



CONSULTING EARTH SCIENTISTS

PRELIMINARY STAGE 1 ENVIRONMENTAL SITE ASSESSMENT UPDATE:

100 BENNELONG ROAD, SYDNEY OLYMPIC PARK, NSW 2127

PREPARED FOR MERITON GROUP

CES REFERENCE: CES130707-MG-AB

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**PRELIMINARY STAGE 1 ENVIRONMENTAL SITE ASSESSMENT
UPDATE**

100 BENNELONG ROAD, SYDNEY OLYMPIC PARK

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1 INTRODUCTION

Consulting Earth Scientists Pty Ltd (CES) has been commissioned by Meriton Group (the Client) to undertake a Preliminary Stage 1 Environmental Site Assessment (ESA) Update for the construction of a new multilevel residential building with basement level car parking at 100 Bennelong Road, Sydney Olympic Park, NSW 2127 (herein referred to as the site). The site location map is shown on Figure 1.

A Preliminary Site Investigation (PSI) prepared previously for the site by Environmental & Earth Sciences Pty Ltd in October 2002 indicates that the site has little potential for onsite activities, past or present, to have impacted site soils or groundwater. While details of aerial photographs and Section 149 Certificates are included in the PSI report copies of the documents are not included. An historic title search was also not included in the PSI report.

This Stage 1 ESA Update has been prepared to accompany the 2002 PSI report, updating the assessment of the contamination status of the Site. This report will provide an assessment of the current contamination status of the Site and provide recommendations for further works (where considered necessary).

The site is roughly square shaped and occupies approximately 15,040 m². The site includes a single lot; Lot 84 contained in Deposited Plan (DP) Number 855929. This report has been prepared in general accordance with the requirements specified for a Stage 1 and Preliminary Site Investigation, as published by the Department of Environment, Climate Change and Water (DECCW), incorporating the NSW Environment Protection Authority (EPA) in the *Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites* (NSW EPA, 1997).

2 OBJECTIVES AND SCOPE

The objectives of the Preliminary Stage 1 ESA Update were to:

- Assess whether the site, with particular focus on the areas of proposed development, had been, or is likely to have been, contaminated from past and/or present activities undertaken on and/or adjacent to the site; and
- If present, assess whether the contamination represents a risk to human health or the environment considering the site's proposed development.
- Perform a soil sampling and analysis programme in accordance with EPA standards;
- If contamination is identified, assess whether the contamination represents a risk to human health or the environment considering the site's proposed development; and
- Outline any recommended remediation options based on the results of the investigations.

To achieve these objectives, CES undertook the following scope of works:

- Partial Stage 1 ESA involving a review of available information and a site inspection;
- Drilling of 3 boreholes on the site to a maximum depth of 1 mbgl;
- Collection of soil samples from regular intervals throughout each borehole and from any near surface 'grab' sampling points;
- Laboratory analysis of soil samples for Polycyclic Aromatic Hydrocarbons (PAH);
- Submission of soil samples for laboratory analysis to a laboratory accredited by the National Association of Testing Authorities (NATA) for tests described above;
- Comparison of the results of chemical analyses from the soil investigation to investigation levels published guidelines prepared or endorsed by the NSW OEH, to assess the contamination status of the site and to assess possible risks to site occupants or the environment; and
- Preparation of a report in accordance with EPA NSW (1997) guidelines to accompany the 2002 PSI report, updating the contamination status of the site.

3 PREVIOUS ENVIRONMENTAL INVESTIGATIONS

CES were provided by the client with the following previous environmental investigations:

- Preliminary Environmental Site Investigation of 100 Bennelong Road, Sydney Olympic Park, New South Wales (Report Number 102112), by Environmental & Earth Sciences Pty Ltd, October 2002; and
- Environmental Survey at 100 Bennelong Road, Homebush Bay, NSW, by HLA-Environmental Services Pty Ltd, December 2002.

The Preliminary Environmental Site Investigation indicated that the site has little potential for onsite activities, past or present, to have impacted site soils or groundwater. Details of aerial photographs and Section 149 Certificates are included in the PSI report however copies of the documents are not included. A historic title search was not included in the PSI report.

The Environmental Survey contains results for the limited soil sampling and analysis program that was carried out. These results detected an exceedance of the Polycyclic Aromatic Hydrocarbons (PAH) (Total PAH and Benzo(a)pyrene (BaP)) threshold concentrations for residential developments with minimal access to soils, in one location, BH4 at 0.2-0.4 m

The Preliminary Stage 1 ESA Update and the fieldwork carried out by CES is to accompany the previous PSI and soil sampling program report when concluding the site's potential for contamination.

4 SITE INFORMATION

The site information presented below is based on a review of readily available government information sources.

4.1 SITE IDENTIFICATION

The site is located at 100 Bennelong Road, Sydney Olympic Park, NSW 2127, within the Local Government Area (LGA) of Auburn City Council. The legal description for the site is Lot 84 contained in Deposited Plan (DP) Number 855929. The site is roughly square shaped and occupies approximately 15,040 m². The site location is shown on Figure 1.

4.2 SITE ZONING AND LANDUSE

The site comprises one lot, as mentioned above and is currently owned (as recorded by Council) by Sydney Olympic Park Authority.

From the Planning Certificate under Section 149 (2) of the Environmental Planning and Assessment Act 1979, the site is excluded land under Auburn Local Environmental Plan 2012. The land zoning and land use provisions of State Environmental Planning Policy (Major Development) 2005 apply to the land. The State Environmental Planning Policy (Major Development) 2005 Sydney Olympic Park Land Zoning Map is presented in Appendix E. As prescribed by the policy the site is affected by the Zone B4 Mixed Use. Zone B4 Mixed Use allows a mixture of commercial and residential land uses.

4.3 SITE HISTORY

Three sources were investigated to determine the relevant history of land use at the site. The following list details the sources of historical information and a summary of information provided by each source:

- NSW Department of Lands, Land and Property Information Division (LPI): Title Search - Historical title information;
- NSW Department of Lands LPI: Historical aerial photographs (1930 to 2005); and
- Auburn City Council: Planning Certificate.

4.4 HISTORICAL TITLE INFORMATION

A title deeds search was conducted through Land and Property Information NSW. A summary of the results showing the history of site ownership is provided in Table 1. Where available, the original title and lease documents are provided in Appendix C. A search of the most recent lease holders was also conducted with all current lease holders summarised in Table 2.

Table 1: Summary of Land Ownership

Year	Proprietor	Source
2002-To Date	Sydney Olympic Park Authority	Current Certificate of Title, Document 8208818
1995-2002	Olympic Coordination Authority	Document 8208818, Document E617299
1992-1995	Homebush Bay Ministerial Corporation	Document E617299, Document O738097
1980-1992	Homebush Abattoir Corporation	Document O738097, Vol. 6129 Fol. 216
1951-1980	The Metropolitan Meat Industry Board	Vol. 6129 Fol. 216
1942-1951	The Metropolitan Meat Industry Commissioner	Vol. 6129 Fol. 216, Vol. 5326 Fol. 143, Vol. 816 Fol. 212, Vol. 5056 Fol. 217
Prior Titles of Vol. 5326 Fol. 143 are Vol. 816 Fol. 212 and Vol. 5056 Fol. 217		
Vol. 816 Fol. 212		
1883-1942	Fitzwilliam Wentworth (esquire)	Vol. 816 Fol. 212, Vol. 622 Fol. 12
Vol. 5056 Fol. 217		
1933-1942	The Metropolitan Meat Industry Commissioner	Vol. 5056 Fol. 217, Vol. 4553 Fol. 104
1929-1933	Metropolitan Meat Industry Board	Vol. 4553 Fol. 104, Vol. 2106 Fol. 53
1910-1929	The Minister for Public Works of the state of New South Wales	Vol. 2106 Fol. 53,
Prior Titles of Vol. 2106 Fol. 53 are: 1) Vol. 817 Fol. 88, 2) Vol. 833 Fol. 143, 3) Vol. 1525 Fol. 151, 4) Vol. 1539 Fol. 200		
Vol. 817 Fol. 88		
1908-1910	The Minister for Public Works of the state of New South Wales	Vol. 2106 Fol. 53, Vol. 817 Fol. 88
1902-1908	Edward Prentice (stock classer)	Vol. 817 Fol. 88
1886-1902	1886-1902 John Turner Blackwell (landowner)	Vol. 817 Fol. 88
1883-1886	1883-1886 Fitzwilliam Wentworth (esquire)	Vol. 817 Fol. 88, Vol. 622 Fol. 12
Vol. 833 Fol. 143		
1908-1910	The Minister for Public Works of the state of New South Wales	Vol. 2106 Fol. 53, Vol. 833 Fol. 143

1985-1908	Alexander Walker Scott Gregg (gentleman)	Vol. 833 Fol. 143
1887-1895	Samuel Haslam (landowner)	Vol. 833 Fol. 143
1887	James Haslam (landowner)	Vol. 833 Fol. 143
1883-1887	Fitzwilliam Wentworth (esquire)	Vol. 833 Fol. 143, Vol. 622 Fol. 12
Vol. 1525 Fol. 151 and Vol. 1539 Fol. 200		
1908-1910	The Minister for Public Works of the state of New South Wales	Vol. 2106 Fol. 53, Vol. 1539 Fol. 200, Vol. 1525 Fol. 151 Vol. 833 Fol. 143
1883-1887	Fitzwilliam Wentworth (esquire)	Vol. 622 Fol. 12

Table 2: Summary of Leases

Lessee	Source
Transfer of Lease 2305522: Lessee now Karimbla Properties (No 33) Pty. Limited. Recorded Date: 17/4/2013	Document AH670602 (not purchased), Current Certificate of Title and Historical of Lot 84 DP 855929
Change of Name affecting Lease 2305522: Lessee now Centuria 100 Bennelong Road Pty. Limited. Recorded Date: 12/7/2011	Document AG361979, Current Certificate of Title and Historical of Lot 84 DP 855929
Transfer of Lease AD690150: Lessee now Jemena Limited. Recorded Date: 3/12/2009	Document AF169347 (not purchased), Current Certificate of Title and Historical of Lot 84 DP 855929
Change of Name affecting Lease AD690150: Lessee now Westnet WA Infrastructure Holdings Limited. Recorded Date: 15/5/2009	Document AE668173 (not purchased), Current Certificate of Title and Historical of Lot 84 DP 855929
Lease of Lease 2305522: To Alinta Limited. Recorded Date: 17/1/2008, Expires: 30/11/2017	Document AD690150 (not purchased), Current Certificate of Title and Historical of Lot 84 DP 855929
Transfer of Lease recorded 31/10/2007, document AD529586 – not searched, Sub-Lease recorded 10/5/2005, document AB440715 – not searched	
Transfer of Lease 2305522: Lessee now 100 Bennelong Road Pty. Limited. Recorded Date: 28/1/2003	Document 9311840 (not purchased), Current Certificate of Title and Historical of Lot 84 DP 855929

Lease to Daewoo Automotive Australia Pty. Limited. Recorded Date: 19/7/1996, Expires: 28/3/2095 Option of renewal 99 years	Document 2305522 (not purchased), Current Certificate of Title and Historical of Lot 84 DP 855929
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Lot 84 DP 855929 (continued)

Lessee	Source
Transfer of Lease to Lessee now Ligon Twenty Five Pty. Limited. Recorded Date: 3/7/1990	Document Z80439 (not purchased)
Transfer of Lease to Lessee now Homebush Export Meat Co Pty. Limited Recorded Date: 3/7/1990	Document Z80440 (not purchased)
Lease to: Silvers Meat Trading Co Pty. Limited of premises known as Silvers Meat Building in Burns Road, Homebush. Expiry: 30/6/2000	Document V51205 (not purchased)
Lease to: FJ Walker Limited of Lot 1 DP623608. Expiry: 5/11/1983	Document T271250 (not purchased)

Lot 84 DP 855929 (continued)

Lessee	Source
Lease to Thorpes Pty. Limited of Lot 1 DP 213156 Dated: 10/7/1964, Expiry: 1/10/1978	Vol. 6129 Fol. 216
Lease to Bronte Industries Pty. Limited of part of the land. Dated: 16/7/1964	Vol. 6129 Fol. 216
Lease to Intercontinental Packers Pty. Limited of part of the land. J282060 - Dated: 14/12/1962, Expiry: 30/9/1978 J231550 - Dated: 22/6/1962, Expiry: 15/6/1967 G919780 - Dated: 6/2/1958, Expiry: 1/10/1978 F377266 - Dated: 15/11/1950, Surrendered: 6/2/1958 D44406 - Dated: 3/8/1948, Surrendered: 19/4/1951	Vol. 6129 Fol. 216

Lease to Radio 2UE Sydney Pty. Limited of part of the land. J206870 - Dated: 5/9/1962, Expired: 12/1/1984 G556702 - Dated: 16/4/1956, Surrendered: 15/5/1963	Vol. 6129 Fol. 216
Lease to Homebush Rugby League and Recreation Club Limited of Lot 1 DP 216347. Dated: 5/12/1962, Expiry: 1/7/1972	Vol. 6129 Fol. 216

Lot 84 DP 855929 (continued)

Lessee	Source
Lease to: Barnes Bacon Company Pty. Limited of part of the land. H708141 - Dated: 5/10/1960, G21240 - Dated: 15/12/1953, Expired: 2/8/1961, D907232 - Dated: 15/9/1948, Expired: 20/7/1954, C980248 Dated: 31/12/1940, Expired (entered): 31/7/1964, C980250 - Dated: 31/12/1940, Expired: 3/6/1949, C312841 - Dated: 19/12/1934, Expired: 3/4/1941, C274876 - Dated: 18/7/1934, Expired: 3/4/1941,	Vol. 6129 Fol. 216, Vol. 5056 Fol. 217, Vol. 4553 Fol. 104
Lease to Australian Meat Packing Corporation Pty. Limited of part of the land. Dated: 14/1/1960	Vol. 6129 Fol. 216
Lease to Wilcox Mofflin Limited of part of the land. H71720 - Dated: 24/9/1958, Expiry: 15/7/1972, D645326 - Dated: 18/2/1947, Expired (entered): 28/10/1958	Vol. 6129 Fol. 216
Lease to Commonwealth Broadcasting Corporation Pty. Limited of part of the land. G565093 - Dated: 18/6/1956, Expiry: 1/8/1966, D803158 - Dated: 20/1/1948, Expired (entered): 31/7/1964	Vol. 6129 Fol. 216
Lease to Wormald Brothers Industries Limited of part of the land. Dated: 16/1/1956, Surrendered: 31/3/1963	Vol. 6129 Fol. 216

Lot 84 DP 855929 (continued)

Lessee	Source
Lease to Hastings Deering Building Limited of part of the land. Dated: 9/7/1952	Vol. 6129 Fol. 216
Lease to: The Sydney County Council of part of the land. F61952 - Dated: 20/6/1949, C904445 - Dated: 5/12/1939, Expired: 6/2/1951, C489973 - Dated: 5/11/1936, Expired: 13/8/1942, C489971 - Dated: 5/11/1936	Vol. 6129 Fol. 216, Vol. 5056 Fol. 217, Vol. 4553 Fol. 104
Lease to The Colonial Wholesale Meat Pty. Limited of part of the premises known as the State & Meat Works Dated: 10/8/1943, Expired (entered): 31/7/1964	Vol. 6129 Fol. 216
Lease to John Clifford of Homebush, merchant, of part of the land. Dated: 18/7/1939	Vol. 6129 Fol. 216, Vol. 5056 Fol. 217, Vol. 4553 Fol. 104
Lease to Brickworks Limited of part of the land. Dated: 24/2/1936, Expired: 18/4/1939	Vol. 5056 Fol. 217, Vol. 4553 Fol. 104
Lease to Harry Leonie Limited of part of the land. Dated: 2/7/1934	Vol. 5056 Fol. 217, Vol. 4553 Fol. 104
Lease to The New South Wales Mortgage Loan & Agency Company Limited of part of the land. Dated: 24/11/1896	Vol. 816 Fol. 212
Lease to: Thomas Garland Freseder of Sydney, nurseryman Dated: 1/10/1885, Surrendered: 20/11/1896	Vol. 816 Fol. 212

4.5 HISTORICAL AERIAL PHOTOGRAPHS

Historical aerial photographs from the NSW Department of Lands LPI Division were examined for the years; 1930, 1972, 1982, 1995 and 1997. The selection of aerial photographs was based on the already obtained aerial photographs discussed in the 2002 PSI. Copies of the aerial photographs are provided in Appendix C. The findings of aerial photo investigations are presented in Table 3.

Table 3: Historical Aerial Photograph Interpretation

Year	Description
1930	Site: The site is vacant land containing only what appears to be a few large trees. Bennelong road has been constructed along the eastern border of the site. Another constructed road is present on the western border, joining Bennelong Road further north. Surrounding Area: The south, north and east of the site is further vacant land with sparse vegetation. Both main roads present around the site run in a longitudinal direction.
1972	Site: The site remains as vacant land with sparse vegetation. Surrounding Area: West of the site has been cleared for farming activities. North, south and east of the site remains vacant land with sparse vegetation.
1982	Site: The site remains as vacant land with sparse vegetation. Surrounding Area: North of the site is now a warehouse with a small parking lot. Further north and west of the site are a few more commercial/industrial warehouses and further west of the site remains as developed farmland. East and south of the site have changed little since the 1930 photograph.
1995	Site: The site remains as vacant land with sparse vegetation. Surrounding Area: Warehouses north of the site have been further developed and the farming land has been replaced with roads, vacant land and large trees. Surrounding main roads including Australia Avenue, have been expanded, added on to and further refined. West of the site has been extensively developed into a commercial/industrial area. East of the site has been cleared and earthworks have begun for the beginnings of Bicentennial Park.
1997	Site: The site is now occupied by the newly constructed Daewoo factory. The site is covered predominantly by the warehouse with a small office on the north-western corner and a car park covering the remaining land. Surrounding Area: North of the site the warehouse has been demolished and a construction has begun on the opposing side of the road. West of the site has been extensively developed into roads and industrial/commercial buildings. Bicentennial Park has been further developed to the east of the site and Sydney Olympic Park is being constructed south-east of the site.
Source: Environmental Legal Searches, 2013.	

4.6 AUBURN CITY COUNCIL PLANNING CERTIFICATE

Additional matters prescribed by section 59 (2) of the Contaminated Land Management Act 1997 and specified in the Planning Certificate are quoted as follows:

“The land is not significantly contaminated land (or part of the land) within the meaning of the *Contaminated Lands Management Act 1997* at the date when the certificate is issued.”

“The land is not subject to a management order within the meaning of the *Contaminated Lands Management Act 1997* at the date when the certificate is issued.”

“The land is not the subject of an approved voluntary management proposal within the meaning of the *Contaminated Lands Management Act 1997* at the date when the certificate is issued.”

“The land is not subject to an ongoing maintenance order within the meaning of the *Contaminated Lands Management Act 1997* at the date when the certificate is issued.”

“The land is subject to a site audit statement within the meaning of the *Contaminated Lands Management Act 1997*.”

The Planning Certificates are contained in Appendix D.

5 DATA QUALITY OBJECTIVES

The DQO process comprises a seven-step iterative planning approach. The process is used to define the type, quantity and quality of data needed to support decisions relating to the assessment of site contamination. It provides a systematic approach for defining the criteria that a data collection design should satisfy, including when, where and how to collect samples or measurements; determination of tolerable decision error rates; and the number of samples or measurements that should be collected.

Step 1 - State the Problem

The problem is the potential for the site to have contaminant levels in excess of those permissible for residential land use and which could impact upon receiving environments (i.e. nearby residences).

Step 2 - Identify the Decision Statement

Determine if there is any contamination at the site which would pose an unacceptable risk as defined by the NEPM (1999) or NSW EPA (1998) for the use of the site for residential land use, or that would impact upon receiving environments.

Step 3 - Identify inputs to the decision

The following informational inputs are required to resolve the decision statement:

- The findings from the investigation to be undertaken at the site;
- Health Investigation Levels (HIL) as published in NEPM, 1999 Schedule B1;
- The Soil Investigation Levels (SILs) as published in NSW EPA *Guidelines for Assessing Service Station Sites* (1994) for TRH and BTEX assessment; and
- ANZECC (2000) *Water Quality Guidelines*.

Step 4 - Define the Boundaries of the Study

The subject site consists of the property situated at 31 Queen Street, Beaconsfield, NSW (herein referred to as the site). A site location map is presented on Figure 1.

Step 5 - Develop a Decision Rule

The purpose of this step is to define the parameter of interest, specify the action level and combine the outputs of the previous DQO steps into an “if...then...” decision rule that defines the conditions that would cause the decision maker to choose alternative actions.

The parameters of interest (or contaminants of concern) have been determined based on potential sources of contamination, including those identified in the Stage 1 investigations. The action

level will be used to decide if the parameter represents an unacceptable risk for residential land use and/or the receiving environment. If the 95% Upper Confidence Level (UCL) of a measured concentration of a parameter or compound exceeds the action levels in soils, then this is deemed to present an unacceptable risk for residential land use.

If the 95% UCL or absolute values of a parameter or compound, whichever is representative for particular area of the sites, are above the nominated action levels, then further sampling will be proposed to determine the extent of contamination.

Step 6 - Specify Acceptable Limits on Decision Errors

There are two types of errors:

- a) Deciding that the site is acceptable for residential land use and that there is a low risk to receiving environments when it actually is not. The consequence of this error may be unacceptable health risk for current and future users of the sites.
- b) Deciding that the site is unacceptable for residential land use and that there is a risk to receiving environments when it is acceptable. The consequence of this error is that the client will pay for further investigation / remediation that are not necessary.

The more severe consequences are with decision error (a) since the risk of jeopardising human health outweighs the consequences of paying more for remediation.

Step 7 - Optimising the Design for Obtaining Data

The purpose of this step is to identify a resource-effective data collection design for generating data that are expected to satisfy the DQO's. The resource effective data collection design that is expected to satisfy the DQOs is described in detail in Section 8. To ensure the design satisfies the DQOs a comprehensive Quality Assurance and Quality Control Plan will be implemented as detailed in Section 8.

6 FIELDWORK

6.1 FIELDWORK (SITE VISIT)

A site visit was carried out by an experienced CES Principal Environmental Scientist on 25th July 2013. During the site a physical description of the site and its surrounds was recorded, the presence of any potential contaminants, site drainage conditions and current land use were assessed.

6.2 FIELDWORK (HAND AUGUER OPERATIONS)

Hand Auguring fieldwork was carried out on 25th July 2013 and was supervised by a CES experienced environmental scientist, who conducted hand auger operations, nominated sampling and testing, and recorded the encountered sub-surface lithology.

6.3 SOIL SAMPLING PROGRAMME

6.3.1 Sampling Pattern

Prior to the preparation of this report CES carried out further soil sampling in the area of previous exceedance to assess the extent of the PAH and BaP impact previously indicated in the northern part of the site. Three hand augered boreholes were drilled to approximately 0.5 – 1 m. The location of the sample locations are provided as Figure 2.

6.3.2 Depth Intervals of Sampling

Each borehole was extended to a maximum depth of 1 metre below ground level (mBGL) or to hand auguer refusal (whichever is shallower). Representative, disturbed environmental samples were then collected.

6.3.3 Method of Sampling Collection

Care was taken to ensure that representative samples were obtained from the depth required and that the integrity was maintained, particularly when dealing with potentially volatile and semi-volatile components. When collecting duplicates, samples to be analysed for volatiles were not mixed, rather they were placed directly into sample jars.

In boreholes, all soil samples were collected directly from the auger. Care was taken when collecting auger samples to ensure the most representative sample of the targeted material was sampled. The soil was then transferred to the sample jar using new nitrile gloves.

6.3.4 Decontamination Procedures

The following decontamination procedures were adopted for the hand augering and sampling equipment.

6.3.4.1 Auger

Samples were collected directly from the auger. The auger was washed between sample locations using Decon 90 followed by adequate rinsing with clean water. All samples were collected with new disposable latex or nitrile gloves.

6.3.4.2 Sampling Equipment

Sampling equipment, such as trowels and/or knives, were washed between samples using Decon 90 followed by adequate rinsing with clean water.

6.3.5 Sample Containers

The soil sample jars comprise glass with a Teflon lined lid and were supplied by either the primary laboratory. The jars were completely filled with soil, sealed, labelled with the job number, date, unique sampling point identification and depth.

6.3.6 Method of Sample Storage and Handling

The full soil jars were immediately placed in a cool box in which ice had been added to keep the samples below a temperature of approximately 4°C. At the end of each day the samples in the cool box were transported directly to the laboratory (within one day).

6.3.7 Documentation

While on site, the supervising engineer/scientist filled out a copy of CES “sample register”, which documents:

- Time of sample collection;
- Weather;
- Unique sample identification number; and
- Sample location and depth.

All samples were classified in the field based on soil/fill characteristics and obvious signs of contamination such as discolouration or odour noted on a log. All samples were transported to the primary laboratory under Chain-of Custody procedures and maintained in an ice-filled cooler. The COC forms detail the following information:

- Site identification;
- The sampler's name;
- Nature of the sample;
- Collection time and date;
- Analyses to be performed;
- Sample preservation method;
- Departure time from site; and
- Dispatch courier(s).

6.4 ANALYTICAL PROGRAMME

6.4.1 Number of Samples for Analysis

One sample from each borehole was selected and submitted for analysis for PAH, as per the proposal. A summary of the preservation, containers and maximum holding times for the samples is provided in Tables 4 and 5.

6.4.2 Laboratory

CES engaged Envirolab Services Pty Ltd (Envirolab) as the primary laboratory for all chemical testing. This laboratory is NATA registered for the proposed chemical testing.

6.4.3 Analytical Methods

The soil/fill samples were analysed in accordance with ANZECC (1996) *Guidelines for the Laboratory Analysis of Contaminated Soils* using US EPA and APHA approved analytical methods as described in Tables 6 and 7. The corresponding laboratory Practical Quantitation Limits for the respective samples are also summarised in Table 6.

6.4.4 Analytes

The choice of chemical analytes was determined based on previous sample results at the site and to provide information on baseline conditions.

7 QA/QC DATA EVALUATION

All soil samples were collected by experienced CES environmental scientists, under established CES protocols. CES personnel have been trained in sample collection and handling techniques outlined in the Sampling Program section above.

For the purpose of assessing the quality of data presented in this report, the NATA accredited laboratory completed their own QC. The current section of this report is focused on the presentation of results of these QC samples and discussion of deviations from the Data Acceptance Criteria (DAC).

Additionally, in accordance with the NEPM, 1999: National Environment Protection Measure (1999) *Schedule B(1) Guideline on the Investigation Levels for Soil and Groundwater*, Data Quality Indicators (Completeness, Comparability, Representativeness, Precision and Accuracy) have also been considered (where appropriate).

7.1 LABORATORY QA/QC

Laboratory QA/QC data is presented in full in the laboratory certificates in Appendix A.

7.1.1 Laboratory Duplicates

Laboratory duplicate samples conformed to the DAC.

7.1.2 Laboratory Control Samples

Laboratory control samples conformed to the DAC.

7.1.3 Matrix Spikes

All matrix spike data conformed to DAC.

7.1.4 Sample Holding Times

All samples were extracted and analysed within the specified holding times.

7.1.5 Sample Condition

All samples were received by the analytical laboratories in correctly preserved and chilled containers with no reported breakages.

7.2 *SITE ASSESSMENT CRITERIA*

7.2.1 Soil

To address potential health impacts at the site, CES will compare the analytical testing results against a set of health and ecological based soil investigation levels to be referred to as Soil Investigation Levels (SIL) appropriate for the proposed land-use. That is, the SIL will be set at a level that provides confidence that contaminant concentrations below the SIL will not adversely affect human health or be phytotoxic to plants.

The site's current land-use is mixed commercial and residential. Therefore, CES has adopted the proposed land use criteria as it is the more sensitive land use. The proposed land use concept does not provide for areas of soft landscaping horticulture or vegetated areas, therefore the ecological investigation levels have not been assessed. The values from the following criteria will be adopted:

- NEPM (1999) Health Investigation Levels recommended for exposure setting 'B' which includes residential developments with minimal access to soil;

The adopted SILs are included in Table 6.