches – CTVol 2749 Fol 187)
1961 – 1961	Scott's (Newcastle) Investments Limited
1935 – 1961	David Bruce Frater, retired grazier
1917 – 1935	Henry Edward Haddrill, produce merchant
(1937 – 1961)	*(various commercial leases shown on CTVol 2749 Fol 187)*
	(Part of Lot 9 Section 25 Parish of St John and other lands – Area 1 Acre 1 Rood 31 ¾ Perches – CTVol 712 Fol 173)
1917 – 1917	Henry Edward Haddrill, produce merchant
1894 – 1917	Emily Smith, widow
1891 – 1894	Emily Smith, widow George Phillips, civil engineer, Colony of Queensland John Jabez Phillips, bank manager
1884 – 1891	Shepherd Smith, esquire

*****

Note 3

Current Search

Folio Identifier Auto Consol 8663-164 (title attached)
DP 1031459 (plan attached)
Dated 23rd March, 2011
Registered Proprietor:
KARIMBLA PROPERTIES (NO. 22) PTY LTD

Title Tree
Auto Consol 8663-164

Auto Consol 8663-164

Folio Identifier 101/1031459

Folio Identifier 1/724764

Certificate of Title Volume 2749 Folio 187

Certificate of Title Volume 712 Folio 173

PA 5910

*****

Summary of proprietor(s)
Auto Consol 8663-164
Lot 101 DP 1031459

Year	Proprietor
	(Lot 101 DP 1031459 – Auto Consol 8663-164)
2004 – todate	Karimbla Properties (No. 22) Pty Ltd
2004 – 2004	Riverbank T'ee Pty Limited
2001 – 2004	Riverbank Corporate Centre Pty Limited
2001 – 2001	Scott's (Newcastle) Investments Limited
(2005 – todate)	*(various commercial leases shown on folio identifier A/c 8663-164 and historical search 101/1031459)*
	(Lot 1 DP 724764)
1988 – 2001	Scott's (Newcastle) Investments Limited
(1996 – 2001)	*(various commercial leases shown on historical search 1/724764)*
	(Part of Lot 9 Section 25 Parish of St John – Area 3 Roods 39 ½ Perches – CTVol 2749 Fol 187)
1961 – 1988	Scott's (Newcastle) Investments Limited
1935 – 1961	David Bruce Frater, retired grazier
1917 – 1935	Henry Edward Haddrill, produce merchant
(1937 – 1961)	*(various commercial leases shown on CTVol 2749 Fol 187)*
	(Part of Lot 9 Section 25 Parish of St John and other lands - Area 1 Acre 1 Rood 31 ¾ Perches – CTVol 712 Fol 173)
1917 – 1917	Henry Edward Haddrill, produce merchant
1894 – 1917	Emily Smith, widow
1891 – 1894	Emily Smith, widow George Phillips, civil engineer, Colony of Queensland John Jabez Phillips, bank manager
1884 – 1891	Shepherd Smith, esquire

*****

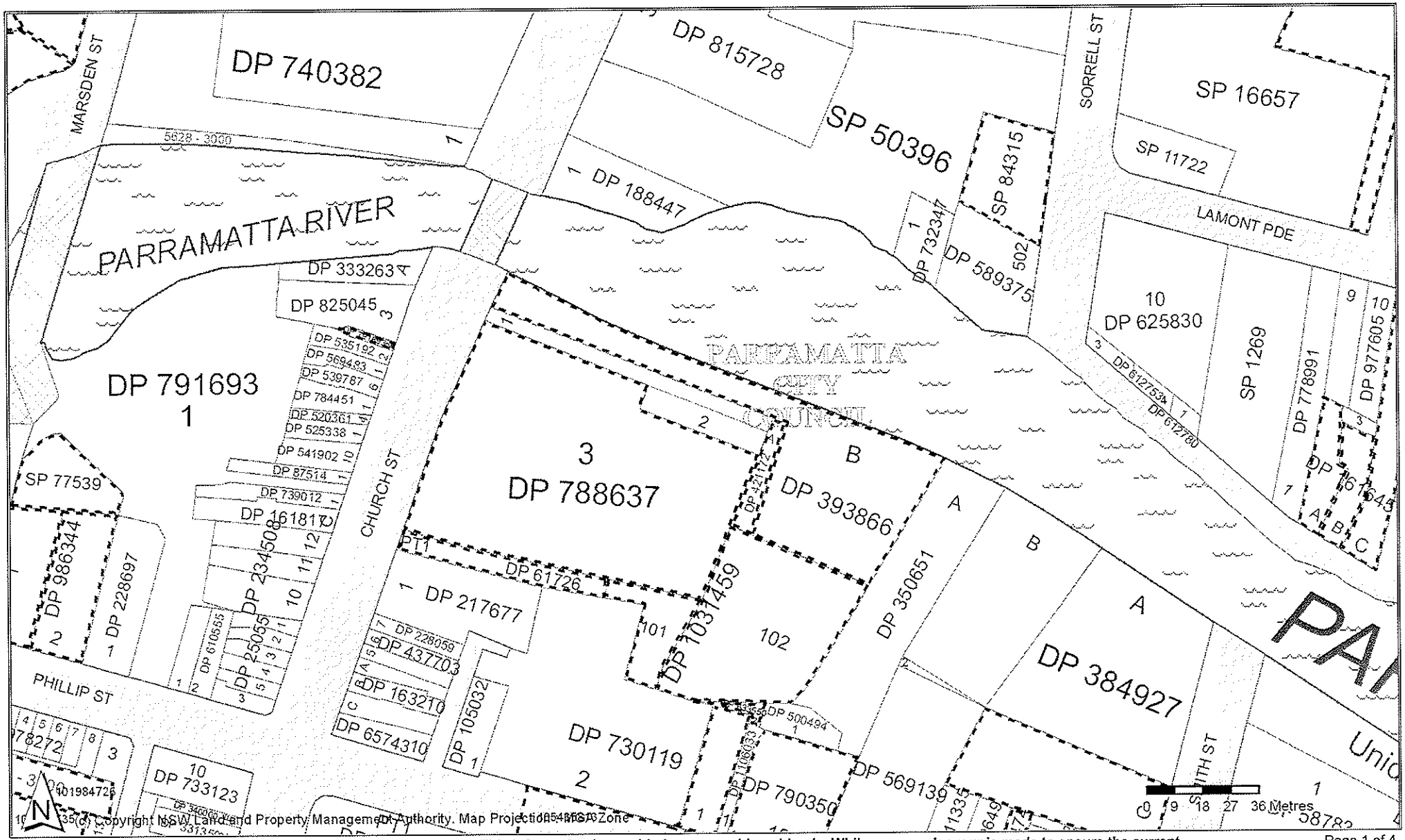
Land & Property Management Authority
Land & Property Information

Cadastral Records Enquiry Report

Ref : EIS - Parramatta

Requested Parcel : Lot 2 DP 788637 **Identified Parcel :** Lot 2 DP 788637

Locality : PARRAMATTA **LGA :** PARRAMATTA **Parish :** ST JOHN **County :** CUMBERLAND



Report Generated 12:06:02 PM, 23 March, 2011

This information is provided as a searching aid only. While every endeavour is made to ensure the current cadastral pattern is accurately reflected, the Registrar General cannot guarantee the information provided. For all ACTIVITY PRIOR to SEPT 2002 you must refer to the RGs Charting and Reference Maps.

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - TITLE SEARCH

FOLIO: AUTO CONSOL 8663-164

SEARCH DATE	TIME	EDITION NO	DATE
23/3/2011	11:49 AM	3	29/12/2010

LAND

LAND DESCRIBED IN SCHEDULE OF PARCELS
AT PARRAMATTA
LOCAL GOVERNMENT AREA PARRAMATTA
PARISH OF ST JOHN COUNTY OF CUMBERLAND
TITLE DIAGRAM SEE SCHEDULE OF PARCELS

FIRST SCHEDULE

KARIMBLA PROPERTIES (NO.22) PTY LTD (T AF942603)

SECOND SCHEDULE (18 NOTIFICATIONS)

1 RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)
2 PREMISES KNOWN AS "BRAND SMART CENTRE" AND "RIVERBANK CENTRE", 330-342 CHURCH STREET, PARRAMATTA
3 G372973 EASEMENT FOR SUPPORT AFFECTING THE PART SHOWN SO BURDENED IN THE TITLE DIAGRAM AS REGARDS LOT 3 IN DP788637
4 H708294 SUBJECT TO THE PROVISIONS OF SEC.340(A) LOCAL GOVERNMENT ACT, 1919
5 8976522 EASEMENT FOR INDOOR SUBSTATION VARIABLE WIDTH AFFECTING THE PART SHOWN DESIGNATED (A) IN DP1043441 AS REGARDS LOT 3 IN DP788637
6 8976522 RIGHT OF ACCESS 0.805 & 2.235 WIDE AFFECTING THE PART SHOWN DESIGNATED (B) IN DP1043441 AS REGARDS LOT 3 IN DP788637
7 8976522 EASEMENT FOR UNDERGROUND CABLES 2 WIDE AFFECTING THE PART SHOWN DESIGNATED (C) IN DP1043441 AS REGARDS LOT 3 IN DP788637
8 8976522 EASEMENT FOR CABLES 1.2 WIDE AFFECTING THE PART SHOWN DESIGNATED (D) IN DP1043441 AS REGARDS LOT 3 IN DP788637
9 Z240345 EASEMENT FOR SUPPORT AFFECTING THE PART OF THE LAND ABOVE DESCRIBED SHOWN 0.54 WIDE IN PLAN WITH Z240345 AS REGARDS LOT 3 IN DP788637
10 DP1031459 RIGHT OF CARRIAGEWAY 12.31 WIDE, 5 WIDE AND VARIABLE WIDTH AFFECTING THE PART(S) SHOWN SO BURDENED AND DESIGNATED (B) IN THE TITLE DIAGRAM AS REGARDS LOT 101 IN DP1031459
11 DP1031459 RIGHT OF CARRIAGEWAY 12.31 WIDE, 5 WIDE AND VARIABLE WIDTH AFFECTING THE PART(S) SHOWN SO BURDENED AND

END OF PAGE 1 - CONTINUED OVER

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**ANY ENTRIES PRECEDED BY AN ASTERISK DO NOT APPEAR ON THE CURRENT EDITION OF THE CERTIFICATE OF TITLE. WARNING: THE INFORMATION APPEARING UNDER NOTATIONS HAS NOT BEEN FORMALLY RECORDED IN THE REGISTER.*

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - TITLE SEARCH

FOLIO: AUTO CONSOL 8663-164 PAGE 2

SECOND SCHEDULE (18 NOTIFICATIONS) (CONTINUED)

		DESIGNATED (D) IN THE TITLE DIAGRAM AS REGARDS LOT 101 IN DP1031459
12	DP1031459	EASEMENT FOR UNDERGROUND CABLES 1 WIDE AND VARIABLE WIDTH AFFECTING THE PART(S) SHOWN SO BURDENED IN THE TITLE DIAGRAM AS REGARDS LOT 101 IN DP1031459
13	DP1031459	EASEMENT FOR RIGHT OF ACCESS AND RIGHT OF MANOEUVRING VARIABLE WIDTH APPURTENANT TO THE LAND ABOVE DESCRIBED AS REGARD LOT 3 IN DP788637 & LOT 101 IN DP1031459
14	DP1031459	RIGHT OF CARRIAGEWAY 12.31 WIDE AND VARIABLE WIDTH AND DESIGNATED (A) APPURTENANT TO THE LAND ABOVE DESCRIBED AS REGARDS LOT 3 IN DP788637 AND LOT 101 IN DP1031459
15	8976522	POSITIVE COVENANT
16	AD952636	LEASE TO SUZANNE GRAE CORPORATION PTY LIMITED BEING SUITE 4, LEVEL 2. EXPIRES: 30/9/2013.
17	AF112746	LEASE TO LANDCOM BEING SHOPS L12 & L13, LEVEL 1. EXPIRES: 30/6/2010. OPTION OF RENEWAL: 6 MONTHS.
18	AF726215	LEASE TO LANDCOM BEING SUITES 1, 1A & 3, LEVEL 2,. EXPIRES: 30/6/2011. OPTION OF RENEWAL: 1 YEAR, TOGETHER WITH A FURTHER OPTION OF 1 YEAR..

NOTATIONS

UNREGISTERED DEALINGS: NIL

SCHEDULE OF PARCELS	TITLE DIAGRAM
LOTS 2-3 IN DP788637	DP788637
LOT 101 IN DP1031459	DP1031459.

*** END OF SEARCH ***

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE
23/3/2011 11:52AM

FOLIO: 2/788637

First Title(s): OLD SYSTEM
Prior Title(s): VOL 8454 FOL 215

Recorded	Number	Type of Instrument	C.T. Issue
19/6/1989	DP788637	DEPOSITED PLAN	FOLIO CREATED EDITION 1
25/2/1991	Z522081	DEPARTMENTAL DEALING	EDITION 2
10/5/1996	2147636	CAVEAT	
17/10/1996	2460540	WITHDRAWAL OF CAVEAT	
17/10/1996	2460541	TRANSFER	EDITION 3
14/11/1996	2612688	MORTGAGE	EDITION 4
26/3/1999	5709938	DISCHARGE OF MORTGAGE	
26/3/1999	5709939	TRANSFER	
26/3/1999	5709940	MORTGAGE	EDITION 5
31/5/2001	7654328	DEPARTMENTAL DEALING	EDITION 6
9/8/2001	7829293	CHANGE OF NAME	
12/3/2002	8383391	MORTGAGE	
12/3/2002	8383392	MORTGAGE	
3/6/2002	8651296	LEASE	
11/3/2003	9438362	TRANSFER OF LEASE	
11/3/2003	9438363	VARIATION OF LEASE	
4/3/2004	AA467353	DEPARTMENTAL DEALING	EDITION 7
29/4/2004	AA581056	DISCHARGE OF MORTGAGE	
29/4/2004	AA581058	TRANSFER	
29/4/2004	AA581059	REQUEST	
29/4/2004	AA581060	MORTGAGE	
29/4/2004	AA581061	POSTPONEMENT OF MORTGAGE	EDITION 8
15/7/2004	AA801478	DISCHARGE OF MORTGAGE	
15/7/2004	AA801479	DISCHARGE OF MORTGAGE	
15/7/2004	AA801480	DISCHARGE OF MORTGAGE	
15/7/2004	AA801482	TRANSFER	

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LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE
23/3/2011 11:52AM

FOLIO: 2/788637 PAGE 2

Recorded	Number	Type of Instrument	C.T. Issue
15/7/2004	AA801483	MORTGAGE	EDITION 9
29/6/2005	AB586943	DEPARTMENTAL DEALING	
8/11/2005	AB891297	LEASE	
30/3/2006	AC213283	CONVERTED TO AUTO CONSOL 8663-164	CONSOL CREATED CT NOT ISSUED

*** END OF SEARCH ***

8071326

Form: 01T
Release: 2.1
www.lpi.nsw.gov.au

TRANSFER

New South Wales
Real Property Act 1900

AA581058U

PRIVACY NOTE: this information is legally required and will become part of the public record

STAMP DUTY Office of State Revenue use only

NEW SOUTH WALES DUTY
05-03-2004 [illegible]
SECTION 281-ORIGINAL
NO DUTY PAYABLE

(A) **TORRENS TITLE** Folio Identifier 101/1031459, 3/788637, 2/788637

(B) **LODGED BY**

Delivery Box	Name, Address or DX and Telephone	CODES
IW	Watson Mangioni DX 530 SYDNEY 9262 6666 Reference: JOM 203 4952	T TW (Sheriff)

(C) **TRANSFEROR** RIVERBANK CORPORATE CENTRE PTY LIMITED ACN 084 183 273

(D) **CONSIDERATION** The transferor acknowledges receipt of the consideration of $ PURSUANT TO PROMISSORY NOTE DATED 5 MARCH 2004 and as regards

(E) **ESTATE** the land specified above transfers to the transferee an estate in fee simple

(F) **SHARE TRANSFERRED** whole

(G) Encumbrances (if applicable): 8383391 & 8383392

(H) **TRANSFEREE** RIVERBANK T'EE PTY LIMITED ACN 108 074 684

5

(I) **TENANCY:**

(J) **DATE** 5 MARCH 2004

Certified correct for the purposes of the Real Property Act 1900 and executed on behalf of the corporation named below by the authorised person(s) whose signature(s) appear(s) below pursuant to the authority specified.

Corporation: Riverbank Corporate Centre Pty Limited ACN 084 183 273
Authority: Section 127 of the Corporations Act 2001

Signature of authorised person: [signature]
Name of authorised person: Robert Maxwell Mawhinney
Office held: DIRECTOR

Signature of authorised person: [signature]
Name of authorised person: MATTHEW SCOTT BANKS
Office held:

Certified for the purposes of the Real Property Act 1900 by the person whose signature appears below.

Signature: [signature]
Signatory's name: JOHN CANNINGS
Signatory's capacity: transferee's solicitor

All handwriting must be in block capitals.

Req:R940892 /Doc:DL 5709939 /Rev:31-Mar-1999 /Sts:SC.OK /Prt:23-Mar-2011 12:36 /Pgs:ALL /Seq:1 of 1
Ref:EIS - Parramatta /Src:T

Form: 7/-011
Licence: AUS/0634/96

(2) **TRANSFER**

New South Wales
Real Property Act 1900

5709939D

Instructions for filling out this form are available from the Land Titles Office

Office of State Revenue use only

N.S.W. STAMP DUTY
$2.00
061198 6011 04 40244430/03

(A) **LAND TRANSFERRED**
If appropriate, specify the share or part transferred.

FOLIOS 2/788637 AND 3/788637

(B) **LODGED BY**

LTO Box	Name, Address or DX and Telephone
864L	COCKS & MADDOX SOLICITORS DX 123 SYDNEY 221 2744
	Reference (15 character maximum): MCC99154T

(C) **TRANSFEROR** FRIENDSHIP PTY. LIMITED (ACN 067 637 012)

(D) acknowledges receipt of the consideration of $14,500,000.00

and as regards the land specified above transfers to the transferee an estate in fee simple.

(E) Encumbrances (if applicable): 1. S624995 2. ~~H708294~~ 3.

(F) **TRANSFEREE**

T	CLAIHOPE PTY. LIMITED (ACN 084 183 273)
TS (s713 LGA)	
TW (Sheriff)	
(G)	~~TENANCY:~~

(H) We certify this dealing correct for the purposes of the Real Property Act 1900. DATE 18/3/99

Signed in my presence by the transferor who is personally known to me.

FRIENDSHIP PTY LTD ACN 067 637 012 The Common Seal of

~~Signature of Witness~~
SECRETARY

Name of Witness (BLOCK LETTERS)
JASON MULSICH

Address of Witness

D Bowman
DIRECTOR
Signature of Transferor

Signed in my presence by the transferee who is personally known to me.

THE COMMON SEAL OF CLAIHOPE PTY. LIMITED WAS HERETO AFFIXED IN THE PRESENCE OF:

084 183 273 CLAIHOPE PTY. LIMITED Common Seal

~~Signature of Witness~~

~~Name of Witness (BLOCK LETTERS)~~

~~Address of Witness~~
SECRETARY

~~Signature of Transferee~~
DIRECTOR

If signed on the transferee's behalf by a solicitor or licensed conveyancer, show the signatory's full name in block letters.

Checked by (LTO use) .....

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - TITLE SEARCH

FOLIO: AUTO CONSOL 8663-164

SEARCH DATE	TIME	EDITION NO	DATE
23/3/2011	11:55 AM	3	29/12/2010

LAND

LAND DESCRIBED IN SCHEDULE OF PARCELS
AT PARRAMATTA
LOCAL GOVERNMENT AREA PARRAMATTA
PARISH OF ST JOHN COUNTY OF CUMBERLAND
TITLE DIAGRAM SEE SCHEDULE OF PARCELS

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11 DP1031459 RIGHT OF CARRIAGEWAY 12.31 WIDE, 5 WIDE AND VARIABLE WIDTH AFFECTING THE PART(S) SHOWN SO BURDENED AND

END OF PAGE 1 - CONTINUED OVER

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LAND AND PROPERTY INFORMATION NEW SOUTH WALES - TITLE SEARCH

FOLIO: AUTO CONSOL 8663-164 PAGE 2

SECOND SCHEDULE (18 NOTIFICATIONS) (CONTINUED)

		DESIGNATED (D) IN THE TITLE DIAGRAM AS REGARDS LOT 101 IN DP1031459
12	DP1031459	EASEMENT FOR UNDERGROUND CABLES 1 WIDE AND VARIABLE WIDTH AFFECTING THE PART(S) SHOWN SO BURDENED IN THE TITLE DIAGRAM AS REGARDS LOT 101 IN DP1031459
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17	AF112746	LEASE TO LANDCOM BEING SHOPS L12 & L13, LEVEL 1. EXPIRES: 30/6/2010. OPTION OF RENEWAL: 6 MONTHS.
18	AF726215	LEASE TO LANDCOM BEING SUITES 1, 1A & 3, LEVEL 2,. EXPIRES: 30/6/2011. OPTION OF RENEWAL: 1 YEAR, TOGETHER WITH A FURTHER OPTION OF 1 YEAR..

NOTATIONS

UNREGISTERED DEALINGS: NIL

SCHEDULE OF PARCELS	TITLE DIAGRAM
LOTS 2-3 IN DP788637	DP788637
LOT 101 IN DP1031459	DP1031459.

*** END OF SEARCH ***

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE
23/3/2011 11:54AM

FOLIO: 3/788637

First Title(s): OLD SYSTEM
Prior Title(s): VOL 8454 FOL 215

Recorded	Number	Type of Instrument	C.T. Issue
19/6/1989	DP788637	DEPOSITED PLAN	FOLIO CREATED EDITION 1
4/1/1991	Z240345	GRANT OF EASEMENT	EDITION 2
10/5/1996	2147636	CAVEAT	
17/10/1996	2460540	WITHDRAWAL OF CAVEAT	
17/10/1996	2460541	TRANSFER	EDITION 3
14/11/1996	2612688	MORTGAGE	EDITION 4
26/3/1999	5709937	DISCHARGE OF MORTGAGE	
26/3/1999	5709939	TRANSFER	
26/3/1999	5709940	MORTGAGE	EDITION 5
31/5/2001	7654328	DEPARTMENTAL DEALING	EDITION 6
8/8/2001	DP1031459	DEPOSITED PLAN	
9/8/2001	7829293	CHANGE OF NAME	
28/2/2002	8391619	LEASE	
28/2/2002	8391620	LEASE	
28/2/2002	8391621	LEASE	
28/2/2002	8391622	LEASE	
28/2/2002	8391623	LEASE	
1/3/2002	8395949	LEASE	
1/3/2002	8395950	LEASE	
1/3/2002	8395951	LEASE	
1/3/2002	8395952	LEASE	
1/3/2002	8395953	LEASE	
1/3/2002	8395954	LEASE	
1/3/2002	8395955	LEASE	
4/3/2002	8399411	LEASE	
4/3/2002	8399412	LEASE	
4/3/2002	8399413	LEASE	
4/3/2002	8399414	LEASE	

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LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE
23/3/2011 11:54AM

FOLIO: 3/788637

PAGE 2

Recorded	Number	Type of Instrument	C.T. Issue
12/3/2002	8383391	MORTGAGE	
12/3/2002	8383392	MORTGAGE	
13/3/2002	8426907	LEASE	
25/3/2002	8454407	LEASE	
25/3/2002	8454408	LEASE	
27/3/2002	8460348	LEASE	
27/3/2002	8465240	LEASE	
15/4/2002	8500676	LEASE	
19/4/2002	8524317	LEASE	
19/4/2002	8528641	LEASE	
3/6/2002	8651296	LEASE	
13/6/2002	8679322	LEASE	
13/6/2002	8679323	LEASE	
13/6/2002	8679324	LEASE	
13/6/2002	8679325	LEASE	
13/6/2002	8679326	LEASE	
13/6/2002	8679327	LEASE	
13/6/2002	8679234	LEASE	
13/6/2002	8679235	LEASE	
25/6/2002	8708834	LEASE	
9/7/2002	8746538	REQUEST	
9/7/2002	8746587	LEASE	
15/7/2002	8768306	LEASE	
15/7/2002	8768307	LEASE	
15/7/2002	8768353	LEASE	

7/8/2002	DP1043441	DEPOSITED PLAN
3/10/2002	8976522	GRANT OF EASEMENT
8/10/2002	9008890	LEASE
13/11/2002	9120040	LEASE

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LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE
23/3/2011 11:54AM

FOLIO: 3/788637 PAGE 3

Recorded	Number	Type of Instrument	C.T. Issue
25/11/2002	9151064	LEASE	
25/11/2002	9151065	LEASE	
11/3/2003	9438362	TRANSFER OF LEASE	
11/3/2003	9438363	VARIATION OF LEASE	
31/3/2003	9478577	DETERMINATION OF LEASE	
14/4/2003	9527849	LEASE	
14/5/2003	9601977	LEASE	
9/7/2003	9771312	TRANSFER OF LEASE	
19/8/2003	9886615	LEASE	
10/9/2003	9954310	LEASE	
10/9/2003	9954311	LEASE	
10/9/2003	9954312	LEASE	
16/9/2003	9967169	REQUEST	
24/10/2003	AA91650	TRANSFER OF LEASE	
25/11/2003	AA189521	TRANSFER OF LEASE	
15/12/2003	AA249479	DETERMINATION OF LEASE	
23/12/2003	AA276482	DETERMINATION OF LEASE	

23/12/2003	AA276483	LEASE	
4/3/2004	AA467353	DEPARTMENTAL DEALING	EDITION 7
29/4/2004	AA581056	DISCHARGE OF MORTGAGE	
29/4/2004	AA581058	TRANSFER	
29/4/2004	AA581059	REQUEST	
29/4/2004	AA581060	MORTGAGE	
29/4/2004	AA581061	POSTPONEMENT OF MORTGAGE	EDITION 8
19/5/2004	AA651722	DETERMINATION OF LEASE	
19/5/2004	AA651723	DETERMINATION OF LEASE	
19/5/2004	AA651724	DETERMINATION OF LEASE	EDITION 9

END OF PAGE 3 - CONTINUED OVER

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LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE
23/3/2011 11:54AM

FOLIO: 3/788637 PAGE 4

Recorded	Number	Type of Instrument	C.T. Issue
25/5/2004	AA666631	TRANSFER OF LEASE	
15/7/2004	AA801478	DISCHARGE OF MORTGAGE	
15/7/2004	AA801479	DISCHARGE OF MORTGAGE	
15/7/2004	AA801480	DISCHARGE OF MORTGAGE	
15/7/2004	AA801481	DETERMINATION OF LEASE	
15/7/2004	AA801482	TRANSFER	
15/7/2004	AA801483	MORTGAGE	EDITION 10
3/8/2004	AA850027	DEPARTMENTAL DEALING	
17/11/2004	AB96523	DETERMINATION OF LEASE	
17/11/2004	AB96504	DETERMINATION OF LEASE	
19/5/2005	AB486105	DETERMINATION OF LEASE	
19/5/2005	AB486106	DETERMINATION OF LEASE	
19/5/2005	AB486107	DETERMINATION OF LEASE	
19/5/2005	AB486108	DETERMINATION OF LEASE	
19/5/2005	AB486109	DETERMINATION OF LEASE	
8/11/2005	AB891297	LEASE	

25/11/2005	AB486110	LEASE	
30/3/2006	AC213283	CONVERTED TO AUTO CONSOL 8663-164	CONSOL CREATED CT NOT ISSUED

*** END OF SEARCH ***

EIS - Parramatta PRINTED ON 23/3/2011

*ANY ENTRIES PRECEDED BY AN ASTERISK DO NOT APPEAR ON THE CURRENT EDITION OF THE CERTIFICATE OF TITLE.
WARNING: THE INFORMATION APPEARING UNDER NOTATIONS HAS NOT BEEN FORMALLY RECORDED IN THE REGISTER.

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - TITLE SEARCH

FOLIO: AUTO CONSOL 8663-164

SEARCH DATE	TIME	EDITION NO	DATE
23/3/2011	11:56 AM	3	29/12/2010

LAND

LAND DESCRIBED IN SCHEDULE OF PARCELS
AT PARRAMATTA
LOCAL GOVERNMENT AREA PARRAMATTA
PARISH OF ST JOHN COUNTY OF CUMBERLAND
TITLE DIAGRAM SEE SCHEDULE OF PARCELS

FIRST SCHEDULE

KARIMBLA PROPERTIES (NO.22) PTY LTD (T AF942603)

SECOND SCHEDULE (18 NOTIFICATIONS)

1 RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)
2 PREMISES KNOWN AS "BRAND SMART CENTRE" AND "RIVERBANK CENTRE", 330-342 CHURCH STREET, PARRAMATTA
3 G372973 EASEMENT FOR SUPPORT AFFECTING THE PART SHOWN SO BURDENED IN THE TITLE DIAGRAM AS REGARDS LOT 3 IN DP788637
4 H708294 SUBJECT TO THE PROVISIONS OF SEC.340(A) LOCAL GOVERNMENT ACT, 1919
5 8976522 EASEMENT FOR INDOOR SUBSTATION VARIABLE WIDTH AFFECTING THE PART SHOWN DESIGNATED (A) IN DP1043441 AS REGARDS LOT 3 IN DP788637
6 8976522 RIGHT OF ACCESS 0.805 & 2.235 WIDE AFFECTING THE PART SHOWN DESIGNATED (B) IN DP1043441 AS REGARDS LOT 3 IN DP788637
7 8976522 EASEMENT FOR UNDERGROUND CABLES 2 WIDE AFFECTING THE PART SHOWN DESIGNATED (C) IN DP1043441 AS REGARDS LOT 3 IN DP788637
8 8976522 EASEMENT FOR CABLES 1.2 WIDE AFFECTING THE PART SHOWN DESIGNATED (D) IN DP1043441 AS REGARDS LOT 3 IN DP788637
9 Z240345 EASEMENT FOR SUPPORT AFFECTING THE PART OF THE LAND ABOVE DESCRIBED SHOWN 0.54 WIDE IN PLAN WITH Z240345 AS REGARDS LOT 3 IN DP788637
10 DP1031459 RIGHT OF CARRIAGEWAY 12.31 WIDE, 5 WIDE AND VARIABLE WIDTH AFFECTING THE PART(S) SHOWN SO BURDENED AND DESIGNATED (B) IN THE TITLE DIAGRAM AS REGARDS LOT 101 IN DP1031459
11 DP1031459 RIGHT OF CARRIAGEWAY 12.31 WIDE, 5 WIDE AND VARIABLE WIDTH AFFECTING THE PART(S) SHOWN SO BURDENED AND

END OF PAGE 1 - CONTINUED OVER

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**ANY ENTRIES PRECEDED BY AN ASTERISK DO NOT APPEAR ON THE CURRENT EDITION OF THE CERTIFICATE OF TITLE.*
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LAND AND PROPERTY INFORMATION NEW SOUTH WALES - TITLE SEARCH

FOLIO: AUTO CONSOL 8663-164 PAGE 2

SECOND SCHEDULE (18 NOTIFICATIONS) (CONTINUED)

		DESIGNATED (D) IN THE TITLE DIAGRAM AS REGARDS LOT 101 IN DP1031459
12	DP1031459	EASEMENT FOR UNDERGROUND CABLES 1 WIDE AND VARIABLE WIDTH AFFECTING THE PART(S) SHOWN SO BURDENED IN THE TITLE DIAGRAM AS REGARDS LOT 101 IN DP1031459
13	DP1031459	EASEMENT FOR RIGHT OF ACCESS AND RIGHT OF MANOEUVRING VARIABLE WIDTH APPURTENANT TO THE LAND ABOVE DESCRIBED AS REGARD LOT 3 IN DP788637 & LOT 101 IN DP1031459
14	DP1031459	RIGHT OF CARRIAGEWAY 12.31 WIDE AND VARIABLE WIDTH AND DESIGNATED (A) APPURTENANT TO THE LAND ABOVE DESCRIBED AS REGARDS LOT 3 IN DP788637 AND LOT 101 IN DP1031459
15	8976522	POSITIVE COVENANT
16	AD952636	LEASE TO SUZANNE GRAE CORPORATION PTY LIMITED BEING SUITE 4, LEVEL 2. EXPIRES: 30/9/2013.
17	AF112746	LEASE TO LANDCOM BEING SHOPS L12 & L13, LEVEL 1. EXPIRES: 30/6/2010. OPTION OF RENEWAL: 6 MONTHS.
18	AF726215	LEASE TO LANDCOM BEING SUITES 1, 1A & 3, LEVEL 2,. EXPIRES: 30/6/2011. OPTION OF RENEWAL: 1 YEAR, TOGETHER WITH A FURTHER OPTION OF 1 YEAR..

NOTATIONS

UNREGISTERED DEALINGS: NIL

SCHEDULE OF PARCELS	TITLE DIAGRAM
LOTS 2-3 IN DP788637	DP788637
LOT 101 IN DP1031459	DP1031459.

*** END OF SEARCH ***

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE
23/3/2011 11:57AM

FOLIO: 101/1031459

First Title(s): OLD SYSTEM
Prior Title(s): 1/724764

Recorded	Number	Type of Instrument	C.T. Issue
8/8/2001	DP1031459	DEPOSITED PLAN	FOLIO CREATED EDITION 1
4/9/2001	7909592	TRANSFER	
4/9/2001	7909593	MORTGAGE	EDITION 2
12/3/2002	8383391	MORTGAGE	
12/3/2002	8383392	MORTGAGE	EDITION 3
15/7/2002	8678282	REQUEST	
29/4/2004	AA581057	DISCHARGE OF MORTGAGE	
29/4/2004	AA581058	TRANSFER	
29/4/2004	AA581059	REQUEST	
29/4/2004	AA581060	MORTGAGE	
29/4/2004	AA581061	POSTPONEMENT OF MORTGAGE	EDITION 4
15/7/2004	AA801478	DISCHARGE OF MORTGAGE	
15/7/2004	AA801479	DISCHARGE OF MORTGAGE	
15/7/2004	AA801480	DISCHARGE OF MORTGAGE	
15/7/2004	AA801482	TRANSFER	
15/7/2004	AA801483	MORTGAGE	EDITION 5
29/6/2005	AB586943	DEPARTMENTAL DEALING	
8/11/2005	AB891297	LEASE	
30/3/2006	AC213283	CONVERTED TO AUTO CONSOL 8663-164	CONSOL CREATED CT NOT ISSUED

*** END OF SEARCH ***

LAND AND PROPERTY INFORMATION NEW SOUTH WALES - HISTORICAL SEARCH

SEARCH DATE
23/3/2011 11:59AM

FOLIO: 1/724764

First Title(s): OLD SYSTEM
Prior Title(s): VOL 2749 FOL 187

Recorded	Number	Type of Instrument	C.T. Issue
16/6/1987	DP724764	DEPOSITED PLAN	LOT RECORDED FOLIO NOT CREATED
29/2/1988	X299786	APPLN FOR REPLACEMENT CT	FOLIO CREATED EDITION 1
14/10/1996	2531470	DEPARTMENTAL DEALING	
17/10/1996	2482330	TRANSFER OF LEASE	
19/11/1996	2612687	MORTGAGE OF LEASE	
29/3/1999	5709941	DISCHARGE OF MORTGAGE	
29/3/1999	5709942	TRANSFER OF LEASE	
29/3/1999	5709943	MORTGAGE OF LEASE	
8/8/2001	DP1031459	DEPOSITED PLAN	FOLIO CANCELLED

*** END OF SEARCH ***

PLAN FORM 2

Plan Drawing only to appear in this space

*OFFICE USE ONLY

DP 788637

DIAGRAM

DIAGRAM

STREET

CHURCH STREET

PHILLIP STREET

PUBLIC RESERVE

DIAG 2 336 m2

3 5948 m2

F.P.421670

WARNING: CREASING OR FOLDING WILL LEAD TO REJECTION

This negative is a photograph made as a permanent record of a document in the custody of the Registrar General this day 9th June, 1989

PLAN FORM 2

SIGNATURES AND SEALS ONLY.

THE COMMON SEAL OF THE COUNCIL OF THE CITY OF PARRAMATTA WAS HEREUNTO AFFIXED THIS 28TH DAY OF JUNE 2001 PURSUANT TO A RESOLUTION OF COUNCIL PASSED AT ITS MEETING OF 20 NOVEMBER 2000.

L. Meane
LORD MAYOR

Tony Barnes
GENERAL MANAGER

Crown Lands Office Approval

PLAN APPROVED. . . . .
Authorised Officer
Land District . . . .
Paper No. . . . .
Field Book . . . . . . pages.

Subdivision Certificate

I certify that the provisions of s.109J of the Environmental Planning and Assessment Act, 1979 have been satisfied in relation to the proposed SUBDIVISION set out herein and
*Insert subdivision or 'new road'
Tony Barnes
*Authorised Person/General Manager/Accredited Certifier
Consent Authority: PARRAMATTA CITY COUNCIL
Date of endorsement: 28 JUNE 2001
Accreditation no. . . . . . .
Subdivision Certificate no. . . . . .
File no.: DA01/427

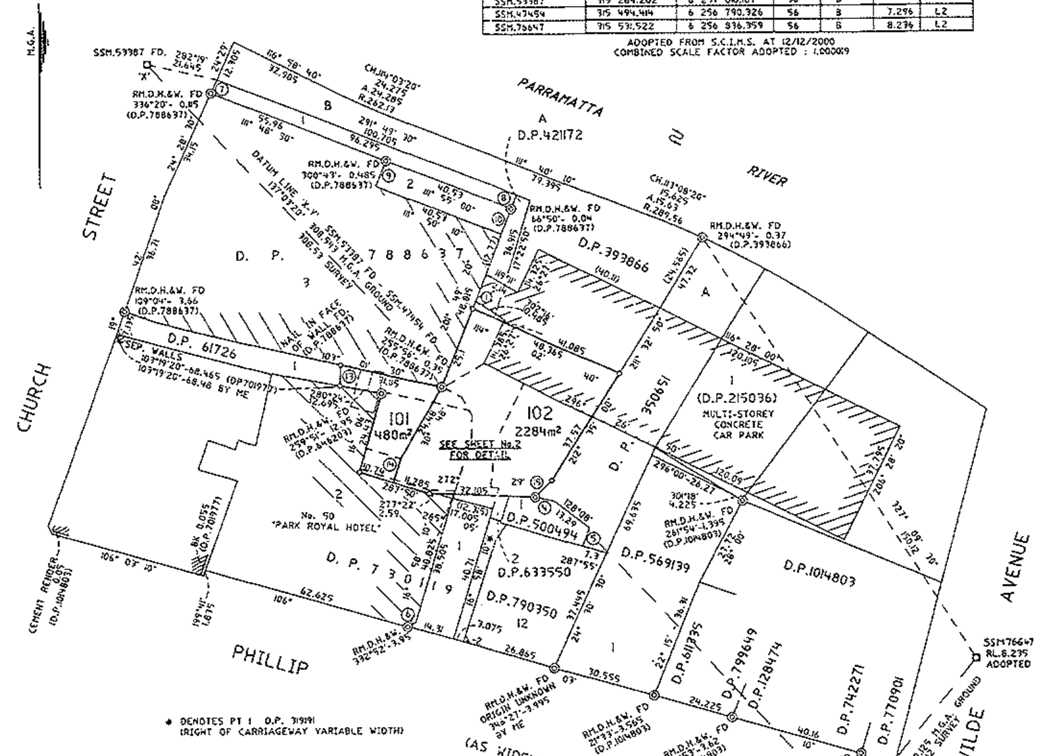
Note
When the plan is to be imaged electronically in the Land Titles Office, it should include a signature in an electronic or digital format approved by the Registrar-General

*Delete whichever is inapplicable

Plan Drawing only to appear in this space

SURVEY PRACTICE REGULATIONS 1996 CLAUSE 32(2)						
M.G.A. CO-ORDINATES						
MARK	EASTING	NORTHING	ZONE	CLASS	RL (A.H.D.)	ORDER
SSM.53387	315 284.202	6 257 016.187	56	B		
SSM.47454	315 494.414	6 256 790.326	56	B	7.295	L2
SSM.76647	315 531.522	6 256 936.359	56	B	8.235	L2

ADOPTED FROM S.C.I.M.S. AT 12/12/2000
COMBINED SCALE FACTOR ADOPTED : 1.000009



◆ DENOTES PT 1 D.P. 319191 (RIGHT OF CARRIAGEWAY VARIABLE WIDTH)

SCHEDULE of SHORT BOUNDARIES

No.	BEARING	DISTANCE	No.	BEARING	DISTANCE
1	21° 49'	8.625	9	21° 50'	8.325
4	300° 46'	5.995	10	201° 49'	8.27
5	199° 53'	5.83	13	3° 04'	6.24
6	61° 30'	2.85	14	15° 44'	7.565
7	24° 29'	4.49	15	225° 37'	7.225
8	201° 49'	4.595			

* OFFICE USE ONLY

DP1031459

Registered: 8.8.2001

Title System: TORRENS

Purpose: SUBDIVISION

Ref. Map: U0052-411

Last Plan: DP724764

PLAN OF SUBDIVISION OF LOT 1 IN D.P.724764 AND EASEMENTS WITHIN LOT 1 IN D.P.73009, LOT 2 IN D.P.633550, LOT 8 IN D.P.393866 AND LOT A IN D.P.421172

Lengths are in metres. Reduction Ratio 1:800

LGA: PARRAMATTA
Locality: PARRAMATTA
Parish: ST. JOHN
County: CUMBERLAND

This is sheet 1 of my plan in 2 sheets.
(Delete if inapplicable)

Surveyors (Practice) Regulation 1996
I, RODNEY J. WORTHINGTON of YOUDALE STRUDWICK & Co. P/L SUITE 4, 94 HAMPDEN ROAD ARTARMON FAX: 9412 4802
a surveyor registered under the Surveyors Act 2002, hereby certify that the survey represented in this plan is accurate, has been made in accordance with the Surveyors (Practice) Regulation 1996 and was completed on 20TH DECEMBER, 2000.
The survey relates to LOTS 101, 102 AND EASEMENTS
(here specify the land actually surveyed or specify any land shown in the plan that is not the subject of the survey)
Datum Line "X-Y"
Zone: Suburban/Country
Signature
Surveyor registered under the Surveyors Act 2002

Plans used in preparation of survey/compilation
DPs 1014803, 788637, 73009, 701977, 742764, 646203, 633550, 569139, 500494, 421172, 420522, 393866, 350651, 319191, 384927, 215036, 61726, 953734

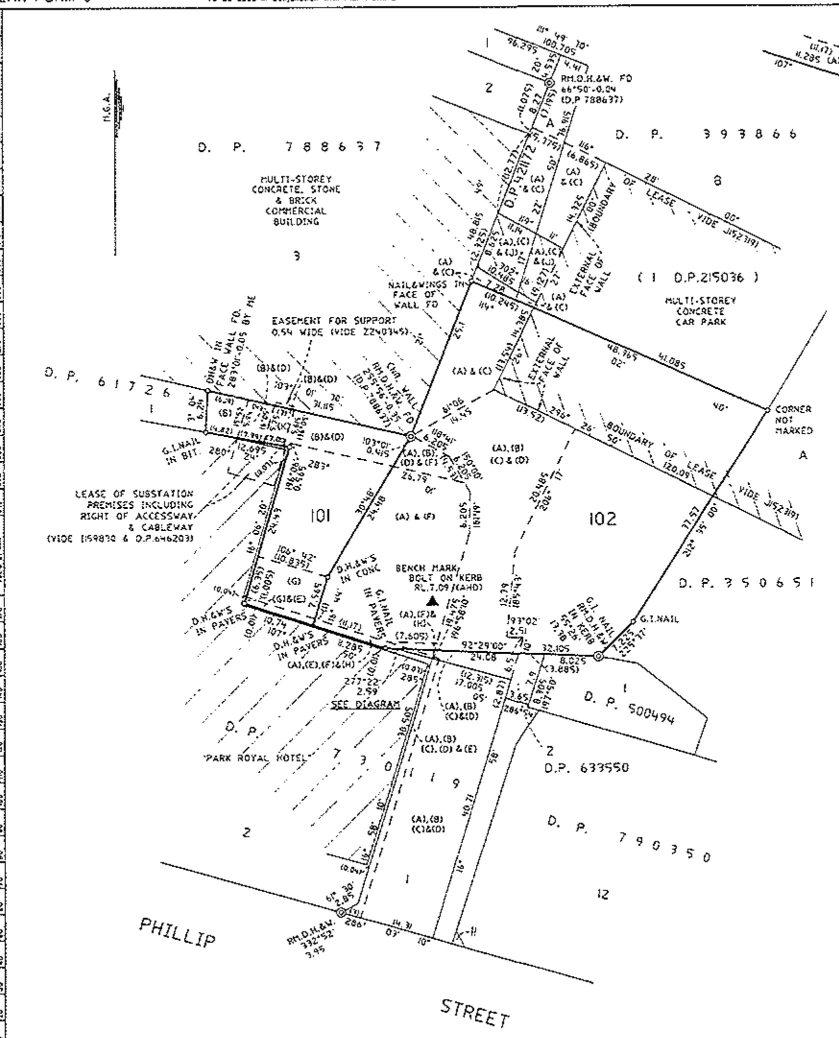
PANEL FOR USE ONLY for statements of intention to dedicate public roads, to create public reserves, drainage reserves, easements, restrictions on the use of land or positive covenants.

PURSUANT TO SECTION 88B OF THE CONVEYANCING ACT, 1919, IT IS INTENDED TO CREATE:

1. RIGHT OF CARRIAGEWAY 12.31 WIDE AND VARIABLE WIDTH (A)
2. RIGHT OF CARRIAGEWAY 12.31 WIDE, 5 WIDE AND VARIABLE WIDTH (B)
3. RIGHT OF CARRIAGEWAY 12.31 WIDE AND VARIABLE WIDTH (C)
4. RIGHT OF CARRIAGEWAY 12.31 WIDE, 5 WIDE AND VARIABLE WIDTH (D)
5. EASEMENT FOR UNDERGROUND CABLES 1 WIDE AND VARIABLE WIDTH (E)
6. EASEMENT FOR RIGHT OF ACCESS AND RIGHT OF MANOEUVRING VARIABLE WIDTH (F)
7. EASEMENT FOR ACCESS AND USE VARIABLE WIDTH (G)
8. RIGHT OF WAY 1 WIDE (H)

SURVEYOR'S REFERENCE 54208-DP "CHECKLIST"   MPR: 2003

WARNING: CREASING OR FOLDING WILL LEAD TO REJECTION



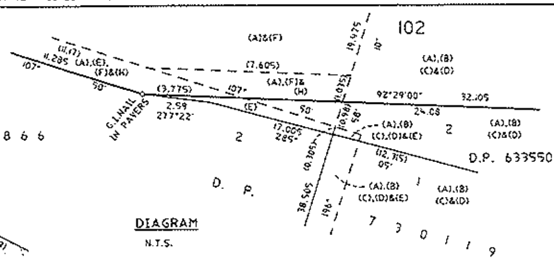


DIAGRAM
N.T.S.

(A) RIGHT OF CARRIAGEWAY 12.31 WIDE & VARIABLE WIDTH
(B) RIGHT OF CARRIAGEWAY 12.31 WIDE, 5 WIDE & VARIABLE WIDTH
(C) RIGHT OF CARRIAGEWAY 12.31 WIDE AND VARIABLE WIDTH
(D) RIGHT OF CARRIAGEWAY 12.31 WIDE, 5 WIDE & VARIABLE WIDTH
(E) EASEMENT FOR UNDERGROUND CABLES 1 WIDE & VARIABLE WIDTH
(F) EASEMENT FOR RIGHT OF ACCESS AND RIGHT OF MANOEUVRING VARIABLE WIDTH
(G) EASEMENT FOR ACCESS & USE VARIABLE WIDTH
(H) RIGHT OF WAY 1 WIDE

NOTES:

(J) DENOTES THAT PART OF THE RIGHT OF CARRIAGEWAY 12.31 WIDE AND VARIABLE WIDTH DENOTED (A) AND THAT PART OF THE RIGHT OF CARRIAGEWAY 12.31 WIDE AND VARIABLE WIDTH DENOTED (C) WHICH ARE LIMITED IN HEIGHT TO A HORIZONTAL PLANE AT R.L. 9.30 AND ARE UNLIMITED IN DEPTH.

(K) DENOTES THAT PART OF THE RIGHT OF CARRIAGEWAY 12.31 WIDE, 5 WIDE AND VARIABLE WIDTH DENOTED (B) AND THAT PART OF THE RIGHT OF CARRIAGEWAY 12.31 WIDE, 5 WIDE AND VARIABLE WIDTH DENOTED (D) WHICH ARE LIMITED IN HEIGHT TO A HORIZONTAL PLANE AT R.L. 12.00 AND ARE UNLIMITED IN DEPTH.

DP1031459

Registered 8.8.2001

This is sheet 2 of my plan in 2 sheets

Surveyor registered under Surveyors Act 1929

This is sheet 2 of the plan of 2 sheets covered by my Certificate No. DA01/1427 of 28 June 2001

General Manager

For use where space is insufficient in any panel on Plan Form 2

Reduction Ratio 1:400

Plan Drawing only to appear in this space

SURVEYOR'S REFERENCE 84208-DP "CHECKLIST"

(Site History Documents – Council Records)

0011670-01 Property 330 CHURCH STREET LOT 3 PARRAMATTA NSW FORMER DAVID JONES BUILDING GENERAL ISSUES 13/07/1994
0011670-02 Property 330 CHURCH STREET LOT 3 PARRAMATTA NSW FORMER DAVID JONES BUILDING GENERAL ISSUES 22/05/2003
0011670-03 Property 330 CHURCH STREET LOT 3 PARRAMATTA NSW FORMER DAVID JONES BUILDING GENERAL ISSUES 19/06/2003
32/5034-01 Subject SUBDIV 330 CHURCH STREET PCC - ACQUISITION32/5034 9/09/1988
BA60/210-01 Building Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW14/07/1994
DA00/860-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW LOWER GROUND FLOOR SUPERMARKET/CAFE/LIQUOR 23/06/2000
DA01/1081-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW DA FITOUT EXIST SHOP AS COUNTRY ROAD 12/06/2001
DA01/1162-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW FITOUT SHOP LG 6 PARRABEY PIDE KEBAB BBQ D/A & C/C 2/07/2001
DA01/1190-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW SHOP L1 13 TO BE USED FOR HOMEWARES 28/06/2001
DA01/1191-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW SHOP L1 9 FITOUT FOR CHILDREN'S CLOTHING 28/06/2001
DA01/1191-02 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW SHOP L1 9 FITOUT FOR CHILDREN'S CLOTHING 28/06/2001
DA01/1191-03 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW SHOP L1 9 FITOUT FOR CHILDREN'S CLOTHING 13/09/2001
DA01/1215-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW FITOUT FASHION SHOP G 12 2/07/2001
DA01/1216-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW FITOUT SHOP L1 15 BED BATH N'TABLE 2/07/2001
DA01/1217-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW FITOUT SHOP LG 7 MALAYSIAN FOOD SHOP D/A & C/C 2/07/2001
DA01/1250-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW SHOP LG2 FITOUT CHINESE FAST FOOD 6/07/2001
DA01/1286-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW DA SHOP L1 4 FITOUT FOR SALE OF HOMEWARES 11/07/2001
DA01/1289-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW DA SHOP LG3 FITOUT 11/07/2001
DA01/1290-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW SHOP LG 12 FOR USE AS A PHARMACY 12/07/2001

DA01/1322-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW FITOUT SHOP K2 FIX ESPRESSO BAR 16/07/2001
DA01/1323-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW FITOUT SHOPS G17 & 18 FASHION 16/07/2001
DA01/1334-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW DA SHOP LG4-5 FITOUT FOR USE AS FOOD OUTLET 17/07/2001
DA01/1417-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW SHOP LG8 FITOUT FLAVOUR OF INDIA30/07/2001
DA01/1418-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW SHOP G19 FITOUT FASHION JOANNE MERCER 30/07/2001
DA01/1466-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW SHOP G16 FITOUT WOMEN'S APPAREL & ACCESSORIES 3/08/2001
DA01/1468-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW SHOP G5 FITOUT COSMETICS & ACCESSORIES 3/08/2001
DA01/1490-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW SHOP FITOUT G7,G8,G9,G9A 6/08/2001
DA01/1500-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW DA OFFICE FITOUT LEVEL 2 7/08/2001
DA01/1625-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW SHOP LI 14 LUGGAGE & LEATHERGOODS 23/08/2001
DA01/1650-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW DA SHOP G6 TO BE USED AS SURF SHOP 28/08/2001
DA01/1672-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW SHOP LG10 FAST FOOD 30/08/2001
DA01/1709-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW DA USE SHOP FOR SALE OF WOMENS SHOES & ACCESSORIES 5/09/2001
DA01/1735-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW SHOP L1 9 TO USE AS CHILDRENS CLOTHING & ACCESS HAIRCUTS & CAFE 10/09/2001
DA01/1800-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW SHP LG10B SHOP FITOUT USE AS WATCH KIOSK 19/09/2001
DA01/1806-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW SHOP LG10A FAST FOOD 20/09/2001
DA01/1825-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW SHOP LG1 FAST FOOD SUMO JAPANESE 24/09/2001
DA01/1826-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW SHOP L1 5 FASHION SHOP I NET 24/09/2001
DA01/1827-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW SHOP G4 OXFORD FASHION SHOP 24/09/2001
DA01/1853-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW SHOP L1 6-7 SLE OF WOMEN'S & MENS CLOTHES & ACCESS 27/09/2001
DA01/1891-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW DA SHOP L1-19A SHOP FITOUT 5/10/2001

DA01/1928-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW DA SHOP G14 SHOP FITOUT 10/10/2001
DA01/1975-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW SHOP LG 9A ALADDIN'S DRYCLEANER C/C NI/784/01 16/10/2001
DA01/2092-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW DA SHOP LG9B SHOP FITOUT 31/10/2001
DA01/2114-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW DA SHOP L1-1-2 SHOP FITOUT 2/11/2001
DA01/2284-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW FAST FOOD SHOP LG 11 29/11/2001
DA01/2305-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW DA OFFICE FITOUT 4/12/2001
DA01/300-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW DA USE PREMISES AS RETAIL 23/02/2001
DA01/300-02 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW DA USE PREMISES AS RETAIL 21/06/2001
DA02/1025-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW SHOP L1 17 TO USE AS A FOOD/MUSIC/BOOKS 2/05/2002
DA02/1289-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW DA SHOP LG9 FITOUT AS HEALTH FOOD SHOP 31/05/2002
DA02/1511-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW SHOP FITOUT G20 NAPOLEON 1/07/2002
DA02/1817-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW DA SHOP G21 FITOUT 6/08/2002
DA02/2013-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW SHOP LI 18 FITOUT FASHION 28/08/2002
DA02/2057-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW FITOUT OF SHOP LG10A PHOTO IMAGING SHOP 2/09/2002
DA02/215-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW SHOP K2 FITOUT AS CAFE 5/02/2002
DA02/2235-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW DA OUTDOOR DINING 20/09/2002
DA02/2280-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW DA SHOP L1-8 FITOUT AS HAIRDRESSING SALON 24/09/2002
DA02/2476-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW DA SHOP LG13 FITOUT AS NEWSAGENCY 16/10/2002
DA02/2599-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW DA SHOP G19 FITOUT AS BRAS & THINGS 30/10/2002
DA02/2649-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW DA G14 FITOUT AS RECORD SHOP 6/11/2002
DA02/321-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW SALE OF MEN'S CLOTHES & ACCESSORIES SHOP G11 18/02/2002
DA02/322-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW SALE OF WOMEN'S CLOTHING & ACCESSORIES SHOP G13 18/02/2002
DA02/341-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW DA CC OFFICE FITOUT CC96/02 19/02/2002
DA03/1389-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW COMPLYING DEVELOPMENT OFFICE FITOUT LEVEL 2 9/07/2003
DA03/1585-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW TO ENCLOSE CARPARKING SPACES USING ROLLER SHUTTERS & WELD MESH FENCING 18/08/2003
DA03/180-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW DA G10 SHOP FITOUT 3/02/2003
DA03/925-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW SHOP G4 FITOUT JEANS WEST 8/05/2003
DA04/260-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW DA MODIFY EXISTING CARPARK EXITS 10/03/2004
DA96/674-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW 330-342 CHURCH ST LOWER GROUND FLOOR RETAIL SHOP SELLING BOOKS AND STATIONARY 21/11/1996
DA98/1287-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW CONVERSION DEPT STORE TO RETAIL & COMMERCIAL USE 25/11/1998
DA98/1287-02 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW CONVERSION DEPT STORE TO RETAIL & COMMERCIAL USE 14/12/1998
DA98/1287-03 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW CONVERSION DEPT STORE TO RETAIL & COMMERCIAL USE 26/03/1999
DA98/1287-04 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW CONVERSION DEPT STORE TO RETAIL & COMMERCIAL USE 9/07/1999
DA98/1287-05 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW CONVERSION DEPT STORE TO RETAIL & COMMERCIAL USE 11/10/1999
DA98/1287-06 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW CONVERSION DEPT STORE TO RETAIL & COMMERCIAL USE 9/11/1999
DA98/1287-07 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW CONVERSION DEPT STORE TO RETAIL & COMMERCIAL USE 9/11/1999

DA98/1287-08 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW CONVERSION DEPT STORE TO RETAIL & COMMERCIAL USE 9/11/1999

DA98/1287-09 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW CONVERSION DEPT STORE TO RETAIL & COMMERCIAL USE 9/11/1999

DA98/1287-10 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW CONVERSION DEPT STORE TO RETAIL & COMMERCIAL USE 9/12/1999

DA98/1287-11 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW CONVERSION DEPT STORE TO RETAIL & COMMERCIAL USE 7/04/2000

DA98/1287-12 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW CONVERSION DEPT STORE TO RETAIL & COMMERCIAL USE 14/04/2000

DA98/1287-13 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW CONVERSION DEPT STORE TO RETAIL & COMMERCIAL USE 22/06/2000

DA98/1287-14 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW CONVERSION DEPT STORE TO RETAIL & COMMERCIAL USE 3/11/2000

DA98/1287-15 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW CONVERSION DEPT STORE TO RETAIL & COMMERCIAL USE 9/01/2001

DA98/1287-16 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW CONVERSION DEPT STORE TO RETAIL & COMMERCIAL USE 20/03/2001

DA99/334-01 Development Application 330 CHURCH STREET LOT 3 PARRAMATTA NSW INTERNAL DEMOLITION 11/03/1999

DA/1585/2003 DEVELOPMENT AND BUILDING CONTROLS - BUILDING AND DEVELOPMENT APPLICATIONS - 330 Church Street Parramatta NSW Lot 3 DP 788637 Lot 2 DP 788637 EP 1043441 TO Enclose Carparking Spaces Using Roller Shutters And Weld Mesh Fencing 14/05/2004 at 9:42 PM

DA/298/2004 DEVELOPMENT AND BUILDING CONTROLS - BUILDING AND DEVELOPMENT APPLICATIONS - 330 Church Street Parramatta NSW Lot 3 DP 788637; Lot 2 DP 788637; EP 1043441 Fitout Of Ground And First Floor Riverbank Shopping Centre 24/06/2004 at 2:11 PM

DA/873/2004 DEVELOPMENT AND BUILDING CONTROLS - BUILDING AND DEVELOPMENT APPLICATIONS - 330 Church Street Parramatta NSW Lot 3 DP 788637; Lot 2 DP 788637; EP 1043441 Refurbishment of part of lower ground floor 14/07/2004 at 9:52 AM

DA/260/2004 DEVELOPMENT AND BUILDING CONTROLS - BUILDING AND DEVELOPMENT APPLICATIONS - 330 Church Street Parramatta NSW Lot 3 DP 788637 Lot 2 DP 788637 EP 1043441 Modify Existing Carpark Exits 18/08/2004 at 5:55 PM

DA/1110/2004 DEVELOPMENT AND BUILDING CONTROLS - BUILDING AND DEVELOPMENT APPLICATIONS - 330 Church Street PARRAMATTA NSW 330 Lot 3 DP 788637; Lot 2 DP 788637; EP 1043441 Generic List of Shop Uses 7/09/2004 at 1:27 PM

DA/1410/2004 DEVELOPMENT AND BUILDING CONTROLS - BUILDING AND DEVELOPMENT APPLICATIONS - 330 Church Street PARRAMATTA NSW Lot 3 DP 788637; Lot 2 DP 788637; EP 1043441 Shops G14 & G15 Shop Fitout of Existing Brandsmart Shopping Centre 16/11/2004 at 11:14 AM

CD/585/2004 DEVELOPMENT AND BUILDING CONTROLS - BUILDING AND DEVELOPMENT APPLICATIONS - 330 Church Street Parramatta NSW Lot 3 DP 788637 Lot 2 DP 788637 EP 1043441 Shop Fitout for Just Jeans18/11/2004 at 2:20 PM

DA/1480/2004 DEVELOPMENT AND BUILDING CONTROLS - BUILDING AND DEVELOPMENT APPLICATIONS - 330 Church Street Parramatta NSW Lot 3 DP 788637; Lot 2 DP 788637; EP 1043441 remove existing signage and replace with new signs 3/12/2004 at 11:22 AM

DA/11/2005 DEVELOPMENT AND BUILDING CONTROLS - BUILDING AND DEVELOPMENT APPLICATIONS - 330 Church Street Parramatta NSW Lot 3 DP 788637 Lot 2 DP 788637 EP 1043441 Level 2 Office fitout for Landcom 7/01/2005 at 1:39 PM

DA/298/2004/A DEVELOPMENT AND BUILDING CONTROLS - BUILDING AND DEVELOPMENT APPLICATIONS - David Jones, 330 Church Street, PARRAMATTA NSW 2150 - To modify the development consent for internal refurbishment of the ground and first floors at the Riverbank Shopping Centre by modifying condition 13 and the shop layout, deleting condition 14 and6/05/2005 at 10:48 AM

DA/901/2005 DEVELOPMENT AND BUILDING CONTROLS - BUILDING AND DEVELOPMENT APPLICATIONS - 330 Church Street, PARRAMATTA NSW 2150 Lot 3 DP 788637; Lot 2 DP 788637; EP 1043441 - Fitout of a medical centre. 21/09/2005 at 5:32 PM

DA/1142/2005 DEVELOPMENT AND BUILDING CONTROLS - BUILDING AND DEVELOPMENT APPLICATIONS - 330 Church Street, Parramatta NSW 2150 - Lot 3 DP 788637; Lot 2 DP 788637; EP 1043441 - Erection of 8 under awning signs 14/11/2005 at 2:19 PM

DA/69/2008 DEVELOPMENT AND BUILDING CONTROLS - BUILDING AND DEVELOPMENT APPLICATIONS - 330 Church Street, Parramatta NSW 2150 - Lot 3 DP 788637; Lot 2 DP 788637; EP 1043441 - Fitout for the purpose of a restaurant. 5/02/2008 at 11:16 AM

DA/259/2009 DEVELOPMENT AND BUILDING CONTROLS - BUILDING AND DEVELOPMENT APPLICATIONS - 330 Church Street, PARRAMATTA NSW 2150 - Created in error. - Development 29/04/2009 at 12:43 PM

(Site History Documents – s129 Certificates)

TH

31 MAR 2011

PLANNING CERTIFICATE

CERTIFICATE UNDER SECTION 149

Environmental Planning and Assessment Act, 1979 as amended 1998

Environmental Investigation Services North Ryde
PO Box 976
NORTH RYDE NSW 1670

Certificate No: 2011/1368

Fee: $100.00

Issue Date: 29 March 2011

Receipt No: 3350614

Applicant Ref: E24680KH, PARRAMATTA

DESCRIPTION OF LAND

Address: 330 Church Street
PARRAMATTA NSW 2150

Lot Details: Lot 101 DP 1031459, Lot 3 DP 788637, Lot 2 DP 788637

SECTION A

The following Environmental planning instrument to which this certificate relates applies to the land:

Parramatta City Centre Local Environmental Plan 2007 (as amended)

The land being:
Zone B4 Mixed Use

The purpose for which development may be carried out with or without development consent or is prohibited in this zone are set out in the table contained in Annexure 'A' to this certificate.

PARRAMATTA CITY COUNCIL
30 Darcy Street Parramatta NSW 2150
PO Box 32 Parramatta NSW 2124
Phone 02 9806 5050 Fax 02 9806 5917 DX 8279 Parramatta
ABN 49 907 174 773 www.parracity.nsw.gov.au

SECTION B

For the purpose of **Section 149(2)** it is advised that as the date of this certificate the abovementioned land is affected by the matters referred to as follows:

The land is affected by State Environmental Planning Policies and Regional Environmental Plans as detailed in Annexure "B1".

Is AFFECTED by a Draft Local Environmental Plan which has been placed on Public Exhibition but has not yet been prescribed –

Is AFFECTED by a planning proposal for an amendment to the Parramatta City Centre Local Environmental Plan 2007 in relation to car parking controls.

Is affected by Parramatta City Centre Development Control Plan 2007 as amended. This development control plan complements and reinforces the aims and objectives of the Parramatta City Centre Local Environmental Plan 2007 by establishing guidelines and controls for the future built form of Parramatta City Centre.

Parramatta Development Control Plan (DCP) as amended for Sex Services and Restricted Premises applies to the land.

Parramatta Development Control Plan (DCP) for Places of Public Worship applies to all land within the City of Parramatta.

The Parramatta Child Care Centres Development Control Plan applies to all land within the City of Parramatta.

The Minister for Planning has issued directions that provisions of an EPI do not apply to certain Part 4 development where a concept plan has been approved under Part 3A.

The City Centre Civic Improvement Plan 2007 applies to this land.

The land IS AFFECTED by a Tree Preservation Order.

Council has not been notified of an order under the Trees (Disputes Between Neighbours) Act 2006 to carry out work in relation to a tree on the land.

The land is not affected by Section 38 or 39 of the Coastal Protection Act 1979.

The land IS NOT AFFECTED by road widening or road realignment under:

(1) Roads Act, 1993.
(2) Any Environmental Planning Instrument.
(3) Any Resolution of Council.

The land is not affected by Section 15 of the Mine Subsidence Compensation Act 1961 proclaiming land to be a Mine Subsidence District.

Heritage – Is affected by schedule 5 of Parramatta City Centre Local Environmental Plan 2007.

Development consent is required of any proposed development, including demolition, alterations, additions, erection of a new building and subdivision on the subject site pursuant to clause 35 of Parramatta City Centre Local Environmental Plan 2007.

The land IS NOT bushfire prone land.

The Director General with responsibility for the Threatened Species Conservation Act 1995 has not advised Council that the land includes or comprises a critical habitat.

The Parramatta City Centre Local Environmental Plan 2007 clause 25 provides for acquisition of certain lands by public authorities.

Site Compatibility Certificate

At the date of issue of this certificate Council is not aware of any

a. Site compatibility certificate (affordable rental housing),
b. Site compatibility certificate (infrastructure),
c. Site compatibility certificate (seniors housing)

in respect to the land issued pursuant to the Environmental Planning & Assessment Amendment (Site Compatibility Certificates) Regulation 2009 (NSW).

The land is **not affected** by any of the matters contained in Clause 59(2) as amended in the Contaminated Land Management Act 1997 – as listed

a. that the land to which the certificate relates is significantly contaminated land
b. that the land to which the certificate relates is subject to a management order
c. that the land to which the certificate relates is the subject of an approved voluntary management proposal
d. that the land to which the certificate relates is subject to an ongoing maintenance order
e. that the land to which the certificate relates is the subject of a site audit statement

Council has adopted a policy covering the entire City of Parramatta to restrict development of any land by reason of the likelihood of flooding.

Council **HAS NOT** adopted a policy to restrict the development of the land by reason of the likelihood of projected sea level rise (coastal protection), land slip, tidal inundation, subsidence or any other risk.

State Environmental Planning Policy (Exempt and Complying Development Codes) 2008

This information only addresses matters raised in **Clauses 1.17A (c) and (d) and 1.19** of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

It is your responsibility to ensure that you comply with the general requirements of the State Environmental Planning Policy (Exempt and Complying Codes) 2008. Failure to comply with these provisions may mean that a Complying Development Certificate issued under the provisions of State Environmental Planning Policy (Exempt and Complying Codes) 2008 is invalid.

General Housing Code

Complying Development pursuant to the General Housing Code **may not** be carried out on the land. The land is affected by specific land exemptions under **Clause 1.17A.**

- land comprises, or contains an item of environmental heritage (that is listed on the State Heritage Register or that is subject to an interim heritage order under the *Heritage Act 1977* or that is identified as an item of environmental heritage in an environmental planning instrument),

Housing Alterations Code

Complying Development pursuant to the Housing Alterations Code **may not** be carried out on the land. The land is affected by specific land exemptions under **Clause 1.17A.**

- land comprises, or contains an item of environmental heritage (that is listed on the State Heritage Register or that is subject to an interim heritage order under the *Heritage Act 1977* or that is identified as an item of environmental heritage in an environmental planning instrument),

General Development Code

Complying Development pursuant to the General Development Code **may not** be carried out on the land. The land is affected by specific land exemptions under **Clause 1.17A.**

- land comprises, or contains an item of environmental heritage (that is listed on the State Heritage Register or that is subject to an interim heritage order under the *Heritage Act 1977* or that is identified as an item of environmental heritage in an environmental planning instrument),

Demolition Code

Complying Development pursuant to the Demolition Code **may not** be carried out on the land. The land is affected by specific land exemptions under **Clause 1.17A**

- land comprises, or contains an item of environmental heritage (that is listed on the State Heritage Register or that is subject to an interim heritage order under the *Heritage Act 1977* or that is identified as an item of environmental heritage in an environmental planning instrument),

General Commercial and Industrial Code

Complying Development pursuant to the General Commercial and Industrial Code **may not** be carried out on the land. The land is affected by specific land exemptions under **Clause 1.17A**

- land comprises, or contains an item of environmental heritage (that is listed on the State Heritage Register or that is subject to an interim heritage order

under the *Heritage Act 1977* or that is identified as an item of environmental heritage in an environmental planning instrument),

SPECIAL NOTES

Acid Sulphate Soils Class 4 – development consent is required for the carrying out of works described in the Table clause 33B of the Parramatta City Centre Local Environmental Plan 2007.

Applicants for Sections 149 Certificates are advised that Council does not hold sufficient information to fully detail the effect of any encumbrances on the title of the subject land. The information available to Council is provided on the basis that neither Council nor its servants hold out advice or warrant to you in any way its accuracy, nor shall Council or its servants, be liable for any negligence in the preparation of that information. Further information should be sought from relevant Statutory Departments.

SECTION C
The following additional information is issued under Section 149(5)

Pursuant to S149(5) the Council supplies information as set out below on the basis that the Council takes no responsibility for the accuracy of the information. The information if material should be independently checked by the applicant.

Aboriginal Heritage – High Sensitivity – potential to contain items of Aboriginal heritage. Contact Council's Customer Service/Duty Planner (02) 9806 5050 for more information.

This site is coloured on the Key Sites Map and refers to Clause 22B Design Excellence of the Parramatta City Centre Local Environmental Plan 2007.

The land is affected by a 100 year Average Recurrence Interval flood as indicated by Council's current flooding information. As such Council is required to take that into account when determining any development application made in respect of the land.

Further information is available at the Design Services Section within Council's Technical Services Unit.

Additional advice should be also sought from an appropriately qualified person as to the extents and potential hazards associated with the likely flooding of the land. The names of qualified persons maybe obtained from the Institution of Engineers Australia.

ANNEXURE 'A'

Parramatta City Centre Local Environmental Plan 2007

Zone B4 Mixed Use

1 Objectives of zone

- To provide a mixture of compatible land uses.
- To integrate suitable business, office, residential, retail and other development in accessible locations so as to maximise public transport patronage and encourage walking and cycling.
- To create opportunities to improve the public domain and pedestrian links within the Mixed Use Zone.
- To support the higher order Commercial Core Zone while providing for the daily commercial needs of the locality, including:
  - commercial and retail development,
  - cultural and entertainment facilities that cater for a range of arts and cultural activity, including events, festivals, markets and outdoor dining,
  - tourism, leisure and recreation facilities,
  - social, education and health services,
  - high density residential development.
  - To protect and enhance the unique qualities and character of special areas within the Parramatta city centre.

2 Permitted without consent

Nil

3 Permitted with consent

Any other development not otherwise specified in item 2 or 4

4 Prohibited

Car parks (except those required by this Plan or public car parking provided by or on behalf of the Council); Caravan parks; Dual occupancies; Dwelling houses; Extractive industries; Home occupation (sex services); Industries; Light industrial retail outlets; Mines; Vehicle body repair workshops; Warehouse or distribution centres

ANNEXURE "B1"

issued pursuant to Section 149 of the Environmental Planning and Assessment Act 1979. The following information is supplied in respect of Section 149 and embodies the requirements of Department of Planning Circular No. A2 dated 17 March 1989 and the Ministerial Notification dated 15 December 1986.

STATE ENVIRONMENTAL PLANNING POLICY NO.6 - Number of Storeys in a Building

STATE ENVIRONMENTAL PLANNING POLICY NO.10 - Retention of Low Cost Rental Accommodation

STATE ENVIRONMENTAL PLANNING POLICY NO.19 - Bushland in Urban Areas

STATE ENVIRONMENTAL PLANNING POLICY NO.21 – Caravan Parks

STATE ENVIRONMENTAL PLANNING POLICY NO.22 - Shops and Commercial Premises

STATE ENVIRONMENTAL PLANNING POLICY NO.32 - Urban Consolidation (Redevelopment of Urban Land)

STATE ENVIRONMENTAL PLANNING POLICY NO.33 - Hazardous and Offensive Development

STATE ENVIRONMENTAL PLANNING POLICY NO.55 - Remediation of Land

STATE ENVIRONMENTAL PLANNING POLICY NO.64 - Advertising and Signage

STATE ENVIRONMENTAL PLANNING POLICY NO.65 – Design Quality of Residential Flat Development.

STATE ENVIRONMENTAL PLANNING POLICY NO.70 – Affordable Housing (Revised Schemes)

STATE ENVIRONMENTAL PLANNING POLICY – (Housing for Seniors or People with a Disability) 2004

STATE ENVIRONMENTAL PLANNING POLICY – (Building Sustainability Index: BASIX) 2004

STATE ENVIRONMENTAL PLANNING POLICY – (Major Projects) 2005

STATE ENVIRONMENTAL PLANNING POLICY – (Mining, Petroleum Production and Extractive Industries) 2007

STATE ENVIRONMENTAL PLANNING POLICY (Temporary Structures and Places of Public Entertainment) 2007

STATE ENVIRONMENTAL PLANNING POLICY (Infrastructure) 2007

STATE ENVIRONMENTAL PLANNING POLICY (Exempt and Complying Development Codes) 2008

STATE ENVIRONMENTAL PLANNING POLICY (Affordable Rental Housing) 2009

STATE ENVIRONMENTAL PLANNING POLICY (Urban Renewal) 2010

SYDNEY REGIONAL ENVIRONMENTAL PLAN NO.9 (No.2) - Extractive Industries

SYDNEY REGIONAL ENVIRONMENTAL PLAN NO.18 - Public Transport Corridors

SYDNEY REGIONAL ENVIRONMENTAL PLAN NO.24 - Homebush Bay Area

SYDNEY REGIONAL ENVIRONMENTAL PLAN – (Sydney Harbour Catchment) 2005

N.B. All enquiries as to the application of Draft, State and Regional Environmental Planning Policies should be directed to The Department of Infrastructure Planning and Natural Resources – 23-33 Bridge Street Sydney NSW 2000.

Dr Robert Lang
Chief Executive Officer

per **dated 29 March 2011**

(Site History Documents – WorkCover Records)

WorkCover
NEW SOUTH WALES

28 MAR 2011
TH

Our Ref: D11/037459
Your Ref: Todd Hore

24 March 2011

Attention: Todd Hore
Environmental Investigation Services
PO Box 976
NORTH RYDE BC NSW 1670

Dear Mr Hore,

RE SITE: 330 Church Street Parramatta

I refer to your site search request received by WorkCover NSW on 23 March 2011 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

Diana Hayes

Senior Licensing Officer
Dangerous Goods Team

APPENDIX D

(Sampling Protocols and QA/QC Definitions)

SOIL AND GROUNDWATER SAMPLING PROTOCOLS

These protocols specify the basic procedures to be used when sampling soils or groundwater for environmental site assessments undertaken by EIS. The purpose of these protocols is to provide standard methods for: sampling, decontamination procedures for sampling equipment, sample preservation, sample storage and sample handling. Deviations from these procedures must be recorded.

Soil Sampling

a) Prepare a test pit/borehole log.
b) Layout sampling equipment on clean plastic sheeting to prevent direct contact with ground surface. The work area should be at a distance from the drill/rig excavator such that the drill rig/excavator can operate in a safe manner.
c) Ensure all sampling equipment has been decontaminated prior to use.
d) Remove any surface debris from the immediate area of the sampling location.
e) Collect samples and place in glass jar with a Teflon seal. This should be undertaken as quickly as possibly to prevent the loss of volatiles. If possible, fill the glass jars completely.
f) Collect samples for asbestos analysis and place in a zip-lock plastic bag.
g) Label the jar and/or bag with the EIS job number, sample location (eg. BH1), sampling depth interval and date. If more than one sample container is used, this should also be indicated (eg. 2 = Sample jar 1 of 2 jars).
h) Photoionisation detector (PID) screening of volatile organic compounds (VOCs) should be undertaken on samples using the soil sample headspace method. Headspace measurements are taken following equilibration of the headspace gasses in partly filled zip-lock plastic bags. PID headspace data is recorded on the borehole/test pit log and the chain of custody forms.
i) Record the lithology of the sample and sample depth on the borehole/test pit log in accordance with AS1726-1993[37].
j) Store the sample in a sample container cooled with ice or chill packs. On completion of the sampling the sample container should be delivered to the lab immediately or stored in the refrigerator prior to delivery to the lab. All samples are preserved in accordance with AS 4482.1:2005, AS 4482.2:1999 and AS/NZS 5667.1:1998.
k) Check for the presence of groundwater after completion of each borehole using an electronic dip metre or water whistle. Boreholes should be left open until the end of fieldwork. All groundwater levels in the boreholes should be rechecked on the completion of the fieldwork.
l) Backfill the boreholes/test pits with the excavation cuttings or clean sand prior to leaving the site.

Decontamination Procedures for Soil Sampling Equipment

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[37] *Geotechnical Site Investigations*, Standards Australia 1993 (AS1726-1993)

a) All of the equipment associated with the soil sampling procedure should be decontaminated between every sampling location.
b) The following equipment and materials are required for the decontamination procedure:
   - Phosphate free detergent (Decon 90)
   - Potable water
   - Stiff brushes
   - Plastic sheets
c) Ensure the decontamination materials are clean prior to proceeding with the decontamination.
d) Fill both buckets with clean potable water and add phosphate free detergent to one bucket.
e) In the bucket containing the detergent scrub the sampling equipment until all the material attached to the equipment has been removed.
f) Rinse sampling equipment in the bucket containing potable water.
g) Place cleaned equipment on clean plastic sheets.

If all materials are not removed by this procedure, high-pressure water cleaning is recommended. If any equipment is not completely decontaminated by both these processes that equipment should not be used until it has been thoroughly cleaned.

Groundwater Sampling

Groundwater samples are more sensitive to contamination than soil samples and therefore adhesion to this protocol is particularly important to obtain reliable, reproducible results. The recommendations detailed in AS/NZS 5667.1:1998 are considered to form a minimum standard.

The basis of this protocol is to maintain the security of the borehole and obtain accurate and representative groundwater samples. The following procedure should be used for collection of groundwater samples from previously installed groundwater monitoring wells.

a) After monitoring well installation, at least three bore volumes should be pumped from the monitoring wells (well development) to remove any water introduced during the drilling process and/or the water that is disturbed during installation of the monitoring well. This should be completed prior to purging and sampling.
b) Groundwater monitoring wells should then be left to recharge for at least three days before purging and sampling. Prior to purging or sampling the condition of each well should observed and any anomalies recorded on the field data sheets. The following information should be noted: the condition of the well, noting any signs of damage, tampering or complete destruction; the condition and operation of the well lock; the condition of the protective casing and the cement footing (raised or cracked); and, the presence of water between protective casing and well.
c) Take the groundwater level from the collar of the piezometer/monitoring well using an electronic dip meter. The collar level should be taken (if required) during the site visit using a dumpy level and staff.

d) Purging and sampling of piezometers/monitoring wells is done on the same site visit when using micro-purge (or low flow) techniques. Layout and organize all equipment associated with groundwater sampling in a location where they will not interfere with the sampling procedure and will not pose a risk of contaminating samples. Equipment generally required includes:
   - Micropore filtration system or Stericup single-use filters (for heavy metals samples).
   - Filter paper for Micropore filtration system.
   - Bucket with volume increments.
   - Sample containers: teflon bottles with 1 ml nitric acid, 75mL glass vials with 1 mL hydrochloric acid, 1 L amber glass bottles.
   - Bucket with volume increments.
   - Flow cell.
   - pH/EC/Eh/T meters.
   - Plastic drums used for transportation of purged water.
   - Esky and ice.
   - Nitrile gloves.
   - Distilled water (for cleaning).
   - Electronic dip meter.
   - Micro-purge pump pack and pump head.
   - Air and water tubing for Micro-purge.
   - Groundwater sampling forms.

e) If single-use stericup filtration is not being used, clean the Micropore filtration system thoroughly with distilled water prior to use and between each sample. Filter paper should be changed between samples. 0.45um filter paper should be placed below the glass fibre filter paper in the filtration system.

f) Ensure all non-disposable sampling equipment is decontaminated or that new disposable equipment is available prior to any work commencing at a new location. The procedure for decontamination of groundwater equipment is outlined at the end of this section.

g) Disposable gloves should be used whenever samples are taken to protect the sampler and to assist in avoidance of contamination.

h) Groundwater samples are obtained from the monitoring wells using low flow/micro-purge sampling equipment to reduce the disturbance of the water column and loss of volatiles.

i) During pumping to purge the well, the pH, temperature, conductivity, dissolved oxygen, redox potential and groundwater levels are monitored (where possible) using calibrated field instruments to assess the development of steady state conditions. Steady state conditions are generally considered to have been achieved when the difference in the pH measurements was less than 0.2 units and the difference in conductivity was less than 10%.

j) All measurements are recorded on specific data sheets.

k) Once steady state conditions are considered to have been achieved, groundwater samples are obtained directly from the pump tubing and placed in appropriate glass bottles, BTEX vials or plastic bottles.

l) All samples are preserved in accordance with water sampling requirements detailed in the NEPM 1999 and placed in an insulated container with ice. Groundwater samples are preserved by immediate storage in an insulated sample container with ice in accordance with AS/NZS 5667.1:1998.

m) Record the sample on the appropriate log in accordance with AS1726:1993. At the end of each water sampling complete a chain of custody form.

Decontamination Procedures for Groundwater Sampling Equipment

a) All of the equipment associated with the groundwater sampling procedure (other than single-use items) should be decontaminated between every sampling location.

b) The following equipment and materials are required for the decontamination procedure:
   - Phosphate free detergent.
   - Potable water.
   - Distilled water
   - Plastic Sheets or bulk bags (plastic bags)

c) Fill one bucket with clean potable water and phosphate free detergent, and one bucket with distilled water.

d) Flush potable water and detergent through pump head. Wash sampling equipment and pump head using brushes in the bucket containing detergent until all materials attached to the equipment are removed.

e) Flush pump head with distilled water.

f) Change water and detergent solution after each sampling location.

g) Rinse sampling equipment in the bucket containing distilled water.

h) Place cleaned equipment on clean plastic sheets.

i) If all materials are not removed by this procedure that equipment should not be used until it has been thoroughly cleaned

QA/QC DEFINITIONS

The QA/QC terms used in this report are defined below. The definitions are in accordance with US EPA publication SW-846, entitled *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (1994[38]) methods and those described in *Environmental Sampling and Analysis, A Practical Guide,* (H. Keith 1991[39]).

Practical Quantitation Limit (PQL), Limit of Reporting (LOR) and Estimated Quantitation Limit (EQL)

These terms all refer to the concentration above which results can be expressed with a minimum 95% confidence level. The laboratory reporting limits are generally set at ten times the standard deviation for the Method Detection limit (MDL) for each specific analyte. For the purposes of this report the LOR, PQL, and EQL are considered to be equivalent.

When assessing laboratory data it should be borne in mind that values at or near the PQL have two important limitations. "*The uncertainty of the measurement value can approach, and even equal, the reported value. Secondly, confirmation of the analytes reported is virtually impossible unless identification uses highly selective methods. These issues diminish when reliably measurable amounts of analytes are present. Accordingly, legal and regulatory actions should be limited to data at or above the reliable detection limit*" Keith 1991.

Precision

The degree to which data generated from repeated measurements differ from one another due to random errors. Precision is measured using the standard deviation or Relative Percent Difference (RPD). Acceptable targets for precision in this report will be less than 50% RPD for concentrations greater than ten times the PQL, less than 75% RPD for concentrations between five and ten times the PQL and less than 100% RPD for concentrations that are less than five times the PQL.

Accuracy

Accuracy is a measure of the agreement between an experimental result and the true value of the parameter being measured. The assessment of accuracy for an analysis can be achieved through the analysis of known reference materials or assessed by the analysis of surrogates, field blanks, trip spikes and matrix spikes.

The proximity of an averaged result to the true value, where all random errors have been statistically removed. Accuracy is measured by percent recovery. Acceptable

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[38] *SW-846: Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,* US EPA, 1994 (US EPA SW-846)

[39] *Environmental Sampling and Analysis, A Practical Guide*, Keith, H, 1991 (Keith 1991)

limits for accuracy generally lie between 70% to 130% recoveries. Certain laboratory methods may allow for values that lie outside these limits.

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is primarily dependent upon the design and implementation of the sampling program. Representativeness of the data is partially ensured by the avoidance of contamination, adherence to sample handing and analysis protocols and use of proper chain-of-custody and documentation procedures.

Completeness

Completeness is a measure of the number of valid measurements in a data set compared to the total number of measurements made and overall performance against DQIs. The following information is assessed for completeness:

- Chain-of-custody forms;
- Sample receipt form;
- All sample results reported;
- All blank data reported;
- All laboratory duplicate and RPDs calculated;
- All surrogate spike data reported;
- All matrix spike and lab control spike (LCS) data reported and RPDs calculated;
- Spike recovery acceptable limits reported; and
- NATA stamp on reports.

Comparability

Comparability is the evaluation of the similarity of conditions (eg. sample depth, sample homogeneity) under which separate sets of data are produced. Data comparability checks include a bias assessment that may arise from the following sources:

- Collection and analysis of samples by different personnel;
- Use of different techniques;
- Collection and analysis by the same personnel using the same methods but at different times; and
- Spatial and temporal changes (due to environmental dynamics).

Blanks

The purpose of laboratory and field blanks is to check for artifacts and interferences that may arise during sampling and analysis.

Matrix Spikes

Samples are spiked with laboratory grade standards to detect interactive effects between the sample matrix and the analytes being measured. Matrix Spikes are

reported as a percent recovery and are prepared for 1 in every 20 samples. Sample batches that contain less than 20 samples may be reported with a Matrix Spike from another batch. The percent recovery is calculated using the formula;

$$\frac{\text{(Spike Sample Result – Sample Result)}}{\text{Concentration of Spike Added}} \times 100$$

Acceptable recovery limits are 70% to 130%.

Surrogate Spikes

Samples are spiked with a known concentration of compounds that are chemically related to the analyte being investigated but unlikely to be detected in the environment. The purpose of the Surrogate Spikes is to check the accuracy of the analytical technique. Surrogate Spikes are reported as percent recovery.

Duplicates

Laboratory duplicates measure precision, expressed as Relative Percent Difference. Duplicates are prepared from a single field sample and analysed as two separate extraction procedures in the laboratory. The RPD is calculated using the formula where D1 is the sample concentration and D2 is the duplicate sample concentration:

$$\frac{(D1 - D2)}{\{(D1 + D2)/2\}} \times 100$$

APPENDIX E

(Groundwater Monitoring Sheets & Equipment Calibration Records)

Groundwater Sampling Data
Job Ref: E24680KH, Parramatta

Timestamp	EC (uS/cm)	DO (mg/L)	ORP(mV)	pH (Units)	Temp (C)	Site	Folder	Unit ID
31/03/2011 8:40	13.5	10.3	204.6	6.51	16.4	E24680KH	MW1	EIS YSI
31/03/2011 8:41	11.7	10.6	207.4	6.25	15.7	E24680KH	MW1	EIS YSI
31/03/2011 8:42	11	10.6	205.5	6.39	15.5	E24680KH	MW1	EIS YSI
31/03/2011 8:43	10.6	10.5	205.1	6.45	15.3	E24680KH	MW1	EIS YSI
31/03/2011 8:44	10.3	10.4	204.8	6.47	15.3	E24680KH	MW1	EIS YSI
31/03/2011 8:45	21.3	9.9	183.9	6.55	15.8	E24680KH	MW1	EIS YSI
31/03/2011 8:46	19.9	9.9	209.1	6.51	15.7	E24680KH	MW1	EIS YSI
31/03/2011 8:47	15.4	9.7	204.8	6.6	15.8	E24680KH	MW1	EIS YSI
31/03/2011 8:58	14	9.9	210.7	6.56	15.5	E24680KH	MW1	EIS YSI
31/03/2011 8:59	611	2.7	47.6	7.54	21.5	E24680KH	MW1	EIS YSI
31/03/2011 9:00	134.1	3.3	45.9	7.46	21.5	E24680KH	MW1	EIS YSI
5/04/2011 7:35	17.1	9.5	248.2	6.89	18.8	E24680KH	MW1	EIS YSI
5/04/2011 7:36	14.5	9.5	245.3	6.91	18.6	E24680KH	MW1	EIS YSI
5/04/2011 8:08	7.2	9.8	229.4	6.65	16.7	E24680KH	MW1	EIS YSI
5/04/2011 8:09	7.2	9.9	233.7	6.59	16.6	E24680KH	MW1	EIS YSI
5/04/2011 8:10	7	9.9	236.4	6.56	16.5	E24680KH	MW1	EIS YSI
5/04/2011 8:11	6.9	9.9	239.1	6.55	16.5	E24680KH	MW1	EIS YSI
5/04/2011 8:12	8.6	9.8	253.7	6.46	16.6	E24680KH	MW1	EIS YSI
5/04/2011 8:13	708	3.9	97.8	6.27	17.9	E24680KH	MW1	EIS YSI
5/04/2011 8:14	865	2.1	98.5	5.83	19.9	E24680KH	MW1	EIS YSI
5/04/2011 8:15	894	2.6	95.1	5.89	20.7	E24680KH	MW1	EIS YSI
5/04/2011 8:16	910	2.8	92.9	5.96	21.1	E24680KH	MW1	EIS YSI
5/04/2011 8:17	919	2.4	91.4	6	21.3	E24680KH	MW1	EIS YSI
5/04/2011 8:18	922	2.2	90.5	6.03	21.4	E24680KH	MW1	EIS YSI
5/04/2011 8:19	922	2.1	90	6.05	21.5	E24680KH	MW1	EIS YSI
5/04/2011 8:20	916	2	89.8	6.06	21.6	E24680KH	MW1	EIS YSI
5/04/2011 8:21	911	1.9	89.7	6.06	21.6	E24680KH	MW1	EIS YSI
5/04/2011 8:22	907	1.8	89.5	6.07	21.6	E24680KH	MW1	EIS YSI
5/04/2011 8:23	901	1.7	89.5	6.07	21.6	E24680KH	MW1	EIS YSI
5/04/2011 8:24	891	1.6	89.2	6.08	21.6	E24680KH	MW1	EIS YSI
5/04/2011 8:25	880	1.5	88.9	6.09	21.6	E24680KH	MW1	EIS YSI
5/04/2011 8:26	867	1.4	88.6	6.1	21.7	E24680KH	MW1	EIS YSI
5/04/2011 8:27	856	1.3	88.3	6.11	21.7	E24680KH	MW1	EIS YSI
5/04/2011 8:28	846	1.3	87.9	6.13	21.7	E24680KH	MW1	EIS YSI
5/04/2011 8:29	835	1.2	87.6	6.15	21.7	E24680KH	MW1	EIS YSI
5/04/2011 8:30	825	1.2	87.3	6.17	21.8	E24680KH	MW1	EIS YSI
5/04/2011 8:31	817	1.1	87.1	6.18	21.8	E24680KH	MW1	EIS YSI
5/04/2011 8:32	810	1.1	87.1	6.19	21.8	E24680KH	MW1	EIS YSI

**** Calibrate: DO

Date 04/04/11 DD/MM/YY
Time 15:35:21 24-hour
User ID: BP

Method DO Air Calibrate
Cal Value: 100.000000 %
Sensor Value: 5.328399 uA
Sensor Type Polarographic
Membrane Type 1.25 PE Yellow
Salinity Mode 5.328399 Auto
Temperature 21.200001 %C2%B0C
Barometer 765.500000 mmHg
Calibrate Status Calibrated

***** Calibrate: ORP

Date 04/04/11 DD/MM/YY
Time 15:32:02 24-hour
User ID: BP

Cal Solution Value: 235.509995 ORP mV
Sensor Value: 235.699997 ORP mV
Temperature 22.299999 %C2%B0C
Calibrate Status Calibrated

***** Calibrate: pH

Date 04/04/11 DD/MM/YY
Time 15:26:27 24-hour
User ID: BP

Buffer Value 7.011549 pH
Sensor Value: -17.200001 pH mV
Temperature 22.850000 %C2%B0C

Buffer Value 4.003604 pH
Sensor Value: 159.899994 pH mV
Temperature 22.950006 %C2%B0C

Slope 59.285118 mV/pH
Slope 94.397723 % of Ideal pH Value
Calibrate Status Calibrated

***** Calibrate: Conductivity

Date 04/04/11 DD/MM/YY
Time 15:20:24 24-hour
User ID: BP

Method Sp. Conductance
Cal Value: 1338.000000 SPC-uS/cm
Sensor Value: 1338.000000 SPC-uS/cm
Temperature Ref. 25.000000 %C2%B0C
Temperature Comp. 1.910000 %/C
TDS Constant 0.650000
Temperature 22.799999 %C2%B0C
Cal Cell Constant: 4.830285
Calibrate Status Calibrated

***** Calibrate: DO

Date 04/04/11 DD/MM/YY
Time 10:47:50 24-hour
User ID: BP

Method DO Air Calibrate
Cal Value: 100.000000 %
Sensor Value: 6.449045 uA
Sensor Type Polarographic
Membrane Type 1.25 PE Yellow
Salinity Mode 6.449045 Auto
Temperature 25.400000 %C2%B0C
Barometer 760.599976 mmHg
Calibrate Status Calibrated

***** Calibrate: ORP

Date 04/04/11 DD/MM/YY
Time 10:43:43 24-hour
User ID: BP

Cal Solution Value: 233.690002 ORP mV
Sensor Value: 230.100006 ORP mV
Temperature 23.700001 %C2%B0C
Calibrate Status Calibrated

***** Calibrate: pH

Date 04/04/11 DD/MM/YY
Time 10:42:20 24-hour
User ID: BP

Buffer Value 7.011190 pH
Sensor Value: -17.200001 pH mV
Temperature 22.950006 %C2%B0C

Buffer Value 4.003531 pH
Sensor Value: 161.000000 pH mV
Temperature 22.749994 %C2%B0C

Slope 59.699122 mV/pH
Slope 93.660274 % of Ideal pH Value

Calibrate Status Calibrated

***** Calibrate: Conductivity

Date 04/04/11 DD/MM/YY
Time 10:38:05 24-hour
User ID: BP

Method Sp. Conductance
Cal Value: 1302.000000 SPC-uS/cm
Sensor Value: 1261.000000 SPC-uS/cm
Temperature Ref. 25.000000 %C2%B0C
Temperature Comp. 1.910000 %/C
TDS Constant 0.650000
Temperature 22.299999 %C2%B0C
Cal Cell Constant: 4.830286
Calibrate Status Calibrated

***** Calibrate: pH

Date 31/03/11 DD/MM/YY
Time 16:22:04 24-hour
User ID: 200.2

Buffer Value 7.016734 pH
Sensor Value: -11.300000 pH mV
Temperature 21.550013 %C2%B0C

Buffer Value 4.002851 pH
Sensor Value: 163.300003 pH mV
Temperature 21.749994 %C2%B0C

Slope 58.570579 mV/pH
Slope 95.670503 % of Ideal pH Value
Calibrate Status Calibrated

***** Calibrate: ORP

Date 31/03/11 DD/MM/YY
Time 16:20:23 24-hour
User ID: BP

Cal Solution Value: 236.289993 ORP mV
Sensor Value: 236.699997 ORP mV
Temperature 21.700001 %C2%B0C
Calibrate Status Calibrated

***** Calibrate: Conductivity

Date 31/03/11 DD/MM/YY
Time 16:18:59 24-hour
User ID: BP

Method Sp. Conductance
Cal Value: 1307.000000 SPC-uS/cm
Sensor Value: 1307.000000 SPC-uS/cm
Temperature Ref. 25.000000 %C2%B0C
Temperature Comp. 1.910000 %/C
TDS Constant 0.650000
Temperature 21.900000 %C2%B0C
Cal Cell Constant: 4.678180
Calibrate Status Calibrated

***** Calibrate: DO

Date 31/03/11 DD/MM/YY
Time 16:18:18 24-hour
User ID: BP

Method DO Air Calibrate
Cal Value: 100.000000 %
Sensor Value: 5.612107 uA
Sensor Type Polarographic
Membrane Type 1.25 PE Yellow
Salinity Mode 5.612107 Auto
Temperature 22.400000 %C2%B0C
Barometer 756.099976 mmHg
Calibrate Status Calibrated

***** Calibrate: DO

Date 30/03/11 DD/MM/YY
Time 16:45:09 24-hour
User ID: TH

Method DO Air Calibrate
Cal Value: 100.000000 %
Sensor Value: 4.899626 uA
Sensor Type Polarographic
Membrane Type 1.25 PE Yellow
Salinity Mode 4.899626 Auto
Temperature 20.200001 %C2%B0C
Barometer 763.000000 mmHg
Calibrate Status Calibrated

***** Calibrate: ORP

Date 30/03/11 DD/MM/YY
Time 16:42:12 24-hour
User ID: TH

Cal Solution Value: 236.289993 ORP mV
Sensor Value: 241.000000 ORP mV

Temperature 21.700001 %C2%B0C
Calibrate Status Calibrated

***** Calibrate: pH

Date 30/03/11 DD/MM/YY
Time 16:40:53 24-hour
User ID: TH

Buffer Value 7.013735 pH
Sensor Value: -13.400000 pH mV
Temperature 22.249994 %C2%B0C

Buffer Value 4.002787 pH
Sensor Value: 156.300003 pH mV
Temperature 21.749994 %C2%B0C

Slope 56.981682 mV/pH
Slope 98.500745 % of Ideal pH Value
Calibrate Status Calibrated

***** Calibrate: Conductivity

Date 30/03/11 DD/MM/YY
Time 16:31:48 24-hour
User ID: TH

Method Sp. Conductance
Cal Value: 1273.000000 SPC-uS/cm
Sensor Value: 1273.000000 SPC-uS/cm
Temperature Ref. 25.000000 %C2%B0C
Temperature Comp. 1.910000 %/C
TDS Constant 0.650000
Temperature 22.000000 %C2%B0C
Cal Cell Constant: 4.678180
Calibrate Status Calibrated

Groundwater Monitoring Report

Client:	**Meriton Apartments**	**Job No.:**	E24680KH
Project:	Proposed Commercial/residential Development	**Well No.:**	MW1
Location:	330 Church Street, Parramatta	**Depth (m):**	9.3

WELL FINISH

	Gatic Cover		**Standpipe**		**PVC Pipe**

WELL PURGE DETAILS:

Method:	Micro-purge	**SWL – Before:**	3.84 m
Date:	5/4/11	**Time – Before:**	8.08
Undertaken By:	TH	**Total Vol Removed:**	
Pump Program No.		**PID (ppm):**	

PURGING / SAMPLING MEASUREMENTS

Time (min)	CMP	Vol (L)	SWL (m)	Temp (°C)	pH	EC (µS/cm)	Eh (mV)	DO ppm
1	4	0.1	3.90	18.6	6.38	7.2	234.6	9.9
5		0.4	3.9	17.9	6.16	775	99	2.8
6		0.5	3.93	20.2	5.83	792	972	2.2
7			3.96	20.8	5.9	828	94.4	2.7
8		1		21.0	5.94	84.	93.3	2.8
9		1.4	3.95	21.3	6.00	854	916	2.6
10		1.8	"	21.4	6.03	859	907	2.3
11		2.2	3.95	21.41	6.05	<860	90.1	2.1
12		2.6		21.5	6.05	858	899	2.1
13		3	3.96	21.6	6.06	853	89.6	1.8
14		3.5	3.96	21.6	6.06	849	89.5	1.9
15		4.1		21.6	6.07	847	89.3	1.8
16		4.6	3.96	21.6	6.08	839	89.3	1.6
17		5.1		21.6	6.09	836	89.1	1.5
18		5.6	3.96	21.9	6.10	840	88.6	1.4
19		6.1		21.7	6.11	839	88.3	1.3
20		6.5	3.96	21.7	6.13	842	819	1.2
21		6.9	3.96	21.7	6.15	838	87.9	1.2
22		7.3	3.96	21.8	6.16	830	876	1.1
23		7.9	3.96	21.8	6.17	827	872	1.1
24		8.4	3.96	21.8	6.19	813	87.2	1.1
25		8.8	3.96	21.8	6.19	806	871	1.0

Containers Used/Comments

Def A

Tested By:	
Date Tested:	
Checked By:	
Date:	

Remarks:

- All measurements are corrected to ground level
- SWL is an abbreviation for standing water level
- Steady state conditions - difference in the pH less than 0.2 units and difference in conductivity less than 10%

Groundwater Monitoring Well Development Report

Client:	**Meriton Apartments**	**Job No.:**	E24680KH
Project:	Proposed Commercial/residential Development	**Well No.:**	MW 1
Location:	330 Church Street, Parramatta	**Depth (m):**	9.3m

WELL FINISH DETAILS

	Gatic Cover		**Standpipe**		**PVC Pipe**

WELL DEVELOPMENT DETAILS

Method:	Pump	**SWL – Before: (m)**	3.85
Date:	1/4/11	**Time – Before:**	
Undertaken By:	TH	**SWL – After: (m)**	
Total Vol. Removed:	~30L	**Time – After:**	
PID Reading (ppm):			

Comments:

DEVELOPMENT MEASUREMENTS

Time (min)	Volume Removed (L)	SWL (m)	Temp (°C)	pH	EC (mS/m)	DO (mg/L)	Eh (mV)

Comments:

Tested By:	
Date Tested:	
Checked By:	
Date:	

Remarks:

- All measurements are corrected to ground level
- All stated Volumes are in Litres
- SWL is an abbreviation for standing water level
- Steady state conditions - difference in the pH less than 0.2 units and difference in conductivity less than 10%
- Minimum 3 monitoring well volumes are purged

APPENDIX F

(Hardness Modified Trigger Value Calculations)

ADJUSTING THE TRIGGER VALUE TO TAKE ACCOUNT OF HARDNESS

Reference: Australian and New Zealand Guidelines for Fresh and Marine Water Quality ANZECC 2000
Chapter 3 p3.4-21
Table 3.4.3

Conductivity measurements are temperature dependent. The degree to which temp affects conductivity varies from solution to solution. The conductivity of of a solution increases with temperature. For salt solutions this is typically 2.2 to 3%/degree Centigrade, for fresh water it is typically 2%/degree centigrade.
www.emersonprocess.com/raihome/.../Liq_AppData_43-018.pdf

http://www.fivecreeks.org/monitor/sal.html
This website includes a conversion calculator for salinity to conductivity that also incudes a temperature compensation factor
Results are in ppt (1ppt equals 1000mg/L) - http://www.aquatext.com/tables/concconv.htm
This formula is valid for salt concentrations ranging from 2ppt to 42 ppt (ie 2000mg/L to 42000mg/L).
Recommend this one as it is easy, has temp adjustment and appears to give reasonable results.

Different salts have different abilities to conduct electricity most conversion factors appear to assume that the majjority of salt in a sample is sodium chloride (a reasonable assumption).
http://www.sa.waterwatch.org.au/sw_salinity.htm
The above website cites a conversion factor of 0.56 (ie multiply EC value uS/cm by 0.56)

Conversion factors seem to range from 0.52 to 0.56

The calculation allows you you to adjust the trigger value for some of the heavy metals

The calculation only applies to fresh waters with a salinty of 2500mg/L or less.
At 25°C a salinity value of 2500mg/L approximates to a conductivity reading of 4750µS/cm. (assumes a conversion factor 0.52)

CALCULATION:

Calculate the average hardness (H) value (mg/L as CaCO3) for the site and enter here **170**

The original 95% trigger values (TV) and the hardness modified trigger values (HMTV) are shown in the Table below in µg/L

Metal	TV	Hardness algorithm	HMTV
Cadmium	0.2	$HMTV = TV(H/30)^{0.89}$	0.9
Chromium III	1	$HMTV = TV(H/30)^{0.82}$	4.1
Copper	1.4	$HMTV = TV(H/30)^{0.85}$	6.1
Lead	3.4	$HMTV = TV(H/30)^{1.27}$	30.8
Nickel	11	$HMTV = TV(H/30)^{0.85}$	48.1
Zinc	8	$HMTV = TV(H/30)^{0.85}$	34.9

DO NOT ALTER NUMBERS IN RED COLUMN