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MAVILLE PARK PTY LTD

Additional Site Investigation Report

12-22 & 24 Rothschild Avenue, Rosebery NSW

Report E22282 AB_Rev01

28 February 2017

REPORT DISTRIBUTION

Additional Site Investigation Report
12 - 22 & 24 Rothschild Avenue, Rosebery NSW

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EXECUTIVE SUMMARY

Background

Mr Shen Xi Nan of Maville Park Pty Ltd engaged EI Australia Pty Ltd (EI) to conduct an Additional Site Investigation Report (ADSI) for further site characterisation purposes within a property located at 12 - 22 & 24 Rothschild Avenue, Rosebery NSW ('the site'). This environmental assessment was completed as part of a development application process through City of Sydney Council to allow site development for residential with minimal access to soils land uses.

This assessment continues on from a previous Detailed Site Investigation Report (DSI) conducted by EI in September 2014 (Report No. E22282 AA_Rev1, 24th September 2014).

Objectives

The main objective of this assessment is to further characterise soil and groundwater at the site and address previously identified data gaps and contamination sources to assist in the preparation of a Remediation Action Plan. The primary objectives of this investigation were therefore:

- Undertake an additional site history survey including a search of Street Cards held by City Of Sydney Council to obtain a better understanding of former site uses and the associated contaminants of concern;
- Characterise soil and groundwater quality on the southern portion of the site (24 Rothschild Avenue), where access was previously limited during initial DSI works;
- Characterise groundwater conditions in the vicinity of the underground storage tank (UST) known to be located on the north western portion of the site; and
- Characterise groundwater conditions entering the site from the neighbouring properties to the north.

A further objective, should site contamination be confirmed, will be to make recommendations for the appropriate management of any contaminated soils and/or groundwater.

Findings

The work was conducted with reference to the regulatory framework outlined in **Section 1.3** of this report, and assessment findings indicated the following:

- The site comprised a broadly rectangular shaped block, covering a total area of approximately 0.84 hectares (8,403.3 m^2). The site was bound by Rothschild Avenue to the east, Cressy Street to the south, Mentmore Avenue to the west, and residential and industrial buildings to the north;
- Current site use is predominantly commercial and light industrial;
- A review of Planning Street Cards available on the City of Sydney Council website, suggested the former site uses consisted of a variety of commercial and industrial activities including machinery merchants, timber storage, auto wiring and cables manufacturing, plywood manufacturing, assemblage of sheet metal, manufacturing electrical water heaters and used as a depot. Other key findings include; a 5000 gallon petrol tank was installed in the mid 1970's, an electrical substation was present in the late 70's and new roof sheeting was installed in 1982. Street planning cards were consistent with the previous site history survey undertaken (DSI of EI, 2014);

- On the basis of site history and search findings, EI consider potential chemical hazards and onsite contamination sources to be as follows:
    - Imported fill soils of unknown origin distributed across the site;
    - Impacts from previous light industrial manufacturing activities at the site;
    - Painted surfaces in relation to the structures (buildings) that are currently present on the site;
    - Potential Hazardous materials, including potential asbestos-containing materials (ACM) from former building products;
    - Potential pesticide use underneath building structures
    - Electrical substation present at the site;
    - Off-site sources of contamination, including EPA notified site located 30m north of the site and asbestos used in former tram line along;
    - Previously identified lead, PCB, TRH, PAH and Asbestos impacted fill (DSI of EI 2014); and
    - The abandoned underground petroleum storage systems (UPSS) present on the site.
- Based on the findings of the site contamination appraisal, the chemicals of concern (COC) at the site are considered to be:
    - Soil – heavy metals (HMs), TRH, PAH, t monocyclic aromatic hydrocarbon compounds benzene, toluene, ethylbenzene and xylenes (BTEX), organochlorine and organophosphate pesticides (OCP/ OPP), polychlorinated biphenyls (PCB), volatile organic compounds (VOC), phenols and asbestos.
    - Groundwater – HMs, TRH, BTEX, PAH, volatile organic compounds (VOC), including chlorinated VOC (VOCC) such as trichloroethylene (TCE) and phenols.
- Soil sampling and analysis were conducted at seven (7) targeted test bore locations (BH202M, BH206, BH207, BH208, BH209, BH210 and BH211) down to a maximum drilling depth of 5.8m BGL. These borehole locations targeted areas previously limited in access during DSI works (EI, 2014), including the heritage building located at 24 Rothschild Avenue;
- Three (3) additional groundwater wells were installed and sampled at targeted locations within the site, including an up-gradient location along the northern boundary (BH205M), the central portion of 12-22 Rothschild Avenue (BH203M), and a down-gradient location at 24 Rothschild Avenue (BH202M). Due to a buried concrete slabs in the vicinity of the abandoned UST and up-gradient of 24 Rothschild Avenue, groundwater wells BH201M and BH204M could not be installed due to drilling rig refusal;
- The sub-surface layers comprised of fill materials of various constituents, comprising brown sands and sandy clays, underlain by Botany Sands;
- Groundwater was encountered at depths ranging from 4.22 to 4.95 meters below ground level. Former monitoring wells MW1 and MW2 were found to be dry (likely due to siltation);

- Results of soil samples collected from soil test boreholes reported concentrations of the selected analytes to be below the adopted human health based and ecological based soil investigation levels;

- Results of the groundwater samples collected from the newly installed wells (BH202M, BH203M and BH205M) and previous monitoring well (MW3) reported concentrations of the selected analytes to be below the adopted marine and human health based groundwater investigation levels, with the exception of heavy metals (copper, nickel and zinc) and PCE. Concentrations of copper, nickel and zinc, were generally low and considered representive of background groundwater concentrations; and

- EI consider the low concentrations of VOC compounds reported in groundwater is a low human health risk via vapour intrusion for future site users including residents, construction workers, maintenance and commercial workers. However due to the presence of chlorinated solvents in groundwater and the taking into consideration the site history, the need for future soil vapour sampling and subsequent risk assessment should be addressed in the Remediation Action Plan.

- On the basis of investigation findings the preliminary CSM discussed in **Section 5** was considered to have appropriately identified contamination sources, migration mechanisms and exposure pathways, as well as potential onsite and offsite receptors. Previously known data gaps outlined in **Section 5.4** have largely been addressed. However a further assessment of risks posed by potential groundwater contamination in the vicinity of the UST on the north eastern portion of the site must be undertaken should residual impacts be evident following UST removal.

Conclusions and Recommendations

Based on the findings of this report and with consideration of the Statement of Limitations (**Section 12**), EI concludes that widespread contamination was not identified at targeted locations during this additional investigation. Soil concentrations did not exceed the adopted human health and ecological based criteria and groundwater quality at the site is considered a low environmental and human health risk. It is concluded that the site can be remediated for proposed residential use following the preparation and implementation of a Remediation Action Plan. The RAP will also need to consider the findings of the initial DSI (EI, 2014).

In view of the above findings and in accordance with the NEPM 2013 guidelines, it is considered that the site can be made suitable for the proposed residential development on completion of the following recommendations:

- Preparation and implementation of a Remediation Action Plan to outline the removal of the impacted fill material identified in the initial DSI (EI, 2014) and in removal of the abandoned UST. The RAP should also consider the need for further groundwater characterisation in the vicinity of the abandoned UST should residual contamination be observed during remediation of the UST. The RAP should also consider the need for future soil vapour testing and subsequent risk assessment.

- Any material being removed from site (including virgin excavated natural materials (VENM)) should be classified for off-site disposal in accordance the EPA (2014) Waste Classification Guidelines.

- Any material being imported to the site should be assessed for potential contamination in accordance with NSW EPA guidelines as being suitable for the intended use or be classified as VENM.

- Validate that the remediated areas are free of contamination by comparing analytical results for excavated surfaces and any backfill material, against the respective EPA thresholds.

- Preparation of a final site validation report by a qualified environmental consultant, certifying suitability of the site for the proposed development.

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1. INTRODUCTION

1.1 BACKGROUND AND PURPOSE

Mr Shen Xi Nan of Maville Park Pty Ltd engaged EI Australia (EI) to prepare an Additional Site Investigation Report (ADSI) for further site characterisation purposes within a property located at 12 - 22 & 24 Rothschild Avenue, Rosebery NSW ('the site').

As shown in **Figure 1**, the site is currently occupied by various commercial entities with site uses including offices, retail and associated ground level car parking. The site is located approximately 4.7km south of the Sydney central business district and comprises of Lot 5, A & B DP 309149, Lot 408 DP 315228, Lot B DP 308922, Lot 1 DP 314957, Lot 1 & 2 DP 456612, Lot 410 & 456 DP 7534. The site is situated within the Local Government Area of Sydney and site covers a total area of approximately 0.84 hectares (8,403m^2), as depicted in the site plan presented as **Figure 2**.

Site Auditor (Rebeka Hall, Zoic) was appointed, and interim advice (ref: 16059L01_IA1, 20 June 2016) identified numerous data gaps which required closure prior to the preparation of a remedial action plan (RAP).

This ADSI details the findings of the additional works to enable better understating of environmental conditions present at the site, whilst ensuring site characterisation meets the current requirements of NSW EPA endorsed guidelines and the NSW DEC (2006) Site Auditor Scheme.

This assessment was conducted in support of a Development Application (DA) to City of Sydney Council and for the purpose of enabling the developer to meet its obligations under the Contaminated Land Management Act 1997 (CLM Act), for the assessment and management of contaminated soil and/or groundwater.

This assessment augments a previous Detailed Site Investigation Report (DSI) conducted by EI in September 2014 (Report No. E22282 AA_Rev1, 24th September 2014).

1.2 PROPOSED DEVELOPMENT

Based on the sketch designs of the proposed development plans provided by JPR Architects Pty Ltd, the redevelopment at the site will include demolition of the current UNSW building (central portion – 12-22 Rothschild Avenue) and the construction of a multi storey residential building, with two levels of basement car parking. The heritage building location on the southern portion of the site (24 Rothschild Avenue) will be retained with proposed alterations for residential use. Landscaping strips are proposed to be along the northern, western (Mentmore Avenue) and eastern (Rothschild Avenue) boundaries of the site. The sketch design drawings are attached as **Appendix A**.

1.3 REGULATORY FRAMEWORK

The following regulatory framework and guidelines were considered during the preparation of this report:

- ANZECC & ARMCANZ (2000) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*;
- DECCW (2009) *Guidelines for Implementing the Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2008*, (UPSS Guidelines);

- DEC (2007) *Guidelines for the Assessment and Management of Groundwater Contamination*;
- DEC (2006) *Guidelines for the NSW Site Auditor Scheme (2nd Edition)*;
- EPA (1995) *Sampling Design Guidelines*;
- EPA (2014) *Technical Note: Investigation of Service Station Sites*;
- NEPC (2013) *Schedule B(1) Guideline on Investigation Levels for Soil and Groundwater*;
- NEPC (2013) *Schedule B(2) Guideline on Site Characterisation*;
- *Contaminated Land Management Act (1997)*;
- State Environment Protection Policy 55 (SEPP 55) – *Remediation of Land*, and
- OEH (2011) *Guidelines for Consultants Reporting on Contaminated Sites*.

1.4 PROJECT OBJECTIVES

The main objective of this assessment is further characterise soil and groundwater at the site and address previously identified data gaps and contamination sources to assist in the preparation of a Remediation Action Plan. The primary objectives of this investigation were therefore to:

- Undertake an additional site history survey including a search of Street Cards held by City Of Sydney Council to obtain a better understanding of former site uses and the associated contaminants of concern;
- Characterise soil and groundwater quality on the southern portion of the site (24 Rothschild Avenue), previously limited in access during initial DSI works;
- Characterise groundwater conditions in the vicinity of the UST located on the north western portion of the site; and
- Characterise groundwater conditions entering the site from the neighbouring properties to the north.

A further objective, should site contamination be confirmed, will be to make recommendations for the appropriate management of any contaminated soils and/or groundwater.

1.5 SCOPE OF WORKS

In order to achieve the above objectives and in keeping the project cost-effective while generally complying with the OEH (2011) guidelines for consultants reporting on contaminated sites, the proposed/targeted scope of works were:

- Review of the previous DSI report;
- Additional site history investigation, including search of Street Cards held by City of Sydney Council and search of former site operations for the former owners / occupiers.
- Construction of test boreholes at 11 targeted locations distributed across the site. Six (6) of the boreholes are to be located within accessible areas within current buildings for soil sampling and characterisation purposes and five (5) boreholes are to be located in outdoor areas for groundwater monitoring well installation;

- Construction of five (5) groundwater monitoring wells to a maximum depth of 6m (or refusal). *It must be noted that two of the monitoring wells (BH201M and BH204M) could not be installed due to refusal on a buried slab*;
- Multiple level soil sampling of fill and natural soils at the seven (7) borehole locations located within current buildings and one (1) borehole located on the north western corner of the site;
- One round of groundwater sampling from the five (5) newly constructed groundwater monitoring bores and three (3) groundwater monitoring bores installed during DSI works. *It must be noted that BH201M and BH204M could not be installed due to refusal on a buried slab and former wells MW1 and MW2 were found* dry *during sampling*; and
- Laboratory analysis of selected soil samples for relevant analytical parameters as determined from the site history survey and field observations during the investigation program; and

The final task of this assessment involved the preparation of this report to document the additional investigation works, methodologies used, test bore logs and monitoring well construction logs, with discussion of all data findings and laboratory analytical results in regards to potential risks to human health, the environment, and the aesthetic enjoyment of the land. Lastly, conclusions and recommendations for the appropriate management of any contaminated soils and/or groundwater will be made.

2. SITE DESCRIPTION

2.1 PROPERTY IDENTIFICATION, LOCATION AND PHYSICAL SETTING

The site identification details and associated information are presented in **Table 2-1**, while the site locality is shown in **Figure 1**.

Table 2-1 Site Identification, Location and Zoning

Attribute	Description
Street Address	12 - 22 & 24 Rothschild Avenue, Rosebery NSW
Location Description	Approx. 4.7 km south of Sydney CBD, a roughly rectangular block bound by Rothschild Avenue (east), Cressy Street (south), Mentmore Avenue (west) and industrial buildings followed by Epsom Road(north). Coordinates of the northwest corner of site: GDA94-MGA55 Easting: 888873.643, Northing: 6239687.397 (Source: http://maps.six.nsw.gov.au)
Site Area	Approx. 0.84 hectares (8,403.3 m^2, Ref. Watson Buchan Pty Ltd)
Site Owner / Client	Sussman & Co. Pty Ltd (owner) / Maville Park Pty Ltd (client)
Lot and Deposited Plan (DP)	Lot 5, A & B DP 309149, Lot 408 DP 315228, Lot B DP 308922, Lot 1 DP 314957, Lot 1 & 2 DP 456612, Lot 410 & 456 DP 7534
State Survey Marks	Two State Survey Marks (SSM) are situated in close proximity to the site: SS130511 on the Corner of Rothschild Avenue and Cressy Street, and SS130512 at the southwest corner of the site (Source: http://maps.six.nsw.gov.au).
Local Government Authority	City of Sydney Council
Parish	Alexandria
County	Cumberland
Current Zoning	B4 – Mixed Use (Sydney Local Environment Plan, 2012)
Current Land Uses	Northern area – 12 – 22 Rothschild Avenue consisted of a two commercial buildings, occupied by University of NSW and a ground-level bitumen paved car park; and Southern Area – 24 Rothschild Avenue consisted of a heritage building which was occupied by various commercial tenants (offices and fashion retail stores).

2.2 SURROUNDING LAND USE

The site is situated within an area of mixed land uses and current uses. Current uses of surrounding land are described in **Table 2-2**.

Table 2-2 Surrounding Land Uses

Direction Relative to Site	Land Use Description
North	Commercial industrial building (north west) and residential apartments building (north east).
South	Cressy Street followed by construction site.
East	Rothschild Avenue, followed by construction site.
West	Mentmore Avenue, followed by mechanical workshop (south west) and office buidings (north west)

Sensitive land uses, such as schools or childcare centres, were not identified within the close vicinity the site.

2.3 REGIONAL SETTING

Regional topography, geology, soil landscape and hydrogeological information are summarised in **Table 2-3**.

Table 2-3 Regional Setting Information

Attribute	Description
Topography	Regional topography involves gently undulating plains and rolling undulating rises of broad, level to very gently inclined, swales and dunes. Local relief is <20 m (Chapman and Murphy, 1989). Locally, the site generally lies flat, with a slight slope to the southwest with a gradient of approximately 1 m vertical to 100 m horizontal, starting from RL 19.44 m AHD at the northeast corner of the site, to RL 18.13 m AHD at the southwest corner of the site. (Ref. Watson Buchan Pty Ltd, 2014).
Site Drainage	One strip gutter was noted at the eastern entrance to the car park at 12 – 22 Rothschild Avenue and appeared to collect stormwater from nearby areas. Site drainage at the site is anticipated to occur via onsite pits and pipe drainage or sheet flow towards the southwest, discharging to the municipal stormwater system. Precipitation is also likely to infiltrate directly into soils in unsealed site areas.
Regional Geology	With reference to the 1:100 000 scale Geological Series Sheet 9130 (Sydney) the site overlies medium to fine-grained “marine” sand with podsols (Qhd).
Vadose Zone Soil Types	Sand, fine to medium-grain size.
Soil Landscapes	The Soil Conservation Service of NSW Soil Landscapes of the Sydney 1:100,000 Sheet (Chapman and Murphy, 1989) indicated that the site overlies an Aeolian Landscape – Tuggerah (tg). Soils are identified as deep (>200cm) podsols on dunes and podsol/humus podsol intergrades on swales.

Attribute	**Description**
Acid Sulfate Soil Risk	With reference to the Botany Bay Acid Sulfate Soil Risk Map Edition Two (1:25,000 scale; Soil Conservation Service of NSW, 1997), the subject land lies within the map class description of *No Known Occurrence*. In such cases, acid sulfate soils (ASS) are not known or expected to occur and "land management activities are not likely to be affected by ASS materials". The City of Sydney Council Local Environmental Plan 2012- Acid Sulfate Soils Risk Class 1:5,000 scale Map indicates that the site lies within a Class 5 ASS area. Council consent is therefore required prior to commencing any works within 500m of Class 1, 2, 3 or 4 land, with a ground elevation of below 5m Australian Height Datum (AHD) and where the water table is likely to be lowered below 1m AHD on adjacent Class 1, 2, 3 or 4 land. Taking into account the above information, management of acid sulfate soils was considered not required.
Typical Soil Profile	Thin surficial sandy fill overlying weathered sandstone. **Fill –** Mainly comprised of sandy soils, varying from Sandy GRAVEL, SAND, and Gravelly Clayey SAND. Other anthropogenic materials, including GRAVEL, crushed SANDSTONE were also noted. Several other distinctive fill layers comprising Chalky CLAY, COAL and SANDY CLAY, were identified near the northwest corner of the site. (varying thickness 0 – 2.0 m); **Botany Sands –** SAND, fine to medium grained, grey/brown to yellow/orange, no odour.
Depth to Groundwater	Based on previous investigations at the site conducted by EI (2014), the average depth to groundwater is anticipated to be approximately 3.7 mbgl. Onsite groundwater conditions, including groundwater flow direction during this assessment, are discussed in **Section 8.2**.
Aquifer Types / Estimated Thickness	The unconfined Botany Sands form the main aquifer for the region and is underlain by sandstone bedrock, which has been documented to range in depth from 1 m in upgradient (northern) parts of the basin becoming thicker, up to 75m (towards the south and southeast) near Botany Bay (Merrick, 1994). The aquifer thickness in the vicinity of the site is estimated to range from 14m to 17m, based on local drilling records.
Relevant Regulatory Instruments	The site is located within Zone 2 of the Botany Groundwater Management Area.
Nearest Surface Water Feature	Alexandra Canal, which is located approximately 1.3 km south west of the site. Alexandra Canal is understood to be tidally influenced and is considered to be a marine system for impact assessment purposes.
Groundwater Flow Direction	Based on the previous investigation at the site conducted by EI (2014) groundwater flow direction in the vicinity of the site is inferred to be south west towards Alexandra Canal.
Hydraulic Gradient	Previous groundwater assessments in the Botany Sands aquifer have identified hydraulic gradients ranging between 0.001 and 0.002.
Hydraulic Conductivity	Medium grain sized sand is estimated to have a hydraulic conductivity in the range of 5 to 20 m/day (Bouwer, 1978).
Aquifer Porosity	16% to 46% effective porosity estimated for medium grained sand (McWhorter and Sunada, 1977).
Groundwater Seepage Velocity	Based on literature-based estimates of hydraulic conductivity and aquifer porosity, the potential seepage velocity within the sandy material is estimated to range from 109 to 146 m/year (based on estimates of 0.3 to 0.4 m/day, Ref. URS, 2004).

Attribute	Description
Groundwater Salinity	Groundwater salinities within the Botany Sands aquifer are generally low with total dissolved solids (TDS) content typically below 1200 mg/L.

2.4 GROUNDWATER BORE RECORDS AND GROUNDWATER USE

An online search of registered groundwater bores was conducted by EI within the DSI phase (EI, 2014) through the NSW Office of Water (Ref. http://www.nratlas.nsw.gov.au) and this revealed that there are 43 registered bores within 500m of the site. Authorised bore uses included industrial – recreational, domestic and monitoring, with standing water levels ranging between 1.68 and 7m BGL.

The NSW Government has been actively managing the extraction of groundwater in the Botany area and in August 2003 an embargo under Section 113A of the Water Act 1912 was announced in the northern part of the aquifer, because available water was depleted by plumes of contamination. This prohibition prevented any new applications to extract groundwater from being made. In August 2006, an order prohibiting the use of existing domestic bores was made for four zones within the northern Botany Sands Aquifer under Section 323 of the Water Management Act 2000. The ban on domestic use was made in the interest of public health and the zones were based on current and historical land use activity, as well as the potential for contamination. In June 2007, the remaining parts of the Botany Sands aquifer were embargoed under the Water Act 1912, to prevent any additional extraction. Hence, the current site lies within an area where the beneficial uses of groundwater have become highly restricted, therefore any groundwater bores from the NR Atlas search that are registered for domestic use are not considered to be currently used for these purposes. The existence of groundwater bores for authorised industrial and horticultural use in proximity of the site, however, indicates potential beneficial use of groundwater in the locality.

2.5 SITE WALKOVER INSPECTION

The site remained predominantly unchanged since the DSI works (EI, 2014). A summary of recorded observations during previous and current site works are summarised in **Table 2-4.**

Table 2-4 Summary of Buildings and Infrastructure

Allotment	Buildings	USTs/ASTs	Observations
Overall site area	-	-	The site encompassed two separate allotments being 12 – 22 Rothschild Avenue at north, and 24 Rothschild Avenue at south. The site topography was generally flat.

Allotment	Buildings	USTs/ASTs	Observations
12 – 22 Rothschild Avenue	The allotment was occupied by one three-storey concrete commercial block in the southern end, combined with a single storey concrete structure of approximately half length at its north near Mentmore Avenue. One electrical substation, enclosed by metal fence, was located near the western boundary of the allotment, adjacent to Mentmore Avenue. One cooling tower, enclosed by metal fence, was located north of the single storey structure. Remainder of the property was a car park and driveway. One sewage vent pipe, approximately 10 m high, was identified in the centre of the car park area.	One UST vent pipe was identified being attached to the metal fence of the cooling tower.	Both buildings were in use as offices and storage facilities. Structures were in good condition. The substation and surrounding fence were in moderate condition with rusting observed. Cooling tower and surrounding fence were in poor to moderate condition with heavy rusting. Majority of the car parking area was comprised of asphalt pavement, except a few scattered planting boxes. Asphalt pavement was in fair condition, with occasional cracks, patches and staining. Pavement at northeast corner of the site appeared damaged. Multiple vehicles parked in the area observed. Planting boxes were vegetated by trees and shrubs with no signs of distress. Based on a GRP survey conducted by Hunter Smith Locating Services Pty Ltd the location of the UST and was confirmed to be consistent workcover search conducted during DSI works (EI, 2014). The location of the GPR survey is presented in **Figure 2**.
24 Rothschild Avenue	One double-gable roofed, two storey brick building. Associated unsealed lawn areas and concrete paved walkway fronting both Rothschild Avenue and Mentmore Avenue.	No UST identified	Building was in use as office and warehouse and in good condition. Front lawns were planted with shrubs and small trees. Sign of vegetation distress was not observed.

3. PREVIOUS INVESTIGATIONS

3.1 AVAILABLE DOCUMENTS

A previous environmental investigation in the form of a Detailed Site Investigation Report was prepared by EI in 2014. EI documented their findings in a report titled "*Detailed Site Investigation Report, 12 - 22 & 24 Rothschild Avenue, Rosebery NSW* (Ref. E22282 AA_Rev1, 24 September 2014). A summary of EI works and key findings is outlined in **Table 3-1**.

Table 3-1 Summary of Previous Investigation Works and Findings

Assessment Details	Project Tasks and Findings
Detailed Site Investigation Report (EI, 2014)	
Work Objectives	• Evaluate the potential of contamination presence on site on the basis of historical land uses, anecdotal and documentary evidence of possible pollutant sources; • To investigate the degree of any potential contamination by means of limited intrusive sampling and laboratory analysis, for relevant contaminants. • Identify and evaluate potential risks that identified contamination may pose to human health and the environment; and • Provide data to assist in the selection and design of appropriate corrective action options for management of contaminated soils or groundwater, if necessary.
Scope of Works	• A review of relevant topographical, geological, hydrogeological and soil landscape maps for the project area; • Search of historical aerial photographs archived at NSW Land and Property Information in order to review previous site use and the historical sequence of land development in the neighbouring area; • A land titles search, also conducted through NSW Land and Property Information for information relating to site ownership; • Site history survey involving a detailed search of City of Sydney Council records for information relating to operational site history and/or relevant environmental incidents; • A search through the NSW EPA / OEH Land Information records to confirm that there are no statutory notices current on the site under the Unhealthy Building Land Act (1990) or the Contaminated Land Management Act (1997); • A search of the Stored Chemical Information Database (SCID) and microfiche records held by WorkCover NSW relating to possible underground tank approvals and locations; and • A review of existing underground services on site. • A detailed site walkover inspection; • Construction of boreholes at nineteen locations (BH1 – BH19) distributed in a triangular grid pattern across accessible areas of the site; • Multiple level soil sampling down to natural soils; • Three boreholes converted to groundwater monitoring wells for groundwater sampling purposes; • One groundwater monitoring event involving groundwater sampling from the three monitoring wells; and • Laboratory analysis of selected soil samples and the groundwater samples for relevant analytical parameters, as determined from the site history survey and field observations during the investigation program. • Data analysis and Reporting

Assessment Details	**Project Tasks and Findings**
Findings	• The sub-surface layers comprised of fill materials of mainly sandy materials, underlain by natural sand; • Groundwater was encountered generally at 3.5 meters below ground level, flowing within the Botany Sands Aquifer; • A lead hotspot was identified at borehole BH1, with reported concentrations exceeding adopted human health based SILs; The exceedance is not considered to pose a risk to human health if left undisturbed; • Sample BH14-3, collected at approximately 1.5 m – 1.7m bgl, reported exceedance of F1 fraction TRH over HSL for residential developments. The exceedance is considered low risk under the current land uses. • Sample BH11-1 was found to exceed the ESL for F3 fraction TRH for residential developments. Under the current land use the exceedance is not considered significant. • Samples BH11-1 and BH18-1 were found to exceed the human health based SILs for carcinogenic PAH's (as Benzo (a) pyrene TEQ), except under the current land use. Exceedances of Benzo (a) pyrene over the ecological screening levels were also reported at BH11-1, BH16-1 and BH18-1.Vertical delineation was achieved at BH11 at 0.7 m bgl. Future development will likely comprise a basement car parking facility which provides an opportunity for impacted soils to be removed and disposed in accordance with NSW EPA waste classification guidelines. • Asbestos fibres were detected in the fill layer at one location. The investigation indicated that asbestos contamination is likely to be localised within the area of BH1. • PCBs in exceedance of health based SILs were detected in BH14 and BH18. BH18 was identified as a hotspot as significant exceedance was found. Delineation was achieved at approximately 0.7 m – 0.8 m bgl at both locations. The exceedances are not considered to pose an immediate threat to human health under the current setting and will be removed as part of future development.
Conclusions	Overall, contamination onsite was identified during the DSI. The contamination was detected within the surface fill and not considered as an immediate threat to human health and the ecosystems, and the site is generally suitable for ongoing commercial and industrial land use. Future development for residential use will most likely comprise a basement car parking facility which would require off-site disposal of surface fill soils. This is quite common and consistent with surrounding properties in the area. Remediationwas required to make the site suitable for residential use.
Recommendations	• Should redevelopment of the site occur, a Remedial Action Plan (RAP) shall be prepared to detail requirements to locate and remove the UST possibly present near the western boundary of the site., and to remediate and or manage heavy metal, TRH, PAH, PCB, and asbestos impacts present in shallow surface fill soils; • Where any plan of future redevelopment is confirmed; the site shall be assessed against the SILs applicable to the proposed land use. Subsequent actions, including further investigation, delineation and preparation of RAP, shall be conducted based on the proposed land uses and the assessment results, to make the site suitable for the proposed land use.

4. SITE HISTORY

4.1 SUMMARY OF EI HISTORY REVIEW (DSI, 2014)

A comprehensive site history review was undertaken during DSI works (EI, 2014). Information included, historical aerial photographs, land title records, NSW WorkCover records and Council records. A summary of these finding are presented in **Table 4-1.**

Table 4-1 Site History Summary

Source	Summary
Aerial Photos / Land Title Records	**12-22 Rothschild Avenue** • Aerial photographs suggests the existing building on the southern portion (UNSW Building), had been present on the site since the 1930's. The majority of the other areas of the property were predominantly vacant and then converted into a car park in the 1980s. The north eastern portion was occupied by a low rise structure and three sheds in the 1930's and then converted as part of the car park in 1982. • Land title information suggests the majority of the property was privately owned up until the 1950s when Bates (Australasia) Limited bought the property. Since the 1950's the property had been owned by Australian Electrical Industries Pty Ltd, IBM Australia Limited and Sussman and Company Pty Limited. The north eastern portion had been owned solely by commercial entities since the 1914 including companies such as Australian Bag Company Limited, Australian Electrical Industries Pty Ltd, IBM Australia Limited and Sussman and Company Pty Limited. • Overall, the land parcel known as 12 – 22 Rothschild Avenue, Rosebery had been used for commercial/industrial land uses from the 1930s. In late 1960s the land was acquired by IBM Australia and solely used for commercial purposes since then. **24 Rothschild Avenue** • Aerial photographs suggested that the existing site structure had been present on the site since at least the 1930's. • Land title information suggested that the property had predominantly been commercially owned since the 1920's. Such company's include Australian Bag Company Limited, Australian Electrical Industries Pty Ltd, IBM Australia Limited and Sussman and Company Pty Limited. • Overall, the land parcel known as 24 Rothschild Avenue, Rosebery appeared to have been primarily used for commercial and/or manufacturing uses from 1930– 1980, from when the land was likely being used for commercial activities only. **Surrounding Lands** • Historical land uses on surrounding lands appeared to be primarily commercial and industrial from the 1930s. • A review of the 1951 historical aerial photograph identified an operating tram at the corner of Epsom Road and Rothschild Avenue. Further investigation revealed that a Tramway Line was previously constructed along Rothschild Avenue and was in operation until the 1950s.. As historically asbestos was used in some mechanical parts of tram carriages (e.g. brakes), the presence of asbestos onsite as a result of mobilised residual asbestos fibres from the former tramway line is considered possible.
Council Search	Historical Council records indicated that from the1950s to 1960s, 12 – 22 Rothschild Avenue, had been used for light industrial and manufacturing activities, which involved multiwall bags, plywood, electrical equipment and water heater manufacturing. 24 Rothschild Avenue had been used for bag manufacturing purposes from early 1950s.
NSW WorkCover	Revealed the presence of one underground tank (UST) at 12-22 Rothschild Avenue. The tank was installed in 1975, was 25,000 litres in size, stored mineral spirit (presumably petrol) and was abandoned with water and rust inhibitor in 1990.

Source	Summary
Hazardous Chemicals and Regulatory Compliance	An on-line search of the Contaminated Land – Record of EPA Notices database that is maintained by the NSW OEH confirmed that the NSW OEH has no regulatory involvement under Section 58 of the Contaminated Land Management Act 1997 in relation to the land parcel identified as 12 – 22 & 24 Rothschild Avenue, Rosebery, or surrounding areas in its proximity. A search through the List of NSW Contaminated Site notified to EPA was conducted. The search revealed that a property, located approximately 30 m north of the site and known as 2 Mentmore Avenue, was reported to EPA as a contaminated site. Information available in the list suggested that the site was contaminated by Other Industry activities, and was currently under EPA site management class F and G. According to EPA, site management class F suggests the contamination of the site is managed by a planning approval process. The consent authority is either the local council or a government agency, such as the Department of Planning. Site management class G suggests based on the information made available to the EPA to date, the contamination of the site is considered by the EPA to be not significant enough to warrant regulatory intervention under the Contaminated Land Management Act 1997.

4.2 PLANNING STREET CARDS

Additionally a search of the Planning Street Cards for Rothschild Avenue held by the City Of Sydney was undertaken on 25th August 2016 to confirm former site uses identified during the DSI (2014). The majority of the planning street cards content was of poor visual quality and could not be interpreted. From the information that could be interpreted, the key findings are summarised in **Table 4-2.**

Table 4-2 Planning Street Cards Review

Reference no.	Year	Key findings
12-24 Rothschild Avenue		
982/52	1952	Application for continual use of site by a machinery merchants company.
925/52	1952	Application to erect structure for use of timber storage.
978/52	1952	Application to erect structure for use of storage of timber
4841/57	1957	Application for registration of premises to factory of auto wiring and cables.
15/57	1957	DA for alterations and to use to manufacture electrical equipment.
416/58	1958	DA for use of premises for plywood manufacturing.
311/3/86	1963	Labour and Industry notification for assemblage of sheet metal.
1069/63	1963	DA for the premises for use of site to manufacturing electric water heaters.
72/68	1968	DA for alterations and to use premises as depots. Type of depot was unclear on the street planning card
138/75	1975	Application to install a 5000 gallon petrol tank. Application made by I.B.M. Aust. Limited.
599 1/76	1976	Provision for landscaping for car parking area.
354/79	1979	Application for substation enclosure.
4582/I547	1982	Installation of new roof sheeting.

Overall the planning street cards for 12-22 Rothschild Avenue indicated that the premises had been used for a variety of commercial and industrial purposes including machinery merchants, timber storage, auto wiring and cables manufacturing, plywood manufacturing, assemblage of sheet metal, manufacturing electrical water heaters and use as a depot. Other key findings include; a 5000 gallon petrol tank was installed in the mid 1970's, an electrical substation had been present since the late 70's and new roof sheeting was installed in 1982.

There were very few planning street cards for 24 Rothschild Avenue, however review indicated alternations and additions applications to existing building within the period of 1963 to 1973. Specific details of these alternations and additions could not be interpreted.

Overall, the findings of the street planning card search are generally consistent with the previous site history search undertaken during DSI works (2014) and discussed in **Section 4.1**.

5. CONCEPTUAL SITE MODEL

In accordance with NEPM (2013) *Schedule B2 – Guideline on Site Characterisation* and to aid in the assessment of data collection for the site, EI developed a preliminary conceptual site model (CSM) assessing plausible pollutant linkages between potential contamination sources, migration pathways and receptors. The CSM provides a framework for the review of the reliability and useability of the data collected and to identify data gaps in the existing site characterisation.

5.1 CHEMICAL HAZARDS AND CONTAMINATION SOURCES

On the basis of site history and search findings (described in **Section 4**) EI consider potential chemical hazards and onsite contamination sources to be as follows:

- Imported fill soils of unknown origin distributed across the site;
- Impacts from previous light industrial manufacturing activities at the site;
- Painted surfaces in relation to the structures (buildings) that are currently present on the site;
- Potential Hazardous materials, including potential asbestos-containing materials (ACM) from former building products;
- Potential pesticide use underneath building structures
- Electrical substation present at the site;
- Off-site sources of contamination, including EPA notified site located 30m north of the site and asbestos used in former tram line along;
- Previously identified lead, PCB, TRH, PAH and Asbestos impacted fill; and
- The abandoned underground petroleum storage systems (UPSS) present on the site.

5.2 CHEMICALS OF CONCERN

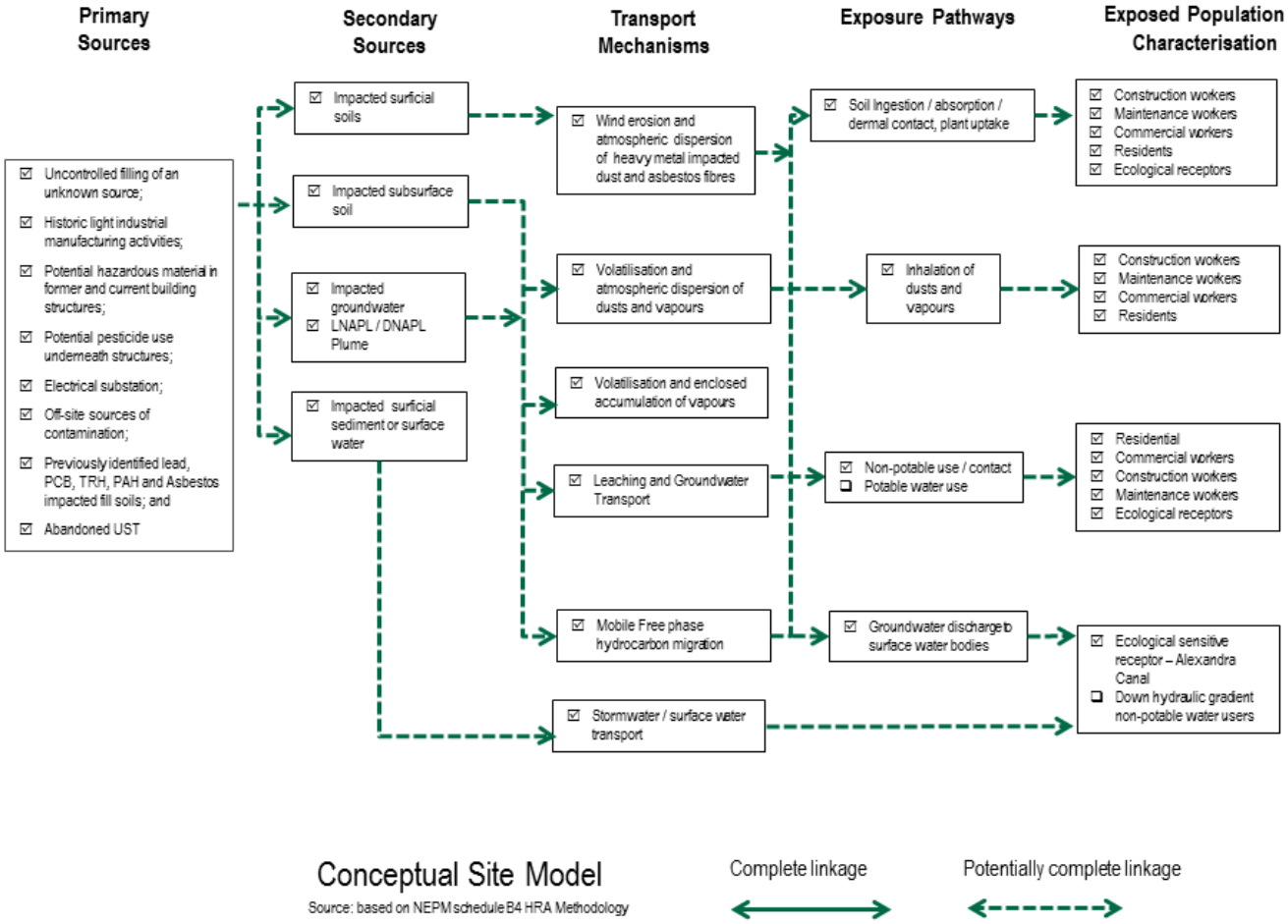
Based on the findings of the site contamination appraisal the chemicals of concern (COC) at the site are considered to be:

- Soil – heavy metals (HMs), TPH, PAH, the monocyclic aromatic hydrocarbon compounds benzene, toluene, ethylbenzene and xylenes (BTEX), organochlorine and organophosphate pesticides (OCP/ OPP), polychlorinated biphenyls (PCB), volatile organic compounds (VOC), Phenols and asbestos.
- Groundwater – HMs, TPH, BTEX, PAH, volatile organic compounds (VOC), including chlorinated VOC (VOCC) such as trichloroethylene (TCE) and phenols.

5.3 POTENTIAL SOURCES, EXPOSURE PATHWAYS AND RECEPTORS

Potential contamination sources, exposure pathways and human and environmental receptors that were considered relevant for this assessment are summarised along with a qualitative assessment of the potential risks posed by complete exposure pathways in **Figure 5-1**.

Figure 5-1 Conceptual Site Model



5.4 DATA GAPS

The following data gaps were aimed to be closed during works this investigation:

- Soil characterisation within internal areas of the site, where access was previously limited, including at 24 Rothschild Avenue (heritage building) and at 12-22 Rothschild Avenue (UNSW Building);
- Characterisation of up-gradient groundwater on the northern portion of the site; and
- Characterisation of groundwater in the vicinity of the abandoned UST at 24 Rothschild Avenue.

6. SAMPLING, ANALYTICAL AND QUALITY PLAN (SAQP)

The SAQP plays a crucial role in ensuring that the data collected as part of this, and ongoing environmental works carried out at the site are representative, and provide a robust basis for site assessment decisions. This SAQP includes the following:

- Data quality objectives, including a summary of the objectives of the ESA;
- Investigation methodology including media to be sampled, details of analytes and parameters to be monitored and a description of intended sampling points;
- Sampling methods and procedures;
- Field screening methods;
- Analysis Methods;
- Sample handling, preservation and storage; and
- Analytical QA/QC.

6.1 DATA QUALITY OBJECTIVES (DQO)

In accordance with the USEPA (2006) *Data Quality Assessment* and the DEC (2006) *Guidelines for the NSW Site Auditor Scheme*, the process of developing Data Quality Objectives (DQO) was used by the EI assessment team to determine the appropriate level of data quality needed for the specific data requirements of the project. The DQO process that was applied for this assessment is documented in **Table 6-1**.

Table 6-1 Summary of Project Data Quality Objectives

DQO Steps (NSW DEC, 2006)	US EPA (2006) (modified)	Details	Comments (changes during investigation)
1. State the Problem Summarise the contamination problem that will require new environmental data, and identify the resources available to resolve the problem; develop a conceptual site model	Give a concise description of the problem Develop a conceptual model of the environmental hazard to be investigated. Identify resources available.	The site is to be developed for mixed land uses including residential apartments. 24 Rothschild Avenue building is heritage listed and will be retained as part of the proposed development. The previous DSI (EI, 2014) was unable to adequately characterise soil within internal areas (including 24 Rothschild Avenue), groundwater in the vicinity of the abandoned UST and groundwater on the southern portion of the site. The additional site investigation was required to fill data gaps identified above to ensure the site can be made suitable for the proposed development and assist in preparation of an RAP.	
2. Identify the Goal of the Study (Identify the decisions) Identify the decisions that need to be made on the contamination problem and the new environmental data required to make them	Identify principal study question(s). Consider alternative outcomes or actions that may result from answering the question(s). For decision problems, develop decision statement(s), organise multiple decisions. For estimation problems, state what needs to be estimated and key assumptions.	Historical information and previous investigation results indicated that site soils had been impacted from previous activities, including site filling, USTs, and industrial use. Further site characterisation was required within areas at which access was previously limited during the initial DSI works. Furthermore an additional site history review was required to further expand understanding of former site uses. The ADSI was aimed to augment characterisation of the site to assist in the developing remedial requirements for the site to be made suitable for the proposed mixed commercial and residential land use.	

DQO Steps (NSW DEC, 2006)	US EPA (2006) (modified)	Details	Comments (changes during investigation)
3. Identify Information Inputs (Identify inputs to decision) Identify the information needed to support any decision and specify which inputs require new environmental measurements	Identify types and sources of information needed to resolve decisions or produce estimates. Identify the basis of information that will guide or support choices to be made in later steps of the DQO Process. Select appropriate sampling and analysis methods for generating the information.	The main inputs to the additional DSI include: Findings of the initial DSI undertaken by EI (2014); Desktop information; Site observations; Laboratory results from analysis of soil and groundwater samples. *National and NSW EPA guidelines under the NSW Contaminated Land Management Act 1997. Laboratory analyses were completed in accordance with NEPM (2013) Schedule B3. Groundwater samples were collected using low flow sampling techniques to assist in the collection of volatile contaminants that may be present.*	
4. Define the Boundaries of the Study Specify the spatial and temporal aspects of the environmental media that the data must represent to support decision	Define the target land-use and receptors of interest and its relevant spatial boundaries. Define what constitutes a sampling unit. Specify temporal boundaries and other practical constraints associated with sample/data collection. Specify the smallest unit on which decisions or estimates will be made.	Lateral – As shown in **Figure 2**, the site comprised of 10 separate lots and is bound by commercial and residential apartments to the north, Cressy street to the south, Rothschild Avenue to the east and Mentmore Avenue to the west. Vertical – Investigation depth to be extended down through natural soils and to the underlying groundwater aquifer; and. Temporal – One round of groundwater sampling was undertaken Regulatory – The site is within Zone 2 of the Botany Bay Groundwater Zone.	
5. Develop the Analytic Approach (Develop a decision rule) To define the parameter of interest, specify the action level, and integrate previous DQO outputs into a single statement that describes a logical basis for choosing from alternative actions	Specify appropriate land-use parameters for making decisions or estimates. For decision problems, choose a workable Action Level and generate an "If then else" decision rule which involves it. For estimation problems, specify the methodology and the estimation procedure.	The decision rules for the investigation were: • If the concentrations of contaminants in the soils and groundwater data exceed the adopted site assessment criteria; then assess the need to further investigate the extent of impacts onsite. • Decision criteria for QA/QC measures are defined by the Data Quality Indicators (DQI) in **Table 6-2**.	

DQO Steps (NSW DEC, 2006)	US EPA (2006) (modified)	Details	Comments (changes during investigation)
6. Specify Performance or Acceptance Criteria (Specify limits on decision errors) Specify the decision-maker's acceptable limits on decision errors, which are used to establish performance goals for limiting uncertainties in the data	For decision problems, specify the decision rule as a statistical hypothesis test, examine consequences of making incorrect decisions from the test, and place acceptable limits on the likelihood of making decision errors. For estimation problems, specify acceptable limits on estimation uncertainty.	Specific limits for this project were in accordance with the guidance made by the NSW EPA, appropriate indicators of data quality and standard procedures for field sampling and handling. This should include the following points to quantify tolerable limits: • A decision can be made based on a probability that 95% Upper Confidence Limits (UCL) of the data will satisfy the given site criteria. Therefore a limit on the decision error will be 5% that a conclusive statement may be incorrect. • A decision can be made based on the probability that a contamination hotspot of a certain circular diameter will be detected with 95% confidence using a selected density of systematic data points. The decision error will be limited to a probability of 5% that a contamination hotspot may not be detected. • If contaminant concentrations in groundwater exceed the adopted criteria, further investigation will be considered prudent. If no contamination is detected in groundwater, further action will not be warranted.	

DQO Steps (NSW DEC, 2006)	US EPA (2006) (modified)	Details	Comments (changes during investigation)
7. Develop the Detailed Plan for Obtaining Data (Optimise the design for obtaining data) Identify the most resource-effective sampling and analysis design for general data that are expected to satisfy the DQOs	Compile all data and outputs generated in Steps 1 to 6. Use this information to identify alternative sampling designs that fit your intended use Select and document a design that will yield data to best achieve your data quality.	Instructions will be issued to guide field personnel in the required fieldwork activities.. Borehole locations were targeted to locations previously inaccessible during initial DSI works to evaluate the environmental conditions on site, to assist in preparation of RAP. Five groundwater monitoring wells were proposed to be installed at the site; including locations along the northern boundary, down-gradient of the abandoned UST, central portion of 12-22 Rothschild Avenue, up-gradient of 24 Rothschild avenue and down-gradient of 24 Rothschild Avenue. An upper soil profile sample (soil extracted immediately beneath the concrete hardstand/pavement, or at surface level if a pavement is not present) will be collected at each borehole location and tested for chemicals of concern, to assess the conditions of fill layer, and potential impacts from activities above ground. Further sampling would also be carried out at deeper soil layers. These samples would be selected for testing based on field observations, while giving consideration to characterise the subsurface soil stratigraphy.	Due to a buried deeper slab in the vicinity of the abandoned UST at 12-22 Rothschild Avenue and up-gradient of 24 Rothschild Avenue groundwater monitoring wells could not be installed in these areas.

6.2 DATA QUALITY INDICATORS

To ensure that the investigation data collected was of an acceptable quality, the investigation data set was assessed against the data quality indicators (DQI) outlined in **Table 6-2**, which related to both field and laboratory-based procedures. The assessment of data quality is discussed in **Section 8**.

Table 6-2 Data Quality Indicators (Summary)

Data Quality Objective	Data Quality Indicator	Acceptable Range
Accuracy	Field – Trip blank (laboratory prepared) Laboratory – Laboratory control spike and matrix spike	< laboratory limit of reporting (LOR) Prescribed by the laboratories
Precision	Field – Blind replicate and spilt duplicate Laboratory – Laboratory duplicate and matrix spike duplicate	< 30 % relative percentage difference (RPD [%]) Prescribed by the laboratories
Representativeness	Field – Trip blank (laboratory prepared) Laboratory – Method blank	< laboratory limit of reporting (LOR) Prescribed by the laboratories
Completeness	Completion (%)	-

7. ASSESSMENT METHODOLOGY

7.1 SAMPLING RATIONALE

With reference to the preliminary CSM described in **Section 5**, soil and groundwater investigation works were planned in accordance with the following rationale:

- Sampling fill and natural soils from five (5) test bore locations located at accessible areas at 24 Rothschild Avenue to further characterise in-situ soils, as illustrated in **Figure 2**.
- Sampling fill and natural soils at two (2) test bore locations within the UNSW building at 12-22 Rothschild Avenue to further characterise in-situ soils, as illustrated in **Figure 2**.
- Installation of five (5) groundwater monitoring wells at targeted locations throughout the site including along the up-gradient northern boundary, in the vicinity of the abandoned UST, central portion of the car park at 12-22 Rothschild Ave, up-gradient and down-gradient locations at 24 Rothschild Ave, as illustrated in **Figure 2**;
- Sampling groundwater during a single groundwater monitoring event (GME) at the newly monitoring wells installed and the three (3) monitoring wells installed during DSI works, as illustrated in **Figure 2**;
- Laboratory analysis of representative soil and groundwater samples for the identified chemicals of concern.

7.2 INVESTIGATION CONSTRAINTS

The number of test bores drilled and monitoring wells installed during the investigation phase did not achieve the planned investigation scope as described in **Section 7.1** due to a number of physical obstructions, which comprised:

- Due to limited access to internal areas of the buildings in the vicinity of bore locations BH208 and BH209 (refer for **Figure 2**) these bores were drilled using the manual auger method, however the target depth was reached at these locations;
- Buried impenetrable materials (buried deep slabs) in the vicinity of bore locations BH201M and BH204M causing auger refusal and therefore these proposed monitoring bores could not be installed;
- Buried impenetrable materials (buried deep slabs) in the vicinity of bore location BH211 caused auger refusal and therefore targeted natural soils were not sampled; and
- Previously installed monitoring wells (MW1 and MW2) were found dry, due to siltation, and therefore groundwater could not sampled at these monitoring wells.

7.3 ASSESSMENT CRITERIA

The assessment criteria proposed for this project are outlined in **Table 7-1**. These were selected from available published guidelines that are endorsed by national or state regulatory authorities, with due consideration of the exposure scenario that is expected for various parts of the site, the likely exposure pathways and the identified potential receptors.

Table 7-1 Adopted Investigation Levels for Soil and Groundwater

Environmental Media	Adopted Guidelines	Rationale
Soil	NEPM, 2013 Soil HILs, EILs, HSLs, ESLs & Management Limits for TPHs	**Soil Health-based Investigation Levels (HILs)** Soil samples are to be assessed against the NEPM 2013 HIL-B thresholds for residential sites with minimal access to soils as these borehole locations are located within proposed basement boundary of beneath a concrete slab. Soil samples collected from BH202M were also assessed NEPM 2013 HIL-C thresholds for public open spaces. BH202M was located within a potential proposed landscaping area. **Ecological Investigation Levels (EILs)** Soil samples collected at BH202M would also be assessed against the NEPM 2013 EILs for Urban residential / public open spaces for arsenic, copper, chromium (III), nickel, lead, zinc, DDT and naphthalene, which have been derived for protection of terrestrial ecosystems as BH202M is located within a proposed landscaping area. **Table 7-2** provides a summary of adopted Added Contaminant Levels (ACL) and Ambient Background Concentrations for derivations of copper, chromium (III), nickel, lead and zinc EILs. Generic EILs were adopted for ecological assessment in relations to arsenic, DDT and naphthalene. BH202M was located within a potential proposed landscaping area. EILs only apply to the upper 2m of soil (the root zone). **Soil Health-based Screening Levels (HSLs)** The NEPM 2013 Soil HSL-A&B thresholds for low-high density residential sites for vapour intrusion would be applied to assess for potential human health impacts from residual vapours resulting from petroleum, BTEX & naphthalene. Soils asbestos results to be assessed against the NEPM 2013 Soil HSL thresholds for “all forms of asbestos”. **Ecological Screening Levels (ESLs)** Soil samples collected at BH202M would also be assessed against the NEPM 2013 ESLs for selected petroleum hydrocarbons & TRH fractions for protection of terrestrial ecosystems. ESLs only apply to the upper 2m of soil (the root zone) **Management Limits for Petroleum Hydrocarbons** Should the ESLs and HSLs be exceeded for petroleum hydrocarbons, soil samples would also assessed against the NEPM 2013 *Management Limits* for the TRH fractions F1 – F4 to assess propensity for phase-separated hydrocarbons (PSH), fire and explosive hazards & adverse effects on buried infrastructure.
Groundwater	NEPM, 2013 GILs for Marine Waters	**Groundwater Investigation Levels (GILs) for Marine Water** NEPM 2013 provides GILs for typical, slightly-moderately disturbed aquatic ecosystems, which are based on the ANZECC & ARMCANZ 2000 Trigger Values (TVs) for the 95% level of protection of aquatic ecosystems; however, the 99% TVs were applied for the bio-accumulative metals *cadmium* and *mercury*. The marine criteria were considered relevant as the closest, potential surface water receptor was Alexandra Canal, located 1.3km south west of the site and understood to be tidally influenced.

Environmental Media	Adopted Guidelines	Rationale
	NEPM, 2013 Groundwater HSLs for Vapour Intrusion	**Health-based Screening Levels (HSLs)** The NEPM 2013 groundwater HSLs for vapour intrusion were used to assess for potential human health impacts from residual vapours resulting from petroleum, BTEX and naphthalene impacts. The *HSL A* and *HSL B* thresholds for low and medium-density residential sites were applied for groundwater.
	NEPM, 2013 GILs for Drinking purposes	**Drinking Water GILs** The NEPM (2013) GILs for drinking water quality were applied for specific parameters, for which freshwater/marine GILs were not provided. These were based on the Australian Drinking Water Guidelines (Ref. NHMRC, 2011).

For the purposes of this investigation, the adopted soil assessment criteria are referred to as the Soil Investigation Levels (SILs) and the adopted groundwater assessment criteria are referred to as the Groundwater Investigation Levels (GILs). SILs and GILs are presented alongside the analytical results in the corresponding summary tables, which are discussed in **Section 9**.

Table 7-2 Generic and Derived Ecological Investigation Levels

Metal	Assumed Values [1]	EIL (mg/kg) [2]
Arsenic	Generic EIL	100
Chromium (III)	ABC - 15 mg/kg (assumes an old NSW high traffic suburb) ACL - 190 mg/kg (assumes clay content <1 % - most conservative)	205
Copper	ABC - 30 mg/kg (assumes an old NSW high traffic suburb) ACL - 60 mg/kg (assumes pH 4.5 – most conservative)	90
DDT	Generic EIL	180
Lead	ABC - 160 mg/kg (assumes an old NSW high traffic suburb) ACL – 1,100 mg/kg (generic)	1,260
Naphthalene	Generic EIL	170
Nickel	ABC - 5 mg/kg (assumes an old NSW high traffic suburb) ACL - 30 mg/kg (assumes CEC 5 – most conservative)	35
Zinc	ABC - 120 mg/kg (assumes an old NSW high traffic suburb) ACL - 70 mg/kg (assumes pH 4 & CEC 5 – most conservative)	190

7.4 SOIL INVESTIGATION

The soil investigation works conducted at the site are described in **Table 7-3**. Test bore locations are illustrated in **Figure 2**.

Table 7-3 Summary of Soil Investigation Methodology

Activity/Item	Details
Fieldwork	The soil investigation was conducted on 6 August 2016.
Drilling Method & Investigation Depth	Test bores BH202M, BH206, BH207, BH210 and BH211 were drilled using a tight access track mounted drilling rig using 100mm diameter augers. Test bores BH208 and BH209 were drilled using the manual auger method due to access restrictions.
Soil Logging	Drilled soils were classified in the field with respect to lithological characteristics and evaluated on a qualitative basis for odour and visual signs of contamination. Soil classifications and descriptions were based on Unified Soil Classification System (USCS) and Australian Standard (AS) 4482.1-2005. Bore logs are presented in **Appendix B.**
Field Observations (including visual and olfactory signs of potential contamination)	A summary of field observations is provided, as follows: • fibre cement sheet fragments were not observed in any drilling cuttings; and • no signs of ash or charcoal materials were detected in any of the drilled boreholes. • No visual signs of contamination were observed and no suspicious odours were detected during any stage of the field investigation programme.
Soil Sampling	• Soil samples were collected using a dry grab method (unused, dedicated nitrile gloves) & placed into laboratory-supplied, acid-washed, solvent-rinsed glass jars. • Blind field duplicates was separated from the primary samples and placed into glass jars. • A small amount of duplicate was collected from each soil samples and placed into zip-lock bag for Photo-ionisation Detector (PID) screening. • A small amount of duplicate was separated from all fill samples and placed into a zip-lock bag for asbestos analysis.
Decontamination Procedures	*Drilling Equipment* - The drilling rods were decontaminated between sampling locations with potable water until the augers were free of all residual materials. *Sampling Equipment* – Nitrile gloves were dedicated to each sample, however were rinsed with laboratory prepared deionised water between samples. One rinsate sample was collected (QR1) during soil sampling.
Sample Preservation	Samples were stored in a chilled (ice-filled) chest, whilst on-site and in transit to the laboratory. All samples were submitted and analysed within the required holding period, as documented in laboratory reports discussed in a later section.
Management of Soil Cuttings	Soil cuttings were used as backfill for completed boreholes.
Quality Control & Laboratory Analysis	A number of soil samples were submitted for analysis of previously-identified chemicals of concern by SGS Laboratories (SGS). QA/QC testing comprised intra-laboratory duplicates ('field duplicates') tested blind by SGS and an inter-laboratory field duplicate tested blind by Envirolab Services (Envirolab). All samples were transported under strict Chain-of-Custody (COC) conditions and COC certificates and laboratory sample receipt documentation were provided to EI for confirmation purposes, as discussed in **Section 8**.
Soil Vapour Screening	Screening for potential VOCs in collected soil samples was conducted using a Photo-ionisation Detector (PID) fitted with a 10.9 eV lamp.

7.5 GROUNDWATER INVESTIGATION

The groundwater investigation works conducted at the site are described in **Table 7-4**. Monitoring well locations are illustrated in **Figure 2**.

Table 7-4 Summary of Groundwater Investigation Methodology

Activity/Item	Details
Fieldwork	Groundwater monitoring wells were installed and developed on 6 August 2016. Water level gauging, well purging, field testing and groundwater sampling was conducted on 17 August 2016.
Well Construction	Test bores were converted to groundwater monitoring wells as follows: • one, approx. 6 m deep, onsite, up-gradient and along the northern boundary at12-22 Rothschild Ave, identified as BH205M; • one, approx. 6 m deep, onsite, central portion of the 12-22 Rothschild Ave, identified as BH203M; and • one, approx. 6 m deep, onsite, down-gradient of 24 Rothschild Ave, identified as BH202M; It must be noted that proposed groundwater monitoring well locations BH201M (up-gradient location of 24 Rothschild Ave) and BH204M (in vicinity of abandoned UST at 12-22 Rothschild Ave) encountered refusal on a deeper concrete slab at approximately 1m BGL and therefore could not be installed. BH201M and BH204M were drilled using a ute-mounted, mechanical, 150 mm diameter, solid-flight auger rig. Monitoring bores BH203M and BH205M were drilled by using a ute-mounted, mechanical, 150 mm diameter, solid-flight auger rig, whilst BH202M was drilled using a tight access, 100 mm diameter, solid-flight auger rig . Well construction details are tabulated in **Table 9-2** and documented in the bore logs presented in **Appendix H**. Wells were generally installed to screen the sand aquifer within the interval of approx. 3.0 to 6.0 m BGL. Locations are provided on **Figure 2** and **Figure 3**.
Well Construction (continued)	Well construction was in general accordance with the standards described in NUDLC, 2012 and involved the following: • 50 mm, Class 18 uPVC, threaded, machine-slotted screen and casing, with slotted intervals in shallow wells set to screen to at least 500 mm above the standing water level to allow sampling of phase-separated hydrocarbon product, if present; • base and top of each well was sealed with a uPVC cap; • annular, graded sand filter was used to approximately 300mm above top of screen interval; • granular bentonite was applied above annular filter to seal the screened interval; • drill cuttings were used to backfill the bore annulus to just below ground level; and • surface completion comprised a steel road box cover set in neat cement and finished flush with the concrete slab level.
Well Development	Well development was conducted for each well directly following installation. This involved agitation within the full length of the water column using a dedicated, HDPE, disposable bailer, followed by removal of water and accumulated sediment using a 12V, HDPE submersible bore pump (Proactive Environmental, model Super Twister). Pumping was continued until no further reduction in suspended sediment was observed (i.e. after removal of several well volumes).

Activity/Item	Details
Well Survey (Elevation and location)	Well elevations at ground level were extrapolated from the spot elevations marked on the survey plan provided by the client (**Figure 3**). Well elevations at ground level were extrapolated in metres relative to Australian Height Datum (m AHD).
Well Gauging & Groundwater Flow Direction	The newly installed monitoring wells (BH202M, BH203M and BH205M) as well as monitoring wells installed during the initial DSI (MW1, MW2 and MW3) were gauged for standing water level (SWL, depth to groundwater) prior to well purging at the commencement of the GME on 17 August, 2015. The wells MW1 and MW2 were found to be dry and all measured SWLs are shown in **Table 9-2**. A transparent HDPE bailer was used to visually assess for the presence PSH prior to the commencement of well purging at as all wells with PSH not detected. Based on the reduced water levels (RWLs, i.e. SWLs corrected to AHD) calculated at each monitoring well (**Table 9-3**) groundwater level contours were interpreted for the site as shown in **Figure 3**. The direction of groundwater flow in the shallow aquifer was inferred to be in a southwest direction. This is consistent with the anticipated groundwater flow direction, as inferred on the basis of bedrock surface contours documented by Griffin (1963) and considering the proximity of the site to Alexandra Canal (located 1.3 km to the southwest).
Well Purging & Field Testing	No volatile organic odours were detected during any stage of well purging. Measurement of water quality parameters was conducted repeatedly during well purging and were recorded onto field data sheets (**Appendix H**) once water quality parameters stabilised. Groundwater was initially observed to be slightly clear / yellow / brown in colour with suspended sediments (SS). Field measurements for Dissolved Oxygen (DO), Electrical Conductivity (EC) and pH of the purged water were also recorded during well purging. Purged water volumes removed from each well and field test results are summarised in **Table 9-3**.
Groundwater sampling	All groundwater monitoring wells were purged and sampled using low-flow/minimal drawdown sampling method with a MicroPurge kit (MP15) and a portable MicroPurge pump following well gauging. The MicroPurge system incorporates a low density poly-ethylene (LDPE) pump bladder, and a Teflon-lined LDPE sample delivery tube. The system used for this investigation employed pressurised carbon dioxide gas to regulate groundwater flow. Pump pressure and pumping cycles were adjusted accordingly to regulate extraction flow rate, and to avoid causing excessive drawdown of water level during the sampling process. Field measurement of water quality parameters was conducted continuously on purged groundwater with a water quality meter (Hanna Multi Parameter 9829) positioned within an open flow-through cell. Groundwater parameters tested in the field were Dissolved Oxygen (DO), Electrical Conductivity (EC), Redox, Temperature and pH. The measured parameters were recorded onto a field data sheet (**Appendix C**), along with the purged water volume at the time of measurement. Groundwater sampling was performed when three consecutive readings of groundwater parameter indicated stabilisation; as per the specified ranges detailed below: • Electrical Conductivity: ± 3% of the read value; • Redox: ± 20 mV; • DO: ± 20% of the read value; and • pH: ± 0.2 pH unit. Total water volume purged and stabilised groundwater parameters at each groundwater monitoring well are summarised in in **Table 9-3**.

Activity/Item	**Details**
Decontamination Procedure	Decontamination was not required on the pump bladder and delivery tube of the MicroPurge System as they were dedicated to each groundwater monitoring well. The remainder of the MicroPurge system, the interface probe and the water quality meter were decontaminated with a solution of potable water and Decon 90. This was followed by rinsing with potable water, then a final rinse with de-ionised rinsate water supplied by the primary laboratory between each sampling location.
Sample Preservation	Sample containers were supplied by the laboratory with the following preservatives: • one, 1 litre amber glass, acid-washed and solvent-rinsed bottle; • two, 40ml glass vials, pre-preserved with dilute hydrochloric acid, Teflon-sealed; and • one, 250mL, HDPE bottle, pre-preserved with dilute nitric acid (1 mL). Samples for metals analysis were field-filtered using 0.45 µm pore-size filters. All containers were filled with sample to the brim then capped and stored in ice-filled chests, until completion of the fieldwork and during sample transit to the laboratory.
Quality Control & Laboratory Analysis	All groundwater samples were submitted for analysis of previously-identified chemicals of concern by SGS Laboratories (SGS). QA/QC testing comprised intra-laboratory duplicates ('field duplicates') tested blind by SGS and an inter-laboratory field duplicate tested blind by Envirolab Services (Envirolab). All samples were transported under strict Chain-of-Custody (COC) conditions and COC certificates and laboratory sample receipt documentation were provided to EI for confirmation purposes.
Sample Transport	After sampling, refrigerated sample chests were transported to SGS Australia Pty Ltd using strict Chain-of-Custody (COC) procedures. Inter-laboratory duplicate (ILD) samples were forwarded to Envirolab Services Pty Ltd (Envirolab) for QA/QC analysis. A Sample Receipt Advice (SRA) was provided by each laboratory to document sample condition upon receipt. Copies of SRA and COC certificates are presented in **Appendix D**.

8. DATA QUALITY ASSESSMENT

The assessment of data quality is defined as the scientific and statistical evaluation of environmental data to determine if these data meet the objectives of the project (Ref. USEPA 2006). Data quality assessment includes an evaluation of the compliance of the field sampling and laboratory analytical procedures and an assessment of the accuracy and precision of these data from the laboratory quality control measurements obtained.

The data quality assessment process for this assessment included a review of analytical procedures to confirm compliance with established laboratory protocols and an assessment of the accuracy and precision of analytical data from a range of quality control measurements. The QC measures generated from the field sampling and analytical program were as follows:

- suitable records of fieldwork observations including borehole logs;
- relevant and appropriate sampling plan (density, type, and location);
- use of approved and appropriate sampling methods;
- preservation and storage of samples upon collection and during transport to the laboratory;
- complete field and analytical laboratory sample COC procedures and documentation;
- sample holding times within acceptable limits;
- use of appropriate analytical procedures and NATA-accredited laboratories; and
- required LOR (to allow for comparison with adopted IL);
- frequency of conducting quality control measurements;
- laboratory blanks;
- field duplicates;
- laboratory duplicates;
- matrix spike/matrix spike duplicates (MS/MSDs);
- surrogates (or System Monitoring Compounds);
- analytical results for replicated samples, including field and laboratory duplicates and inter-laboratory duplicates, expressed as Relative Percentage Difference (RPD); and
- checking for the occurrence of apparently unusual or anomalous results, e.g. laboratory results that appear to be inconsistent with field observations or measurements.

The findings of the data quality assessment in relation to the soil and groundwater investigations at the site are discussed in detail in **Appendix E**. QA/QC policies and DQOs are presented in **Appendix F**.

On the basis of the analytical data validation procedure employed the overall quality of the soil and groundwater analytical data produced for the site were considered to be of an acceptable standard for interpretive use.

9. RESULTS

9.1 SOIL INVESTIGATION RESULTS

9.1.1 Site Geology and Subsurface Conditions

The general site geology encountered during the drilling of the soil investigation boreholes, installation of monitoring wells may be described as a layer of anthropogenic filling overlying Botany Sands. The geological information obtained during the investigation is summarised in **Table 9-1** and borehole logs from these works are presented in **Appendix B**.

Table 9-1 Generalised Subsurface Profile (m bgl)

Material	Depth (mBGL)+	General Description
Fill	0.0 to max 1.7+	Concrete or bitumen hardstand overlying: SAND, fine to medium grained, brown, trace fine grained gravel, moist, no odour. Gravelly Clayey SAND, fine to medium grained, orange / grey, gravel is coarse grained, moist, no odour.
Aeolian	0.5 to max 6.0+	SAND, fine to medium grained, brown / grey, no odour.

Notes: + Termination depth of borehole

9.1.2 Field Observations and PID Results

Soil samples were obtained from the test bores at various depths ranging between 0.0 m to 1.1 m bgl. All examined soil samples were evaluated on a qualitative basis for odour and visual signs of contamination (e.g. hydrocarbon odours, oil staining, petrochemical filming, asbestos fragments, ash, charcoal) and the following observations were noted:

- No visual or olfactory evidence of hydrocarbon impacts were noted at any of the borehole locations investigated during this assessment;
- No fibrous cement sheeting, ash, charcoal or slag was observed in any of the examined fill soils;
- No asbestos containing material was observed in any examined fill soils; and
- Low VOC concentrations ranging from 0 to 1.1 parts per million (ppm) were detected in soil headspace samples, which were field-screened using a portable PID fitted with a 10.9 eV lamp. The PID results are shown in the borehole logs (**Appendix B**).

9.2 GROUNDWATER INVESTIGATION RESULTS

9.2.1 Monitoring Well Construction

A total of three groundwater monitoring wells were installed across during ADSI drilling works (BH202M, BH203M and BH205M). These complimented three groundwater monitoring wells (MW1, MW2 and MW3) installed during initial DSI drilling works (EI, 2014). All monitoring locations were

screened in =Botany Sands. Well construction details for the installed groundwater monitoring wells are summarised in **Table 9-2**.

Table 9-2 Monitoring Well Construction Details

Well ID	Bore Depth (m bgl)	RL (GL)	RL (TOC)	Screen Interval (m bgl)	Lithology Screened
MW1	4.799	18.750	18.570	1.799-4.799	Fill / Sand
MW2	5.005	19.405	19.305	2.005-5.005	Sand
MW3	5.005	18.380	18.280	1.904-4.904	Sand
BH202M	5.800	18.130	18.029	2.800-5.800	Sand
BH203M	6.000	18.870	18.770	3.000-6.000	Sand
BH205M	6.000	19.280	19.200	3.000-6.000	Sand

Notes:
m bgl = metres below ground level.
RL = Reduced Level – Surveyed elevation in metres relative to Australian Height Datum (m AHD).
GL = Ground Level
TOC = top of well casing
RL (TOC) = Surveyed elevation at TOC in m AHD.

9.2.2 Field Observations and Water Test Results

A single GME was conducted on all wells in 17 August, 2016. On this date, standing water levels (SWLs) were measured within each well prior to well purging, the results of which were recorded with well purge volumes and field-based water test results. A summary of the recorded field data is presented in **Table 9-3** and copies of the completed Field Data Sheets are included in **Appendix C**.

Table 9-3 Groundwater Field Data (GME date 17 August 2016)

Well ID	SWL (m BTOC)	RL (TOC)	WL† (m AHD)	Purge Volume (L)	DO (mg/L)	Field pH	Field EC (µS/cm)	Temp (°C)	Redox (mV)	Odours / Turbidity
MW1 *	Well	Dry	-	-	-	-	-	-	-	-
MW2 *	Well	-Dry	-	-	-	-	-	-	-	-
MW3	4.220	18.280	14.060	1.5	1.71	6.54	513	22.9	283.2	None / moderate
BH202M	4.290	18.029	13.739	1.5	2.01	6.37	417	23.29	288.1	None / moderate
BH203M	4.690	18.770	14.080	1.8	1.86	6.71	526	24.09	283.9	None / moderate
BH205M	4.950	19.200	14.250	2.0	1.59	5.72	1383	23.22	304.9	None / moderate

Notes:
GME – Groundwater monitoring event.
SWL – Standing Water Levels as measured from TOC (top of well casing) prior to groundwater sampling.
m BTOC – metres below top of well casing
RL (TOC) – Reduced Level, elevation at TOC in metres relative to Australian Height Datum (m AHD).
† WL = Calculated groundwater level, in m AHD (calculated as RL(TOC) – SWL) Note: these values were used for groundwater flow direction analysis
L – litres (referring to volume of water purged from the well prior to groundwater sample collection).
EC – groundwater electrical conductivity as measured onsite using portable EC meter.
µS/cm – micro Siemens per centimetre (EC units).
DO – Dissolved Oxygen in units of milligrams per litre (mg/L)
All groundwater parameters (pH, EC and DO) were tested on site.
* Well found dry

With reference to **Table 9-3**, the field pH data indicated that the groundwater was slightly acidic (pH ranged from 5.72 to 6.54) with oxidising conditions present. Electrical Conductivity (EC) measurements were recorded in the range 417 to 1383 µS/cm indicating that the groundwater was fresh to marginal in terms of water salinity.

Based on standing water levels the groundwater flow direction is to the south south easterly. This finding was not consistent with the regional flow direction due to extensive dewatering occurring on neighbouring properties. Based on available literature and the findings of the DSI (EI, 2014) natural groundwater flow is to south west.

9.3 LABORATORY ANALYTICAL RESULTS

9.3.1 Soil Analytical Results

A summary of laboratory results showing test sample quantities, minimum/maximum analyte concentrations and samples found to exceed the SILs, is presented in **Table 9-4**. More detailed tabulations of results showing the tested concentrations for individual samples alongside the adopted soil criteria are presented in **Tables T2** to **T6** at the end of this report. Completed documentation used to track soil sample movements and laboratory receipt (i.e. COC and SRA forms) are copied in **Appendix D** and all laboratory analytical reports for tested soil samples are presented in **Appendix E**.

Table 9-4 Summary of Soil Analytical Results

No. of Primary Samples	Analyte	Min. Conc. (mg/kg)	Max. Conc. (mg/kg)	Sample Locations Exceeding Investigation Levels *
Heavy Metals				
13	Arsenic	<3	3	None
13	Cadmium	<0.3	<0.3	None
13	Chromium (Total)	0.8	4.5	None
13	Copper	<0.5	15	None
13	Lead	1	36	None
13	Nickel	<0.5	7.6	None
13	Zinc	0.9	120	None
13	Mercury	<0.05	<0.05	None
TRHs (including BTEX)				
13	TRH C_6-C_{10} minus BTEX (F1)	<25	<25	None
13	TRH >C_{10}-C_{16} (F2) minus Naphthalene	<25	<25	None
13	TRH >C_{16}-C_{34} (F3)	<90	<90	None
13	TRH >C_{34}-C_{40} (F4)	<120	<120	None
13	Benzene	<0.1	<0.1	None
13	Toluene	<0.1	<0.1	None
13	Ethylbenzene	<0.1	<0.1	None
13	Total Xylenes	<0.3	<0.3	None
13	Naphthalene	<0.1	<0.1	None
PAHs				
13	Benzo(a)pyrene	<0.1	0.1	None
13	Carcinogenic PAHs	<0.3	<0.3	None
13	Total PAHs	<0.8	1.5	None
Phenols				
7	Total Phenols	0.2	1.1	None
Asbestos (Concentrations in %w/w)				
7	Asbestos	ND	ND	None
OCPs				
7	OCP compounds	ND	ND	None
OPPs				
7	Total OPPs	ND	ND	None
PCBs				
7	Total PCBs	<1	<1	None
VOCs				
7	VOC compounds	ND	ND	None

With reference to **Tables T2 to T6** and **Table 9-4**, heavy metals, TRH, BTEX, PAH, OCP, OPP, PCB, Phenols and VOC concentrations were below the corresponding health based and ecological based SILs.

9.3.2 Groundwater Analytical Results

Laboratory analytical results for groundwater samples are summarised in **Tables T7**, which also include the adopted GILs. Exceedances of the adopted groundwater criterions are summarised in **Table 9-5**. Completed documentation used to track groundwater sample movements and laboratory receipt (COC and SRA forms) are copied in **Appendix I**. Copies of the laboratory analytical reports are attached in **Appendix J**.

Table 9-5 Summary of Groundwater Analytical Results

No. of Primary Samples	Analyte	Min. Conc. (mg/kg)	Max. Conc. (mg/kg)	Sample Locations Exceeding Investigation Levels *
Heavy Metals				
4	Arsenic	<1	4	None
4	Cadmium	<0.1	<0.1	None
4	Chromium (Total)	<1	1	None
4	Copper	3	5	MW4 - 3 µg/L BH202M – 3 µg/L BH203M – 5 µg/L BH205M – 3 µg/L
4	Lead	<1	<1	None
4	Nickel	<1	15	BH205M – 15 µg/L
4	Zinc	<5	59	MW4 - 19 µg/L BH205M – 59 µg/L
4	Mercury	<0.1	<0.1	None
TRHs (including BTEX)				
4	TRH C_6-C_{10} minus BTEX (F1)	<50	260	None
4	TRH >C_{10}-C_{16} (F2) minus Naphthalene	<60	<60	None
4	TRH >C_{16}-C_{34} (F3)	<500	<500	None
4	TRH >C_{34}-C_{40} (F4)	<500	<500	None
4	Benzene	<0.5	<0.5	None
4	Toluene	<0.5	<0.5	None
4	Ethylbenzene	<0.5	<0.5	None
4	Total Xylenes	<1.5	<1.5	None
PAHs				
4	Naphthalene	0.2	0.6	None
4	Total PAHs	<1	<1	None
Phenols				
4	Total Phenols	<10	<10	None

No. of Primary Samples	Analyte	Min. Conc. (mg/kg)	Max. Conc. (mg/kg)	Sample Locations Exceeding Investigation Levels *
VOCs				
4	Vinyl chloride (Chloroethene)	<0.3	2.1	None
4	cis-1,2-dichloroethene	<0.5	8.1	None
4	Trichloroethene (Trichloroethylene,TCE)	<0.5	36	None
4	Tetrachloroethene (Perchloroethylene,PCE)	<0.5	64	BH205M – 64 µg/L
4	Other VOC compounds	ND	ND	None

With reference to **Table T7** and **Table 9-5**, all heavy metals, TRH, BTEX, PAH, Phenols and VOC concentrations were below the corresponding health based and ecological based GILs with the exception of:

- Copper in all monitoring wells (range 3 – 5 µg/L) which exceeded the GIL of 1.3 µg/L.
- Nickel in BH205M (15 µg/L) which exceeded the GIL of 7 µg/L.
- Zinc in MW1 (19 µg/L) and BH205M (59 µg/L) which exceeded the GIL of 15 µg/L.
- PCE in BH205M (64 µg/L) which exceeded the GIL of 50 µg/L.

10. SITE CHARACTERISATION

10.1 ADDITIONAL SOIL CHARACTERISATION

On review of the soil results it appears that the concentrations of fill and natural soils are below the adopted SILs at the targeted borehole locations selected. As such, soils beneath the heritage building are considered suitable for the proposed residential use with minimal opportunities to soil access land use. Soils in the vicinity of BH2M, which is located in a proposed landscaping area, reported concentrations of the tested analytes below the adopted human health and ecological SILs for public open spaces.

10.2 ADDITIONAL GROUNDWATER CHARACTERISATION

An additional groundwater assessment was undertaken to characterise groundwater quality at the site, including on the northern (12-12 Rothschild Avenue) and southern portions (24 Rothschild Avenue) of the site. Characterisation of groundwater in the vicinity of the abandoned UST on the north western portion and up-gradient of 24 Rothschild Avenue could not be achieved due to a deeper buried concrete slab resulting in refusal during drilling works at BH201M and BH204M.

On review of the available groundwater results, the concentrations reported in groundwater are below the adopted ANZECC 2000 water quality guidelines for marine water ecosystems and adopted human health criteria with the exception of metals (copper, nickel and zinc) and PCE.

Concentrations of copper, nickel and zinc, were generally low and considered representative of background groundwater concentrations given there are no known sources of these metals within natural site soils and similar concentrations were evident within both up-gradient and down-gradient wells. Elevated metals in soil previously identified during the DSI (EI, 2014) were limited to the fill material as no elevated concentration identified in natural soils. This demonstrates that metals in fill had not leached into the natural soils and then groundwater. The reported concentrations of metals reported in groundwater are typical of an urban/industrial environment such as the Botany area and are considered to represent background conditions.

As discussed in **Section 9.3**, low concentration of various VOC compounds were reported in groundwater. The highest VOC concentrations were reported in up-gradient well BH205M, including a PCE Concentration at BH205M (64µg/L) above the adopted marine criteria (50 µg/L), and likely sourced from an off-site location. Given the nearest down-gradient receiving waters at the site, Alexandra Canal located 1.3 km south west of the site, it is considered that the reported VOC concentrations in groundwater will unlikely be present at the point of exposure and therefore are considered a low environmental risk. The human health risk to neighbouring sites are also considered low as the site and surrounding properties are situated in Management Zone 2 of the Botany Sand Aquifer in which extraction of groundwater for domestic purposes is prohibited.

EI consider the low concentrations of VOC compounds reported in groundwater is a low human health risk via vapour intrusion for future site users including residents, construction workers, maintenance and commercial workers. However due to the presence of chlorinated solvents in groundwater and the taking into consideration the site history, the need for future soil vapour sampling and subsequent risk assessment should be addressed in the Remediation Action Plan.

Overall the additional groundwater investigation suggested that groundwater quality at the site is suitable for the proposed development, however further groundwater characterisation in the vicinity of

the abandoned UST must be considered should residual contamination be observed during remediation of the UST.

10.3 REVIEW OF CONCEPTUAL SITE MODEL

On the basis of investigation findings the CSM, discussed in **Section 5,** was considered to have appropriately identified contamination sources, migration mechanisms and exposure pathways, as well as potential onsite and offsite receptors. Previously known data gaps, as outlined in **Section 5.4** have largely been addressed; however a further assessment of risks posed by potential groundwater contamination in the vicinity of the UST on the north eastern portion of the site must be undertaken should residual impacts are evident following UST removal.

11. CONCLUSIONS

The property located at 12 - 22 & 24 Rothschild Avenue, Rosebery NSW, was the subject of an Additional Site Investigation for further characterisation purposes. Based on the findings of this assessment it was concluded that:

- The site comprised a broadly rectangular shaped block, covering a total area of approximately 0.84 hectares (8,403.3 m^2). The site was bound by Rothschild Avenue to the east, Cressy Street to the south, Mentmore Avenue to the west, with residential and industrial buildings to the north;

- Current site use is predominantly commercial and light industrial;

- A review of Planning Street Cards available on the City of Sydney Council website, suggested the former site uses consisted of a variety of commercial and industrial activities including machinery merchants, timber storage, auto wiring and cables manufacturing, plywood manufacturing, assemblage of sheet metal, manufacturing electrical water heaters and used as a depot. Other key findings include; a 5000 gallon petrol tank installed in the mid 1970's, an electrical substation was present in the late 70's, and new roof sheeting was installed in 1982. Street planning cards were generally consistent with the previous site history survey undertaken (EI, 2014);

- Soil sampling and analysis were conducted at seven (7) targeted test bore locations (BH202M, BH206, BH207, BH208, BH209, BH210 and BH211) down to a maximum drilling depth of 5.8m BGL. These borehole locations targeted areas not previously accessible during initial DSI works (EI, 2014), including the heritage building located at 24 Rothschild Avenue;

- Three (3) additional groundwater wells were installed and sampled at targeted locations within the site, including up-gradient location along northern boundary (BH205M), central portion of 12-22 Rothschild Avenue (BH203M), and down-gradient location at 24 Rothschild Avenue (BH202M). Due to a buried concrete slabs in the vicinity of the abandoned UST and up-gradient of 24 Rothschild Avenue, groundwater wells BH201M and BH204M could not be installed due to drilling rig refusal;

- The sub-surface layers comprised of fill materials of various constituents, comprising brown sands and sandy clays, underlain by Botany Sands;

- Groundwater was encountered at depths ranging from 4.22 to 4.95 meters below ground level. Former monitoring wells MW1 and MW2 were found dry (likely siltation);

- Results of soil samples collected from soil test boreholes reported concentrations of the selected analytes to be below the adopted human health based and ecological based SILs;

- Results of the groundwater samples collected from the newly installed wells (BH202M, BH203M and BH205M) and previous monitoring well (MW3) reported concentrations of the selected analytes to be below the adopted marine and human health based GILs, with the exception of various heavy metals (copper, nickel and zinc) and PCE. Concentrations of copper, nickel and zinc, were generally low and considered reflective of background groundwater concentrations;

- EI consider the low concentrations of VOC compounds reported in groundwater is a low human health risk via vapour intrusion for future site users including residents, construction workers, maintenance and commercial workers. However due to the presence of chlorinated solvents in groundwater and the taking into consideration the site history, the need for future soil vapour sampling and subsequent risk assessment should be addressed in the Remediation Action Plan.

- On the basis of investigation findings the preliminary CSM discussed in **Section 5** was considered to have appropriately identified contamination sources, migration mechanisms and exposure pathways, as well as potential onsite and offsite receptors. Previously known data gaps outlined in **Section 5.4** have largely been addressed; however a further assessment of risks posed by potential groundwater contamination in the vicinity of the UST on the north eastern portion of the site must be undertaken should residual impacts be evident following UST removal.

Based on the findings of this report and with consideration of the Statement of Limitations (**Section 12**), EI concludes that widespread contamination was not identified at targeted locations investigated in this additional investigation, which augmented the initial DSI. Soil concentrations reported in this ADSI did not exceed the adopted human health and ecological based SILs and groundwater concentrations did not exceed quality criteria at investigated locations at the site. It is concluded that the site can be remediated for proposed residential use following the preparation and implementation of a Remediation Action Plan. The RAP will also need to consider the findings of the initial DSI (EI, 2014).

12. RECOMMENDATIONS

In view of the above findings and in accordance with the NEPM 2013 guidelines, it is considered that the site will be made suitable for the proposed residential development on completion of the following recommendations:

- Preparation and implementation of a Remediation Action Plan to outline the removal of the impacted fill material identified in the initial DSI (EI, 2014) and the identified abandoned UST. The RAP should also consider the need for further groundwater characterisation in the vicinity of the abandoned UST should residual contamination be observed during remediation of the UST. The RAP should also consider the need for future soil vapour testing and subsequent risk assessment.

- Any material being removed from site (including virgin excavated natural materials or VENM) should be classified for off-site disposal in accordance the EPA (2014) Waste Classification Guidelines.

- Any material being imported to the site should be assessed for potential contamination in accordance with NSW EPA guidelines as being suitable for the intended use or be classified as VENM.

- Validate that the excavated areas are left free of contamination by comparing analytical results for excavation surfaces and any backfill material, against the respective EPA thresholds.

- Preparation of a final site validation report by a qualified environmental consultant, certifying the suitability of the site for the proposed development.

13. STATEMENT OF LIMITATIONS

The findings presented in this report are the result of discrete and specific sampling methodologies used in accordance with best industry practices and standards. Due to the site-specific nature of soil sampling from point locations, it is considered likely that all variations in subsurface conditions across a site cannot be fully defined, no matter how comprehensive the field investigation program.

While normal assessments of data reliability have been made, EI assumes no responsibility or liability for errors in any data obtained from previous assessments conducted on site, regulatory agencies (e.g. Council, EPA), statements from sources outside of EI, or developments resulting from situations outside the scope of works of this project.

Despite all reasonable care and diligence, the ground conditions encountered and concentrations of contaminants measured may not be representative of conditions between the locations sampled and investigated. In addition, site characteristics may change at any time in response to variations in natural conditions, chemical reactions and other events, e.g. groundwater movement and or spillages of contaminating substances. These changes may occur subsequent to EI's investigations and assessment.

EI's assessment is necessarily based upon the result of the site investigation and the restricted program of surface and subsurface sampling, screening and chemical testing which was set out in the proposal. Neither EI, nor any other reputable consultant, can provide unqualified warranties nor does EI assume any liability for site conditions not observed or accessible during the time of the investigations.

This report was prepared for the above named client and no responsibility is accepted for use of any part of this report in any other context or for any other purpose or by other third parties. This report does not purport to provide legal advice.

This report and associated documents remain the property of EI subject to payment of all fees due for this assessment. The report shall not be reproduced except in full and with prior written permission by EI.

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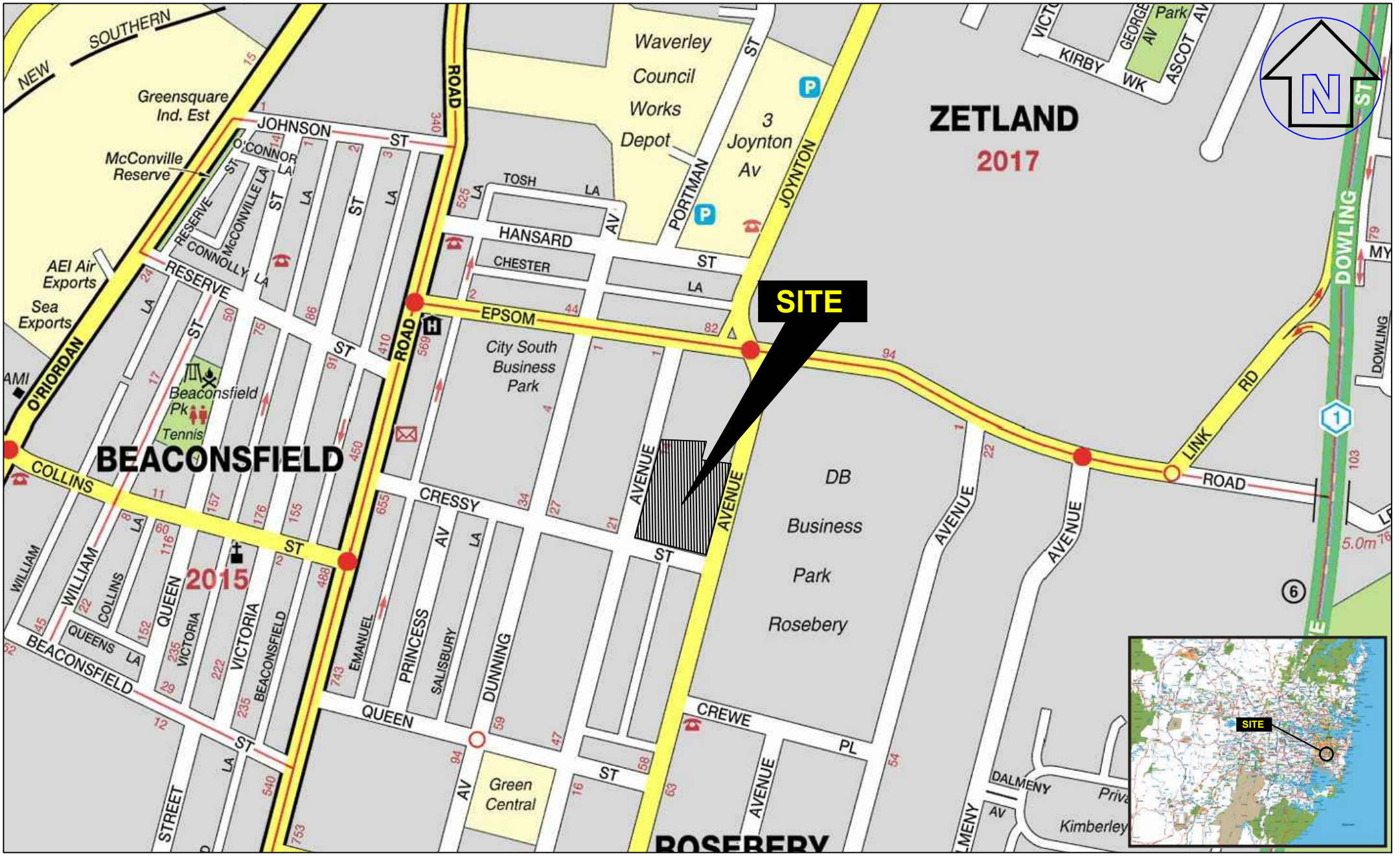
ABBREVIATIONS

ACM	Asbestos-containing materials
ASS	Acid sulfate soils
ANZECC	Australian and New Zealand Environment Conservation Council
ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand
B(a)P	Benzo(a)Pyrene (a PAH compound), - B(a)P TEQ Toxicity Equivalent Quotient
BH	Borehole
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
COC	Chain of Custody
cVOCs	Chlorinated Volatile Organic Compounds (a sub-set of the VOC analysis suite)
DEC	Department of Environment and Conservation, NSW (see OEH)
DECC	Department of Environment and Climate Change, NSW (see OEH)
DECCW	Department of Environment, Climate Change and Water, NSW (see OEH)
DA	Development Application
DO	Dissolved Oxygen
DP	Deposited Plan
EC	Electrical Conductivity
Eh	Redox potential
EPA	Environment Protection Authority
EMP	Environmental Management Plan
F1	TRH C_6 – C_{10} less the sum of BTEX concentrations (Ref. NEPM 2013, Schedule B1)
F2	TRH >C_{10} – C_{16} less the concentration of naphthalene (Ref. NEPM 2013, Schedule B1)
GIL	Groundwater Investigation Level
GME	Groundwater Monitoring Event
HIL	Health-based Investigation Level
HSL	Health-based Screening Level
km	Kilometres
LNAPL	Light, non-aqueous phase liquid (also referred to as PSH)
DNAPL	Dense, non-aqueous phase liquid
EIL	Ecological Investigation Level
ESL	Ecological Screening Level
m	Metres
m AHD	Metres Australian Height Datum
m BGL	Metres Below Ground Level
mg/m^3	Milligrams per cubic metre
mg/L	Milligrams per litre
µg/L	Micrograms per litre
mV	Millivolts
MW	Monitoring well
NATA	National Association of Testing Authorities, Australia
NEPC	National Environmental Protection Council
NSW	New South Wales
OEH	Office of Environment and Heritage, NSW (formerly DEC, DECC, DECCW)
PAHs	Polycyclic Aromatic Hydrocarbons
pH	Measure of the acidity or basicity of an aqueous solution
PSH	Phase-separated hydrocarbons (also referred to as LNAPL)
PQL	Practical Quantitation Limit (limit of detection for respective laboratory instruments)
QA/QC	Quality Assurance / Quality Control

RAP	Remediation Action Plan
SRA	Sample receipt advice (document confirming laboratory receipt of samples)
SWL	Standing Water Level
TDS	Total dissolved solids (a measure of water salinity)
TCLP	Toxicity Characteristics Leaching Procedure
TPH	Total Petroleum Hydrocarbons (superseded term equivalent to TRH)
TRH	Total Recoverable Hydrocarbons (non-specific analysis of organic compounds)
UCL	Upper Confidence Limit of the mean
USEPA	United States Environmental Protection Agency
UPSS	Underground Petroleum Storage System
UST	Underground Storage Tank
VOCs	Volatile Organic Compounds (specific organic compounds which are volatile)

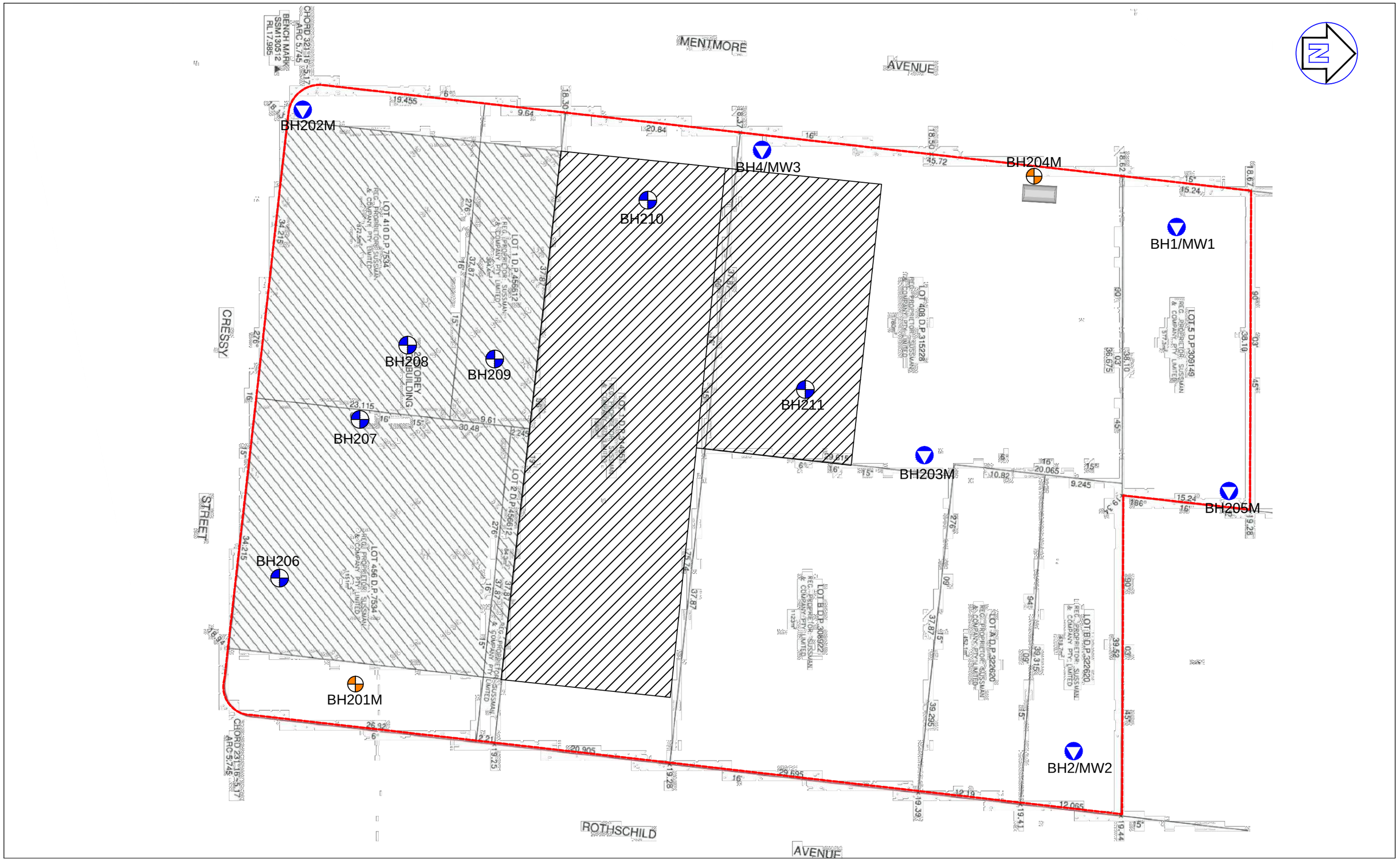
FIGURES



eiaustralia Contamination | Remediation | Geotechnical Suite 6.01, 55 Miller Street, PYRMONT 2009 Ph (02) 9516 0722 Fax (02) 9518 5088	Drawn:	EW	**MAVILLE PARK PTY LTD** ADDITIONAL SITE INVESTIGATION 12-24 ROTHSCHILD AVENUE, ROSEBERY NSW SITE LOCALITY PLAN
	Approved:	GB	
	Date:	05-09-16	
	Approx Scale:	N.T.S	

Figure:
1

Project: E22282 AB



LEGEND

- Borehole Locations
- Approx. Site Boundary
- Borehole/Monitoring Well Locations
- Approx. abandoned UST location
- Intended MW locations refused during drilling

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Date:	08-08-16
Approx Scale:	1:400 @ A3

SUSSMAN AND CO
ADDITIONAL SITE INVESTIGATION
12-24 ROTHSCHILD AVENUE,
ROSEBERY NSW
SAMPLING LOCATION PLAN

Figure:
2

Project: E22282 AB

BH202M (17/8/16)		
SWL	mAHD	13.4
Copper	ug/L	3

MW4 (16/8/14)		
SWL	mAHD	14.629
Copper	ug/L	4
Zinc	ug/L	21

MW4 (17/8/16)		
SWL	mAHD	14.060
Copper	ug/L	3
Zinc	ug/L	19

MW1 (17/8/16)		
SWL	mAHD	Dry

MW1 (16/8/14)		
SWL	mAHD	14.792
Copper	ug/L	7
Zinc	ug/L	21

BH205M (17/8/16)		
SWL	mAHD	14.250
Copper	ug/L	3
Nickel	ug/L	15
Zinc	ug/L	59
PCE	ug/L	64

MW2 (17/8/16)		
SWL	mAHD	Dry

BH203M (17/8/16)		
SWL	mAHD	14.080
Copper	ug/L	5

MW2 (16/8/14)		
SWL	mAHD	15.430
Copper	ug/L	4

BH202M
BH4/MW3
BH1/MW1
BH203M
BH205M
BH2/MW2

CRESSY STREET
ROTHSCHILD AVENUE

LEGEND

- Borehole Locations
- Approx. Site Boundary
- Borehole/Monitoring Well Locations
- Inferred groundwater flow direction
- Groundwater contours

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Drawn:	EW
Approved:	EG
Date:	16-02-17
Approx Scale:	1:400 @ A3

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ADDITIONAL SITE INVESTIGATION
12-24 ROTHSCHILD AVENUE,
ROSEBERY NSW
GROUNDWATER EXCEEDANCE AND INFERRED
GROUNDWATER FLOW DIRECTION PLAN

Figure: 3

Project: E22282 AB

TABLES

Table T1 - Soil and Groundwater Samples Register

Date Sampled	Sample ID	Sample Type	Matrix	Requested Analyses								Primary Laboratory SGS Batch No.	Secondary Laboratory Envirolab Batch No.
				Heavy Metals*	TRH	BTEX	PAH	OCP/PCB/OPP	Asbestos	VOCs	Phenols		
6/08/16	BH202_0.1-0.2	Primary	Soil	X	X	X	X	X	X	X	X	SE155671	-
	BH202_0.8-0.9			X	X	X	X						
	BH206_0.35-0.45			X	X	X	X	X	X	X	X		
	BH206_1.3-1.4			X	X	X	X						
	BH207_0.3-0.4			X	X	X	X	X	X	X	X		
	BH207_0.8-0.9			X	X	X	X						
	BH208_0.1-0.2			X	X	X	X	X	X	X	X		
	BH208_0.7-0.8			X	X	X	X						
	BH209_0.1-0.2			X	X	X	X	X	X	X	X		
	BH209_0.7-0.8			X	X	X	X						
	BH210_0.2-0.4			X	X	X	X	X	X	X	X		
	BH210_0.7-0.8			X	X	X	X						
	BH211_0.3-0.4			X	X	X	X	X	X	X			
	QD100	Duplicate of BH202_0.1-0.2		X	X	X							
	QT100			X	X	X						-	151436
17/08/14	MW3	Primary	Water	X	X	X	X			X	X	SE156129	-
	BH202M			X	X	X	X			X	X		
	BH203M			X	X	X	X			X	X		
	BH205M			X	X	X	X			X	X		
	GWQD1	Duplicate of BH205M		X	X	X							
	GWQT1			X	X	X						-	152056

Notes:

* Samples are only tested for selected heavy metals, which are Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, and Zinc.

Table T2 – Summary of Soil Investigation Results for Heavy Metals

Sample ID	Arsenic[1] (mg/kg)	Cadmium (mg/kg)	Chromium[2] (mg/kg)	Copper (mg/kg)	Lead[3] (mg/kg)	Mercury[4] (mg/kg)	Nickel (mg/kg)	Zinc (mg/kg)
BH202_0.1-0.2	3	<0.3	2	13	36	<0.05	*2*	120
BH202_0.8-0.9	<3	<0.3	2	8	3	<0.05	*1*	9
BH206_0.35-0.45	<3	<0.3	0.8	2.1	10	<0.05	<0.5	3
BH206_1.3-1.4	<3	<0.3	1.7	<0.5	1	<0.05	<0.5	1
BH207_0.3-0.4	<3	<0.3	2.7	1.8	4	<0.05	0.9	3.6
BH207_0.8-0.9	<3	<0.3	4.5	1.9	4	<0.05	1.4	4
BH208_0.1-0.2	<3	<0.3	3.6	15	33	<0.05	7.6	65
BH208_0.7-0.8	<3	<0.3	2.2	5.0	20	<0.05	2.2	34
BH209_0.1-0.2	<3	<0.3	1.4	1.8	5	<0.05	0.7	8
BH209_0.7-0.8	<3	<0.3	1.1	<0.5	1	<0.05	0.5	1.3
BH210_0.2-0.4	<3	<0.3	1.6	3.1	1	<0.05	0.5	0.9
BH210_0.7-0.8	<3	<0.3	1.6	0.8	2	<0.05	<0.5	1.2
BH211_0.3-0.4	<3	<0.3	2.4	4	6	<0.05	0.9	9.7
SILs								
HIL B	500	150	500	30000	1200	120[5]	1200	60000
HIL C	300	90	300	17000	600	80	1200	30000
EIL	100[5]	NR	205	90	1260	NR	35	190

Notes:

	Highlighted concentration value indicates exceedance of all adopted HILs.
XXX	Bolded value indicates concentration exceeds EIL.
SIL	Soil investigation levels. Land uses applicable to each SIL are listed in Section 7.3 of EI Report E22282 AA.
HIL	Health-based investigation levels (mg/kg) as per NEPM 1999 Schedule B1 2013 Amendment.
EIL	Ecological Investigation Levels (mg/kg) as per NEPM. As the physiochemical properties of soil onsite was not tested, the most stringent EIL values were adopted in this assessment.
NL	'Not Limiting' If the derived soil vapour limit exceeds the soil concentration at which the pore water phase cannot dissolve any more of the individual chemical, i.e. where the soil vapour is at equilibrium with the pore water, then the soil vapour source cannot exceed a level that would result in the maximum allowable vapour risk for the given scenario, therefore the limit is not limiting.
NR	No recommended soil assessment criteria are currently available for the indicated parameter(s).
1	Arsenic - HIL assumes 70% oral bioavailability. Site-specific bioavailability may be important and should be considered where appropriate (refer to NEPM 1999 Schedule B7 2013 Amendment).
2	HILs are for Chromium VI while EILs for Chromium III. Concentrations reported were total Chromium including both VI and III. Speciation of the compounds were not conducted as total Chromium were all under SILs.
3	Lead - HIL is based on blood lead models (IEUBK for HILs A, B and C and adult lead model for HIL D where 50% oral bioavailability has been considered. Site-specific bioavailability may be important and should be considered where appropriate.
4	Value shown is representative of inorganic mercury as provided in Table 1A(1) (refer to NEPM 1999 Schedule B1 2013 Amendment).
5	Aged values are applicable to arsenic contamination present in soil for at least two years. For fresh contamination refer to NEPM 1999 Schedule B5c 2013 Amendment.

Table T3 – Summary of Soil Investigation Results for TPH, BTEX, Naphthalene and VOCs

Sample ID	Depth (m below ground level)	Primary Soil Texture	Total Petroleum Hydrocarbons (mg/kg)				Benzene (mg/kg)	Toluene (mg/kg)	Ethyl benzene (mg/kg)	Total Xylenes (mg/kg)	Naphthalene (Volatile) (mg/kg)	VOCs (mg/kg)
			F1[1]	F2[2]	F3[3]	F4[4]						
BH202_0.1-0.2		FILL: Sand	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	<0.1	N.D.
BH202_0.8-0.9		Sand	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	<0.1	N.A.
BH206_0.35-0.45		FILL: Sand	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	<0.1	N.D.
BH206_1.3-1.4		Sand	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	<0.1	N.A.
BH207_0.3-0.4		FILL: Sand	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	<0.1	N.D.
BH207_0.8-0.9		FILL: Sand	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	<0.1	N.A.
BH208_0.1-0.2		FiLL: Sand	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	<0.1	N.D.
BH208_0.7-0.8		FILL: Sand	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	<0.1	N.A.
BH209_0.1-0.2		FILL: Sand	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	<0.1	N.D.
BH209_0.7-0.8		Sand	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	<0.1	N.A.
BH210_0.2-0.4		FILL: Sand	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	<0.1	N.D.
BH210_0.7-0.8		Sand	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	<0.1	N.A.
BH211_0.3-0.4		FILL: Sand	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	<0.1	N.D.
SILs												
HSL A & B (Sand)	0 m to <1 m	Sand	45	110	NR	NR	0.5	160	55	40	3	NR
	1 m to <2 m		70	240	NR	NR	0.5	220	NL	60	NL	NR
	2 m to <4 m		110	440	NR	NR	0.5	310	NL	95	NL	NR
HSLC (Sand)	0 m to <1 m	Sand	NL	NL	NR	NR	NL	NL	NL	NL	NL	NR
	1 m to <2 m		NL	NL	NR	NR	NL	NL	NL	NL	NL	NR
	2 m to <4 m		NL	NL	NR	NR	NL	NL	NL	NL	NL	NR
ESL A[5]		Coarse grained	180*	120*	300	2800	50	85	70	105	170	NR
		Fine grained			1300	5600	65	105	125	45		NR
Management Limits[6]		Coarse grained	700	1000	2500	10000	NL	NL	NL	NL	NR	NR
		Fine grained	800		3500		NL	NL	NL	NL		NR

Notes:

	Highlighted concentration value indicates exceedance of HSL A&B.
XXX	Bolded and italic value indicates concentration only exceeds EIL A.

SIL	Soil investigation levels. Land uses applicable to each SIL are listed in Section 7.3 of EI Report E22282 AA.
HSL	Health screening levels. HSLs for silty and clayey soils were not considered in this assessment as the soil texture encountered during the investigation were primarily sand.
ESL	Ecological screening levels (mg/kg). ESL A is SIL for urban residential and public open sapce developments, whereas ESL D is SIL for commercial and industrial developments.
Management limits	As per Table 1 B(7) in NEPM 1999 Schedule B1 2013 Amendment.
NL	'Not Limiting' If the derived soil vapour limit exceeds the soil concentration at which the pore water phase cannot dissolve any more of the individual chemical, i.e. where the soil vapour is at equilibrium with the pore water, then the soil vapour source cannot exceed a level that would result in the maximum allowable vapour risk for the given scenario, therefore the limit is not limiting.
NR	No recommended soil assessment criteria are currently available for the indicated parameter(s).
N.A.	Sample not tested for the analyte.
1	To obtain F1 subtract the sum of BTEX concentrations from the C6-C10 fraction.
2	To obtain F2 subtract naphthalene from the >C10-C16 fraction.
3	F3 refers to Total Recoverable Hydrocarbon >C16-C34.
4	F4 refers to Total Recoverable Hydrocarbon >C34-C40.
5	ESLs are of low reliability except where indicated by * which indicates that the ESL is of moderate reliability.
6	Management limits are applied after consideration of relevant ESLs and HSLs. BTEX and Naphtalene are not subtracted from the relevant fractions to obtain F1 and F2 when considering management limits.

Table T4 – Summary of Soil Investigation Results for PAH & Phenols

Sample ID	Polyaromatic Hydrocarbons (mg/kg)			Total Phenols (mg/kg)
	Carcinogenic PAHs (as Benzo[a]pyrene TEQ)	Benzo(a)pyrene	Total PAHs	
BH202_0.1-0.2	<0.3	<0.1	<0.8	1.1
BH202_0.8-0.9	<0.3	<0.1	<0.8	N.A.
BH206_0.35-0.45	<0.3	0.1	1.5	0.5
BH206_1.3-1.4	<0.3	<0.1	<0.8	N.A.
BH207_0.3-0.4	<0.3	<0.1	<0.8	0.2
BH207_0.8-0.9	<0.3	<0.1	<0.8	N.A.
BH208_0.1-0.2	<0.3	0.1	1.3	0.2
BH208_0.7-0.8	<0.3	0.1	1.4	N.A.
BH209_0.1-0.2	<0.3	<0.1	<0.8	0.2
BH209_0.7-0.8	<0.3	<0.1	<0.8	N.A.
BH210_0.2-0.4	<0.3	<0.1	<0.8	0.2
BH210_0.7-0.8	<0.3	<0.1	<0.8	N.A.
BH211_0.3-0.4	<0.3	<0.1	<0.8	0.4
SILs				
HIL B	4	NR	400	45000
HIL C	3	NR	300	40000
ESLs	NR	0.7	NR	NR

Notes:

	Highlighted concentration value indicates exceedance of HIL
XXX	Bolded value indicates concentration ESLs

SIL	Soil investigation levels. Land uses applicable to each SIL are listed in Section 7.3 of EI Report E22282 AA.
HIL	Health-based investigation levels (mg/kg).
ESL	Ecological screening levels (mg/kg) as per NEPM 1999 Schedule B1 2013 Amendment.
NR	No recommended soil assessment criteria are currently available for the indicated parameter(s).
NA	Sample not tested for the analyte.

Table T5 – Summary of Soil Investigation Results for OCPs, OPPs & PCBs

Sample ID	OCPs								Total OPPs (mg/kg)	Total PCBs (mg/kg)
	Aldrin (mg/kg)	Dieldrin (mg/kg)	Endrin (mg/kg)	Chlordane (mg/kg)	Heptachlor (mg/kg)	DDT (mg/kg)	DDD (mg/kg)	DDE (mg/kg)		
BH202_0.1-0.2	<0.1	<0.2	<0.2	<0.2	<0.1	<0.2	<0.2	<0.2	N.D.	<1
BH202_0.8-0.9	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
BH206_0.35-0.45	<0.1	<0.2	<0.2	<0.2	<0.1	<0.2	<0.2	<0.2	N.D.	<1
BH206_1.3-1.4	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
BH207_0.3-0.4	<0.1	<0.2	<0.2	<0.2	<0.1	<0.2	<0.2	<0.2	N.D.	<1
BH207_0.8-0.9	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
BH208_0.1-0.2	<0.1	<0.2	<0.2	<0.2	<0.1	<0.2	<0.2	<0.2	N.D.	<1
BH208_0.7-0.8	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
BH209_0.1-0.2	<0.1	<0.2	<0.2	<0.2	<0.1	<0.2	<0.2	<0.2	N.D.	<1
BH209_0.7-0.8	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
BH210_0.2-0.4	<0.1	<0.2	<0.2	<0.2	<0.1	<0.2	<0.2	<0.2	N.D.	<1
BH210_0.7-0.8	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
BH211_0.3-0.4	<0.1	<0.2	<0.2	<0.2	<0.1	<0.2	<0.2	<0.2	N.D.	<1
SILs										
HIL B	Total 10		20	90	10	Total 600			NR	1
HIL C	Total 10		20	70	10	Total 400			NR	1
EIL A	NR	NR	NR	NR	NR	180	NR	NR	NR	NR

Notes:

Highlighted concentration value indicates exceedance of all HILs.

SIL	Soil investigation levels. Land uses applicable to each SIL are listed in Section 7.3 of EI Report E22282 AA.
HIL	Health-based investigation levels (mg/kg).
EIL	Ecological Investigation Levels (mg/kg) as per NEPM.
NR	No recommended soil assessment criteria are currently available for the indicated parameter(s).
N.D.	Concentrations of all tested analytes in this group was under laboratory's practical quantifation limit.
N.A.	Sample not tested for analyte.
1	p,p'-DDT of concentration 0.1 mg/kg was dected in this sample.

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Table T6 – Summary of Soil Investigation Results for Asbestos

Sample ID	Asbestos (% w/w)
BH202_0.1-0.2	<0.01
BH202_0.8-0.9	N.A.
BH206_0.35-0.45	<0.01
BH206_1.3-1.4	N.A.
BH207_0.3-0.4	<0.01
BH207_0.8-0.9	N.A.
BH208_0.1-0.2	<0.01
BH208_0.7-0.8	N.A.
BH209_0.1-0.2	<0.01
BH209_0.7-0.8	N.A.
BH210_0.2-0.4	<0.01
BH210_0.7-0.8	N.A.
BH211_0.3-0.4	<0.01
SIL	
HSL	0.01%

Notes:

Highlighted concentration value indicates exceedance of HSL.

SIL	Soil investigation level.
HSL	Health screening level.

Table T7 – Summary of Groundwater Investigation Results

Sample ID	Heavy Metals								BTEX				TRHs				PAH		Total Phenols	VOCs				
	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	Benzene	Toluene	Ethylbenzene	Total Xylene	F1*	F2**	F3 (>C_{16}-C_{34})	F4 (>C_{34}-C_{40})	Naphthalene	Other PAHs		Vinyl chloride (Chloroethene)	cis-1,2-dichloroethene	Trichloroethene (Trichloroethylene,TCE)	Tetrachloroethene (Perchloroethylene,PCE)	Other VOCs
MW3	<1	<0.1	<1	3	<1	<0.1	<1	19	<0.5	<0.5	<0.5	<1.5	<50	<60	<500	<500	0.5	<1	<10	<0.3	<0.5	1.3	5.2	N.D.
202M	4	<0.1	<1	3	<1	<0.1	<1	<5	<0.5	<0.5	<0.5	<1.5	<50	<60	<500	<500	0.2	<1	<10	<0.3	<0.5	<0.5	<0.5	N.D.
203M	2	<0.1	1	5	<1	<0.1	<1	8	<0.5	<0.5	<0.5	<1.5	<50	<60	<500	<500	0.6	<1	<10	<0.3	<0.5	<0.5	4.7	N.D.
205M	<1	<0.1	1	3	<1	<0.1	15	59	<0.5	<0.5	<0.5	<1.5	260	<60	<500	<500	0.3	<1	<10	2.1	8.1	36	64	N.D.
GIL																								
GIL (Marine Waters)	NR	0.7[3]	27 (Cr III) 4.4 (Cr VI)	1.3	4.4	0.1[3]	7	15[1]	500[1]	NR	NR	NR	NR	NR	NR	NR	50	NR	400	3	60	NR	50	NR
HSL A & B [2]	NR	NR	NR	NR	NR	NR	NR	NR	800	NL	NL	NL	1000	1000	NR	NR	NR	NL	NR	NR	NR	NR	NR	NR
HSL C [2]	NR	NR	NR	NR	NR	NR	NR	NR	NL	NL	NL	NL	NL	NL	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

Notes: All results are in units of µg/L.

Highlighted concentration value indicates exceedance of adopted GILs.

GIL Groundwater Investigation Level. All GIL values sourced from *National Environment Protection (Assessment of Site Contamination) Measure 1999 – Amendment 2013* , *Schedule (B1)* - Guideline on Investigation Levels for Soil and Groundwater, (NEPC) Investigation levels apply to Marine Waters for typical slightly-moderately disturbed systems.

HSL Health-based Screening Level. Land uses applicable to each HSL are listed in Section 7.3 of EI Report E22282 AA.

NL 'Not Limiting' If the derived soil vapour limit exceeds the soil concentration at which the pore water phase cannot dissolve any more of the individual chemical, i.e. where the soil vapour is at equilibrium with the pore water, then the soil vapour source cannot exceed a level that would result in the maximum allowable vapour risk for the given scenario, therefore the limit is not limiting.

NR No recommended soil assessment criteria are currently available for the indicated parameter(s).

N.D. Concentrations of all tested analytes in this group was under laboratory's practical quantifation limit.

* To obtain F1 subtract the sum of BTEX concentrations from the C6-C10 fraction.

** To obtain F2 subtract Naphthalene from the >C10-C16 fraction.

1 Indicated threshold value may not protect key species from chronic toxicity, refer to ANZECC & ARMCANZ (2000) for further guidance.

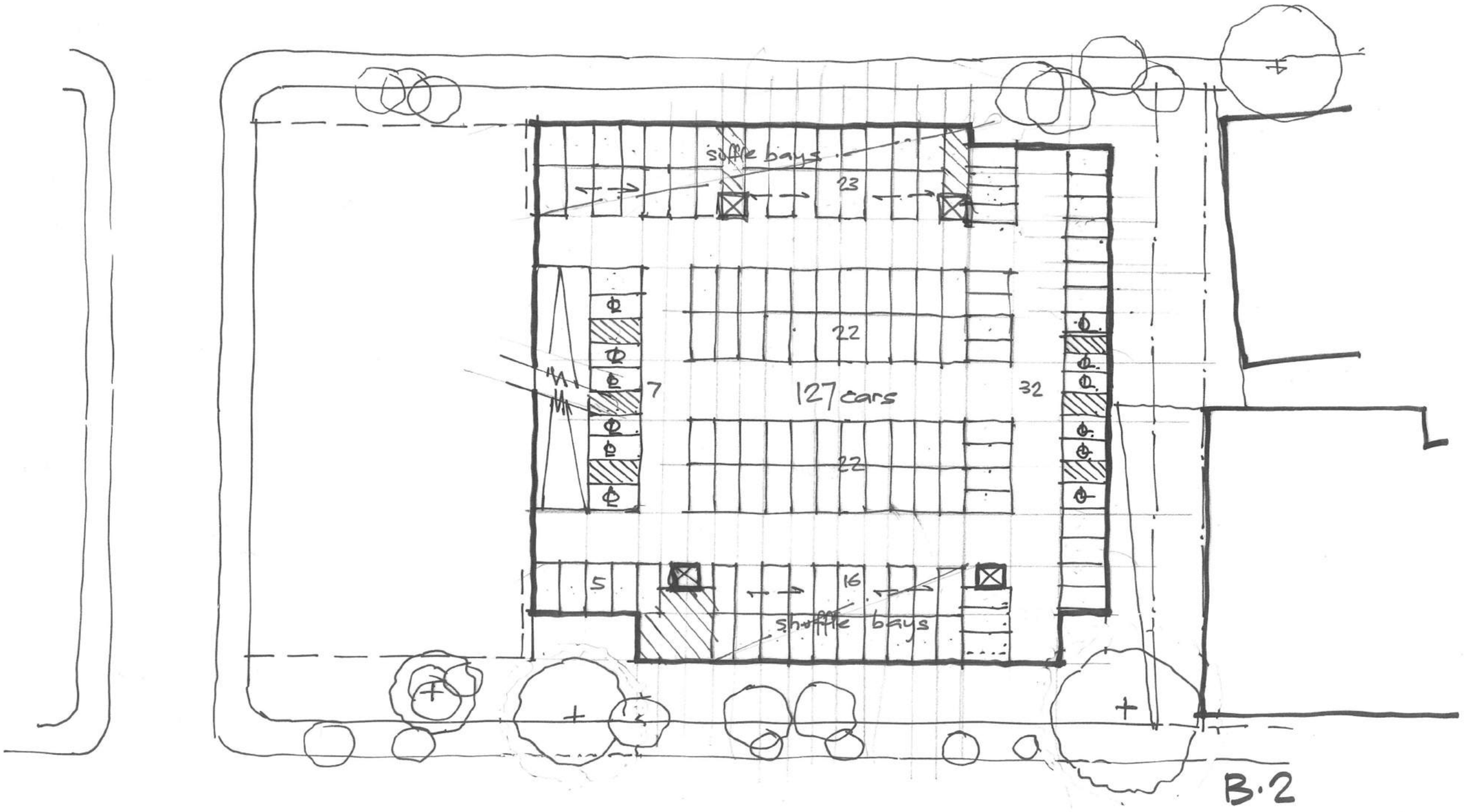
2 NEPC (2013) Table 1A(4) Groundwater HSL A & HSL B for vapour intrusion at the contaminant source depth ranges in sands 2m to <4m, which is consistent with the groundwater sampling depth.

3 Chemical for which possible bioaccumulation and secondary poisoning effects should be considered, refer to ANZECC & ARMCANZ (2000) for further guidance.

APPENDIX A

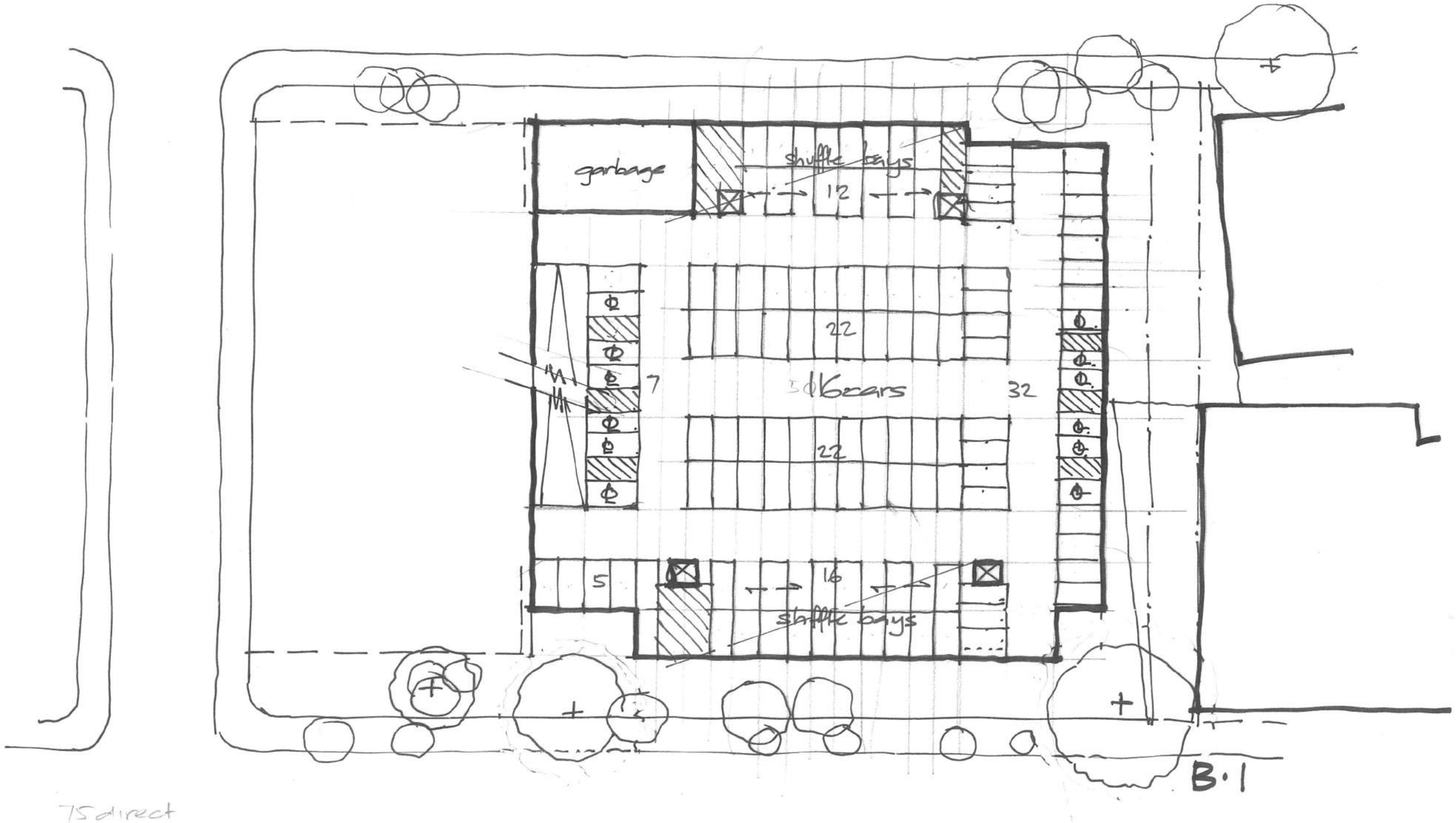
PROPOSED DEVELOPMENT SKETCH DRAWINGS

. OFFICE . CORE .



B.2

JPRA
JPR Architects Pty Ltd
Level 4, 50 Stanley St
East Sydney NSW 2010
T +61 2 9366 1133
ABN 52 255 001 003
www.jpra.com.au



75 direct
33 shuffle
108
12 H/C
120

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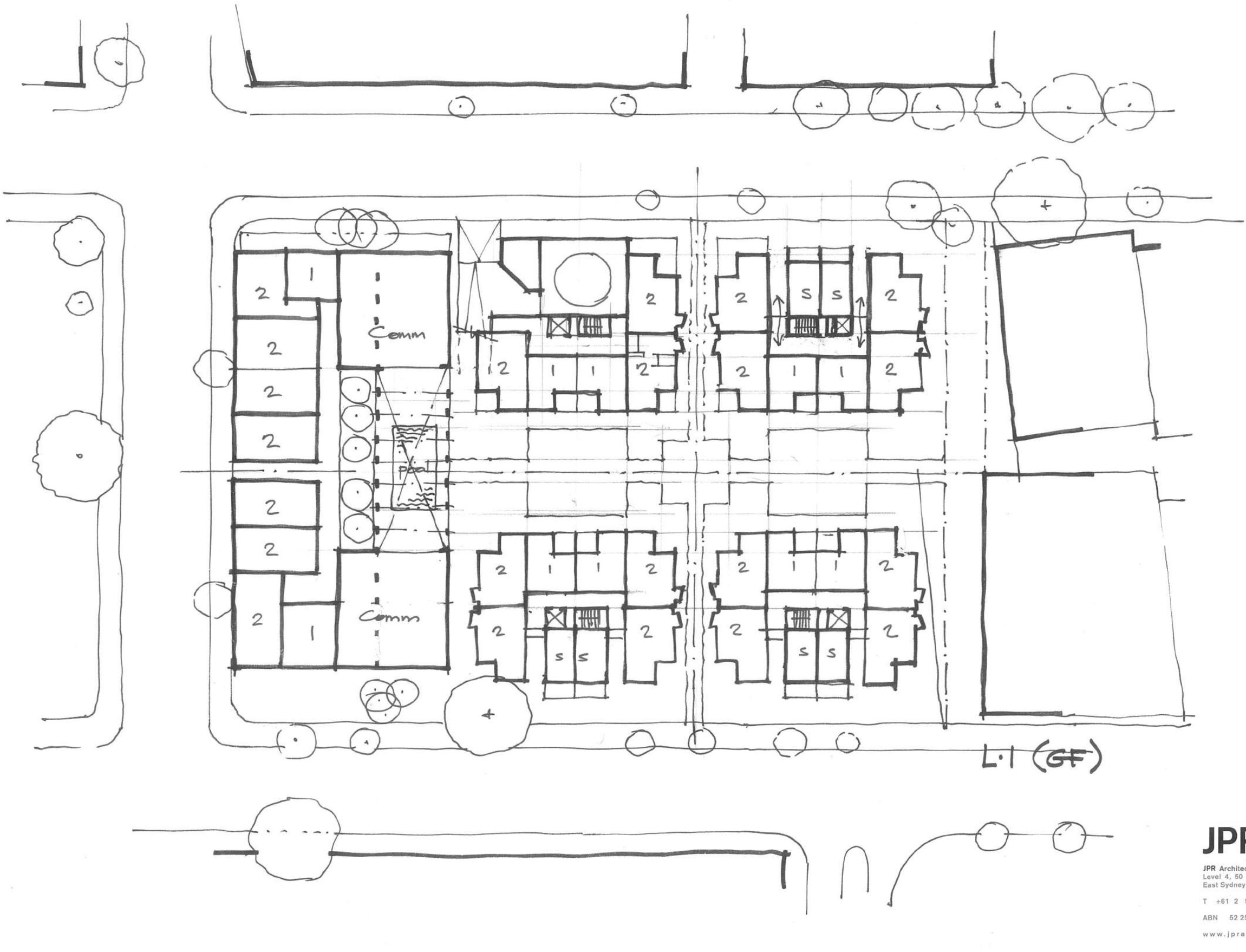

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ABN 52 255 001 003
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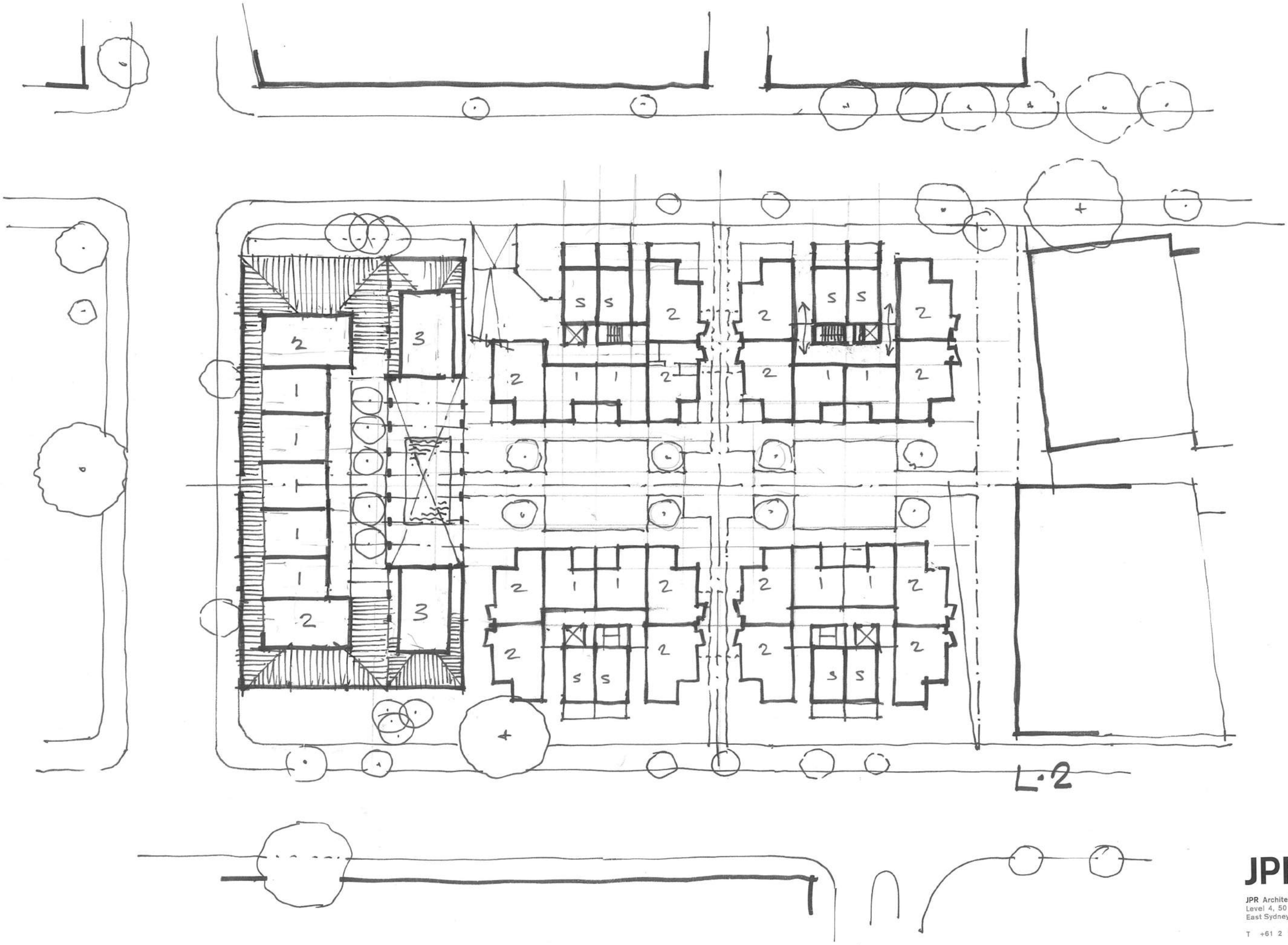

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L-3-6

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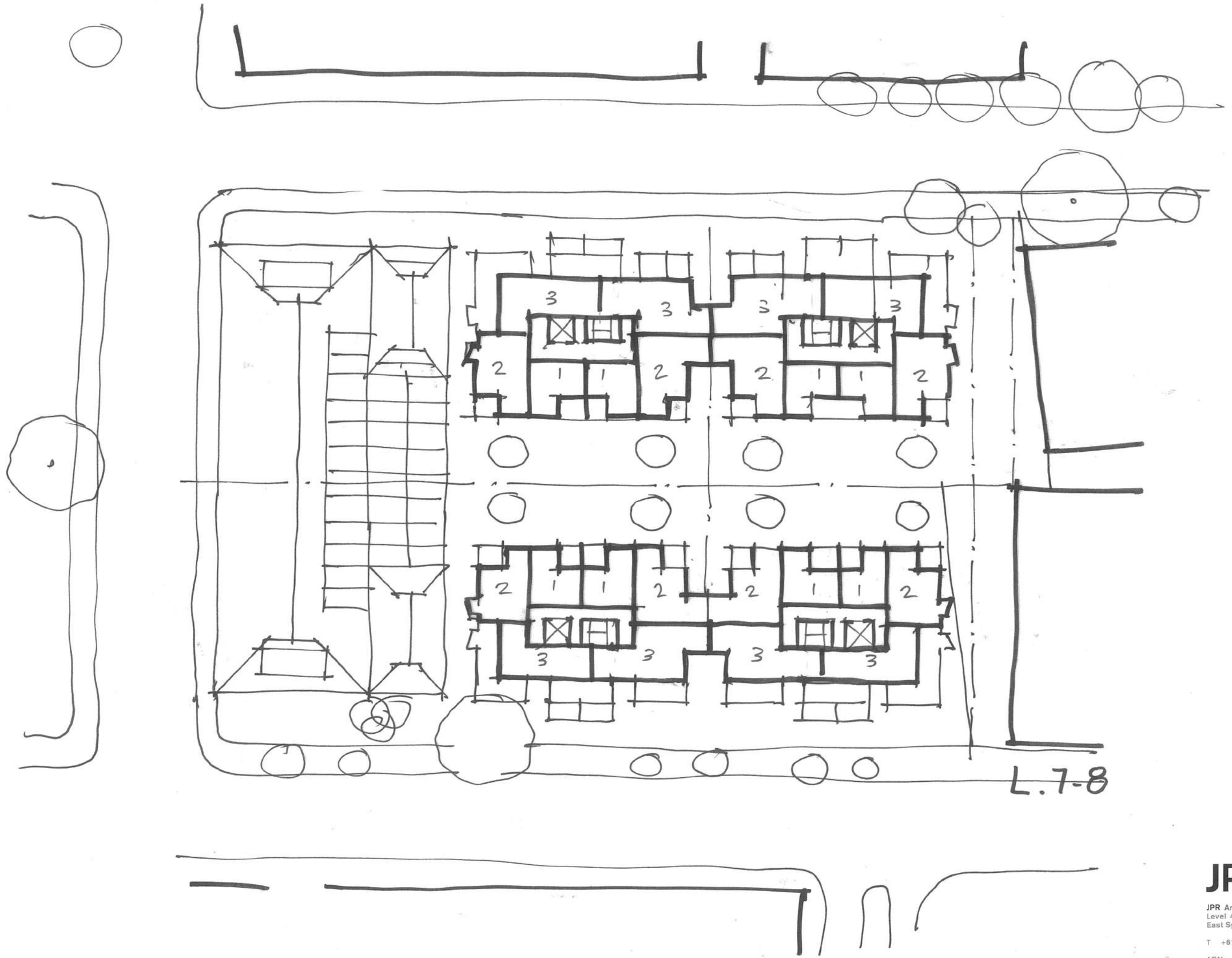

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APPENDIX B
Borehole Logs

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BOREHOLE: BH201M

eiaustralia
Contamination | Remediation | Geotechnical

Project	Mixed Residential and Commercial Building			Sheet	1 OF 1
Location	12-24 Rothschild Avenue, Rosebery, NSW			Date Started	6/8/16
Position	Refer to Figure 2			Date Completed	6/8/16
Job No.	E22282	Contractor	Hart Geo Pty Ltd	Logged BY/EW	Date:
Client	Maville Park Pty Ltd	Drill Rig	Ute Mounted	Checked EG	Date:
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
DT			0.0	0.20				-	Concrete Slab: 0.2 thickness			CONCRETE HARDSTAND
AD/T	-	GWNE	0.5					-	FILL: SAND, fine to medium grained, brown, trace fine grained gravel, moist, no odour.	-	-	FILL
			1.0	1.00					Hole Terminated at 1.00 m Refusal on burried concrete slab.			
			1.5									
			2.0									
			2.5									
			3.0									
			3.5									
			4.0									
			4.5									
			5.0									

This borehole log should be read in conjunction with Environmental Investigations Australia's accompanying standard notes.

BOREHOLE: BH202M

eiaustralia
Contamination | Remediation | Geotechnical

Project	Mixed Residential and Commercial Building			Sheet	1 OF 1
Location	12-24 Rothschild Avenue, Rosebery, NSW			Date Started	6/8/16
Position	Refer to Figure 2			Date Completed	6/8/16
Job No.	E22282	Contractor	BG Drilling Pty Ltd	Logged BY/EW	Date:
Client	Maville Park Pty Ltd	Drill Rig	Track Mounted	Checked EG	Date:
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	PIEZOMETER DETAILS ID / Static Water Level
AD/T	-	17/08/16	0		BH202M ES 0.10-0.20 m PID = 1 ppm			-	FILL: SAND; fine to medium grained, pale brown / brown.	-		BH202M: Gatic Cover; Concrete
				0.60	BH202M ES 0.50-0.60 m PID = 0.9 ppm			SP	SAND; fine to medium grained, grey-brown, no odour.			
			1		BH202M ES 0.80-0.90 m PID = 0.9 ppm							Cuttings; 1x uPVC 50 mm casing
			2		BH202M ES 1.80-1.90 m					M		Bentonite
			3								-	
			4									Sand
			5							W		1x uPVC 50 mm slotted screen
				5.80					Hole Terminated at 5.80 m Target depth reached. Borehole converted to monitoring well.			
			6									
			7									
			8									

This borehole log should be read in conjunction with Environmental Investigations Australia's accompanying standard notes.

BOREHOLE: BH203M

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Contamination | Remediation | Geotechnical

Project	Mixed Residential and Commercial Building			Sheet	1 OF 1
Location	12-24 Rothschild Avenue, Rosebery, NSW			Date Started	6/8/16
Position	Refer to Figure 2			Date Completed	6/8/16
Job No.	E22282	Contractor	Hart Geo Pty Ltd	Logged BY/EW	Date:
Client	Maville Park Pty Ltd	Drill Rig	Ute Mounted	Checked EG	Date:
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	PIEZOMETER DETAILS ID / Static Water Level
AD/T	-	17/08/16	0					-	Bitumen pavement			BH203M / BH203M
								-	FILL: SAND, fine to medium grained, brown, trace fine grained gravel, moist, no odour.	-		
				0.60				SP	SAND; fine to medium grained, grey-brown, no odour.	M	-	
			1									
			2									
			3									
			4									
			5							W		
			6	6.00					Hole Terminated at 6.00 m Target depth reached. Borehole converted to monitoring well.			
			7									
			8									

Gatic Cover
Concrete
Cuttings
1x uPVC 50 mm casing
Bentonite
1x uPVC 50 mm slotted screen
Sand

This borehole log should be read in conjunction with Environmental Investigations Australia's accompanying standard notes.

BOREHOLE: BH204M

Project	Mixed Residential and Commercial Building			Sheet	1 OF 1
Location	12-24 Rothschild Avenue, Rosebery, NSW			Date Started	6/8/16
Position	Refer to Figure 2			Date Completed	6/8/16
Job No.	E22282	Contractor	Hart Geo Pty Ltd	Logged BY/EW	Date:
Client	Maville Park Pty Ltd	Drill Rig	Ute Mounted	Checked EG	Date:
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
AD/T	-	GWNE	0.0	0.05				-	Bitumen pavement - 0.05m thick			PAVEMENT
								-	FILL: SAND, fine to medium grained, brown, trace fine grained gravel, moist, no odour.	-	-	FILL
			0.5									
			1.0	1.00					Hole Terminated at 1.00 m Refusal on burried concrete slab.			
			1.5									
			2.0									
			2.5									
			3.0									
			3.5									
			4.0									
			4.5									
			5.0									

This borehole log should be read in conjunction with Environmental Investigations Australia's accompanying standard notes.

BOREHOLE: BH205M

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Contamination | Remediation | Geotechnical

Project	Mixed Residential and Commercial Building			Sheet	1 OF 1
Location	12-24 Rothschild Avenue, Rosebery, NSW			Date Started	6/8/16
Position	Refer to Figure 2			Date Completed	6/8/16
Job No.	E22282	Contractor	Hart Geo Pty Ltd	Logged BY/EW	Date:
Client	Maville Park Pty Ltd	Drill Rig	Ute Mounted	Checked EG	Date:
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	PIEZOMETER DETAILS ID / Static Water Level
AD/T	-	17/08/16	0					-	Bitumen pavement			BH205
								-	FILL: Gravelly Clayey SAND, fine to medium grained, orange / grey, gravel is coarse grained, moist, no odour.	-		Gatic Cover Concrete Cuttings 1x uPVC 50 mm casing Bentonite
			1									
				1.70				SP	SAND; fine to medium grained, grey-brown, no odour.	M	-	
			2									
			3									1x uPVC 50 mm slotted screen
			4									Sand
			5							W		
			6	6.00					Hole Terminated at 6.00 m Target depth reached. Borehole converted to monitoring well.			
			7									
			8									

This borehole log should be read in conjunction with Environmental Investigations Australia's accompanying standard notes.

BOREHOLE: BH206

Project	Mixed Residential and Commercial Building			Sheet	1 OF 1
Location	12-24 Rothschild Avenue, Rosebery, NSW			Date Started	6/8/16
Position	Refer to Figure 2			Date Completed	6/8/16
Job No.	E22282	Contractor	BG Drilling Pty Ltd	Logged BY/EW	Date:
Client	Maville Park Pty Ltd	Drill Rig	Track Mounted	Checked EG	Date:
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
DT			0.0					-	Concrete Slab: 0.35m thickness			CONCRETE HARDSTAND
				0.35								
AD/T	-	GWNE	0.5		BH206 ES 0.35-0.45 m PID = 0.8 ppm			-	FILL: SAND, fine to medium grained, brown-grey / pale brown, moist, no odour.	-		FILL
			1.0		BH206 ES 0.90-1.00 m PID = 0.5 ppm						-	
				1.20				SP	SAND; fine to medium grained, yellow-brown / pale brown / orange - brown, moist, no odour.	M		AEOLIAN DEPOSITS
			1.5		BH206 ES 1.30-1.40 m PID = 0.8 ppm							
				2.00	BH206 ES 1.90-2.00 m PID = 0.9 ppm				Hole Terminated at 2.00 m Target depth reach. Backfilled with drilling spoils and completed with concrete.			
			2.0									
			2.5									
			3.0									
			3.5									
			4.0									
			4.5									
			5.0									

This borehole log should be read in conjunction with Environmental Investigations Australia's accompanying standard notes.

BOREHOLE: BH207

Project	Mixed Residential and Commercial Building			Sheet	1 OF 1
Location	12-24 Rothschild Avenue, Rosebery, NSW			Date Started	6/8/16
Position	Refer to Figure 2			Date Completed	6/8/16
Job No.	E22282	Contractor	BG Drilling Pty Ltd	Logged BY/EW	Date:
Client	Maville Park Pty Ltd	Drill Rig	Track Mounted	Checked EG	Date:
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
DT			0.0					-	Concrete Slab: 0.3m thickness			CONCRETE HARDSTAND
				0.30								
AD/T	-	GWNE	0.5		BH207 ES 0.30-0.40 m PID = 1 ppm			-	FILL: SAND, fine to medium grained, brown, moist, no odour.	-		FILL
			1.0		BH207 ES 0.80-0.90 m PID = 1.1 ppm						-	
				1.10				SP	SAND; fine to medium grained, yellow-brown / pale brown / orange - brown, moist, no odour.			AEOLIAN DEPOSITS
			1.5		BH207 ES 1.20-1.30 m PID = 0.6 ppm					M		
				2.00	BH207 ES 1.90-2.00 m PID = 0.4 ppm				Hole Terminated at 2.00 m Target depth reach. Backfilled with drilling spoils and completed with concrete.			
			2.0									
			2.5									
			3.0									
			3.5									
			4.0									
			4.5									
			5.0									

This borehole log should be read in conjunction with Environmental Investigations Australia's accompanying standard notes.

BOREHOLE: BH208

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Project	Mixed Residential and Commercial Building			Sheet	1 OF 1
Location	12-24 Rothschild Avenue, Rosebery, NSW			Date Started	6/8/16
Position	Refer to Figure 2			Date Completed	6/8/16
Job No.	E22282	Contractor	-	Logged BY/EW	Date:
Client	Maville Park Pty Ltd	Drill Rig	-	Checked EG	Date:
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
DT			0.0	0.10				-	Concrete Slab: 0.1m thickness			CONCRETE HARDSTAND
HA	-	GWNE	0.5		BH208 ES 0.10-0.20 m PID = 0.1 ppm			-	FILL: SAND, fine to medium grained, brown, trace of fine grained gravel, moist, no odour.	-	-	FILL
			1.0	1.10	BH208 ES 0.70-0.80 m PID = 0.2 ppm			SP	SAND; fine to medium grained, brown, moist, no odour.	M		AEOLIAN DEPOSITS
			1.5	1.50	BH208 ES 1.20-1.30 m PID = 0.1 ppm				Hole Terminated at 1.50 m Target depth reach. Backfilled with drilling spoils and completed with concrete.			
			2.0									
			2.5									
			3.0									
			3.5									
			4.0									
			4.5									
			5.0									

This borehole log should be read in conjunction with Environmental Investigations Australia's accompanying standard notes.

TEST: BH209

Project	Mixed Residential and Commercial Building			Sheet	1 OF 1
Location	12-24 Rothschild Avenue, Rosebery, NSW			Date Started	6/8/16
Position	Refer to Figure 2			Date Completed	6/8/16
Job No.	E22282	Contractor	-	Logged BY/EW	Date:
Client	Maville Park Pty Ltd	Drill Rig	-	Checked EG	Date:
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
DT			0.0	0.10				-	Concrete Slab: 0.1m thickness			CONCRETE HARDSTAND
HA	-	GWNE	0.5	0.50	BH209 ES 0.10-0.20 m PID = 0.1 ppm			-	FILL: SAND, fine to medium grained, brown / orange, moist, no odour.	-		FILL
					BH209 ES 0.70-0.80 m PID = 0.1 ppm			SP	SAND; fine to medium grained, yellow, moist, no odour.	M	-	AEOLIAN DEPOSITS
			1.0	1.00					Hole Terminated at 1.00 m Target depth reach. Backfilled with drilling spoils and completed with concrete.			
			1.5									
			2.0									
			2.5									
			3.0									
			3.5									
			4.0									
			4.5									
			5.0									

This borehole log should be read in conjunction with Environmental Investigations Australia's accompanying standard notes.

BOREHOLE: BH210

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Project	Mixed Residential and Commercial Building			Sheet	1 OF 1
Location	12-24 Rothschild Avenue, Rosebery, NSW			Date Started	6/8/16
Position	Refer to Figure 2			Date Completed	6/8/16
Job No.	E22282	Contractor	BG Drilling Pty Ltd	Logged BY/EW	Date:
Client	Maville Park Pty Ltd	Drill Rig	Track Mounted	Checked EG	Date:
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
DT			0.0	0.20				-	Concrete Slab: 0.2m thickness			CONCRETE HARDSTAND
AD/T	-	GWNE	0.5	0.70	BH210 ES 0.20-0.40 m PID = 0 ppm			-	FILL: SAND, fine to medium grained, brown-grey / pale brown, moist, no odour.	-	-	FILL
			1.0	1.00	BH210 ES 0.70-0.80 m PID = 0 ppm			SP	SAND; fine to medium grained, yellow, moist, no odour.	M		AEOLIAN DEPOSITS
									Hole Terminated at 1.00 m Target depth reach. Backfilled with drilling spoils and completed with concrete.			
			1.5									
			2.0									
			2.5									
			3.0									
			3.5									
			4.0									
			4.5									
			5.0									

This borehole log should be read in conjunction with Environmental Investigations Australia's accompanying standard notes.

BOREHOLE: BH211

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Contamination | Remediation | Geotechnical

Project	Mixed Residential and Commercial Building			Sheet	1 OF 1
Location	12-24 Rothschild Avenue, Rosebery, NSW			Date Started	6/8/16
Position	Refer to Figure 2			Date Completed	6/8/16
Job No.	E22282	Contractor	BG Drilling Pty Ltd	Logged BY/EW	Date:
Client	Maville Park Pty Ltd	Drill Rig	Track Mounted	Checked EG	Date:
		Inclination	-90°		

Drilling					Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	USCS SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
DT		GWNE	0.0					-	Concrete Slab: 0.3m thickness			CONCRETE HARDSTAND
	-			0.30						-	-	
AD/T			0.5		BH211 ES 0.30-0.40 m PID = 0 ppm			-	FILL: SAND, fine to medium grained, brown-grey / pale brown, moist, no odour.			FILL
				0.60					Hole Terminated at 0.60 m Refusal on buried concrete slab.			
			1.0									
			1.5									
			2.0									
			2.5									
			3.0									
			3.5									
			4.0									
			4.5									
			5.0									

This borehole log should be read in conjunction with Environmental Investigations Australia's accompanying standard notes.

APPENDIX C
Field Data Sheets

eiaustralia
Contamination | Remediation | Geotechnical

Water Quality Meter Calibration Log

Instrument: EI WQM 003 (Hanna Multi Parameter 9828 – Serial no. 08333310)

Room Temperature: 24.5 °C

Sensor (Unit of measure)	Standard Solutions Used (Item Code / Name)	Solution Batch Number	Temperature Adjusted Calibration Solution Value	Instrument Reading	
				Initial	Post Calibration
pH	HI7007	8290	7.01	7.25	7.02
	HI7004L	8498	4.01	4.13	4.01
	HI7010	8072	10.01	10.11	10.04
ORP (mV)	HI7021	6011	240.0	239.9	240.0
Conductivity (µs/cm)	HI7031L	8656	1413	1353	1412
	HI7030L	8661	12880	13150	12890
DO Saturation (%)	Ambient Air	N.A.	100%	112.0%	99.9%
	Sodium Metabisulfide + Deionised Water	278121 + BA000027.001	0%	0.3%	0.0%
Temperature (°C)	Thermometre	N/A	23.7°C	23.55°C	23.7°C

Calibrated by: CARMEN YZ

Calibration Date: 20 July 2016

Next Calibration Due: August 2016

Notes:

DO Membrane Replaced

GROUNDWATER SAMPLING FIELD SHEET

Environmental Investigations Australia
Contamination | Remediation | Geotechnical

Site Address:	12-24 Rothschild Ave, Rosebery	Job Number:	E22282 AA
Client:	Sussman & Co.	Date:	17/08/16
Field Staff:	A. McAllister	Well ID:	MW1
Well Location:	NW corner	Round No:	
WELL BACKGROUND			
Well Installation Date:	15/08/2014	Well Stickup (m):	gallic
Initial Well Depth (mbgl):	5.00 / 4.799	Screen Interval (mbgl):	2-5
Previous Sampling Date:	26/8/14	Previous SWL (m):	3.778
PRE PURGE			
Well Head Condition:	gallic	PID Headspace (ppm):	
Total Well Depth (mbgl):	4.82 ~~4.56~~ = 4.517	Water Measure Device:	
SWL (mbtoc):	dry	Purge Vol = Water Column x 6 (50mm Well)	
Water Column (m):		Purge Volume (L):	
PHASE SEPARATED HYDROCARBONS(PSH)			
Depth to PSH (mbtoc):	nil	PSH Visually Confirmed:	nil
PID Headspace (ppm):		PSH Thickness (mm):	
LOW FLOW: PURGING & SAMPLING			
Depth of Pump Inlet:		Fill Timer:	
Pump Pressure Regulator (psi):	not required	Discharge Timer:	
Weather Conditions:		Cycle:	no
Pump on time:		Pump off time:	
Weather Conditions:			

WATER QUALITY PARAMETERS

Time	Volume (L)	SWL (mbtoc)	Temp (°C)	EC (uS/cm)	Redox (mV)	DO (mg/L)	pH	Comments (colour, turbidity, odour etc.)
Stabilisation range: 3 consecutive readings				+/- 3%	+/- 10mV	+/- 10%	+/- 0.05	

OTHER COMMENTS: Not enough water to sample.

Used bailer < 5cm water captured, did not recharge.

GROUNDWATER SAMPLING FIELD SHEET

Environmental Investigations Australia
Contamination | Remediation | Geotechnical

Site Address:	12-24 Rothschild Ave, Rosebery	Job Number:	E22282
Client:	Sycsman + Co	Date:	17/08/16
Field Staff:	A. McAllister	Well ID:	MW2
Well Location:	NE corner	Round No:	2
WELL BACKGROUND			
Well Installation Date:	15/08/14	Well Stickup (m):	- 0.18
Initial Well Depth (mbgl):	5.005	Screen Interval (mbgl):	2-5
Previous Sampling Date:	26/08/14	Previous SWL (m):	3.875
PRE PURGE			
Well Head Condition:	gatic	PID Headspace (ppm):	
Total Well Depth (mbgl):	14.84ft = 4.52m	Water Measure Device:	
SWL (mbtoc):	DRY	Purge Vol = Water Column x 6 (50mm Well)	
Water Column (m):	-	Purge Volume (L):	
PHASE SEPARATED HYDROCARBONS(PSH)			
Depth to PSH (mbtoc):	-	PSH Visually Confirmed:	-
PID Headspace (ppm):	-	PSH Thickness (mm):	-
LOW FLOW: PURGING & SAMPLING			
Depth of Pump Inlet:		Fill Timer:	
Pump Pressure Regulator (psi):		Discharge Timer:	
Weather Conditions:		Cycle:	
Pump on time:		Pump off time:	
Weather Conditions:			

WATER QUALITY PARAMETERS

Time	Volume (L)	SWL (mbtoc)	Temp (°C)	EC (uS/cm)	Redox (mV)	DO (mg/L)	pH	Comments (colour, turbidity, odour etc.)
								NOT SAMPLED - DRY @
								4.52m
Stabilisation range: 3 consecutive readings				+/- 3%	+/- 10mV	+/- 10%	+/- 0.05	

OTHER COMMENTS:

GROUNDWATER SAMPLING FIELD SHEET

Environmental Investigations Australia
Contamination | Remediation | Geotechnical

Site Address:	12-24 Rothschild Ave, Rosebery	Job Number:	E22282
Client:	Sussman + Co.	Date:	17/08/16
Field Staff:	A. McAllister	Well ID:	BH205M
Well Location:	N boundary	Round No:	1
WELL BACKGROUND			
Well Installation Date:	06/08/16	Well Stickup (m):	0.08mm
Initial Well Depth (mbgl):	6.0	Screen Interval (mbgl):	3-6
Previous Sampling Date:	-	Previous SWL (m):	4.0mBGL
PRE PURGE			
Well Head Condition:	gatic ✓	PID Headspace (ppm):	
Total Well Depth (mbgl):	= 5.78	Water Measure Device:	
SWL (mbtoc):	= 4.45	Purge Vol = Water Column x 6 (50mm Well)	
Water Column (m):	= 1.33 m	Purge Volume (L):	
PHASE SEPARATED HYDROCARBONS(PSH)			
Depth to PSH (mbtoc):	nil	PSH Visually Confirmed:	nil
PID Headspace (ppm):	0	PSH Thickness (mm):	
LOW FLOW: PURGING & SAMPLING			
Depth of Pump Inlet:	5.0m = 16.4 ft	Fill Timer:	10
Pump Pressure Regulator (psi):	40	Discharge Timer:	10
Weather Conditions:	sunny, clear	Cycle:	CPM4
Pump on time:		Pump off time:	
Weather Conditions:	—		

WATER QUALITY PARAMETERS

Time	Volume (L)	SWL (mbtoc)	Temp (°C)	EC (uS/cm)	Redox (mV)	DO (mg/L)	pH	Comments (colour, turbidity, odour etc.)
0								
4	0.5	15.13	23.70	1390	98.5	2.12	5.61	brown-grey, mod turbidity (4) no odour
8	0.5	15.25	23.63	1379	102.2	1.77	5.72	"
12	0.5	15.20	23.35	1383	104.2	1.67	5.72	"
18	0.5	15.20	23.22	1383	104.9	1.59	5.72	Sampled
Stabilisation range: 3 consecutive readings				+/- 3%	+/- 10mV	+/- 10%	+/- 0.05	

OTHER COMMENTS:

GROUNDWATER SAMPLING FIELD SHEET

Environmental Investigations Australia
Contamination | Remediation | Geotechnical

Site Address:	12-24 Rothschild Ave, Rosebery	Job Number:	E22282
Client:	Sussmans Co	Date:	17/08/16
Field Staff:	A.Mc	Well ID:	MW3
Well Location:	western driveway	Round No:	
WELL BACKGROUND			
Well Installation Date:	20/08/14	Well Stickup (m):	- 0.2
Initial Well Depth (mbgl):	5.00 / 4.90	Screen Interval (mbgl):	2-5
Previous Sampling Date:	28/8/2014	Previous SWL (m):	3.651
PRE PURGE			
Well Head Condition:	gattic	PID Headspace (ppm):	
Total Well Depth (mbgl):	16.1 ft = 4.9	Water Measure Device:	
SWL (mbtoc):	13.86ft = 4.22	Purge Vol = Water Column x 6 (50mm Well)	
Water Column (m):	1 = 0.68	Purge Volume (L):	
PHASE SEPARATED HYDROCARBONS(PSH)			
Depth to PSH (mbtoc):	nil	PSH Visually Confirmed:	nil
PID Headspace (ppm):		PSH Thickness (mm):	
LOW FLOW: PURGING & SAMPLING			
Depth of Pump Inlet:	15.7ft (4.8m)	Fill Timer:	10
Pump Pressure Regulator (psi):	20	Discharge Timer:	10
Weather Conditions:	Sunny	Cycle:	10MF
Pump on time:		Pump off time:	
Weather Conditions:	—		

WATER QUALITY PARAMETERS

Time	Volume (L)	SWL (mbtoc)	Temp (°C)	EC (uS/cm)	Redox (mV)	DO (mg/L)	pH	Comments (colour, turbidity, odour etc.)
	0.3	13.9	21.45	488	87.5	3.04	6.60	clear yellow-brown no odour low turbidity
	0.3	13.95	21.37	504	82.2	2.17	6.58	"
	0.3	13.95	22.41	511	79.6	1.83	6.56	" increase turbidity - brown /
	0.3	13.95	22.9	513	79.2	1.71	6.54	mod turbidity, brown, no odour
								sampled
	1.2L							
Stabilisation range: 3 consecutive readings				+/- 3%	+/- 10mV	+/- 10%	+/- 0.05	

OTHER COMMENTS:

GROUNDWATER SAMPLING FIELD SHEET

Environmental Investigations Australia
Contamination | Remediation | Geotechnical

Site Address:	12-24 Rothschild Ave, Rosebery	Job Number:	62282
Client:	A. Sussman + Co.	Date:	17/08/16
Field Staff:	A. McAllister	Well ID:	BH202M
Well Location:		Round No:	1
WELL BACKGROUND			
Well Installation Date:	06/08/16	Well Stickup (m):	-0.11
Initial Well Depth (mbgl):		Screen Interval (mbgl):	2.8-5.8
Previous Sampling Date:	—	Previous SWL (m):	
PRE PURGE			
Well Head Condition:	gatic ✓	PID Headspace (ppm):	
Total Well Depth (mbgl):	17.2 = 5.24	Water Measure Device:	
SWL (mbtoc):	14 1/4 = 4.29	Purge Vol = Water Column x 6 (50mm Well)	
Water Column (m):	0.95	Purge Volume (L):	
PHASE SEPARATED HYDROCARBONS(PSH)			
Depth to PSH (mbtoc):	nil	PSH Visually Confirmed:	
PID Headspace (ppm):		PSH Thickness (mm):	nil
LOW FLOW: PURGING & SAMPLING			
Depth of Pump Inlet:	16.4ft = 5.0m	Fill Timer:	10
Pump Pressure Regulator (psi):	20	Discharge Timer:	10
Weather Conditions:	sunny	Cycle:	CDM4
Pump on time:		Pump off time:	
Weather Conditions:			

WATER QUALITY PARAMETERS

Time	Volume (L)	SWL (mbtoc)	Temp (°C)	EC (uS/cm)	Redox (mV)	DO (mg/L)	pH	Comments (colour, turbidity, odour etc.)
	0.3	14.3	23.47	415	81.8	2.89	6.43	brown, mod turbidity, no odours
	0.3	14.3	23.41	414	23.8	2.06	6.28	"
	0.3	14.35	23.29	417	54.1	2.01	6.37	"
	0.3	14.35	sampled					"
								mv. turbidity
Stabilisation range: 3 consecutive readings				+/- 3%	+/- 10mV	+/- 10%	+/- 0.05	

OTHER COMMENTS:

WATER SAMPLING FIELD SHEET

Environmental Investigations Australia
Contamination | Remediation | Geotechnics

Site Address:	12 - 24 Rothschild Ave,	Job Number:	E22282
Client:	Sussman + Co	Date:	17/08/16
Field Staff:	A. McAuley	Sampling Location ID	BH203M
Well Location:	Central carpark	Round No:	1

MEDIUM ☑Groundwater ☐Surface Water ☐Stormwater ☐Other:

SAMPLING POINT INFO

Well Installation Date:	06/08/16	Stickup (m):	0.1 (+ above ground - below ground)
Initial Well Depth (mbgl):	6.00	Screen Interval (mBTOC):	3-6 mAGL
Previous Sampling Date:	-	Previous SWL (mBTOC):	-

PID READINGS

PID Headspace (ppm):	PID Background (ppm):
PID Breathing Space (ppm):	

PRE PURGE

Total Well Depth (mbgl):	18.54ft = 5.638	Well Head Condition:	✓
SWL (mbtoc):	15.41ft = 4.69	Water Column (m):	0.948

PHASE SEPARATED HYDROCARBONS (PSH)

Depth to PSH (mbtoc):	Nil	PSH Visually Confirmed (Bailer):	Nil
PSH Thickness (mm):	Nil		

PURGE AND SAMPLE

Sampling Method ☑Bladder ☐Peristaltic ☐Submersible ☐Other:

Depth of Pump Inlet:	17.4ft = 5.3m	Fill Timer:	10
Pump Pressure Regulator (psi):	20	Discharge Timer:	10
Weather Conditions:	sunny slow wind	Cycle:	10M4
Pump on time:		Pump off time:	

WATER QUALITY PARAMETERS

Probe Make and Model:	Bump Test Date and Time:

Time	Volume (L)	SWL (mbtoc)	Temp (°C)	EC (µS/cm)	Redox (mV)	DO (mg/L)	pH (units)	Comments (colour, turbidity, odour etc.)
	0.3	15.35	24.25	526	93.7	2.51	6.64	orown mod. turbidity+SS no odour
	0.3	15.30	24.18	527	81.4	2.67	6.67	"
	0.3	15.25	24.16	528	80.7	1.81	6.68	"
	0.3	15.25	24.19	526	79.9	1.86	6.71	"
	0.3			Sampled				
Stabilisation range: 3 consecutive readings			±0.2°C	±3%	±20mV	±10%	±0.2	

OTHER COMMENTS/OBSERVATIONS:

SIGNATURE:

eiaustralia

Environmental Investigations Australia Pty Ltd
Suite 6.01, 55 Miller Street
PYRMONT, NSW, 2009

ABN 33 102 449 507
E service@eiaustralia.com.au
W www.eiaustralia.com.au
T 02 9516 0722

CALIBRATION CERTIFICATE FOR PHOTO IONISATION DETECTOR

Instrument: Mini RAE 3000

Serial Number: 592-906667 - EI **PID02** ☑ **OR** 592-901345 - EI **PID03** ☐

Instrument Conditions: Good

Calibration gas species: Isobutylene.

Calibration gas concentration: 100 ppm

Gas bottle number: 02

This PID has been calibrated to Isobutylene gas with the span concentration displayed as

100 ppm at 100 ppm span setting (allowable range +/-10ppm from span setting).

The PID is initially zero calibrated in fresh air.

Remaining gas in bottle: 250 psi (if reading is <250 psi, notify Equipment Manager to arrange new gas bottle order)

The above detector was calibrated in accordance with manufacturer's specifications.

Signed: [signature]

Date: 6/8/16

Time: 7am

APPENDIX D
Chain of Custody and Sample Receipt Forms

COC received 8/8/16 @ 3:15 pm

Sheet 1 of 2

Site: 12-24 Rothschild Ave, Rosebery

Project No: E11282

Laboratory: SGS Australia
Unit 16, 33 Maddox Street,
ALEXANDRIA NSW 2015
P: 02 8594 0400 F: 02 8594 0499

Sample ID	Laboratory ID	Container Type	Sampling Date	Sampling Time	Sample Matrix: WATER	SOIL	OTHERS (i.e. Fibro, Paint, etc.)	Analysis: HM [A] /TRH/BTEX/PAHs OCP/OP/PCB/Asbestos	HM [A] /TRH/BTEX/PAHs	HM [A] /TRH/BTEX	TRH/BTEX/Lead	TRH/BTEX	PAHs	VOCs	Asbestos	pH / CEC (cation exchange)	pH / EC (electrical conductivity)	sPOCAS	Phenols			TCLP PAHs	TCLP HM [A]	TCLP HM [B]
BH202_0.1-0.2	1	T, ZLB	6/8/16	AM		✓		✓						✓					✓					
-0.5-0.6																								
-0.8-0.9	2								✓															
-1.8-1.9																								
BH206_0.35-0.45	3							✓						✓					✓					
-0.4-1.0																								
-1.5-1.4	4								✓															
-1.9-2.0																								
BH207_0.3-0.4	5							✓						✓					✓					
-0.3-0.4	6								✓															
-1.2-1.3																								
-1.9-2.0		↓	↓	↓		↓																		

Comments

HM [A]
Arsenic
Cadmium
Chromium
Copper
Lead
Mercury
Nickel
Zinc

HM [B]
Arsenic
Cadmium
Chromium
Lead
Mercury
Nickel

LABORATORY TURNAROUND

- [✓] Standard
- [ ] 4 Hours
- [ ] 48 Hours
- [ ] 72 Hours
- [ ] Other_____

Investigator: I attest that these samples were collected in accordance with standard EI field sampling procedures.

Sampler's Commen

Container Type:
J= solvent washed, acid
S= solvent washed, acid
P= natural HDPE plastic
VC= glass vial, Teflon S
ZLB = Zip-Lock Bag

SGS Alexandria Environmental

SE155671 COC
Received: 08 – Aug – 2016

Sampler's Name (EI): EW / BY

Print: Emmanuel Wedders

Signature: E Wedders

Date: 8/8/16

Received by (SGS):

Print: TOMMY

Signature:

Date: 8/8/16

IMPORTANT:
Please e-mail laboratory results to: lab@eiaustralia.com.au

eiaustralia
Contamination | Remediation | Geotechnical
Suite 6.01, 55 Miller Street, PYRMONT NSW 2009
Ph: 9516 0722
lab@eiaustral...a

COC July 2016 FORM v.3 - SGS

Sheet 2 of 2

Site: 12-24 Rowlerschild Ave, Roseberry

Project No: 311232

Laboratory: SGS Australia
Unit 16, 33 Maddox Street,
ALEXANDRIA NSW 2015
P: 02 8594 0400 F: 02 8594 0499

Sample Matrix: WATER | SOIL | OTHERS (i.e. Fibro, Paint, etc.)

Analysis: HM [A] /TRH/BTEX/PAHs OCP/OP/PCB/Asbestos | HM [A] /TRH/BTEX/PAHs | HM [A] /TRH/BTEX | TRH/BTEX/Lead | TRH/BTEX | PAHs | VOCs | Asbestos | pH / CEC (cation exchange) | pH / EC (electrical conductivity) | sPOCAS | BTEX | Phenols | | TCLP PAHs | TCLP HM [A] | TCLP HM [B]

Sample ID	Laboratory ID	Container Type	Sampling Date	Sampling Time	WATER	SOIL	OTHERS	HM [A] /TRH/BTEX/PAHs OCP/OP/PCB/Asbestos	HM [A] /TRH/BTEX/PAHs	HM [A] /TRH/BTEX	TRH/BTEX/Lead	TRH/BTEX	PAHs	VOCs	Asbestos	pH / CEC (cation exchange)	pH / EC (electrical conductivity)	sPOCAS	BTEX	Phenols		TCLP PAHs	TCLP HM [A]	TCLP HM [B]
BH208_0.1-0.2	7	S,ZLB	6/8/16	AM		✓		✓						✓						✓				
" 0.7-0.8	8	"	"	"		"			✓															
" 1.2-1.3																								
BH209_0.1-0.2	9							✓						✓						✓				
" 0.7-0.8	10								✓															
BH210_0.2-0.4	11							✓						✓						✓				
" 0.7-0.8	12								✓															
BH211_0.5-0.6	13	↓						✓						✓						✓				
GW100	14	J				✓				✓														
GW200	15	J			✓					✓														
GTB100	16	VC				✓													✓					
GTS100	17	VC	↓	↓		↓													✓					

Comments

HM [A]
Arsenic
Cadmium
Chromium
Copper
Lead
Mercury
Nickel
Zinc

HM [B]
Arsenic
Cadmium
Chromium
Lead
Mercury
Nickel

LABORATORY TURNAROUND
✓ Standard
Hours
Hours
Hours
Other

Investigator: I attest that these samples were collected in accordance with standard EI field sampling procedures.

Sampler's Comments:

Container Type:
J= solvent washed, acid rinsed,Teflon sealed, glass jaR
S= solvent washed, acid rinsed glass bottle
P= natural HDPE plastic bottle
VC= glass vial, Teflon Septum
ZLB = Zip-Lock Bag

Sampler's Name (EI): FW/BY

Print: Emmanuel Welders

Signature:

Date: 6/8/16

Received by (SGS):

Print: TOMMY

Signature:

Date: 8/8/16

IMPORTANT:
Please e-mail laboratory results to: lab@eiaustralia.com.au

eiaustralia
Contamination | Remediation | Geotechnical
Suite 6.01, 55 Miller Street, PYRMONT NSW 2009
Ph: 9516 0722
lab@eiaustralia.com.au

SAMPLE RECEIPT ADVICE

SE155671

CLIENT DETAILS

Contact	Emmanuel Woelders
Client	Environmental Investigations
Address	Suite 6.01, 55 Miller Street NSW 2009
Telephone	02 9516 0722
Facsimile	02 9516 0741
Email	Emmanuel.Woelders@eiaustralia.com.au
Project	**E22282 - 12-24 Rothschild Ave, Rosebery**
Order Number	**E22282**
Samples	17

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
Samples Received	Mon 8/8/2016
Report Due	Mon 15/8/2016
SGS Reference	**SE155671**

SUBMISSION DETAILS

This is to confirm that 17 samples were received on Monday 8/8/2016. Results are expected to be ready by Monday 15/8/2016. Please quote SGS reference SE155671 when making enquiries. Refer below for details relating to sample integrity upon receipt.

Sample counts by matrix	16 Soil, 1 Water	Type of documentation received	COC
Date documentation received	8/8/2016	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	8.5°C
Sample container provider	SGS	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes		

Unless otherwise instructed, water and bulk samples will be held for one month from date of report, and soil samples will be held for two months.

COMMENTS

7 soil samples have been placed on hold.

SAMPLE RECEIPT ADVICE

SE155671

CLIENT DETAILS

Client Environmental Investigations

Project E22282 - 12-24 Rothschild Ave, Rosebery

SUMMARY OF ANALYSIS

No.	Sample ID	OC Pesticides in Soil	OP Pesticides in Soil	PAH (Polynuclear Aromatic Hydrocarbons) in Soil	PCBs in Soil	Total Phenolics in Soil	TRH (Total Recoverable Hydrocarbons) in Soil	VOC's in Soil	Volatile Petroleum Hydrocarbons in Soil
001	BH202_0.1-0.2	28	13	26	11	1	10	79	8
002	BH202_0.8-0.9	-	-	26	-	-	10	12	8
003	BH206_0.35-0.45	28	13	26	11	1	10	79	8
004	BH206_1.3-1.4	-	-	26	-	-	10	12	8
005	BH207_0.3-0.4	28	13	26	11	1	10	79	8
006	BH207_0.8-0.9	-	-	26	-	-	10	12	8
007	BH208_0.1-0.2	28	13	26	11	1	10	79	8
008	BH208_0.7-0.8	-	-	26	-	-	10	12	8
009	BH209_0.1-0.2	28	13	26	11	1	10	79	8
010	BH209_0.7-0.8	-	-	26	-	-	10	12	8
011	BH210_0.2-0.4	28	13	26	11	1	10	79	8
012	BH210_0.7-0.8	-	-	26	-	-	10	12	8
013	BH211_0.3-0.4	28	13	26	11	1	10	79	8
014	QD100	-	-	-	-	-	10	12	8
016	QTB100	-	-	-	-	-	-	12	-
017	QTS100	-	-	-	-	-	-	12	-

CONTINUED OVERLEAF

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

SAMPLE RECEIPT ADVICE

SE155671

CLIENT DETAILS

Client Environmental Investigations

Project E22282 - 12-24 Rothschild Ave, Rosebery

SUMMARY OF ANALYSIS

No.	Sample ID	Fibre Identification in soil	Mercury in Soil	Moisture Content	Total Recoverable Metals in Soil/Waste
001	BH202_0.1-0.2	2	1	1	7
002	BH202_0.8-0.9	-	1	1	7
003	BH206_0.35-0.45	2	1	1	7
004	BH206_1.3-1.4	-	1	1	7
005	BH207_0.3-0.4	2	1	1	7
006	BH207_0.8-0.9	-	1	1	7
007	BH208_0.1-0.2	2	1	1	7
008	BH208_0.7-0.8	-	1	1	7
009	BH209_0.1-0.2	2	1	1	7
010	BH209_0.7-0.8	-	1	1	7
011	BH210_0.2-0.4	2	1	1	7
012	BH210_0.7-0.8	-	1	1	7
013	BH211_0.3-0.4	2	1	1	7
014	QD100	-	1	1	7
016	QTB100	-	-	1	-

CONTINUED OVERLEAF

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

SAMPLE RECEIPT ADVICE

SE155671

CLIENT DETAILS

Client Environmental Investigations

Project E22282 - 12-24 Rothschild Ave, Rosebery

SUMMARY OF ANALYSIS

No.	Sample ID	Mercury (dissolved) in Water	Trace Metals (Dissolved) in Water by ICPMS	TRH (Total Recoverable Hydrocarbons) in Water	VOCs in Water	Volatile Petroleum Hydrocarbons in Water
015	QR100	1	7	9	12	8

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

Sheet 1 of 1

Site: 12-24 Rothschild Ave, Rosebery

Project No: E22282

Laboratory: Envirolab Services
12 Ashley Street,
CHATSWOOD NSW 2067
P: 02 9910 6200

Sample ID	Laboratory ID	Container Type	Sampling Date	Sampling Time	Sample Matrix: WATER	SOIL	OTHERS (i.e. Fibro, Paint, etc.)	Analysis: HM [A] /TRH/BTEX/PAHs OCP/OP/PCB/Asbestos	HM [A] /TRH/BTEX/PAHs	HM [A] /TRH/BTEX	TRH/BTEX/Lead	TRH/BTEX	PAHs	VOCs	Asbestos	pH / CEC (cation exchange)	pH / EC (electrical conductivity)	sPOCAS				TCLP PAHs	TCLP HM [A]	TCLP HM [B]
GT100	1.	J	6/8/16	AM		✓				✓														

Comments

HM [A]
Arsenic
Cadmium
Chromium
Copper
Lead
Mercury
Nickel
Zinc

HM [B]
Arsenic
Cadmium
Chromium
Lead
Mercury
Nickel

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

Job No: 151436
Date Received: 08/08/16
Time Received: 15:30
Received by: D.F.
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

LABORATORY TURNAROUND
✓ Standard
Hours
Hours
Hours
Other

Investigator: I attest that these samples were collected in accordance with standard EI field sampling procedures.

Sampler's Comments:

Sampler's Name (EI):
EW / BY
Print: Emmanuel Welders
Signature:
Date: 6/8/16

Received by (SGS):
Daniel Ford.
Print: pp gls
Signature:
Date: 08/08/16

Container Type:
J= solvent washed, acid rinsed, Teflon sealed, glass jaR
S= solvent washed, acid rinsed glass bottle
P= natural HDPE plastic bottle
VC= glass vial, Teflon Septum
ZLB = Zip-Lock Bag

IMPORTANT:
Please e-mail laboratory results to: lab@eiaustralia.com.au

eiaustralia
Contamination | Remediation | Geotechnical
Suite 6.01, 55 Miller Street, PYRMONT NSW 2009
Ph: 9516 0722
lab@eiaustralia

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 Details	
Client	EI Australia
Attention	Benjamin Yuan

Sample Login Details	
Your Reference	E22282, Rosebery
Envirolab Reference	**151436**
Date Sample Received	05/08/2016
Date Instructions Received	08/08/2016
Date Results Expected to be Reported	**15/08/2016**

Sample Condition	
Samples received in appropriate condition for analysis	YES
No. of Samples Provided	1 Soil
Turnaround Time Requested	Standard
Temperature on receipt (°C)	8
Cooling Method	Ice Pack
Sampling Date Provided	YES

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

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	Phone: 02 9910 6200
Fax: 02 9910 6201	Fax: 02 9910 6201
Email: ahie@envirolabservices.com.au	Email: jhurst@envirolabservices.com.au

Sample and Testing Details on following page

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 Id	*vTRH(C6-C10)/BTEXN in Soil*	*svTRH (C10-C40) in Soil*	*Acid Extractable metals in soil*
QT100	✓	✓	✓

Sheet 1 of _____

Site: 12-24 Rothschild Ave, Rosebery

Project No: E22282

Laboratory: SGS Australia
Unit 16, 33 Maddox Street,
ALEXANDRIA NSW 2015
P: 02 8594 0400 F: 02 8594 0499

Sample ID	Laboratory ID	Container Type	Sampling Date	Sampling Time	Sample Matrix: WATER	SOIL	OTHERS (i.e. Fibro, Paint, etc.)
MW1			17/08		X		
MW2			"		X		
MW3	1		"		X		
202M	2		"		X		
203M	3		"		X		
205M	4		"		X		
GWQD1	5		"		X		
GWTB1	6		"				
GWQTS1	7		"				
GWQR1	8		"		X		

Analysis

HM A /TRH/BTEX/PAHs OCP/OP/PCB/Asbestos	HM A /TRH/BTEX/PAHs	HM A /TRH/BTEX	TRH/BTEX/Lead	TRH/BTEX	PAHs	VOCs	Asbestos	pH / CEC (cation exchange)	pH / EC (electrical conductivity)	sPOCAS	Phenols			TCLP PAHs	TCLP HM A	TCLP HM B
	X					X					X					
	X					X					X					
	X					X					X					
	X					X					X					
	X					X					X					
	X					X					X					
	X					X					X					
		X														
				X												
				X												
		X														

Comments

HM A
Arsenic
Cadmium
Chromium
Copper
Lead
Mercury
Nickel
ZinC

HM B
Arsenic
Cadmium
Chromium
Lead
Mercury
Nickel

SGS Alexandria EHS
SE156129 COC
Received: 18 – Aug – 2016

LABORATORY TURNAROUND
- [X] Standard
- [ ] 24 Hours
- [ ] 48 Hours
- [ ] 72 Hours
- [ ] Other_____

Investigator: I attest that these samples were collected in accordance with standard EI field sampling procedures.

Sampler's Comments:

Container Type:
J= solvent washed, acid rinsed, Teflon sealed, glass jaR
S= solvent washed, acid rinsed glass bottle
P= natural HDPE plastic bottle
VC= glass vial, Teflon Septum
ZLB = Zip Lock Bag

	Sampler's Name (EI):	Received by (SGS):
	Aimee McAllister	
Print	AMcA	Print Seba
Signature	17/08/16	Signature
Date		Date 18/08/16 @12:30

IMPORTANT:
Please e-mail laboratory results to: lab@eiaustralia.com.au

clp - 14.2

Environmental Investigations Australia
Contamination | Remediation | Geotechnical
Suite 6.01, 55 Miller Street
PYRMONT NSW 2009
Ph: 9516 0722
lab@eiaustralia.com.au

SAMPLE RECEIPT ADVICE

SE156129

CLIENT DETAILS

Contact	Aimee McAllister
Client	Environmental Investigations
Address	Suite 6.01, 55 Miller Street NSW 2009
Telephone	02 9516 0722
Facsimile	02 9516 0741
Email	Aimee.Mcallister@eiaustralia.com.au
Project	**E22282 - 12-24 Rothschild Ave Rosebery**
Order Number	**E22282**
Samples	8

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
Samples Received	Thu 18/8/2016
Report Due	Thu 25/8/2016
SGS Reference	**SE156129**

SUBMISSION DETAILS

This is to confirm that 8 samples were received on Thursday 18/8/2016. Results are expected to be ready by Thursday 25/8/2016. Please quote SGS reference SE156129 when making enquiries. Refer below for details relating to sample integrity upon receipt.

Sample counts by matrix	8 Waters	Type of documentation received	COC
Date documentation received	18/8/2016	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	14.2°C
Sample container provider	SGS	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes		

Unless otherwise instructed, water and bulk samples will be held for one month from date of report, and soil samples will be held for two months.

COMMENTS

SAMPLE RECEIPT ADVICE

SE156129

CLIENT DETAILS

Client Environmental Investigations

Project E22282 - 12-24 Rothschild Ave Rosebery

SUMMARY OF ANALYSIS

No.	Sample ID	Mercury (dissolved) in Water	PAH (Polynuclear Aromatic Hydrocarbons) in Water	Total Phenolics in Water	Trace Metals (Dissolved) in Water by ICPMS	TRH (Total Recoverable Hydrocarbons) in Water	VOCs in Water	Volatile Petroleum Hydrocarbons in Water
001	MW3	1	22	1	7	9	79	8
002	202M	1	22	1	7	9	79	8
003	203M	1	22	1	7	9	79	8
004	205M	1	22	1	7	9	79	8
005	GWQD1	1	-	-	7	9	79	8
006	GWTB1	-	-	-	-	-	12	-
007	GWQTS1	-	-	-	-	-	12	-
008	GWQR1	1	-	-	7	9	12	8

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

Sheet 1 of 1

Site: 12-24 Rothschild Ave, Rosebery

Project No: E22287

Laboratory: **Envirolab Services**
12 Ashley Street,
CHATSWOOD NSW 2067
P: 02 9910 6200

Sample ID	Laboratory ID	Container, Type	Sampling Date	Sampling Time	Sample Matrix: WATER	SOIL	OTHERS (i.e. Fibro, Paint, etc.)	Analysis: HM A /TRH/BTEX/PAHs OCP/OP/PCB/Asbestos	HM A /TRH/BTEX/PAHs	HM A /TRH/BTEX	TRH/BTEX/Lead	TRH/BTEX	PAHs	VOCs	Asbestos	pH / CEC (cation exchange)	pH / EC (electrical conductivity)	sPOCAS				TCLP PAHs	TCLP HM A	TCLP HM B
GWBT1	(1)		17/08		X					X														

Comments

HM A
Arsenic
Cadmium
Chromium
Copper
Lead
Mercury
Nickel
Zinc

HM B
Arsenic
Cadmium
Chromium
Lead
Mercury
Nickel

ENVIROLAB GROUP

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

Job No: 152050

Date Received: 18/8/2016

Time Received: 13.15

Received by: R

Temp: Cool/Ambient 9.7

Cooling: Ice/Icepack

Security: Intact/Broken/None

LABORATORY TURNAROUND

- [X] Standard
- [ ] 24 Hours
- [ ] 48 Hours
- [ ] 72 Hours
- [ ] Other_____

Investigator: I attest that these samples were collected in accordance with standard EI field sampling procedures.

Sampler's Comments:

Container Type:
J= solvent washed, acid rinsed, Teflon sealed, glass jaR
S= solvent washed, acid rinsed glass bottle
P= natural HDPE plastic bottle
VC= glass vial, Teflon Septum
ZLB = Zip-Lock Bag

Sampler's Name (EI):	Received by (SGS):
Aimee McAllister	P. Raj
Print AMc	*Print* PR
Signature	*Signature*
17/08/16	18/8/2016
Date	*Date* 13.15

IMPORTANT:
Please e-mail laboratory results to: lab@eiaustralia.com.au

eiaustralia
Contamination | Remediation | Geotechnical
Suite 6.01, 55 Miller Street, PYRMONT NSW 2009
Ph: 9516 0722
lab@eiaustralia.com.au

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

SAMPLE RECEIPT ADVICE

Client Details	
Client	EI Australia
Attention	A McAllister

Sample Login Details	
Your Reference	E22282, Rosebery
Envirolab Reference	**152056**
Date Sample Received	18/08/2016
Date Instructions Received	18/08/2016
Date Results Expected to be Reported	**25/08/2016**

Sample Condition	
Samples received in appropriate condition for analysis	YES
No. of Samples Provided	1 Water
Turnaround Time Requested	Standard
Temperature on receipt (°C)	9.7
Cooling Method	Ice Pack
Sampling Date Provided	YES

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

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	Phone: 02 9910 6200
Fax: 02 9910 6201	Fax: 02 9910 6201
Email: ahie@envirolabservices.com.au	Email: jhurst@envirolabservices.com.au

Sample and Testing Details on following page

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 Id	*vTRH(C6-C10)/BTEXN in Water*	*svTRH (C10-C40) in Water*	*HM in water - dissolved*
GWQT1	✓	✓	✓

APPENDIX E
Laboratory Analytical Reports

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Emmanuel Woelders
Client	Environmental Investigations
Address	Suite 6.01, 55 Miller Street NSW 2009
Telephone	02 9516 0722
Facsimile	02 9516 0741
Email	Emmanuel.Woelders@eiaustralia.com.au
Project	**E22282 - 12-24 Rothschild Ave, Rosebery**
Order Number	**E22282**
Samples	17

LABORATORY DETAILS

Manager	Huong Crawford
Laboratory	SGS Alexandria Environmental
Address	Unit 16, 33 Maddox St Alexandria NSW 2015
Telephone	+61 2 8594 0400
Facsimile	+61 2 8594 0499
Email	au.environmental.sydney@sgs.com
SGS Reference	**SE155671 R0**
Date Received	8/8/2016
Date Reported	15/8/2016

COMMENTS

Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562(4354).

No respirable fibres detected in all samples using trace analysis technique.

Asbestos analysed by Approved Identifier Yusuf Kuthpudin.

SIGNATORIES

Andy Sutton
Senior Organic Chemist

Dong Liang
Metals/Inorganics Team Leader

Kamrul Ahsan
Senior Chemist

Ly Kim Ha
Organic Section Head

Yusuf Kuthpudin
Asbestos Analyst

VOC's in Soil [AN433] Tested: 10/8/2016

PARAMETER	UOM	LOR	BH202_0.1-0.2 SOIL - 6/8/2016 SE155671.001	BH202_0.8-0.9 SOIL - 6/8/2016 SE155671.002	BH206_0.35-0.45 SOIL - 6/8/2016 SE155671.003	BH206_1.3-1.4 SOIL - 6/8/2016 SE155671.004	BH207_0.3-0.4 SOIL - 6/8/2016 SE155671.005
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Xylenes*	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorodifluoromethane (CFC-12)	mg/kg	1	<1	-	<1	-	<1
Chloromethane	mg/kg	1	<1	-	<1	-	<1
Vinyl chloride (Chloroethene)	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
Bromomethane	mg/kg	1	<1	-	<1	-	<1
Chloroethane	mg/kg	1	<1	-	<1	-	<1
Trichlorofluoromethane	mg/kg	1	<1	-	<1	-	<1
Acetone (2-propanone)	mg/kg	10	<10	-	<10	-	<10
Iodomethane	mg/kg	5	<5	-	<5	-	<5
1,1-dichloroethene	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
Acrylonitrile	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
Dichloromethane (Methylene chloride)	mg/kg	0.5	<0.5	-	<0.5	-	<0.5
Allyl chloride	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
Carbon disulfide	mg/kg	0.5	<0.5	-	<0.5	-	<0.5
trans-1,2-dichloroethene	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
MtBE (Methyl-tert-butyl ether)	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
1,1-dichloroethane	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
Vinyl acetate	mg/kg	10	<10	-	<10	-	<10
MEK (2-butanone)	mg/kg	10	<10	-	<10	-	<10
cis-1,2-dichloroethene	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
Bromochloromethane	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
Chloroform	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
2,2-dichloropropane	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
1,2-dichloroethane	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
1,1,1-trichloroethane	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
1,1-dichloropropene	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
Carbon tetrachloride	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
Dibromomethane	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
1,2-dichloropropane	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
Trichloroethene (Trichloroethylene -TCE)	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
2-nitropropane	mg/kg	10	<10	-	<10	-	<10
Bromodichloromethane	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
MIBK (4-methyl-2-pentanone)	mg/kg	1	<1	-	<1	-	<1
cis-1,3-dichloropropene	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
trans-1,3-dichloropropene	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
1,1,2-trichloroethane	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
1,3-dichloropropane	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
Chlorodibromomethane	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
2-hexanone (MBK)	mg/kg	5	<5	-	<5	-	<5
1,2-dibromoethane (EDB)	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
Tetrachloroethene (Perchloroethylene,PCE)	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
1,1,1,2-tetrachloroethane	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
Chlorobenzene	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
Bromoform	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
cis-1,4-dichloro-2-butene	mg/kg	1	<1	-	<1	-	<1
Styrene (Vinyl benzene)	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
1,1,2,2-tetrachloroethane	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
1,2,3-trichloropropane	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
trans-1,4-dichloro-2-butene	mg/kg	1	<1	-	<1	-	<1

VOC's in Soil [AN433] Tested: 10/8/2016 (continued)

PARAMETER	UOM	LOR	BH202_0.1-0.2 SOIL - 6/8/2016 SE155671.001	BH202_0.8-0.9 SOIL - 6/8/2016 SE155671.002	BH206_0.35-0.45 SOIL - 6/8/2016 SE155671.003	BH206_1.3-1.4 SOIL - 6/8/2016 SE155671.004	BH207_0.3-0.4 SOIL - 6/8/2016 SE155671.005
Isopropylbenzene (Cumene)	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
Bromobenzene	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
n-propylbenzene	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
2-chlorotoluene	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
4-chlorotoluene	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
1,3,5-trimethylbenzene	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
tert-butylbenzene	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
1,2,4-trimethylbenzene	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
sec-butylbenzene	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
1,3-dichlorobenzene	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
1,4-dichlorobenzene	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
p-isopropyltoluene	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
1,2-dichlorobenzene	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
n-butylbenzene	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
1,2-dibromo-3-chloropropane	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
1,2,4-trichlorobenzene	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
Hexachlorobutadiene	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
1,2,3-trichlorobenzene	mg/kg	0.1	<0.1	-	<0.1	-	<0.1
Total VOC*	mg/kg	24	-	-	-	-	-

VOC's in Soil [AN433] Tested: 10/8/2016 (continued)

PARAMETER	UOM	LOR	BH207_0.8-0.9 SOIL - 6/8/2016 SE155671.006	BH208_0.1-0.2 SOIL - 6/8/2016 SE155671.007	BH208_0.7-0.8 SOIL - 6/8/2016 SE155671.008	BH209_0.1-0.2 SOIL - 6/8/2016 SE155671.009	BH209_0.7-0.8 SOIL - 6/8/2016 SE155671.010
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Xylenes*	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorodifluoromethane (CFC-12)	mg/kg	1	-	<1	-	<1	-
Chloromethane	mg/kg	1	-	<1	-	<1	-
Vinyl chloride (Chloroethene)	mg/kg	0.1	-	<0.1	-	<0.1	-
Bromomethane	mg/kg	1	-	<1	-	<1	-
Chloroethane	mg/kg	1	-	<1	-	<1	-
Trichlorofluoromethane	mg/kg	1	-	<1	-	<1	-
Acetone (2-propanone)	mg/kg	10	-	<10	-	<10	-
Iodomethane	mg/kg	5	-	<5	-	<5	-
1,1-dichloroethene	mg/kg	0.1	-	<0.1	-	<0.1	-
Acrylonitrile	mg/kg	0.1	-	<0.1	-	<0.1	-
Dichloromethane (Methylene chloride)	mg/kg	0.5	-	<0.5	-	<0.5	-
Allyl chloride	mg/kg	0.1	-	<0.1	-	<0.1	-
Carbon disulfide	mg/kg	0.5	-	<0.5	-	<0.5	-
trans-1,2-dichloroethene	mg/kg	0.1	-	<0.1	-	<0.1	-
MtBE (Methyl-tert-butyl ether)	mg/kg	0.1	-	<0.1	-	<0.1	-
1,1-dichloroethane	mg/kg	0.1	-	<0.1	-	<0.1	-
Vinyl acetate	mg/kg	10	-	<10	-	<10	-
MEK (2-butanone)	mg/kg	10	-	<10	-	<10	-
cis-1,2-dichloroethene	mg/kg	0.1	-	<0.1	-	<0.1	-
Bromochloromethane	mg/kg	0.1	-	<0.1	-	<0.1	-
Chloroform	mg/kg	0.1	-	<0.1	-	<0.1	-
2,2-dichloropropane	mg/kg	0.1	-	<0.1	-	<0.1	-
1,2-dichloroethane	mg/kg	0.1	-	<0.1	-	<0.1	-
1,1,1-trichloroethane	mg/kg	0.1	-	<0.1	-	<0.1	-
1,1-dichloropropene	mg/kg	0.1	-	<0.1	-	<0.1	-
Carbon tetrachloride	mg/kg	0.1	-	<0.1	-	<0.1	-
Dibromomethane	mg/kg	0.1	-	<0.1	-	<0.1	-
1,2-dichloropropane	mg/kg	0.1	-	<0.1	-	<0.1	-
Trichloroethene (Trichloroethylene -TCE)	mg/kg	0.1	-	<0.1	-	<0.1	-
2-nitropropane	mg/kg	10	-	<10	-	<10	-
Bromodichloromethane	mg/kg	0.1	-	<0.1	-	<0.1	-
MIBK (4-methyl-2-pentanone)	mg/kg	1	-	<1	-	<1	-
cis-1,3-dichloropropene	mg/kg	0.1	-	<0.1	-	<0.1	-
trans-1,3-dichloropropene	mg/kg	0.1	-	<0.1	-	<0.1	-
1,1,2-trichloroethane	mg/kg	0.1	-	<0.1	-	<0.1	-
1,3-dichloropropane	mg/kg	0.1	-	<0.1	-	<0.1	-
Chlorodibromomethane	mg/kg	0.1	-	<0.1	-	<0.1	-
2-hexanone (MBK)	mg/kg	5	-	<5	-	<5	-
1,2-dibromoethane (EDB)	mg/kg	0.1	-	<0.1	-	<0.1	-
Tetrachloroethene (Perchloroethylene,PCE)	mg/kg	0.1	-	<0.1	-	<0.1	-
1,1,1,2-tetrachloroethane	mg/kg	0.1	-	<0.1	-	<0.1	-
Chlorobenzene	mg/kg	0.1	-	<0.1	-	<0.1	-
Bromoform	mg/kg	0.1	-	<0.1	-	<0.1	-
cis-1,4-dichloro-2-butene	mg/kg	1	-	<1	-	<1	-
Styrene (Vinyl benzene)	mg/kg	0.1	-	<0.1	-	<0.1	-
1,1,2,2-tetrachloroethane	mg/kg	0.1	-	<0.1	-	<0.1	-
1,2,3-trichloropropane	mg/kg	0.1	-	<0.1	-	<0.1	-
trans-1,4-dichloro-2-butene	mg/kg	1	-	<1	-	<1	-

VOC's in Soil [AN433] Tested: 10/8/2016 (continued)

PARAMETER	UOM	LOR	BH207_0.8-0.9 SOIL - 6/8/2016 SE155671.006	BH208_0.1-0.2 SOIL - 6/8/2016 SE155671.007	BH208_0.7-0.8 SOIL - 6/8/2016 SE155671.008	BH209_0.1-0.2 SOIL - 6/8/2016 SE155671.009	BH209_0.7-0.8 SOIL - 6/8/2016 SE155671.010
Isopropylbenzene (Cumene)	mg/kg	0.1	-	<0.1	-	<0.1	-
Bromobenzene	mg/kg	0.1	-	<0.1	-	<0.1	-
n-propylbenzene	mg/kg	0.1	-	<0.1	-	<0.1	-
2-chlorotoluene	mg/kg	0.1	-	<0.1	-	<0.1	-
4-chlorotoluene	mg/kg	0.1	-	<0.1	-	<0.1	-
1,3,5-trimethylbenzene	mg/kg	0.1	-	<0.1	-	<0.1	-
tert-butylbenzene	mg/kg	0.1	-	<0.1	-	<0.1	-
1,2,4-trimethylbenzene	mg/kg	0.1	-	<0.1	-	<0.1	-
sec-butylbenzene	mg/kg	0.1	-	<0.1	-	<0.1	-
1,3-dichlorobenzene	mg/kg	0.1	-	<0.1	-	<0.1	-
1,4-dichlorobenzene	mg/kg	0.1	-	<0.1	-	<0.1	-
p-isopropyltoluene	mg/kg	0.1	-	<0.1	-	<0.1	-
1,2-dichlorobenzene	mg/kg	0.1	-	<0.1	-	<0.1	-
n-butylbenzene	mg/kg	0.1	-	<0.1	-	<0.1	-
1,2-dibromo-3-chloropropane	mg/kg	0.1	-	<0.1	-	<0.1	-
1,2,4-trichlorobenzene	mg/kg	0.1	-	<0.1	-	<0.1	-
Hexachlorobutadiene	mg/kg	0.1	-	<0.1	-	<0.1	-
1,2,3-trichlorobenzene	mg/kg	0.1	-	<0.1	-	<0.1	-
Total VOC*	mg/kg	24	-	-	-	-	-

VOC's in Soil [AN433] Tested: 10/8/2016 (continued)

PARAMETER	UOM	LOR	BH210_0.2-0.4 SOIL - 6/8/2016 SE155671.011	BH210_0.7-0.8 SOIL - 6/8/2016 SE155671.012	BH211_0.3-0.4 SOIL - 6/8/2016 SE155671.013	QD100 SOIL - 6/8/2016 SE155671.014	QTB100 SOIL - 6/8/2016 SE155671.016
Benzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Toluene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Ethylbenzene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
m/p-xylene	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o-xylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Total Xylenes*	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Total BTEX	mg/kg	0.6	<0.6	<0.6	<0.6	<0.6	<0.6
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorodifluoromethane (CFC-12)	mg/kg	1	<1	-	<1	-	-
Chloromethane	mg/kg	1	<1	-	<1	-	-
Vinyl chloride (Chloroethene)	mg/kg	0.1	<0.1	-	<0.1	-	-
Bromomethane	mg/kg	1	<1	-	<1	-	-
Chloroethane	mg/kg	1	<1	-	<1	-	-
Trichlorofluoromethane	mg/kg	1	<1	-	<1	-	-
Acetone (2-propanone)	mg/kg	10	<10	-	<10	-	-
Iodomethane	mg/kg	5	<5	-	<5	-	-
1,1-dichloroethene	mg/kg	0.1	<0.1	-	<0.1	-	-
Acrylonitrile	mg/kg	0.1	<0.1	-	<0.1	-	-
Dichloromethane (Methylene chloride)	mg/kg	0.5	<0.5	-	<0.5	-	-
Allyl chloride	mg/kg	0.1	<0.1	-	<0.1	-	-
Carbon disulfide	mg/kg	0.5	<0.5	-	<0.5	-	-
trans-1,2-dichloroethene	mg/kg	0.1	<0.1	-	<0.1	-	-
MtBE (Methyl-tert-butyl ether)	mg/kg	0.1	<0.1	-	<0.1	-	-
1,1-dichloroethane	mg/kg	0.1	<0.1	-	<0.1	-	-
Vinyl acetate	mg/kg	10	<10	-	<10	-	-
MEK (2-butanone)	mg/kg	10	<10	-	<10	-	-
cis-1,2-dichloroethene	mg/kg	0.1	<0.1	-	<0.1	-	-
Bromochloromethane	mg/kg	0.1	<0.1	-	<0.1	-	-
Chloroform	mg/kg	0.1	<0.1	-	<0.1	-	-
2,2-dichloropropane	mg/kg	0.1	<0.1	-	<0.1	-	-
1,2-dichloroethane	mg/kg	0.1	<0.1	-	<0.1	-	-
1,1,1-trichloroethane	mg/kg	0.1	<0.1	-	<0.1	-	-
1,1-dichloropropene	mg/kg	0.1	<0.1	-	<0.1	-	-
Carbon tetrachloride	mg/kg	0.1	<0.1	-	<0.1	-	-
Dibromomethane	mg/kg	0.1	<0.1	-	<0.1	-	-
1,2-dichloropropane	mg/kg	0.1	<0.1	-	<0.1	-	-
Trichloroethene (Trichloroethylene -TCE)	mg/kg	0.1	<0.1	-	<0.1	-	-
2-nitropropane	mg/kg	10	<10	-	<10	-	-
Bromodichloromethane	mg/kg	0.1	<0.1	-	<0.1	-	-
MIBK (4-methyl-2-pentanone)	mg/kg	1	<1	-	<1	-	-
cis-1,3-dichloropropene	mg/kg	0.1	<0.1	-	<0.1	-	-
trans-1,3-dichloropropene	mg/kg	0.1	<0.1	-	<0.1	-	-
1,1,2-trichloroethane	mg/kg	0.1	<0.1	-	<0.1	-	-
1,3-dichloropropane	mg/kg	0.1	<0.1	-	<0.1	-	-
Chlorodibromomethane	mg/kg	0.1	<0.1	-	<0.1	-	-
2-hexanone (MBK)	mg/kg	5	<5	-	<5	-	-
1,2-dibromoethane (EDB)	mg/kg	0.1	<0.1	-	<0.1	-	-
Tetrachloroethene (Perchloroethylene,PCE)	mg/kg	0.1	<0.1	-	<0.1	-	-
1,1,1,2-tetrachloroethane	mg/kg	0.1	<0.1	-	<0.1	-	-
Chlorobenzene	mg/kg	0.1	<0.1	-	<0.1	-	-
Bromoform	mg/kg	0.1	<0.1	-	<0.1	-	-
cis-1,4-dichloro-2-butene	mg/kg	1	<1	-	<1	-	-
Styrene (Vinyl benzene)	mg/kg	0.1	<0.1	-	<0.1	-	-
1,1,2,2-tetrachloroethane	mg/kg	0.1	<0.1	-	<0.1	-	-
1,2,3-trichloropropane	mg/kg	0.1	<0.1	-	<0.1	-	-
trans-1,4-dichloro-2-butene	mg/kg	1	<1	-	<1	-	-

VOC's in Soil [AN433] Tested: 10/8/2016 (continued)

PARAMETER	UOM	LOR	BH210_0.2-0.4 SOIL - 6/8/2016 SE155671.011	BH210_0.7-0.8 SOIL - 6/8/2016 SE155671.012	BH211_0.3-0.4 SOIL - 6/8/2016 SE155671.013	QD100 SOIL - 6/8/2016 SE155671.014	QTB100 SOIL - 6/8/2016 SE155671.016
Isopropylbenzene (Cumene)	mg/kg	0.1	<0.1	-	<0.1	-	-
Bromobenzene	mg/kg	0.1	<0.1	-	<0.1	-	-
n-propylbenzene	mg/kg	0.1	<0.1	-	<0.1	-	-
2-chlorotoluene	mg/kg	0.1	<0.1	-	<0.1	-	-
4-chlorotoluene	mg/kg	0.1	<0.1	-	<0.1	-	-
1,3,5-trimethylbenzene	mg/kg	0.1	<0.1	-	<0.1	-	-
tert-butylbenzene	mg/kg	0.1	<0.1	-	<0.1	-	-
1,2,4-trimethylbenzene	mg/kg	0.1	<0.1	-	<0.1	-	-
sec-butylbenzene	mg/kg	0.1	<0.1	-	<0.1	-	-
1,3-dichlorobenzene	mg/kg	0.1	<0.1	-	<0.1	-	-
1,4-dichlorobenzene	mg/kg	0.1	<0.1	-	<0.1	-	-
p-isopropyltoluene	mg/kg	0.1	<0.1	-	<0.1	-	-
1,2-dichlorobenzene	mg/kg	0.1	<0.1	-	<0.1	-	-
n-butylbenzene	mg/kg	0.1	<0.1	-	<0.1	-	-
1,2-dibromo-3-chloropropane	mg/kg	0.1	<0.1	-	<0.1	-	-
1,2,4-trichlorobenzene	mg/kg	0.1	<0.1	-	<0.1	-	-
Hexachlorobutadiene	mg/kg	0.1	<0.1	-	<0.1	-	-
1,2,3-trichlorobenzene	mg/kg	0.1	<0.1	-	<0.1	-	-
Total VOC*	mg/kg	24	-	-	-	-	-

VOC's in Soil [AN433] Tested: 10/8/2016 (continued)

PARAMETER	UOM	LOR	QTS100 SOIL - 6/8/2016 SE155671.017
Benzene	mg/kg	0.1	[84%]
Toluene	mg/kg	0.1	[87%]
Ethylbenzene	mg/kg	0.1	[85%]
m/p-xylene	mg/kg	0.2	[83%]
o-xylene	mg/kg	0.1	[90%]
Total Xylenes*	mg/kg	0.3	-
Total BTEX	mg/kg	0.6	-
Naphthalene	mg/kg	0.1	<0.1
Dichlorodifluoromethane (CFC-12)	mg/kg	1	-
Chloromethane	mg/kg	1	-
Vinyl chloride (Chloroethene)	mg/kg	0.1	-
Bromomethane	mg/kg	1	-
Chloroethane	mg/kg	1	-
Trichlorofluoromethane	mg/kg	1	-
Acetone (2-propanone)	mg/kg	10	-
Iodomethane	mg/kg	5	-
1,1-dichloroethene	mg/kg	0.1	-
Acrylonitrile	mg/kg	0.1	-
Dichloromethane (Methylene chloride)	mg/kg	0.5	-
Allyl chloride	mg/kg	0.1	-
Carbon disulfide	mg/kg	0.5	-
trans-1,2-dichloroethene	mg/kg	0.1	-
MtBE (Methyl-tert-butyl ether)	mg/kg	0.1	-
1,1-dichloroethane	mg/kg	0.1	-
Vinyl acetate	mg/kg	10	-
MEK (2-butanone)	mg/kg	10	-
cis-1,2-dichloroethene	mg/kg	0.1	-
Bromochloromethane	mg/kg	0.1	-
Chloroform	mg/kg	0.1	-
2,2-dichloropropane	mg/kg	0.1	-
1,2-dichloroethane	mg/kg	0.1	-
1,1,1-trichloroethane	mg/kg	0.1	-
1,1-dichloropropene	mg/kg	0.1	-
Carbon tetrachloride	mg/kg	0.1	-
Dibromomethane	mg/kg	0.1	-
1,2-dichloropropane	mg/kg	0.1	-
Trichloroethene (Trichloroethylene -TCE)	mg/kg	0.1	-
2-nitropropane	mg/kg	10	-
Bromodichloromethane	mg/kg	0.1	-
MIBK (4-methyl-2-pentanone)	mg/kg	1	-
cis-1,3-dichloropropene	mg/kg	0.1	-
trans-1,3-dichloropropene	mg/kg	0.1	-
1,1,2-trichloroethane	mg/kg	0.1	-
1,3-dichloropropane	mg/kg	0.1	-
Chlorodibromomethane	mg/kg	0.1	-
2-hexanone (MBK)	mg/kg	5	-
1,2-dibromoethane (EDB)	mg/kg	0.1	-
Tetrachloroethene (Perchloroethylene,PCE)	mg/kg	0.1	-
1,1,1,2-tetrachloroethane	mg/kg	0.1	-
Chlorobenzene	mg/kg	0.1	-
Bromoform	mg/kg	0.1	-
cis-1,4-dichloro-2-butene	mg/kg	1	-
Styrene (Vinyl benzene)	mg/kg	0.1	-
1,1,2,2-tetrachloroethane	mg/kg	0.1	-
1,2,3-trichloropropane	mg/kg	0.1	-
trans-1,4-dichloro-2-butene	mg/kg	1	-

VOC's in Soil [AN433] Tested: 10/8/2016 (continued)

PARAMETER	UOM	LOR	QTS100 SOIL - 6/8/2016 SE155671.017
Isopropylbenzene (Cumene)	mg/kg	0.1	-
Bromobenzene	mg/kg	0.1	-
n-propylbenzene	mg/kg	0.1	-
2-chlorotoluene	mg/kg	0.1	-
4-chlorotoluene	mg/kg	0.1	-
1,3,5-trimethylbenzene	mg/kg	0.1	-
tert-butylbenzene	mg/kg	0.1	-
1,2,4-trimethylbenzene	mg/kg	0.1	-
sec-butylbenzene	mg/kg	0.1	-
1,3-dichlorobenzene	mg/kg	0.1	-
1,4-dichlorobenzene	mg/kg	0.1	-
p-isopropyltoluene	mg/kg	0.1	-
1,2-dichlorobenzene	mg/kg	0.1	-
n-butylbenzene	mg/kg	0.1	-
1,2-dibromo-3-chloropropane	mg/kg	0.1	-
1,2,4-trichlorobenzene	mg/kg	0.1	-
Hexachlorobutadiene	mg/kg	0.1	-
1,2,3-trichlorobenzene	mg/kg	0.1	-
Total VOC*	mg/kg	24	-

Volatile Petroleum Hydrocarbons in Soil [AN433] Tested: 10/8/2016

PARAMETER	UOM	LOR	BH202_0.1-0.2 SOIL - 6/8/2016 SE155671.001	BH202_0.8-0.9 SOIL - 6/8/2016 SE155671.002	BH206_0.35-0.45 SOIL - 6/8/2016 SE155671.003	BH206_1.3-1.4 SOIL - 6/8/2016 SE155671.004	BH207_0.3-0.4 SOIL - 6/8/2016 SE155671.005
TRH C6-C9	mg/kg	20	<20	<20	<20	<20	<20
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TRH C6-C10	mg/kg	25	<25	<25	<25	<25	<25
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25	<25	<25

PARAMETER	UOM	LOR	BH207_0.8-0.9 SOIL - 6/8/2016 SE155671.006	BH208_0.1-0.2 SOIL - 6/8/2016 SE155671.007	BH208_0.7-0.8 SOIL - 6/8/2016 SE155671.008	BH209_0.1-0.2 SOIL - 6/8/2016 SE155671.009	BH209_0.7-0.8 SOIL - 6/8/2016 SE155671.010
TRH C6-C9	mg/kg	20	<20	<20	<20	<20	<20
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
TRH C6-C10	mg/kg	25	<25	<25	<25	<25	<25
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25	<25	<25

PARAMETER	UOM	LOR	BH210_0.2-0.4 SOIL - 6/8/2016 SE155671.011	BH210_0.7-0.8 SOIL - 6/8/2016 SE155671.012	BH211_0.3-0.4 SOIL - 6/8/2016 SE155671.013	QD100 SOIL - 6/8/2016 SE155671.014
TRH C6-C9	mg/kg	20	<20	<20	<20	<20
Benzene (F0)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
TRH C6-C10	mg/kg	25	<25	<25	<25	<25
TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	<25	<25

TRH (Total Recoverable Hydrocarbons) in Soil [AN403] Tested: 10/8/2016

PARAMETER	UOM	LOR	BH202_0.1-0.2 SOIL - 6/8/2016 SE155671.001	BH202_0.8-0.9 SOIL - 6/8/2016 SE155671.002	BH206_0.35-0.45 SOIL - 6/8/2016 SE155671.003	BH206_1.3-1.4 SOIL - 6/8/2016 SE155671.004	BH207_0.3-0.4 SOIL - 6/8/2016 SE155671.005
TRH C10-C14	mg/kg	20	<20	<20	<20	<20	<20
TRH C15-C28	mg/kg	45	<45	<45	<45	<45	<45
TRH C29-C36	mg/kg	45	<45	<45	<45	<45	<45
TRH C37-C40	mg/kg	100	<100	<100	<100	<100	<100
TRH >C10-C16 (F2)	mg/kg	25	<25	<25	<25	<25	<25
TRH >C10-C16 (F2) - Naphthalene	mg/kg	25	<25	<25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	<90	<90	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	<120	<120
TRH C10-C36 Total	mg/kg	110	<110	<110	<110	<110	<110
TRH C10-C40 Total	mg/kg	210	<210	<210	<210	<210	<210

PARAMETER	UOM	LOR	BH207_0.8-0.9 SOIL - 6/8/2016 SE155671.006	BH208_0.1-0.2 SOIL - 6/8/2016 SE155671.007	BH208_0.7-0.8 SOIL - 6/8/2016 SE155671.008	BH209_0.1-0.2 SOIL - 6/8/2016 SE155671.009	BH209_0.7-0.8 SOIL - 6/8/2016 SE155671.010
TRH C10-C14	mg/kg	20	<20	<20	<20	<20	<20
TRH C15-C28	mg/kg	45	<45	<45	<45	<45	<45
TRH C29-C36	mg/kg	45	<45	<45	<45	<45	<45
TRH C37-C40	mg/kg	100	<100	<100	<100	<100	<100
TRH >C10-C16 (F2)	mg/kg	25	<25	<25	<25	<25	<25
TRH >C10-C16 (F2) - Naphthalene	mg/kg	25	<25	<25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	<90	<90	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	<120	<120
TRH C10-C36 Total	mg/kg	110	<110	<110	<110	<110	<110
TRH C10-C40 Total	mg/kg	210	<210	<210	<210	<210	<210

PARAMETER	UOM	LOR	BH210_0.2-0.4 SOIL - 6/8/2016 SE155671.011	BH210_0.7-0.8 SOIL - 6/8/2016 SE155671.012	BH211_0.3-0.4 SOIL - 6/8/2016 SE155671.013	QD100 SOIL - 6/8/2016 SE155671.014
TRH C10-C14	mg/kg	20	<20	<20	<20	<20
TRH C15-C28	mg/kg	45	<45	<45	<45	<45
TRH C29-C36	mg/kg	45	<45	<45	<45	<45
TRH C37-C40	mg/kg	100	<100	<100	<100	<100
TRH >C10-C16 (F2)	mg/kg	25	<25	<25	<25	<25
TRH >C10-C16 (F2) - Naphthalene	mg/kg	25	<25	<25	<25	<25
TRH >C16-C34 (F3)	mg/kg	90	<90	<90	<90	<90
TRH >C34-C40 (F4)	mg/kg	120	<120	<120	<120	<120
TRH C10-C36 Total	mg/kg	110	<110	<110	<110	<110
TRH C10-C40 Total	mg/kg	210	<210	<210	<210	<210

PAH (Polynuclear Aromatic Hydrocarbons) in Soil [AN420] Tested: 10/8/2016

PARAMETER	UOM	LOR	BH202_0.1-0.2 SOIL - 6/8/2016 SE155671.001	BH202_0.8-0.9 SOIL - 6/8/2016 SE155671.002	BH206_0.35-0.45 SOIL - 6/8/2016 SE155671.003	BH206_1.3-1.4 SOIL - 6/8/2016 SE155671.004	BH207_0.3-0.4 SOIL - 6/8/2016 SE155671.005
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	<0.1	<0.1	**0.2**	<0.1	<0.1
Pyrene	mg/kg	0.1	<0.1	<0.1	**0.2**	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	**0.2**	<0.1	<0.1
Chrysene	mg/kg	0.1	<0.1	<0.1	**0.2**	<0.1	<0.1
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	**0.2**	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	**0.1**	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	**0.1**	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	**0.1**	<0.1	<0.1
Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	**0.1**	<0.1	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	<0.2	**0.2**	<0.2	<0.2
Total PAH (18)	mg/kg	0.8	<0.8	<0.8	**1.5**	<0.8	<0.8
Total PAH (NEPM/WHO 16)	mg/kg	0.8	<0.8	<0.8	**1.5**	<0.8	<0.8

PARAMETER	UOM	LOR	BH207_0.8-0.9 SOIL - 6/8/2016 SE155671.006	BH208_0.1-0.2 SOIL - 6/8/2016 SE155671.007	BH208_0.7-0.8 SOIL - 6/8/2016 SE155671.008	BH209_0.1-0.2 SOIL - 6/8/2016 SE155671.009	BH209_0.7-0.8 SOIL - 6/8/2016 SE155671.010
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	**0.1**	<0.1	<0.1
Anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	<0.1	**0.2**	**0.3**	<0.1	<0.1
Pyrene	mg/kg	0.1	<0.1	**0.2**	**0.4**	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1	**0.2**	**0.2**	<0.1	<0.1
Chrysene	mg/kg	0.1	<0.1	**0.2**	**0.2**	<0.1	<0.1
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	**0.1**	**0.1**	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	<0.1	**0.1**	**0.1**	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	**0.1**	**0.1**	<0.1	<0.1
Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	**0.1**	**0.1**	<0.1	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	**0.2**	**0.2**	<0.2	<0.2
Total PAH (18)	mg/kg	0.8	<0.8	**1.3**	**1.4**	<0.8	<0.8
Total PAH (NEPM/WHO 16)	mg/kg	0.8	<0.8	**1.3**	**1.4**	<0.8	<0.8

PAH (Polynuclear Aromatic Hydrocarbons) in Soil [AN420] Tested: 10/8/2016 (continued)

PARAMETER	UOM	LOR	BH210_0.2-0.4 SOIL - 6/8/2016 SE155671.011	BH210_0.7-0.8 SOIL - 6/8/2016 SE155671.012	BH211_0.3-0.4 SOIL - 6/8/2016 SE155671.013
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1
2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	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	0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.1	<0.1	<0.1	<0.1
Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1
Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	<0.1
Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ	0.2	<0.2	<0.2	<0.2
Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	<0.3	<0.3
Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	<0.2	<0.2
Total PAH (18)	mg/kg	0.8	<0.8	<0.8	<0.8
Total PAH (NEPM/WHO 16)	mg/kg	0.8	<0.8	<0.8	<0.8

OC Pesticides in Soil [AN400/AN420] Tested: 10/8/2016

PARAMETER	UOM	LOR	BH202_0.1-0.2 SOIL - 6/8/2016 SE155671.001	BH206_0.35-0.45 SOIL - 6/8/2016 SE155671.003	BH207_0.3-0.4 SOIL - 6/8/2016 SE155671.005	BH208_0.1-0.2 SOIL - 6/8/2016 SE155671.007	BH209_0.1-0.2 SOIL - 6/8/2016 SE155671.009
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Lindane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDE	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Endrin	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
o,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1

OC Pesticides in Soil [AN400/AN420] Tested: 10/8/2016 (continued)

PARAMETER	UOM	LOR	BH210_0.2-0.4 SOIL - 6/8/2016 SE155671.011	BH211_0.3-0.4 SOIL - 6/8/2016 SE155671.013
Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	<0.1
Alpha BHC	mg/kg	0.1	<0.1	<0.1
Lindane	mg/kg	0.1	<0.1	<0.1
Heptachlor	mg/kg	0.1	<0.1	<0.1
Aldrin	mg/kg	0.1	<0.1	<0.1
Beta BHC	mg/kg	0.1	<0.1	<0.1
Delta BHC	mg/kg	0.1	<0.1	<0.1
Heptachlor epoxide	mg/kg	0.1	<0.1	<0.1
o,p'-DDE	mg/kg	0.1	<0.1	<0.1
Alpha Endosulfan	mg/kg	0.2	<0.2	<0.2
Gamma Chlordane	mg/kg	0.1	<0.1	<0.1
Alpha Chlordane	mg/kg	0.1	<0.1	<0.1
trans-Nonachlor	mg/kg	0.1	<0.1	<0.1
p,p'-DDE	mg/kg	0.1	<0.1	<0.1
Dieldrin	mg/kg	0.2	<0.2	<0.2
Endrin	mg/kg	0.2	<0.2	<0.2
o,p'-DDD	mg/kg	0.1	<0.1	<0.1
o,p'-DDT	mg/kg	0.1	<0.1	<0.1
Beta Endosulfan	mg/kg	0.2	<0.2	<0.2
p,p'-DDD	mg/kg	0.1	<0.1	<0.1
p,p'-DDT	mg/kg	0.1	<0.1	<0.1
Endosulfan sulphate	mg/kg	0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	0.1	<0.1	<0.1
Methoxychlor	mg/kg	0.1	<0.1	<0.1
Endrin Ketone	mg/kg	0.1	<0.1	<0.1
Isodrin	mg/kg	0.1	<0.1	<0.1
Mirex	mg/kg	0.1	<0.1	<0.1

OP Pesticides in Soil [AN400/AN420] Tested: 10/8/2016

PARAMETER	UOM	LOR	BH202_0.1-0.2 SOIL - 6/8/2016 SE155671.001	BH206_0.35-0.45 SOIL - 6/8/2016 SE155671.003	BH207_0.3-0.4 SOIL - 6/8/2016 SE155671.005	BH208_0.1-0.2 SOIL - 6/8/2016 SE155671.007	BH209_0.1-0.2 SOIL - 6/8/2016 SE155671.009
Dichlorvos	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dimethoate	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fenitrothion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Methidathion	mg/kg	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethion	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2

PARAMETER	UOM	LOR	BH210_0.2-0.4 SOIL - 6/8/2016 SE155671.011	BH211_0.3-0.4 SOIL - 6/8/2016 SE155671.013
Dichlorvos	mg/kg	0.5	<0.5	<0.5
Dimethoate	mg/kg	0.5	<0.5	<0.5
Diazinon (Dimpylate)	mg/kg	0.5	<0.5	<0.5
Fenitrothion	mg/kg	0.2	<0.2	<0.2
Malathion	mg/kg	0.2	<0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2	<0.2
Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2	<0.2
Bromophos Ethyl	mg/kg	0.2	<0.2	<0.2
Methidathion	mg/kg	0.5	<0.5	<0.5
Ethion	mg/kg	0.2	<0.2	<0.2
Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2	<0.2

PCBs in Soil [AN400/AN420] Tested: 10/8/2016

PARAMETER	UOM	LOR	BH202_0.1-0.2 SOIL - 6/8/2016 SE155671.001	BH206_0.35-0.45 SOIL - 6/8/2016 SE155671.003	BH207_0.3-0.4 SOIL - 6/8/2016 SE155671.005	BH208_0.1-0.2 SOIL - 6/8/2016 SE155671.007	BH209_0.1-0.2 SOIL - 6/8/2016 SE155671.009
Arochlor 1016	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1221	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1232	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1242	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1248	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1254	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1260	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1262	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Arochlor 1268	mg/kg	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total PCBs (Arochlors)	mg/kg	1	<1	<1	<1	<1	<1

PARAMETER	UOM	LOR	BH210_0.2-0.4 SOIL - 6/8/2016 SE155671.011	BH211_0.3-0.4 SOIL - 6/8/2016 SE155671.013
Arochlor 1016	mg/kg	0.2	<0.2	<0.2
Arochlor 1221	mg/kg	0.2	<0.2	<0.2
Arochlor 1232	mg/kg	0.2	<0.2	<0.2
Arochlor 1242	mg/kg	0.2	<0.2	<0.2
Arochlor 1248	mg/kg	0.2	<0.2	<0.2
Arochlor 1254	mg/kg	0.2	<0.2	<0.2
Arochlor 1260	mg/kg	0.2	<0.2	<0.2
Arochlor 1262	mg/kg	0.2	<0.2	<0.2
Arochlor 1268	mg/kg	0.2	<0.2	<0.2
Total PCBs (Arochlors)	mg/kg	1	<1	<1

Total Phenolics in Soil [AN289] Tested: 12/8/2016

PARAMETER	UOM	LOR	BH202_0.1-0.2 SOIL - 6/8/2016 SE155671.001	BH206_0.35-0.45 SOIL - 6/8/2016 SE155671.003	BH207_0.3-0.4 SOIL - 6/8/2016 SE155671.005	BH208_0.1-0.2 SOIL - 6/8/2016 SE155671.007	BH209_0.1-0.2 SOIL - 6/8/2016 SE155671.009
Total Phenols	mg/kg	0.1	1.1	0.5	0.2	0.2	0.2

PARAMETER	UOM	LOR	BH210_0.2-0.4 SOIL - 6/8/2016 SE155671.011	BH211_0.3-0.4 SOIL - 6/8/2016 SE155671.013
Total Phenols	mg/kg	0.1	0.2	0.4

Total Recoverable Metals in Soil/Waste Solids/Materials by ICPOES [AN040/AN320] Tested: 12/8/2016

PARAMETER	UOM	LOR	BH202_0.1-0.2 SOIL - 6/8/2016 SE155671.001	BH202_0.8-0.9 SOIL - 6/8/2016 SE155671.002	BH206_0.35-0.45 SOIL - 6/8/2016 SE155671.003	BH206_1.3-1.4 SOIL - 6/8/2016 SE155671.004	BH207_0.3-0.4 SOIL - 6/8/2016 SE155671.005
Arsenic, As	mg/kg	3	3	<3	<3	<3	<3
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.3	1.9	2.1	0.8	1.7	2.7
Copper, Cu	mg/kg	0.5	13	8.2	2.1	<0.5	1.8
Lead, Pb	mg/kg	1	36	3	10	1	4
Nickel, Ni	mg/kg	0.5	1.6	0.6	<0.5	<0.5	0.9
Zinc, Zn	mg/kg	0.5	120	9.0	2.6	0.9	3.6

PARAMETER	UOM	LOR	BH207_0.8-0.9 SOIL - 6/8/2016 SE155671.006	BH208_0.1-0.2 SOIL - 6/8/2016 SE155671.007	BH208_0.7-0.8 SOIL - 6/8/2016 SE155671.008	BH209_0.1-0.2 SOIL - 6/8/2016 SE155671.009	BH209_0.7-0.8 SOIL - 6/8/2016 SE155671.010
Arsenic, As	mg/kg	3	<3	<3	<3	<3	<3
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.3	4.5	3.6	2.2	1.4	1.1
Copper, Cu	mg/kg	0.5	1.9	15	5.0	1.8	<0.5
Lead, Pb	mg/kg	1	4	33	20	5	1
Nickel, Ni	mg/kg	0.5	1.4	7.6	2.2	0.7	0.5
Zinc, Zn	mg/kg	0.5	3.6	65	34	8.0	1.3

PARAMETER	UOM	LOR	BH210_0.2-0.4 SOIL - 6/8/2016 SE155671.011	BH210_0.7-0.8 SOIL - 6/8/2016 SE155671.012	BH211_0.3-0.4 SOIL - 6/8/2016 SE155671.013	QD100 SOIL - 6/8/2016 SE155671.014
Arsenic, As	mg/kg	3	<3	<3	<3	<3
Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	<0.3	<0.3
Chromium, Cr	mg/kg	0.3	1.6	1.6	2.4	0.9
Copper, Cu	mg/kg	0.5	3.1	0.8	4.0	1.5
Lead, Pb	mg/kg	1	1	2	6	7
Nickel, Ni	mg/kg	0.5	0.5	<0.5	0.9	<0.5
Zinc, Zn	mg/kg	0.5	0.9	1.2	9.7	2.0

Mercury in Soil [AN312] Tested: 11/8/2016

PARAMETER	UOM	LOR	BH202_0.1-0.2 SOIL - 6/8/2016 SE155671.001	BH202_0.8-0.9 SOIL - 6/8/2016 SE155671.002	BH206_0.35-0.45 SOIL - 6/8/2016 SE155671.003	BH206_1.3-1.4 SOIL - 6/8/2016 SE155671.004	BH207_0.3-0.4 SOIL - 6/8/2016 SE155671.005
Mercury	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	<0.05

PARAMETER	UOM	LOR	BH207_0.8-0.9 SOIL - 6/8/2016 SE155671.006	BH208_0.1-0.2 SOIL - 6/8/2016 SE155671.007	BH208_0.7-0.8 SOIL - 6/8/2016 SE155671.008	BH209_0.1-0.2 SOIL - 6/8/2016 SE155671.009	BH209_0.7-0.8 SOIL - 6/8/2016 SE155671.010
Mercury	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05	<0.05

PARAMETER	UOM	LOR	BH210_0.2-0.4 SOIL - 6/8/2016 SE155671.011	BH210_0.7-0.8 SOIL - 6/8/2016 SE155671.012	BH211_0.3-0.4 SOIL - 6/8/2016 SE155671.013	QD100 SOIL - 6/8/2016 SE155671.014
Mercury	mg/kg	0.05	<0.05	<0.05	<0.05	<0.05

Moisture Content [AN002] Tested: 11/8/2016

PARAMETER	UOM	LOR	BH202_0.1-0.2 SOIL - 6/8/2016 SE155671.001	BH202_0.8-0.9 SOIL - 6/8/2016 SE155671.002	BH206_0.35-0.45 SOIL - 6/8/2016 SE155671.003	BH206_1.3-1.4 SOIL - 6/8/2016 SE155671.004	BH207_0.3-0.4 SOIL - 6/8/2016 SE155671.005
% Moisture	%w/w	0.5	6.2	5.7	2.0	1.4	6.0

PARAMETER	UOM	LOR	BH207_0.8-0.9 SOIL - 6/8/2016 SE155671.006	BH208_0.1-0.2 SOIL - 6/8/2016 SE155671.007	BH208_0.7-0.8 SOIL - 6/8/2016 SE155671.008	BH209_0.1-0.2 SOIL - 6/8/2016 SE155671.009	BH209_0.7-0.8 SOIL - 6/8/2016 SE155671.010
% Moisture	%w/w	0.5	6.3	3.9	2.7	3.3	1.7

PARAMETER	UOM	LOR	BH210_0.2-0.4 SOIL - 6/8/2016 SE155671.011	BH210_0.7-0.8 SOIL - 6/8/2016 SE155671.012	BH211_0.3-0.4 SOIL - 6/8/2016 SE155671.013	QD100 SOIL - 6/8/2016 SE155671.014	QTB100 SOIL - 6/8/2016 SE155671.016
% Moisture	%w/w	0.5	2.4	1.3	6.1	2.2	<0.5

Fibre Identification in soil [AN602] Tested: 12/8/2016

PARAMETER	UOM	LOR	BH202_0.1-0.2 SOIL - 6/8/2016 SE155671.001	BH206_0.35-0.45 SOIL - 6/8/2016 SE155671.003	BH207_0.3-0.4 SOIL - 6/8/2016 SE155671.005	BH208_0.1-0.2 SOIL - 6/8/2016 SE155671.007	BH209_0.1-0.2 SOIL - 6/8/2016 SE155671.009
Asbestos Detected	No unit	-	No	No	No	No	No
Estimated Fibres*	%w/w	0.01	<0.01	<0.01	<0.01	<0.01	<0.01

PARAMETER	UOM	LOR	BH210_0.2-0.4 SOIL - 6/8/2016 SE155671.011	BH211_0.3-0.4 SOIL - 6/8/2016 SE155671.013
Asbestos Detected	No unit	-	No	No
Estimated Fibres*	%w/w	0.01	<0.01	<0.01

VOCs in Water [AN433] Tested: 10/8/2016

PARAMETER	UOM	LOR	QR100 SOIL - 6/8/2016 SE155671.015
Benzene	µg/L	0.5	<0.5
Toluene	µg/L	0.5	<0.5
Ethylbenzene	µg/L	0.5	<0.5
m/p-xylene	µg/L	1	<1
o-xylene	µg/L	0.5	<0.5
Total Xylenes	µg/L	1.5	<1.5
Total BTEX	µg/L	3	<3
Naphthalene	µg/L	0.5	<0.5

Volatile Petroleum Hydrocarbons in Water [AN433] Tested: 10/8/2016

PARAMETER	UOM	LOR	QR100 SOIL - 6/8/2016 SE155671.015
TRH C6-C9	µg/L	40	<40
Benzene (F0)	µg/L	0.5	<0.5
TRH C6-C10	µg/L	50	<50
TRH C6-C10 minus BTEX (F1)	µg/L	50	<50

TRH (Total Recoverable Hydrocarbons) in Water [AN403] Tested: 10/8/2016

PARAMETER	UOM	LOR	QR100 SOIL - 6/8/2016 SE155671.015
TRH C10-C14	µg/L	50	<50
TRH C15-C28	µg/L	200	<200
TRH C29-C36	µg/L	200	<200
TRH C37-C40	µg/L	200	<200
TRH >C10-C16 (F2)	µg/L	60	<60
TRH >C16-C34 (F3)	µg/L	500	<500
TRH >C34-C40 (F4)	µg/L	500	<500
TRH C10-C36	µg/L	450	<450
TRH C10-C40	µg/L	650	<650

Trace Metals (Dissolved) in Water by ICPMS [AN318] Tested: 12/8/2016

PARAMETER	UOM	LOR	QR100 SOIL - 6/8/2016 SE155671.015
Arsenic, As	µg/L	1	<1
Cadmium, Cd	µg/L	0.1	<0.1
Chromium, Cr	µg/L	1	<1
Copper, Cu	µg/L	1	<1
Lead, Pb	µg/L	1	<1
Nickel, Ni	µg/L	1	<1
Zinc, Zn	µg/L	5	<5

Mercury (dissolved) in Water [AN311(Perth)/AN312] Tested: 12/8/2016

PARAMETER	UOM	LOR	QR100 SOIL - 6/8/2016 SE155671.015
Mercury	mg/L	0.0001	<0.0001

METHOD	METHODOLOGY SUMMARY
AN002	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
AN020	Unpreserved water sample is filtered through a 0.45µm membrane filter and acidified with nitric acid similar to APHA3030B.
AN040/AN320	A portion of sample is digested with nitric acid to decompose organic matter and hydrochloric acid to complete the digestion of metals. The digest is then analysed by ICP OES with metals results reported on the dried sample basis. Based on USEPA method 200.8 and 6010C.
AN040	A portion of sample is digested with Nitric acid to decompose organic matter and Hydrochloric acid to complete the digestion of metals and then filtered for analysis by ASS or ICP as per USEPA Method 200.8.
AN289	Analysis of Total Phenols in Soil Sediment and Water: Steam distillable phenols react with 4-aminoantipyrine at pH 7.9±0.1 in the presence of potassium ferricyanide to form a coloured antipyrine dye analysed by Discrete Analyser. Reference APHA 5530 B/D.
AN311(Perth)/AN312	Mercury by Cold Vapour AAS in Waters: Mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500.
AN312	Mercury by Cold Vapour AAS in Soils: After digestion with nitric acid, hydrogen peroxide and hydrochloric acid , mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser . Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500
AN318	Determination of elements at trace level in waters by ICP-MS technique, in accordance with USEPA 6020A.
AN400	OC and OP Pesticides by GC-ECD: The determination of organochlorine (OC) and organophosphorus (OP) pesticides and polychlorinated biphenyls (PCBs) in soils, sludges and groundwater. (Based on USEPA methods 3510, 3550, 8140 and 8080.)
AN403	Total Recoverable Hydrocarbons: Determination of Hydrocarbons by gas chromatography after a solvent extraction. Detection is by flame ionisation detector (FID) that produces an electronic signal in proportion to the combustible matter passing through it. Total Recoverable Hydrocarbons (TRH) are routinely reported as four alkane groupings based on the carbon chain length of the compounds: C6-C9, C10-C14, C15-C28 and C29-C36 and in recognition of the NEPM 1999 (2013), >C10-C16 (F2), >C16-C34 (F3) and >C34-C40 (F4). F2 is reported directly and also corrected by subtracting Naphthalene (from VOC method AN433) where available.
AN403	Additionally, the volatile C6-C9 fraction may be determined by a purge and trap technique and GC/MS because of the potential for volatiles loss. Total Petroleum Hydrocarbons (TPH) follows the same method of analysis after silica gel cleanup of the solvent extract. Aliphatic/Aromatic Speciation follows the same method of analysis after fractionation of the solvent extract over silica with differential polarity of the eluent solvents .
AN403	The GC/FID method is not well suited to the analysis of refined high boiling point materials (ie lubricating oils or greases) but is particularly suited for measuring diesel, kerosene and petrol if care to control volatility is taken. This method will detect naturally occurring hydrocarbons, lipids, animal fats, phenols and PAHs if they are present at sufficient levels, dependent on the use of specific cleanup/fractionation techniques. Reference USEPA 3510B, 8015B.
AN420	(SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols (etc) in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN420	SVOC Compounds: Semi-Volatile Organic Compounds (SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN433	VOCs and C6-C9 Hydrocarbons by GC-MS P&T: VOC`s are volatile organic compounds. The sample is presented to a gas chromatograph via a purge and trap (P&T) concentrator and autosampler and is detected with a Mass Spectrometer (MSD). Solid samples are initially extracted with methanol whilst liquid samples are processed directly. References: USEPA 5030B, 8020A, 8260.
AN602	Qualitative identification of chrysotile, amosite and crocidolite in bulk samples by polarised light microscopy (PLM) in conjunction with dispersion staining (DS). AS4964 provides the basis for this document. Unequivocal identification of the asbestos minerals present is made by obtaining sufficient diagnostic `clues`, which provide a reasonable degree of certainty, dispersion staining is a mandatory `clue` for positive identification. If sufficient `clues` are absent, then positive identification of asbestos is not possible. This procedure requires removal of suspect fibres/bundles from the sample which cannot be returned.
AN602	Fibres/material that cannot be unequivocably identified as one of the three asbestos forms, will be reported as unknown mineral fibres (umf).

AN602	AS4964.2004 Method for the Qualitative Identification of Asbestos in Bulk Samples, Section 8.4, Trace Analysis Criteria, Note 4 states:"Depending upon sample condition and fibre type, the detection limit of this technique has been found to lie generally in the range of 1 in 1,000 to 1 in 10,000 parts by weight, equivalent to 1 to 0.1 g/kg."
AN602	The sample can be reported “no asbestos found at the reporting limit of 0.1 g/kg” (<0.01%w/w) where AN602 section 4.5 of this method has been followed, and if- (a) no trace asbestos fibres have been detected (i.e. no ‘respirable’ fibres): (b) the estimated weight of non-respirable asbestos fibre bundles and/or the estimated weight of asbestos in asbestos-containing materials are found to be less than 0.1g/kg: and (c) these non-respirable asbestos fibre bundles and/or the asbestos containing materials are only visible under stereo-microscope viewing conditions.

FOOTNOTES

*	NATA accreditation does not cover the performance of this service.	-	Not analysed.	UOM	Unit of Measure.
		NVL	Not validated.	LOR	Limit of Reporting.
**	Indicative data, theoretical holding time exceeded.	IS	Insufficient sample for analysis.	↑↓	Raised/lowered Limit of Reporting.
		LNR	Sample listed, but not received.		

Samples analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calculated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the " Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.
Note that in terms of units of radioactivity:

a. 1 Bq is equivalent to 27 pCi
b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here : http://www.sgs.com.au/~/media/Local/Australia/Documents/Technical Documents/MP-AU-ENV-QU-022 QA QC Plan.pdf

STATEMENT OF QA/QC PERFORMANCE

SE155671 R0

CLIENT DETAILS

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Project	**E22282 - 12-24 Rothschild Ave, Rosebery**
Order Number	**E22282**
Samples	17

LABORATORY DETAILS

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SGS Reference	**SE155671 R0**
Date Received	08 Aug 2016
Date Reported	15 Aug 2016

COMMENTS

All the laboratory data for each environmental matrix was compared to SGS' stated Data Quality Objectives (DQO). Comments arising from the comparison were made and are reported below.

The data relating to sampling was taken from the Chain of Custody document and was supplied by the Client.
This QA/QC Statement must be read in conjunction with the referenced Analytical Report.
The Statement and the Analytical Report must not be reproduced except in full.

All Data Quality Objectives were met with the exception of the following:

Matrix Spike	Trace Metals (Dissolved) in Water by ICPMS	1 item

SAMPLE SUMMARY

Sample counts by matrix	16 Soil, 1 Water	Type of documentation received	COC
Date documentation received	8/8/2016	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	8.5°C
Sample container provider	SGS	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes		

HOLDING TIME SUMMARY

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SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS “Field Sampling Guide for Containers and Holding Time” (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

Fibre Identification in soil

Method: ME-(AU)-[ENV]AN602

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH202_0.1-0.2	SE155671.001	LB107546	06 Aug 2016	08 Aug 2016	06 Aug 2017	12 Aug 2016	06 Aug 2017	15 Aug 2016
BH206_0.35-0.45	SE155671.003	LB107546	06 Aug 2016	08 Aug 2016	06 Aug 2017	12 Aug 2016	06 Aug 2017	15 Aug 2016
BH207_0.3-0.4	SE155671.005	LB107546	06 Aug 2016	08 Aug 2016	06 Aug 2017	12 Aug 2016	06 Aug 2017	15 Aug 2016
BH208_0.1-0.2	SE155671.007	LB107546	06 Aug 2016	08 Aug 2016	06 Aug 2017	12 Aug 2016	06 Aug 2017	15 Aug 2016
BH209_0.1-0.2	SE155671.009	LB107546	06 Aug 2016	08 Aug 2016	06 Aug 2017	12 Aug 2016	06 Aug 2017	15 Aug 2016
BH210_0.2-0.4	SE155671.011	LB107546	06 Aug 2016	08 Aug 2016	06 Aug 2017	12 Aug 2016	06 Aug 2017	15 Aug 2016
BH211_0.3-0.4	SE155671.013	LB107546	06 Aug 2016	08 Aug 2016	06 Aug 2017	12 Aug 2016	06 Aug 2017	15 Aug 2016

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311(Perth)/AN312

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
QR100	SE155671.015	LB107488	06 Aug 2016	08 Aug 2016	03 Sep 2016	12 Aug 2016	03 Sep 2016	12 Aug 2016

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH202_0.1-0.2	SE155671.001	LB107441	06 Aug 2016	08 Aug 2016	03 Sep 2016	11 Aug 2016	03 Sep 2016	15 Aug 2016
BH202_0.8-0.9	SE155671.002	LB107441	06 Aug 2016	08 Aug 2016	03 Sep 2016	11 Aug 2016	03 Sep 2016	15 Aug 2016
BH206_0.35-0.45	SE155671.003	LB107443	06 Aug 2016	08 Aug 2016	03 Sep 2016	11 Aug 2016	03 Sep 2016	15 Aug 2016
BH206_1.3-1.4	SE155671.004	LB107443	06 Aug 2016	08 Aug 2016	03 Sep 2016	11 Aug 2016	03 Sep 2016	15 Aug 2016
BH207_0.3-0.4	SE155671.005	LB107443	06 Aug 2016	08 Aug 2016	03 Sep 2016	11 Aug 2016	03 Sep 2016	15 Aug 2016
BH207_0.8-0.9	SE155671.006	LB107443	06 Aug 2016	08 Aug 2016	03 Sep 2016	11 Aug 2016	03 Sep 2016	15 Aug 2016
BH208_0.1-0.2	SE155671.007	LB107443	06 Aug 2016	08 Aug 2016	03 Sep 2016	11 Aug 2016	03 Sep 2016	15 Aug 2016
BH208_0.7-0.8	SE155671.008	LB107443	06 Aug 2016	08 Aug 2016	03 Sep 2016	11 Aug 2016	03 Sep 2016	15 Aug 2016
BH209_0.1-0.2	SE155671.009	LB107443	06 Aug 2016	08 Aug 2016	03 Sep 2016	11 Aug 2016	03 Sep 2016	15 Aug 2016
BH209_0.7-0.8	SE155671.010	LB107443	06 Aug 2016	08 Aug 2016	03 Sep 2016	11 Aug 2016	03 Sep 2016	15 Aug 2016
BH210_0.2-0.4	SE155671.011	LB107443	06 Aug 2016	08 Aug 2016	03 Sep 2016	11 Aug 2016	03 Sep 2016	15 Aug 2016
BH210_0.7-0.8	SE155671.012	LB107443	06 Aug 2016	08 Aug 2016	03 Sep 2016	11 Aug 2016	03 Sep 2016	15 Aug 2016
BH211_0.3-0.4	SE155671.013	LB107443	06 Aug 2016	08 Aug 2016	03 Sep 2016	11 Aug 2016	03 Sep 2016	15 Aug 2016
QD100	SE155671.014	LB107443	06 Aug 2016	08 Aug 2016	03 Sep 2016	11 Aug 2016	03 Sep 2016	15 Aug 2016

Moisture Content

Method: ME-(AU)-[ENV]AN002

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH202_0.1-0.2	SE155671.001	LB107435	06 Aug 2016	08 Aug 2016	20 Aug 2016	11 Aug 2016	16 Aug 2016	15 Aug 2016
BH202_0.8-0.9	SE155671.002	LB107435	06 Aug 2016	08 Aug 2016	20 Aug 2016	11 Aug 2016	16 Aug 2016	15 Aug 2016
BH206_0.35-0.45	SE155671.003	LB107435	06 Aug 2016	08 Aug 2016	20 Aug 2016	11 Aug 2016	16 Aug 2016	15 Aug 2016
BH206_1.3-1.4	SE155671.004	LB107435	06 Aug 2016	08 Aug 2016	20 Aug 2016	11 Aug 2016	16 Aug 2016	15 Aug 2016
BH207_0.3-0.4	SE155671.005	LB107435	06 Aug 2016	08 Aug 2016	20 Aug 2016	11 Aug 2016	16 Aug 2016	15 Aug 2016
BH207_0.8-0.9	SE155671.006	LB107435	06 Aug 2016	08 Aug 2016	20 Aug 2016	11 Aug 2016	16 Aug 2016	15 Aug 2016
BH208_0.1-0.2	SE155671.007	LB107435	06 Aug 2016	08 Aug 2016	20 Aug 2016	11 Aug 2016	16 Aug 2016	15 Aug 2016
BH208_0.7-0.8	SE155671.008	LB107435	06 Aug 2016	08 Aug 2016	20 Aug 2016	11 Aug 2016	16 Aug 2016	15 Aug 2016
BH209_0.1-0.2	SE155671.009	LB107435	06 Aug 2016	08 Aug 2016	20 Aug 2016	11 Aug 2016	16 Aug 2016	15 Aug 2016
BH209_0.7-0.8	SE155671.010	LB107435	06 Aug 2016	08 Aug 2016	20 Aug 2016	11 Aug 2016	16 Aug 2016	15 Aug 2016
BH210_0.2-0.4	SE155671.011	LB107435	06 Aug 2016	08 Aug 2016	20 Aug 2016	11 Aug 2016	16 Aug 2016	15 Aug 2016
BH210_0.7-0.8	SE155671.012	LB107435	06 Aug 2016	08 Aug 2016	20 Aug 2016	11 Aug 2016	16 Aug 2016	15 Aug 2016
BH211_0.3-0.4	SE155671.013	LB107435	06 Aug 2016	08 Aug 2016	20 Aug 2016	11 Aug 2016	16 Aug 2016	15 Aug 2016
QD100	SE155671.014	LB107435	06 Aug 2016	08 Aug 2016	20 Aug 2016	11 Aug 2016	16 Aug 2016	15 Aug 2016
QTB100	SE155671.016	LB107435	06 Aug 2016	08 Aug 2016	20 Aug 2016	11 Aug 2016	16 Aug 2016	15 Aug 2016

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH202_0.1-0.2	SE155671.001	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH202_0.8-0.9	SE155671.002	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH206_0.35-0.45	SE155671.003	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH206_1.3-1.4	SE155671.004	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH207_0.3-0.4	SE155671.005	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH207_0.8-0.9	SE155671.006	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH208_0.1-0.2	SE155671.007	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH208_0.7-0.8	SE155671.008	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH209_0.1-0.2	SE155671.009	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH209_0.7-0.8	SE155671.010	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH210_0.2-0.4	SE155671.011	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH210_0.7-0.8	SE155671.012	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016

HOLDING TIME SUMMARY

SE155671 R0

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS “Field Sampling Guide for Containers and Holding Time” (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

OC Pesticides in Soil (continued)

Method: ME-(AU)-[ENV]AN400/AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH211_0.3-0.4	SE155671.013	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
QD100	SE155671.014	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH202_0.1-0.2	SE155671.001	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH202_0.8-0.9	SE155671.002	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH206_0.35-0.45	SE155671.003	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH206_1.3-1.4	SE155671.004	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH207_0.3-0.4	SE155671.005	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH207_0.8-0.9	SE155671.006	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH208_0.1-0.2	SE155671.007	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH208_0.7-0.8	SE155671.008	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH209_0.1-0.2	SE155671.009	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH209_0.7-0.8	SE155671.010	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH210_0.2-0.4	SE155671.011	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH210_0.7-0.8	SE155671.012	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH211_0.3-0.4	SE155671.013	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
QD100	SE155671.014	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH202_0.1-0.2	SE155671.001	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH202_0.8-0.9	SE155671.002	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH206_0.35-0.45	SE155671.003	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH206_1.3-1.4	SE155671.004	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH207_0.3-0.4	SE155671.005	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH207_0.8-0.9	SE155671.006	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH208_0.1-0.2	SE155671.007	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH208_0.7-0.8	SE155671.008	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH209_0.1-0.2	SE155671.009	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH209_0.7-0.8	SE155671.010	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH210_0.2-0.4	SE155671.011	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH210_0.7-0.8	SE155671.012	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH211_0.3-0.4	SE155671.013	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
QD100	SE155671.014	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016

PCBs in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH202_0.1-0.2	SE155671.001	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH202_0.8-0.9	SE155671.002	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH206_0.35-0.45	SE155671.003	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH206_1.3-1.4	SE155671.004	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH207_0.3-0.4	SE155671.005	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH207_0.8-0.9	SE155671.006	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH208_0.1-0.2	SE155671.007	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH208_0.7-0.8	SE155671.008	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH209_0.1-0.2	SE155671.009	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH209_0.7-0.8	SE155671.010	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH210_0.2-0.4	SE155671.011	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH210_0.7-0.8	SE155671.012	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH211_0.3-0.4	SE155671.013	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
QD100	SE155671.014	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016

Total Phenolics in Soil

Method: ME-(AU)-[ENV]AN289

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH202_0.1-0.2	SE155671.001	LB107483	06 Aug 2016	08 Aug 2016	20 Aug 2016	12 Aug 2016	20 Aug 2016	15 Aug 2016
BH206_0.35-0.45	SE155671.003	LB107483	06 Aug 2016	08 Aug 2016	20 Aug 2016	12 Aug 2016	20 Aug 2016	15 Aug 2016
BH207_0.3-0.4	SE155671.005	LB107483	06 Aug 2016	08 Aug 2016	20 Aug 2016	12 Aug 2016	20 Aug 2016	15 Aug 2016
BH208_0.1-0.2	SE155671.007	LB107483	06 Aug 2016	08 Aug 2016	20 Aug 2016	12 Aug 2016	20 Aug 2016	15 Aug 2016
BH209_0.1-0.2	SE155671.009	LB107483	06 Aug 2016	08 Aug 2016	20 Aug 2016	12 Aug 2016	20 Aug 2016	15 Aug 2016
BH210_0.2-0.4	SE155671.011	LB107483	06 Aug 2016	08 Aug 2016	20 Aug 2016	12 Aug 2016	20 Aug 2016	15 Aug 2016

HOLDING TIME SUMMARY

SE155671 R0

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS “Field Sampling Guide for Containers and Holding Time” (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

Total Phenolics in Soil (continued)

Method: ME-(AU)-[ENV]AN289

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH211_0.3-0.4	SE155671.013	LB107483	06 Aug 2016	08 Aug 2016	20 Aug 2016	12 Aug 2016	20 Aug 2016	15 Aug 2016

Total Recoverable Metals in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH202_0.1-0.2	SE155671.001	LB107477	06 Aug 2016	08 Aug 2016	02 Feb 2017	12 Aug 2016	02 Feb 2017	15 Aug 2016
BH202_0.8-0.9	SE155671.002	LB107477	06 Aug 2016	08 Aug 2016	02 Feb 2017	12 Aug 2016	02 Feb 2017	15 Aug 2016
BH206_0.35-0.45	SE155671.003	LB107477	06 Aug 2016	08 Aug 2016	02 Feb 2017	12 Aug 2016	02 Feb 2017	15 Aug 2016
BH206_1.3-1.4	SE155671.004	LB107477	06 Aug 2016	08 Aug 2016	02 Feb 2017	12 Aug 2016	02 Feb 2017	15 Aug 2016
BH207_0.3-0.4	SE155671.005	LB107477	06 Aug 2016	08 Aug 2016	02 Feb 2017	12 Aug 2016	02 Feb 2017	15 Aug 2016
BH207_0.8-0.9	SE155671.006	LB107477	06 Aug 2016	08 Aug 2016	02 Feb 2017	12 Aug 2016	02 Feb 2017	15 Aug 2016
BH208_0.1-0.2	SE155671.007	LB107477	06 Aug 2016	08 Aug 2016	02 Feb 2017	12 Aug 2016	02 Feb 2017	15 Aug 2016
BH208_0.7-0.8	SE155671.008	LB107477	06 Aug 2016	08 Aug 2016	02 Feb 2017	12 Aug 2016	02 Feb 2017	15 Aug 2016
BH209_0.1-0.2	SE155671.009	LB107477	06 Aug 2016	08 Aug 2016	02 Feb 2017	12 Aug 2016	02 Feb 2017	15 Aug 2016
BH209_0.7-0.8	SE155671.010	LB107477	06 Aug 2016	08 Aug 2016	02 Feb 2017	12 Aug 2016	02 Feb 2017	15 Aug 2016
BH210_0.2-0.4	SE155671.011	LB107477	06 Aug 2016	08 Aug 2016	02 Feb 2017	12 Aug 2016	02 Feb 2017	15 Aug 2016
BH210_0.7-0.8	SE155671.012	LB107477	06 Aug 2016	08 Aug 2016	02 Feb 2017	12 Aug 2016	02 Feb 2017	15 Aug 2016
BH211_0.3-0.4	SE155671.013	LB107477	06 Aug 2016	08 Aug 2016	02 Feb 2017	12 Aug 2016	02 Feb 2017	15 Aug 2016
QD100	SE155671.014	LB107477	06 Aug 2016	08 Aug 2016	02 Feb 2017	12 Aug 2016	02 Feb 2017	15 Aug 2016

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
QR100	SE155671.015	LB107495	06 Aug 2016	08 Aug 2016	02 Feb 2017	12 Aug 2016	02 Feb 2017	15 Aug 2016

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH202_0.1-0.2	SE155671.001	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	12 Aug 2016
BH202_0.8-0.9	SE155671.002	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	12 Aug 2016
BH206_0.35-0.45	SE155671.003	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	12 Aug 2016
BH206_1.3-1.4	SE155671.004	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	12 Aug 2016
BH207_0.3-0.4	SE155671.005	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	12 Aug 2016
BH207_0.8-0.9	SE155671.006	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	12 Aug 2016
BH208_0.1-0.2	SE155671.007	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	12 Aug 2016
BH208_0.7-0.8	SE155671.008	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	12 Aug 2016
BH209_0.1-0.2	SE155671.009	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	12 Aug 2016
BH209_0.7-0.8	SE155671.010	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	12 Aug 2016
BH210_0.2-0.4	SE155671.011	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	12 Aug 2016
BH210_0.7-0.8	SE155671.012	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	12 Aug 2016
BH211_0.3-0.4	SE155671.013	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	12 Aug 2016
QD100	SE155671.014	LB107362	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	12 Aug 2016

TRH (Total Recoverable Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN403

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
QR100	SE155671.015	LB107373	06 Aug 2016	08 Aug 2016	13 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH202_0.1-0.2	SE155671.001	LB107350	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH202_0.8-0.9	SE155671.002	LB107350	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH206_0.35-0.45	SE155671.003	LB107350	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH206_1.3-1.4	SE155671.004	LB107350	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH207_0.3-0.4	SE155671.005	LB107350	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH207_0.8-0.9	SE155671.006	LB107350	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH208_0.1-0.2	SE155671.007	LB107350	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH208_0.7-0.8	SE155671.008	LB107350	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH209_0.1-0.2	SE155671.009	LB107350	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH209_0.7-0.8	SE155671.010	LB107350	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH210_0.2-0.4	SE155671.011	LB107350	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH210_0.7-0.8	SE155671.012	LB107350	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH211_0.3-0.4	SE155671.013	LB107350	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
QD100	SE155671.014	LB107350	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016

HOLDING TIME SUMMARY

SE155671 R0

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS “Field Sampling Guide for Containers and Holding Time” (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

VOC's in Soil (continued)

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
QTB100	SE155671.016	LB107350	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
QTS100	SE155671.017	LB107350	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
QR100	SE155671.015	LB107329	06 Aug 2016	08 Aug 2016	13 Aug 2016	10 Aug 2016	19 Sep 2016	12 Aug 2016

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
BH202_0.1-0.2	SE155671.001	LB107350	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH202_0.8-0.9	SE155671.002	LB107350	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH206_0.35-0.45	SE155671.003	LB107350	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH206_1.3-1.4	SE155671.004	LB107350	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH207_0.3-0.4	SE155671.005	LB107350	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH207_0.8-0.9	SE155671.006	LB107350	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH208_0.1-0.2	SE155671.007	LB107350	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH208_0.7-0.8	SE155671.008	LB107350	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH209_0.1-0.2	SE155671.009	LB107350	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH209_0.7-0.8	SE155671.010	LB107350	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH210_0.2-0.4	SE155671.011	LB107350	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH210_0.7-0.8	SE155671.012	LB107350	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
BH211_0.3-0.4	SE155671.013	LB107350	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
QD100	SE155671.014	LB107350	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
QTB100	SE155671.016	LB107350	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016
QTS100	SE155671.017	LB107350	06 Aug 2016	08 Aug 2016	20 Aug 2016	10 Aug 2016	19 Sep 2016	15 Aug 2016

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
QR100	SE155671.015	LB107329	06 Aug 2016	08 Aug 2016	13 Aug 2016	10 Aug 2016	19 Sep 2016	12 Aug 2016

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	BH202_0.1-0.2	SE155671.001	%	60 - 130%	81
	BH206_0.35-0.45	SE155671.003	%	60 - 130%	78
	BH207_0.3-0.4	SE155671.005	%	60 - 130%	77
	BH208_0.1-0.2	SE155671.007	%	60 - 130%	79
	BH209_0.1-0.2	SE155671.009	%	60 - 130%	79
	BH210_0.2-0.4	SE155671.011	%	60 - 130%	82
	BH211_0.3-0.4	SE155671.013	%	60 - 130%	107

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	BH202_0.1-0.2	SE155671.001	%	60 - 130%	80
	BH206_0.35-0.45	SE155671.003	%	60 - 130%	80
	BH207_0.3-0.4	SE155671.005	%	60 - 130%	80
	BH208_0.1-0.2	SE155671.007	%	60 - 130%	78
	BH209_0.1-0.2	SE155671.009	%	60 - 130%	82
	BH210_0.2-0.4	SE155671.011	%	60 - 130%	72
	BH211_0.3-0.4	SE155671.013	%	60 - 130%	84
d14-p-terphenyl (Surrogate)	BH202_0.1-0.2	SE155671.001	%	60 - 130%	116
	BH206_0.35-0.45	SE155671.003	%	60 - 130%	118
	BH207_0.3-0.4	SE155671.005	%	60 - 130%	112
	BH208_0.1-0.2	SE155671.007	%	60 - 130%	114
	BH209_0.1-0.2	SE155671.009	%	60 - 130%	104
	BH210_0.2-0.4	SE155671.011	%	60 - 130%	112
	BH211_0.3-0.4	SE155671.013	%	60 - 130%	106

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	BH202_0.1-0.2	SE155671.001	%	70 - 130%	80
	BH202_0.8-0.9	SE155671.002	%	70 - 130%	86
	BH206_0.35-0.45	SE155671.003	%	70 - 130%	80
	BH206_1.3-1.4	SE155671.004	%	70 - 130%	82
	BH207_0.3-0.4	SE155671.005	%	70 - 130%	80
	BH207_0.8-0.9	SE155671.006	%	70 - 130%	78
	BH208_0.1-0.2	SE155671.007	%	70 - 130%	78
	BH208_0.7-0.8	SE155671.008	%	70 - 130%	84
	BH209_0.1-0.2	SE155671.009	%	70 - 130%	82
	BH209_0.7-0.8	SE155671.010	%	70 - 130%	74
	BH210_0.2-0.4	SE155671.011	%	70 - 130%	72
	BH210_0.7-0.8	SE155671.012	%	70 - 130%	76
	BH211_0.3-0.4	SE155671.013	%	70 - 130%	84
d14-p-terphenyl (Surrogate)	BH202_0.1-0.2	SE155671.001	%	70 - 130%	116
	BH202_0.8-0.9	SE155671.002	%	70 - 130%	92
	BH206_0.35-0.45	SE155671.003	%	70 - 130%	118
	BH206_1.3-1.4	SE155671.004	%	70 - 130%	116
	BH207_0.3-0.4	SE155671.005	%	70 - 130%	112
	BH207_0.8-0.9	SE155671.006	%	70 - 130%	116
	BH208_0.1-0.2	SE155671.007	%	70 - 130%	114
	BH208_0.7-0.8	SE155671.008	%	70 - 130%	118
	BH209_0.1-0.2	SE155671.009	%	70 - 130%	104
	BH209_0.7-0.8	SE155671.010	%	70 - 130%	92
	BH210_0.2-0.4	SE155671.011	%	70 - 130%	112
	BH210_0.7-0.8	SE155671.012	%	70 - 130%	108
	BH211_0.3-0.4	SE155671.013	%	70 - 130%	106
d5-nitrobenzene (Surrogate)	BH202_0.1-0.2	SE155671.001	%	70 - 130%	78
	BH202_0.8-0.9	SE155671.002	%	70 - 130%	78
	BH206_0.35-0.45	SE155671.003	%	70 - 130%	76
	BH206_1.3-1.4	SE155671.004	%	70 - 130%	76
	BH207_0.3-0.4	SE155671.005	%	70 - 130%	74
	BH207_0.8-0.9	SE155671.006	%	70 - 130%	74
	BH208_0.1-0.2	SE155671.007	%	70 - 130%	72
	BH208_0.7-0.8	SE155671.008	%	70 - 130%	78
	BH209_0.1-0.2	SE155671.009	%	70 - 130%	76

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil (continued)

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
d5-nitrobenzene (Surrogate)	BH209_0.7-0.8	SE155671.010	%	70 - 130%	82
	BH210_0.2-0.4	SE155671.011	%	70 - 130%	76
	BH210_0.7-0.8	SE155671.012	%	70 - 130%	78
	BH211_0.3-0.4	SE155671.013	%	70 - 130%	74

PCBs in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Tetrachloro-m-xylene (TCMX) (Surrogate)	BH202_0.1-0.2	SE155671.001	%	60 - 130%	81
	BH206_0.35-0.45	SE155671.003	%	60 - 130%	78
	BH207_0.3-0.4	SE155671.005	%	60 - 130%	77
	BH208_0.1-0.2	SE155671.007	%	60 - 130%	79
	BH209_0.1-0.2	SE155671.009	%	60 - 130%	79
	BH210_0.2-0.4	SE155671.011	%	60 - 130%	82
	BH211_0.3-0.4	SE155671.013	%	60 - 130%	107

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	BH202_0.1-0.2	SE155671.001	%	60 - 130%	116
	BH202_0.8-0.9	SE155671.002	%	60 - 130%	96
	BH206_0.35-0.45	SE155671.003	%	60 - 130%	123
	BH206_1.3-1.4	SE155671.004	%	60 - 130%	112
	BH207_0.3-0.4	SE155671.005	%	60 - 130%	93
	BH207_0.8-0.9	SE155671.006	%	60 - 130%	99
	BH208_0.1-0.2	SE155671.007	%	60 - 130%	107
	BH208_0.7-0.8	SE155671.008	%	60 - 130%	96
	BH209_0.1-0.2	SE155671.009	%	60 - 130%	110
	BH209_0.7-0.8	SE155671.010	%	60 - 130%	106
	BH210_0.2-0.4	SE155671.011	%	60 - 130%	114
	BH210_0.7-0.8	SE155671.012	%	60 - 130%	120
	BH211_0.3-0.4	SE155671.013	%	60 - 130%	110
	QD100	SE155671.014	%	60 - 130%	111
	QTB100	SE155671.016	%	60 - 130%	99
	QTS100	SE155671.017	%	60 - 130%	120
d4-1,2-dichloroethane (Surrogate)	BH202_0.1-0.2	SE155671.001	%	60 - 130%	82
	BH202_0.8-0.9	SE155671.002	%	60 - 130%	82
	BH206_0.35-0.45	SE155671.003	%	60 - 130%	88
	BH206_1.3-1.4	SE155671.004	%	60 - 130%	85
	BH207_0.3-0.4	SE155671.005	%	60 - 130%	86
	BH207_0.8-0.9	SE155671.006	%	60 - 130%	94
	BH208_0.1-0.2	SE155671.007	%	60 - 130%	94
	BH208_0.7-0.8	SE155671.008	%	60 - 130%	97
	BH209_0.1-0.2	SE155671.009	%	60 - 130%	97
	BH209_0.7-0.8	SE155671.010	%	60 - 130%	94
	BH210_0.2-0.4	SE155671.011	%	60 - 130%	102
	BH210_0.7-0.8	SE155671.012	%	60 - 130%	101
	BH211_0.3-0.4	SE155671.013	%	60 - 130%	99
	QD100	SE155671.014	%	60 - 130%	103
	QTB100	SE155671.016	%	60 - 130%	114
	QTS100	SE155671.017	%	60 - 130%	100
d8-toluene (Surrogate)	BH202_0.1-0.2	SE155671.001	%	60 - 130%	104
	BH202_0.8-0.9	SE155671.002	%	60 - 130%	121
	BH206_0.35-0.45	SE155671.003	%	60 - 130%	112
	BH206_1.3-1.4	SE155671.004	%	60 - 130%	109
	BH207_0.3-0.4	SE155671.005	%	60 - 130%	116
	BH207_0.8-0.9	SE155671.006	%	60 - 130%	128
	BH208_0.1-0.2	SE155671.007	%	60 - 130%	113
	BH208_0.7-0.8	SE155671.008	%	60 - 130%	114
	BH209_0.1-0.2	SE155671.009	%	60 - 130%	108
	BH209_0.7-0.8	SE155671.010	%	60 - 130%	130
	BH210_0.2-0.4	SE155671.011	%	60 - 130%	113
	BH210_0.7-0.8	SE155671.012	%	60 - 130%	128
	BH211_0.3-0.4	SE155671.013	%	60 - 130%	127

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

VOC's in Soil (continued)

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
d8-toluene (Surrogate)	QD100	SE155671.014	%	60 - 130%	112
	QTB100	SE155671.016	%	60 - 130%	114
	QTS100	SE155671.017	%	60 - 130%	129
Dibromofluoromethane (Surrogate)	BH202_0.1-0.2	SE155671.001	%	60 - 130%	76
	BH202_0.8-0.9	SE155671.002	%	60 - 130%	80
	BH206_0.35-0.45	SE155671.003	%	60 - 130%	87
	BH206_1.3-1.4	SE155671.004	%	60 - 130%	83
	BH207_0.3-0.4	SE155671.005	%	60 - 130%	80
	BH207_0.8-0.9	SE155671.006	%	60 - 130%	87
	BH208_0.1-0.2	SE155671.007	%	60 - 130%	88
	BH208_0.7-0.8	SE155671.008	%	60 - 130%	91
	BH209_0.1-0.2	SE155671.009	%	60 - 130%	90
	BH209_0.7-0.8	SE155671.010	%	60 - 130%	87
	BH210_0.2-0.4	SE155671.011	%	60 - 130%	96
	BH210_0.7-0.8	SE155671.012	%	60 - 130%	95
	BH211_0.3-0.4	SE155671.013	%	60 - 130%	92
	QD100	SE155671.014	%	60 - 130%	105
	QTB100	SE155671.016	%	60 - 130%	110
	QTS100	SE155671.017	%	60 - 130%	96

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	QR100	SE155671.015	%	40 - 130%	78
d4-1,2-dichloroethane (Surrogate)	QR100	SE155671.015	%	40 - 130%	127
d8-toluene (Surrogate)	QR100	SE155671.015	%	40 - 130%	107
Dibromofluoromethane (Surrogate)	QR100	SE155671.015	%	40 - 130%	119

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	BH202_0.1-0.2	SE155671.001	%	60 - 130%	96
	BH202_0.8-0.9	SE155671.002	%	60 - 130%	96
	BH206_0.35-0.45	SE155671.003	%	60 - 130%	111
	BH206_1.3-1.4	SE155671.004	%	60 - 130%	112
	BH207_0.3-0.4	SE155671.005	%	60 - 130%	101
	BH207_0.8-0.9	SE155671.006	%	60 - 130%	99
	BH208_0.1-0.2	SE155671.007	%	60 - 130%	100
	BH208_0.7-0.8	SE155671.008	%	60 - 130%	96
	BH209_0.1-0.2	SE155671.009	%	60 - 130%	102
	BH209_0.7-0.8	SE155671.010	%	60 - 130%	106
	BH210_0.2-0.4	SE155671.011	%	60 - 130%	105
	BH210_0.7-0.8	SE155671.012	%	60 - 130%	120
	BH211_0.3-0.4	SE155671.013	%	60 - 130%	100
	QD100	SE155671.014	%	60 - 130%	111
d4-1,2-dichloroethane (Surrogate)	BH202_0.1-0.2	SE155671.001	%	60 - 130%	82
	BH202_0.8-0.9	SE155671.002	%	60 - 130%	82
	BH206_0.35-0.45	SE155671.003	%	60 - 130%	88
	BH206_1.3-1.4	SE155671.004	%	60 - 130%	85
	BH207_0.3-0.4	SE155671.005	%	60 - 130%	87
	BH207_0.8-0.9	SE155671.006	%	60 - 130%	94
	BH208_0.1-0.2	SE155671.007	%	60 - 130%	94
	BH208_0.7-0.8	SE155671.008	%	60 - 130%	97
	BH209_0.1-0.2	SE155671.009	%	60 - 130%	97
	BH209_0.7-0.8	SE155671.010	%	60 - 130%	94
	BH210_0.2-0.4	SE155671.011	%	60 - 130%	102
	BH210_0.7-0.8	SE155671.012	%	60 - 130%	101
	BH211_0.3-0.4	SE155671.013	%	60 - 130%	99
	QD100	SE155671.014	%	60 - 130%	103
d8-toluene (Surrogate)	BH202_0.1-0.2	SE155671.001	%	60 - 130%	118
	BH202_0.8-0.9	SE155671.002	%	60 - 130%	121
	BH206_0.35-0.45	SE155671.003	%	60 - 130%	110
	BH206_1.3-1.4	SE155671.004	%	60 - 130%	109
	BH207_0.3-0.4	SE155671.005	%	60 - 130%	122

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Volatile Petroleum Hydrocarbons in Soil (continued)

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
d8-toluene (Surrogate)	BH207_0.8-0.9	SE155671.006	%	60 - 130%	128
	BH208_0.1-0.2	SE155671.007	%	60 - 130%	130
	BH208_0.7-0.8	SE155671.008	%	60 - 130%	114
	BH209_0.1-0.2	SE155671.009	%	60 - 130%	125
	BH209_0.7-0.8	SE155671.010	%	60 - 130%	130
	BH210_0.2-0.4	SE155671.011	%	60 - 130%	108
	BH210_0.7-0.8	SE155671.012	%	60 - 130%	128
	BH211_0.3-0.4	SE155671.013	%	60 - 130%	127
	QD100	SE155671.014	%	60 - 130%	112
Dibromofluoromethane (Surrogate)	BH202_0.1-0.2	SE155671.001	%	60 - 130%	77
	BH202_0.8-0.9	SE155671.002	%	60 - 130%	80
	BH206_0.35-0.45	SE155671.003	%	60 - 130%	87
	BH206_1.3-1.4	SE155671.004	%	60 - 130%	83
	BH207_0.3-0.4	SE155671.005	%	60 - 130%	81
	BH207_0.8-0.9	SE155671.006	%	60 - 130%	87
	BH208_0.1-0.2	SE155671.007	%	60 - 130%	88
	BH208_0.7-0.8	SE155671.008	%	60 - 130%	91
	BH209_0.1-0.2	SE155671.009	%	60 - 130%	91
	BH209_0.7-0.8	SE155671.010	%	60 - 130%	87
	BH210_0.2-0.4	SE155671.011	%	60 - 130%	96
	BH210_0.7-0.8	SE155671.012	%	60 - 130%	95
	BH211_0.3-0.4	SE155671.013	%	60 - 130%	93
	QD100	SE155671.014	%	60 - 130%	105

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	QR100	SE155671.015	%	40 - 130%	78
d4-1,2-dichloroethane (Surrogate)	QR100	SE155671.015	%	60 - 130%	127
d8-toluene (Surrogate)	QR100	SE155671.015	%	40 - 130%	107
Dibromofluoromethane (Surrogate)	QR100	SE155671.015	%	40 - 130%	119

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311(Perth)/AN312

Sample Number	Parameter	Units	LOR	Result
LB107488.001	Mercury	mg/L	0.0001	<0.0001

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Sample Number	Parameter	Units	LOR	Result
LB107441.001	Mercury	mg/kg	0.05	<0.05
LB107443.001	Mercury	mg/kg	0.05	<0.05

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number		Parameter	Units	LOR	Result
LB107362.001		Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1
		Alpha BHC	mg/kg	0.1	<0.1
		Lindane	mg/kg	0.1	<0.1
		Heptachlor	mg/kg	0.1	<0.1
		Aldrin	mg/kg	0.1	<0.1
		Beta BHC	mg/kg	0.1	<0.1
		Delta BHC	mg/kg	0.1	<0.1
		Heptachlor epoxide	mg/kg	0.1	<0.1
		Alpha Endosulfan	mg/kg	0.2	<0.2
		Gamma Chlordane	mg/kg	0.1	<0.1
		Alpha Chlordane	mg/kg	0.1	<0.1
		p,p'-DDE	mg/kg	0.1	<0.1
		Dieldrin	mg/kg	0.2	<0.2
		Endrin	mg/kg	0.2	<0.2
		Beta Endosulfan	mg/kg	0.2	<0.2
		p,p'-DDD	mg/kg	0.1	<0.1
		p,p'-DDT	mg/kg	0.1	<0.1
		Endosulfan sulphate	mg/kg	0.1	<0.1
		Endrin Aldehyde	mg/kg	0.1	<0.1
		Methoxychlor	mg/kg	0.1	<0.1
		Endrin Ketone	mg/kg	0.1	<0.1
		Isodrin	mg/kg	0.1	<0.1
		Mirex	mg/kg	0.1	<0.1
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	87

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number		Parameter	Units	LOR	Result
LB107362.001		Dichlorvos	mg/kg	0.5	<0.5
		Dimethoate	mg/kg	0.5	<0.5
		Diazinon (Dimpylate)	mg/kg	0.5	<0.5
		Fenitrothion	mg/kg	0.2	<0.2
		Malathion	mg/kg	0.2	<0.2
		Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	<0.2
		Parathion-ethyl (Parathion)	mg/kg	0.2	<0.2
		Bromophos Ethyl	mg/kg	0.2	<0.2
		Methidathion	mg/kg	0.5	<0.5
		Ethion	mg/kg	0.2	<0.2
		Azinphos-methyl (Guthion)	mg/kg	0.2	<0.2
	Surrogates	2-fluorobiphenyl (Surrogate)	%	-	88
		d14-p-terphenyl (Surrogate)	%	-	122

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number	Parameter	Units	LOR	Result
LB107362.001	Naphthalene	mg/kg	0.1	<0.1
	2-methylnaphthalene	mg/kg	0.1	<0.1
	1-methylnaphthalene	mg/kg	0.1	<0.1
	Acenaphthylene	mg/kg	0.1	<0.1
	Acenaphthene	mg/kg	0.1	<0.1
	Fluorene	mg/kg	0.1	<0.1
	Phenanthrene	mg/kg	0.1	<0.1
	Anthracene	mg/kg	0.1	<0.1

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil (continued)

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB107362.001		Fluoranthene	mg/kg	0.1	<0.1
		Pyrene	mg/kg	0.1	<0.1
		Benzo(a)anthracene	mg/kg	0.1	<0.1
		Chrysene	mg/kg	0.1	<0.1
		Benzo(a)pyrene	mg/kg	0.1	<0.1
		Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1
		Dibenzo(ah)anthracene	mg/kg	0.1	<0.1
		Benzo(ghi)perylene	mg/kg	0.1	<0.1
		Total PAH (18)	mg/kg	0.8	<0.8
	Surrogates	d5-nitrobenzene (Surrogate)	%	-	86
		2-fluorobiphenyl (Surrogate)	%	-	82
		d14-p-terphenyl (Surrogate)	%	-	96

PCBs in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number		Parameter	Units	LOR	Result
LB107362.001		Arochlor 1016	mg/kg	0.2	<0.2
		Arochlor 1221	mg/kg	0.2	<0.2
		Arochlor 1232	mg/kg	0.2	<0.2
		Arochlor 1242	mg/kg	0.2	<0.2
		Arochlor 1248	mg/kg	0.2	<0.2
		Arochlor 1254	mg/kg	0.2	<0.2
		Arochlor 1260	mg/kg	0.2	<0.2
		Arochlor 1262	mg/kg	0.2	<0.2
		Arochlor 1268	mg/kg	0.2	<0.2
		Total PCBs (Arochlors)	mg/kg	1	<1
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	87

Total Phenolics in Soil

Method: ME-(AU)-[ENV]AN289

Sample Number	Parameter	Units	LOR	Result
LB107483.001	Total Phenols	mg/kg	0.1	<0.1

Total Recoverable Metals in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

Sample Number	Parameter	Units	LOR	Result
LB107477.001	Arsenic, As	mg/kg	3	<3
	Cadmium, Cd	mg/kg	0.3	<0.3
	Chromium, Cr	mg/kg	0.3	<0.3
	Copper, Cu	mg/kg	0.5	<0.5
	Lead, Pb	mg/kg	1	<1
	Nickel, Ni	mg/kg	0.5	<0.5
	Zinc, Zn	mg/kg	0.5	<0.5

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Number	Parameter	Units	LOR	Result
LB107495.001	Arsenic, As	µg/L	1	<1
	Cadmium, Cd	µg/L	0.1	<0.1
	Chromium, Cr	µg/L	1	<1
	Copper, Cu	µg/L	1	<1
	Lead, Pb	µg/L	1	<1
	Nickel, Ni	µg/L	1	<1
	Zinc, Zn	µg/L	5	<5

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Sample Number	Parameter	Units	LOR	Result
LB107362.001	TRH C10-C14	mg/kg	20	<20
	TRH C15-C28	mg/kg	45	<45
	TRH C29-C36	mg/kg	45	<45
	TRH C37-C40	mg/kg	100	<100
	TRH C10-C36 Total	mg/kg	110	<110

TRH (Total Recoverable Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN403

Sample Number	Parameter	Units	LOR

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

TRH (Total Recoverable Hydrocarbons) in Water (continued)

Method: ME-(AU)-[ENV]AN403

Sample Number	Parameter	Units	LOR	Result
LB107373.001	TRH C10-C14	µg/L	50	<50
	TRH C15-C28	µg/L	200	<200
	TRH C29-C36	µg/L	200	<200
	TRH C37-C40	µg/L	200	<200

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB107350.001	Fumigants	2,2-dichloropropane	mg/kg	0.1	<0.1
		1,2-dichloropropane	mg/kg	0.1	<0.1
		cis-1,3-dichloropropene	mg/kg	0.1	<0.1
		trans-1,3-dichloropropene	mg/kg	0.1	<0.1
		1,2-dibromoethane (EDB)	mg/kg	0.1	<0.1
	Halogenated Aliphatics	Dichlorodifluoromethane (CFC-12)	mg/kg	1	<1
		Chloromethane	mg/kg	1	<1
		Vinyl chloride (Chloroethene)	mg/kg	0.1	<0.1
		Bromomethane	mg/kg	1	<1
		Chloroethane	mg/kg	1	<1
		Trichlorofluoromethane	mg/kg	1	<1
		Iodomethane	mg/kg	5	<5
		1,1-dichloroethene	mg/kg	0.1	<0.1
		Dichloromethane (Methylene chloride)	mg/kg	0.5	<0.5
		Allyl chloride	mg/kg	0.1	<0.1
		trans-1,2-dichloroethene	mg/kg	0.1	<0.1
		1,1-dichloroethane	mg/kg	0.1	<0.1
		cis-1,2-dichloroethene	mg/kg	0.1	<0.1
		Bromochloromethane	mg/kg	0.1	<0.1
		1,2-dichloroethane	mg/kg	0.1	<0.1
		1,1,1-trichloroethane	mg/kg	0.1	<0.1
		1,1-dichloropropene	mg/kg	0.1	<0.1
		Carbon tetrachloride	mg/kg	0.1	<0.1
		Dibromomethane	mg/kg	0.1	<0.1
		Trichloroethene (Trichloroethylene -TCE)	mg/kg	0.1	<0.1
		1,1,2-trichloroethane	mg/kg	0.1	<0.1
		1,3-dichloropropane	mg/kg	0.1	<0.1
		Tetrachloroethene (Perchloroethylene,PCE)	mg/kg	0.1	<0.1
		1,1,1,2-tetrachloroethane	mg/kg	0.1	<0.1
		cis-1,4-dichloro-2-butene	mg/kg	1	<1
		1,1,2,2-tetrachloroethane	mg/kg	0.1	<0.1
		1,2,3-trichloropropane	mg/kg	0.1	<0.1
		trans-1,4-dichloro-2-butene	mg/kg	1	<1
		1,2-dibromo-3-chloropropane	mg/kg	0.1	<0.1
		Hexachlorobutadiene	mg/kg	0.1	<0.1
	Halogenated Aromatics	Chlorobenzene	mg/kg	0.1	<0.1
		Bromobenzene	mg/kg	0.1	<0.1
		2-chlorotoluene	mg/kg	0.1	<0.1
		4-chlorotoluene	mg/kg	0.1	<0.1
		1,3-dichlorobenzene	mg/kg	0.1	<0.1
		1,4-dichlorobenzene	mg/kg	0.1	<0.1
		1,2-dichlorobenzene	mg/kg	0.1	<0.1
		1,2,4-trichlorobenzene	mg/kg	0.1	<0.1
		1,2,3-trichlorobenzene	mg/kg	0.1	<0.1
	Monocyclic Aromatic Hydrocarbons	Benzene	mg/kg	0.1	<0.1
		Toluene	mg/kg	0.1	<0.1
		Ethylbenzene	mg/kg	0.1	<0.1
		m/p-xylene	mg/kg	0.2	<0.2
		o-xylene	mg/kg	0.1	<0.1
		Styrene (Vinyl benzene)	mg/kg	0.1	<0.1
		Isopropylbenzene (Cumene)	mg/kg	0.1	<0.1
		n-propylbenzene	mg/kg	0.1	<0.1
		1,3,5-trimethylbenzene	mg/kg	0.1	<0.1
		tert-butylbenzene	mg/kg	0.1	<0.1

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

VOC's in Soil (continued)

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB107350.001	Monocyclic Aromatic Hydrocarbons	1,2,4-trimethylbenzene	mg/kg	0.1	<0.1
		sec-butylbenzene	mg/kg	0.1	<0.1
		p-isopropyltoluene	mg/kg	0.1	<0.1
		n-butylbenzene	mg/kg	0.1	<0.1
	Nitrogenous Compounds	Acrylonitrile	mg/kg	0.1	<0.1
		2-nitropropane	mg/kg	10	<10
	Oxygenated Compounds	Acetone (2-propanone)	mg/kg	10	<10
		MtBE (Methyl-tert-butyl ether)	mg/kg	0.1	<0.1
		Vinyl acetate	mg/kg	10	<10
		MEK (2-butanone)	mg/kg	10	<10
		MIBK (4-methyl-2-pentanone)	mg/kg	1	<1
		2-hexanone (MBK)	mg/kg	5	<5
	Polycyclic VOCs	Naphthalene	mg/kg	0.1	<0.1
	Sulphonated	Carbon disulfide	mg/kg	0.5	<0.5
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	82
		d4-1,2-dichloroethane (Surrogate)	%	-	102
		d8-toluene (Surrogate)	%	-	120
		Bromofluorobenzene (Surrogate)	%	-	109
	Totals	Total BTEX	mg/kg	0.6	<0.6
	Trihalomethanes	Chloroform	mg/kg	0.1	<0.1
		Bromodichloromethane	mg/kg	0.1	<0.1
		Chlorodibromomethane	mg/kg	0.1	<0.1
		Bromoform	mg/kg	0.1	<0.1

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB107329.001	Monocyclic Aromatic Hydrocarbons	Benzene	µg/L	0.5	<0.5
		Toluene	µg/L	0.5	<0.5
		Ethylbenzene	µg/L	0.5	<0.5
		m/p-xylene	µg/L	1	<1
		o-xylene	µg/L	0.5	<0.5
	Polycyclic VOCs	Naphthalene	µg/L	0.5	<0.5
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	101
		d4-1,2-dichloroethane (Surrogate)	%	-	100
		d8-toluene (Surrogate)	%	-	95
		Bromofluorobenzene (Surrogate)	%	-	100

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB107350.001		TRH C6-C9	mg/kg	20	<20
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	82
		d4-1,2-dichloroethane (Surrogate)	%	-	103
		d8-toluene (Surrogate)	%	-	116

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB107329.001		TRH C6-C9	µg/L	40	<40
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	101
		d4-1,2-dichloroethane (Surrogate)	%	-	100
		d8-toluene (Surrogate)	%	-	95
		Bromofluorobenzene (Surrogate)	%	-	100

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311(Perth)/AN312

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE155826.020	LB107488.010	Mercury	µg/L	0.0001	<0.0001	<0.0001	200	0

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE155658.002	LB107441.014	Mercury	mg/kg	0.05	0.00042869760	.0006627919	200	0
SE155671.002	LB107441.024	Mercury	mg/kg	0.05	<0.05	<0.05	200	0
SE155671.012	LB107443.014	Mercury	mg/kg	0.05	<0.05	<0.05	200	0
SE155799.001	LB107443.024	Mercury	mg/kg	0.05	0.0179030612	0.0165353535	200	0

Moisture Content

Method: ME-(AU)-[ENV]AN002

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE155671.010	LB107435.011	% Moisture	%w/w	0.5	1.7	1.8	87	3
SE155678.003	LB107435.022	% Moisture	%w/w	0.5	34	37	33	8
SE155731.004	LB107435.033	% Moisture	%w/w	0.5	81.0	81.8	31	1
SE155810.001	LB107435.041	% Moisture	%w/w	0.5	29.952830188	29.463171036	33	2

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE155671.013	LB107362.028	Hexachlorobenzene (HCB)	mg/kg	0.1	<0.1	0	200	0
		Alpha BHC	mg/kg	0.1	<0.1	0	200	0
		Lindane	mg/kg	0.1	<0.1	0	200	0
		Heptachlor	mg/kg	0.1	<0.1	0	200	0
		Aldrin	mg/kg	0.1	<0.1	0	200	0
		Beta BHC	mg/kg	0.1	<0.1	0	200	0
		Delta BHC	mg/kg	0.1	<0.1	0	200	0
		Heptachlor epoxide	mg/kg	0.1	<0.1	0	200	0
		o,p'-DDE	mg/kg	0.1	<0.1	0	200	0
		Alpha Endosulfan	mg/kg	0.2	<0.2	0	200	0
		Gamma Chlordane	mg/kg	0.1	<0.1	0	200	0
		Alpha Chlordane	mg/kg	0.1	<0.1	0	200	0
		trans-Nonachlor	mg/kg	0.1	<0.1	0	200	0
		p,p'-DDE	mg/kg	0.1	<0.1	0	200	0
		Dieldrin	mg/kg	0.2	<0.2	0	200	0
		Endrin	mg/kg	0.2	<0.2	0	200	0
		o,p'-DDD	mg/kg	0.1	<0.1	0	200	0
		o,p'-DDT	mg/kg	0.1	<0.1	0	200	0
		Beta Endosulfan	mg/kg	0.2	<0.2	0	200	0
		p,p'-DDD	mg/kg	0.1	<0.1	0	200	0
		p,p'-DDT	mg/kg	0.1	<0.1	0	200	0
		Endosulfan sulphate	mg/kg	0.1	<0.1	0	200	0
		Endrin Aldehyde	mg/kg	0.1	<0.1	0	200	0
		Methoxychlor	mg/kg	0.1	<0.1	0	200	0
		Endrin Ketone	mg/kg	0.1	<0.1	0	200	0
		Isodrin	mg/kg	0.1	<0.1	0	200	0
		Mirex	mg/kg	0.1	<0.1	0	200	0
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.16	0.132	30	19

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE155671.004	LB107362.014	Naphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		Acenaphthylene	mg/kg	0.1	<0.1	<0.1	200	0
		Acenaphthene	mg/kg	0.1	<0.1	<0.1	200	0
		Fluorene	mg/kg	0.1	<0.1	<0.1	200	0
		Phenanthrene	mg/kg	0.1	<0.1	<0.1	200	0
		Anthracene	mg/kg	0.1	<0.1	<0.1	200	0
		Fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
		Pyrene	mg/kg	0.1	<0.1	<0.1	200	0
		Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	200	0

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

PAH (Polynuclear Aromatic Hydrocarbons) in Soil (continued)

Method: ME-(AU)-[ENV]AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE155671.004	LB107362.014		Chrysene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(a)pyrene	mg/kg	0.1	<0.1	<0.1	200	0
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	200	0
			Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	200	0
			Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	200	0
			Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	<0.2	<0.2	200	0
			Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	<0.3	134	0
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	<0.2	175	0
			Total PAH (18)	mg/kg	0.8	<0.8	<0.8	200	0
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.4	0.4	30	3
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	0.4	30	2
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.6	0.6	30	4
SE155671.010	LB107362.026		Naphthalene	mg/kg	0.1	<0.1	0	200	0
			2-methylnaphthalene	mg/kg	0.1	<0.1	0	200	0
			1-methylnaphthalene	mg/kg	0.1	<0.1	0	200	0
			Acenaphthylene	mg/kg	0.1	<0.1	0	200	0
			Acenaphthene	mg/kg	0.1	<0.1	0	200	0
			Fluorene	mg/kg	0.1	<0.1	0	200	0
			Phenanthrene	mg/kg	0.1	<0.1	0	200	0
			Anthracene	mg/kg	0.1	<0.1	0	200	0
			Fluoranthene	mg/kg	0.1	<0.1	0	200	0
			Pyrene	mg/kg	0.1	<0.1	0	200	0
			Benzo(a)anthracene	mg/kg	0.1	<0.1	0.01	200	0
			Chrysene	mg/kg	0.1	<0.1	0.01	200	0
			Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	0	200	0
			Benzo(k)fluoranthene	mg/kg	0.1	<0.1	0	200	0
			Benzo(a)pyrene	mg/kg	0.1	<0.1	0.01	200	0
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	0	200	0
			Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	0	200	0
			Benzo(ghi)perylene	mg/kg	0.1	<0.1	0	200	0
			Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ (mg/kg)	0.2	<0.2	0	200	0
			Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	<0.3	0.242	134	0
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	<0.2	0.121	175	0
			Total PAH (18)	mg/kg	0.8	<0.8	0	200	0
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.4	0.39	30	5
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	0.37	30	0
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.48	30	4

PCBs in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE155671.013	LB107362.026		Arochlor 1016	mg/kg	0.2	<0.2	0	200	0
			Arochlor 1221	mg/kg	0.2	<0.2	0	200	0
			Arochlor 1232	mg/kg	0.2	<0.2	0	200	0
			Arochlor 1242	mg/kg	0.2	<0.2	0	200	0
			Arochlor 1248	mg/kg	0.2	<0.2	0	200	0
			Arochlor 1254	mg/kg	0.2	<0.2	0	200	0
			Arochlor 1260	mg/kg	0.2	<0.2	0	200	0
			Arochlor 1262	mg/kg	0.2	<0.2	0	200	0
			Arochlor 1268	mg/kg	0.2	<0.2	0	200	0
			Total PCBs (Arochlors)	mg/kg	1	<1	0	200	0
		Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0	0.132	30	19

Total Recoverable Metals in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE155671.006	LB107477.014	Arsenic, As	mg/kg	3	<3	<3	159	0
		Cadmium, Cd	mg/kg	0.3	<0.3	<0.3	200	0
		Chromium, Cr	mg/kg	0.3	4.5	4.5	41	1
		Copper, Cu	mg/kg	0.5	1.9	1.8	57	2
		Lead, Pb	mg/kg	1	4	4	54	2
		Nickel, Ni	mg/kg	0.5	1.4	1.3	67	5

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Total Recoverable Metals in Soil/Waste Solids/Materials by ICPOES (continued)

Method: ME-(AU)-[ENV]AN040/AN320

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE155671.006	LB107477.014	Zinc, Zn	mg/kg	0.5	3.6	3.3	88	8

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE155817.022	LB107495.022	Arsenic, As	µg/L	1	<1	<1	200	0
		Cadmium, Cd	µg/L	0.1	<0.1	<0.1	200	0
		Chromium, Cr	µg/L	1	<1	<1	200	0
		Copper, Cu	µg/L	1	<1	<1	200	0
		Lead, Pb	µg/L	1	<1	<1	200	0
		Nickel, Ni	µg/L	1	<1	<1	200	0
		Zinc, Zn	µg/L	5	<5	<5	200	0

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE155671.004	LB107362.014		TRH C10-C14	mg/kg	20	<20	<20	200	0
			TRH C15-C28	mg/kg	45	<45	<45	200	0
			TRH C29-C36	mg/kg	45	<45	<45	200	0
			TRH C37-C40	mg/kg	100	<100	<100	200	0
			TRH C10-C36 Total	mg/kg	110	<110	<110	200	0
			TRH C10-C40 Total	mg/kg	210	<210	<210	200	0
		TRH F Bands	TRH >C10-C16 (F2)	mg/kg	25	<25	<25	200	0
			TRH >C10-C16 (F2) - Naphthalene	mg/kg	25	<25	<25	200	0
			TRH >C16-C34 (F3)	mg/kg	90	<90	<90	200	0
			TRH >C34-C40 (F4)	mg/kg	120	<120	<120	200	0
SE155671.010	LB107362.027		TRH C10-C14	mg/kg	20	<20	0	200	0
			TRH C15-C28	mg/kg	45	<45	0	200	0
			TRH C29-C36	mg/kg	45	<45	0	200	0
			TRH C37-C40	mg/kg	100	<100	0	200	0
			TRH C10-C36 Total	mg/kg	110	<110	0	200	0
			TRH C10-C40 Total	mg/kg	210	<210	0	200	0
		TRH F Bands	TRH >C10-C16 (F2)	mg/kg	25	<25	0	200	0
			TRH >C10-C16 (F2) - Naphthalene	mg/kg	25	<25	0	200	0
			TRH >C16-C34 (F3)	mg/kg	90	<90	0	200	0
			TRH >C34-C40 (F4)	mg/kg	120	<120	0	200	0
SE155671.014	LB107362.025		TRH C10-C14	mg/kg	20	<20	<20	200	0
			TRH C15-C28	mg/kg	45	<45	<45	200	0
			TRH C29-C36	mg/kg	45	<45	<45	200	0
			TRH C37-C40	mg/kg	100	<100	<100	200	0
			TRH C10-C36 Total	mg/kg	110	<110	<110	200	0
			TRH C10-C40 Total	mg/kg	210	<210	<210	200	0
		TRH F Bands	TRH >C10-C16 (F2)	mg/kg	25	<25	<25	200	0
			TRH >C10-C16 (F2) - Naphthalene	mg/kg	25	<25	<25	200	0
			TRH >C16-C34 (F3)	mg/kg	90	<90	<90	200	0
			TRH >C34-C40 (F4)	mg/kg	120	<120	<120	200	0

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE155671.010	LB107350.014	Monocyclic	Benzene	mg/kg	0.1	<0.1	<0.1	200	0
		Aromatic	Toluene	mg/kg	0.1	<0.1	<0.1	200	0
			Ethylbenzene	mg/kg	0.1	<0.1	<0.1	200	0
			m/p-xylene	mg/kg	0.2	<0.2	<0.2	200	0
			o-xylene	mg/kg	0.1	<0.1	<0.1	200	0
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	<0.1	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.4	3.6	50	20
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.7	3.9	50	20
			d8-toluene (Surrogate)	mg/kg	-	6.5	5.0	50	26
			Bromofluorobenzene (Surrogate)	mg/kg	-	5.3	5.1	50	4
		Totals	Total Xylenes*	mg/kg	0.3	<0.3	<0.3	200	0
			Total BTEX	mg/kg	0.6	<0.6	<0.6	200	0
SE155671.014	LB107350.022	Monocyclic	Benzene	mg/kg	0.1	<0.1	0.01	200	0
		Aromatic	Toluene	mg/kg	0.1	<0.1	0.03	200	0
			Ethylbenzene	mg/kg	0.1	<0.1	0.01	200	0

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

VOC's in Soil (continued)

Method: ME-(AU)-[ENV]AN433

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE155671.014	LB107350.022	Monocyclic	m/p-xylene	mg/kg	0.2	<0.2	0.04	200	0
		Aromatic	o-xylene	mg/kg	0.1	<0.1	0.01	200	0
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	0	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	5.3	4.46	50	17
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	5.2	4.81	50	7
			d8-toluene (Surrogate)	mg/kg	-	5.6	5.87	50	5
			Bromofluorobenzene (Surrogate)	mg/kg	-	5.6	5.2	50	7
		Totals	Total Xylenes*	mg/kg	0.3	<0.3	0.05	200	0
			Total BTEX	mg/kg	0.6	<0.6	0.1	200	0

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Original	Duplicate		Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE155671.010	LB107350.014		TRH C6-C10	mg/kg	25	<25	<25	200	0
			TRH C6-C9	mg/kg	20	<20	<20	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.4	3.6	30	20
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.7	3.9	30	20
			d8-toluene (Surrogate)	mg/kg	-	6.5	5.0	30	26
			Bromofluorobenzene (Surrogate)	mg/kg	-	5.3	5.1	30	4
		VPH F Bands	Benzene (F0)	mg/kg	0.1	<0.1	<0.1	200	0
			TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	<25	200	0
SE155671.014	LB107350.022		TRH C6-C10	mg/kg	25	<25	0	200	0
			TRH C6-C9	mg/kg	20	<20	0	200	0
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	5.3	4.46	30	17
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	5.2	4.81	30	7
			d8-toluene (Surrogate)	mg/kg	-	5.6	5.87	30	5
			Bromofluorobenzene (Surrogate)	mg/kg	-	5.6	5.2	30	7
		VPH F Bands	Benzene (F0)	mg/kg	0.1	<0.1	0.01	200	0
			TRH C6-C10 minus BTEX (F1)	mg/kg	25	<25	-0.1	200	0

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB107441.002	Mercury	mg/kg	0.05	0.20	0.2	70 - 130	98
LB107443.002	Mercury	mg/kg	0.05	0.21	0.2	70 - 130	107

OC Pesticides in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB107362.002		Heptachlor	mg/kg	0.1	0.2	0.2	60 - 140	77
		Aldrin	mg/kg	0.1	0.2	0.2	60 - 140	80
		Delta BHC	mg/kg	0.1	0.2	0.2	60 - 140	75
		Dieldrin	mg/kg	0.2	<0.2	0.2	60 - 140	78
		Endrin	mg/kg	0.2	<0.2	0.2	60 - 140	82
		p,p'-DDT	mg/kg	0.1	0.2	0.2	60 - 140	76
	Surrogates	Tetrachloro-m-xylene (TCMX) (Surrogate)	mg/kg	-	0.13	0.15	40 - 130	85

OP Pesticides in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB107362.002		Dichlorvos	mg/kg	0.5	2.0	2	60 - 140	101
		Diazinon (Dimpylate)	mg/kg	0.5	2.2	2	60 - 140	110
		Chlorpyrifos (Chlorpyrifos Ethyl)	mg/kg	0.2	2.3	2	60 - 140	113
		Ethion	mg/kg	0.2	1.8	2	60 - 140	90
	Surrogates	2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	0.5	40 - 130	86
		d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	108

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB107362.002		Naphthalene	mg/kg	0.1	3.9	4	60 - 140	97
		Acenaphthylene	mg/kg	0.1	4.4	4	60 - 140	109
		Acenaphthene	mg/kg	0.1	4.0	4	60 - 140	100
		Phenanthrene	mg/kg	0.1	3.7	4	60 - 140	93
		Anthracene	mg/kg	0.1	4.3	4	60 - 140	107
		Fluoranthene	mg/kg	0.1	4.8	4	60 - 140	121
		Pyrene	mg/kg	0.1	4.8	4	60 - 140	120
		Benzo(a)pyrene	mg/kg	0.1	4.0	4	60 - 140	101
	Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.4	0.5	40 - 130	80
		2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	0.5	40 - 130	78
		d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	40 - 130	106

PCBs in Soil

Method: ME-(AU)-[ENV]AN400/AN420

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB107362.002	Arochlor 1260	mg/kg	0.2	0.4	0.4	60 - 140	106

Total Phenolics in Soil

Method: ME-(AU)-[ENV]AN289

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB107483.002	Total Phenols	mg/kg	0.1	2.3	2.5	70 - 130	94

Total Recoverable Metals in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB107477.002	Arsenic, As	mg/kg	3	51	50	80 - 120	102
	Cadmium, Cd	mg/kg	0.3	54	50	80 - 120	109
	Chromium, Cr	mg/kg	0.3	49	50	80 - 120	98
	Copper, Cu	mg/kg	0.5	48	50	80 - 120	96
	Lead, Pb	mg/kg	1	53	50	80 - 120	105
	Nickel, Ni	mg/kg	0.5	50	50	80 - 120	101
	Zinc, Zn	mg/kg	0.5	50	50	80 - 120	100

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB107495.002	Arsenic, As	µg/L	1	20	20	80 - 120	101
	Cadmium, Cd	µg/L	0.1	21	20	80 - 120	106
	Chromium, Cr	µg/L	1	22	20	80 - 120	109

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Trace Metals (Dissolved) in Water by ICPMS (continued)

Method: ME-(AU)-[ENV]AN318

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB107495.002		Copper, Cu	µg/L	1	23	20	80 - 120	113
		Lead, Pb	µg/L	1	22	20	80 - 120	111
		Nickel, Ni	µg/L	1	22	20	80 - 120	112
		Zinc, Zn	µg/L	5	23	20	80 - 120	114

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB107362.002		TRH C10-C14	mg/kg	20	44	40	60 - 140	110
		TRH C15-C28	mg/kg	45	<45	40	60 - 140	98
		TRH C29-C36	mg/kg	45	<45	40	60 - 140	80
	TRH F Bands	TRH >C10-C16 (F2)	mg/kg	25	43	40	60 - 140	108
		TRH >C16-C34 (F3)	mg/kg	90	<90	40	60 - 140	88
		TRH >C34-C40 (F4)	mg/kg	120	<120	20	60 - 140	80

TRH (Total Recoverable Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN403

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB107373.002		TRH C10-C14	µg/L	50	970	1200	60 - 140	80
		TRH C15-C28	µg/L	200	1200	1200	60 - 140	97
		TRH C29-C36	µg/L	200	1300	1200	60 - 140	109
	TRH F Bands	TRH >C10-C16 (F2)	µg/L	60	1100	1200	60 - 140	88
		TRH >C16-C34 (F3)	µg/L	500	1300	1200	60 - 140	108
		TRH >C34-C40 (F4)	µg/L	500	640	600	60 - 140	107

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB107350.002	Halogenated	1,1-dichloroethene	mg/kg	0.1	1.9	2.56	60 - 140	72
	Aliphatics	1,2-dichloroethane	mg/kg	0.1	2.7	2.56	60 - 140	105
		Trichloroethene (Trichloroethylene -TCE)	mg/kg	0.1	2.3	2.56	60 - 140	89
	Halogenated	Chlorobenzene	mg/kg	0.1	2.6	2.56	60 - 140	102
	Monocyclic	Benzene	mg/kg	0.1	2.8	2.9	60 - 140	96
	Aromatic	Toluene	mg/kg	0.1	2.3	2.9	60 - 140	81
		Ethylbenzene	mg/kg	0.1	2.6	2.9	60 - 140	88
		m/p-xylene	mg/kg	0.2	5.0	5.8	60 - 140	86
		o-xylene	mg/kg	0.1	2.6	2.9	60 - 140	90
	Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	6.0	5	60 - 140	120
		d4-1,2-dichloroethane (Surrogate)	mg/kg	-	6.4	5	60 - 140	128
		d8-toluene (Surrogate)	mg/kg	-	5.9	5	60 - 140	118
		Bromofluorobenzene (Surrogate)	mg/kg	-	6.2	5	60 - 140	124
	Trihalomethan	Chloroform	mg/kg	0.1	2.7	2.56	60 - 140	105

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB107329.002	Monocyclic	Benzene	µg/L	0.5	52	45.45	60 - 140	114
	Aromatic	Toluene	µg/L	0.5	52	45.45	60 - 140	114
		Ethylbenzene	µg/L	0.5	52	45.45	60 - 140	114
		m/p-xylene	µg/L	1	100	90.9	60 - 140	113
		o-xylene	µg/L	0.5	51	45.45	60 - 140	112
	Surrogates	Dibromofluoromethane (Surrogate)	µg/L	-	5.1	5	60 - 140	103
		d4-1,2-dichloroethane (Surrogate)	µg/L	-	5.2	5	60 - 140	104
		d8-toluene (Surrogate)	µg/L	-	5.5	5	60 - 140	109
		Bromofluorobenzene (Surrogate)	µg/L	-	5.1	5	60 - 140	101

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB107350.002		TRH C6-C10	mg/kg	25	<25	24.65	60 - 140	90
		TRH C6-C9	mg/kg	20	<20	23.2	60 - 140	71
	Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	4.2	5	60 - 140	83
		d4-1,2-dichloroethane (Surrogate)	mg/kg	-	5.2	5	60 - 140	104
		d8-toluene (Surrogate)	mg/kg	-	5.4	5	60 - 140	108
		Bromofluorobenzene (Surrogate)	mg/kg	-	5.7	5	60 - 140	114
	VPH F Bands	TRH C6-C10 minus BTEX (F1)	mg/kg	25	NVL	NVL	NVL	NVL

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Sample Number	Parameter	Units	LOR

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Volatile Petroleum Hydrocarbons in Water (continued) — **Method: ME-(AU)-[ENV]AN433**

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB107329.002		TRH C6-C10	µg/L	50	890	946.63	60 - 140	94
		TRH C6-C9	µg/L	40	730	818.71	60 - 140	89
	Surrogates	Dibromofluoromethane (Surrogate)	µg/L	-	5.1	5	60 - 140	103
		d4-1,2-dichloroethane (Surrogate)	µg/L	-	5.2	5	60 - 140	104
		d8-toluene (Surrogate)	µg/L	-	5.5	5	60 - 140	109
		Bromofluorobenzene (Surrogate)	µg/L	-	5.1	5	60 - 140	101
	VPH F Bands	TRH C6-C10 minus BTEX (F1)	µg/L	50	580	639.67	60 - 140	91

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub -sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311(Perth)/AN312

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE155615.001	LB107488.004	Mercury	mg/L	0.0001	0.0062	-0.027	0.008	77

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE155645.001	LB107441.004	Mercury	mg/kg	0.05	0.23	0.06916597074	0.2	81
SE155671.003	LB107443.004	Mercury	mg/kg	0.05	NVL	NVL	NVL	NVL

PAH (Polynuclear Aromatic Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN420

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE155671.002	LB107362.027		Naphthalene	mg/kg	0.1	3.8	<0.1	4	94
			2-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	-	-
			1-methylnaphthalene	mg/kg	0.1	<0.1	<0.1	-	-
			Acenaphthylene	mg/kg	0.1	4.3	<0.1	4	107
			Acenaphthene	mg/kg	0.1	3.8	<0.1	4	94
			Fluorene	mg/kg	0.1	<0.1	<0.1	-	-
			Phenanthrene	mg/kg	0.1	3.8	<0.1	4	94
			Anthracene	mg/kg	0.1	4.6	<0.1	4	115
			Fluoranthene	mg/kg	0.1	5.2	<0.1	4	129
			Pyrene	mg/kg	0.1	5.1	<0.1	4	128
			Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	-	-
			Chrysene	mg/kg	0.1	<0.1	<0.1	-	-
			Benzo(b&j)fluoranthene	mg/kg	0.1	<0.1	<0.1	-	-
			Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	-	-
			Benzo(a)pyrene	mg/kg	0.1	3.9	<0.1	4	98
			Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	-	-
			Dibenzo(ah)anthracene	mg/kg	0.1	<0.1	<0.1	-	-
			Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=0	TEQ	0.2	3.9	<0.2	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=LOR	TEQ (mg/kg)	0.3	4.1	<0.3	-	-
			Carcinogenic PAHs, BaP TEQ <LOR=LOR/2	TEQ (mg/kg)	0.2	4.0	<0.2	-	-
			Total PAH (18)	mg/kg	0.8	34	<0.8	-	-
		Surrogates	d5-nitrobenzene (Surrogate)	mg/kg	-	0.4	0.4	-	78
			2-fluorobiphenyl (Surrogate)	mg/kg	-	0.4	0.4	-	80
			d14-p-terphenyl (Surrogate)	mg/kg	-	0.5	0.5	-	94

Total Phenolics in Soil

Method: ME-(AU)-[ENV]AN289

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE155826.005	LB107483.017	Total Phenols	mg/kg	0.1	2.5	<5	2.5	95

Total Recoverable Metals in Soil/Waste Solids/Materials by ICPOES

Method: ME-(AU)-[ENV]AN040/AN320

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE155665.003	LB107477.004	Lead, Pb	mg/kg	1	56	15	50	81

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE155615.001	LB107495.004	Arsenic, As	µg/L	1	30	1.702	20	141 ④
		Cadmium, Cd	µg/L	0.1	22	0.007	20	108
		Chromium, Cr	µg/L	1	28	7.748	20	101
		Copper, Cu	µg/L	1	19	0.366	20	93
		Lead, Pb	µg/L	1	21	0.123	20	106
		Nickel, Ni	µg/L	1	28	9.155	20	93
		Zinc, Zn	µg/L	5	28	8.804	20	94

TRH (Total Recoverable Hydrocarbons) in Soil

Method: ME-(AU)-[ENV]AN403

QC Sample	Sample Number	Parameter	Units	LOR

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub -sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

TRH (Total Recoverable Hydrocarbons) in Soil (continued)

Method: ME-(AU)-[ENV]AN403

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE155671.002	LB107362.026		TRH C10-C14	mg/kg	20	42	<20	40	105
			TRH C15-C28	mg/kg	45	<45	<45	40	95
			TRH C29-C36	mg/kg	45	<45	<45	40	80
			TRH C37-C40	mg/kg	100	<100	<100	-	-
			TRH C10-C36 Total	mg/kg	110	110	<110	-	-
			TRH C10-C40 Total	mg/kg	210	<210	<210	-	-
		TRH F Bands	TRH >C10-C16 (F2)	mg/kg	25	41	<25	40	103
			TRH >C10-C16 (F2) - Naphthalene	mg/kg	25	41	<25	-	-
			TRH >C16-C34 (F3)	mg/kg	90	<90	<90	40	85
			TRH >C34-C40 (F4)	mg/kg	120	<120	<120	-	-

VOC's in Soil

Method: ME-(AU)-[ENV]AN433

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE155671.001	LB107350.004	Fumigants	2,2-dichloropropane	mg/kg	0.1	<0.1	<0.1	-	-
			1,2-dichloropropane	mg/kg	0.1	<0.1	<0.1	-	-
			cis-1,3-dichloropropene	mg/kg	0.1	<0.1	<0.1	-	-
			trans-1,3-dichloropropene	mg/kg	0.1	<0.1	<0.1	-	-
			1,2-dibromoethane (EDB)	mg/kg	0.1	<0.1	<0.1	-	-
		Halogenated	Dichlorodifluoromethane (CFC-12)	mg/kg	1	<1	<1	-	-
		Aliphatics	Chloromethane	mg/kg	1	<1	<1	-	-
			Vinyl chloride (Chloroethene)	mg/kg	0.1	<0.1	<0.1	-	-
			Bromomethane	mg/kg	1	<1	<1	-	-
			Chloroethane	mg/kg	1	<1	<1	-	-
			Trichlorofluoromethane	mg/kg	1	<1	<1	-	-
			Iodomethane	mg/kg	5	<5	<5	-	-
			1,1-dichloroethene	mg/kg	0.1	1.8	<0.1	2.56	71
			Dichloromethane (Methylene chloride)	mg/kg	0.5	<0.5	<0.5	-	-
			Allyl chloride	mg/kg	0.1	<0.1	<0.1	-	-
			trans-1,2-dichloroethene	mg/kg	0.1	<0.1	<0.1	-	-
			1,1-dichloroethane	mg/kg	0.1	<0.1	<0.1	-	-
			cis-1,2-dichloroethene	mg/kg	0.1	<0.1	<0.1	-	-
			Bromochloromethane	mg/kg	0.1	<0.1	<0.1	-	-
			1,2-dichloroethane	mg/kg	0.1	2.8	<0.1	2.56	109
			1,1,1-trichloroethane	mg/kg	0.1	<0.1	<0.1	-	-
			1,1-dichloropropene	mg/kg	0.1	<0.1	<0.1	-	-
			Carbon tetrachloride	mg/kg	0.1	<0.1	<0.1	-	-
			Dibromomethane	mg/kg	0.1	<0.1	<0.1	-	-
			Trichloroethene (Trichloroethylene -TCE)	mg/kg	0.1	1.9	<0.1	2.56	74
			1,1,2-trichloroethane	mg/kg	0.1	<0.1	<0.1	-	-
			1,3-dichloropropane	mg/kg	0.1	<0.1	<0.1	-	-
			Tetrachloroethene (Perchloroethylene,PCE)	mg/kg	0.1	<0.1	<0.1	-	-
			1,1,1,2-tetrachloroethane	mg/kg	0.1	<0.1	<0.1	-	-
			cis-1,4-dichloro-2-butene	mg/kg	1	<1	<1	-	-
			1,1,2,2-tetrachloroethane	mg/kg	0.1	<0.1	<0.1	-	-
			1,2,3-trichloropropane	mg/kg	0.1	<0.1	<0.1	-	-
			trans-1,4-dichloro-2-butene	mg/kg	1	<1	<1	-	-
			1,2-dibromo-3-chloropropane	mg/kg	0.1	<0.1	<0.1	-	-
			Hexachlorobutadiene	mg/kg	0.1	<0.1	<0.1	-	-
		Halogenated	Chlorobenzene	mg/kg	0.1	2.4	<0.1	2.56	93
		Aromatics	Bromobenzene	mg/kg	0.1	<0.1	<0.1	-	-
			2-chlorotoluene	mg/kg	0.1	<0.1	<0.1	-	-
			4-chlorotoluene	mg/kg	0.1	<0.1	<0.1	-	-
			1,3-dichlorobenzene	mg/kg	0.1	<0.1	<0.1	-	-
			1,4-dichlorobenzene	mg/kg	0.1	<0.1	<0.1	-	-
			1,2-dichlorobenzene	mg/kg	0.1	<0.1	<0.1	-	-
			1,2,4-trichlorobenzene	mg/kg	0.1	<0.1	<0.1	-	-
			1,2,3-trichlorobenzene	mg/kg	0.1	<0.1	<0.1	-	-
		Monocyclic	Benzene	mg/kg	0.1	2.8	<0.1	2.9	96
		Aromatic	Toluene	mg/kg	0.1	2.1	<0.1	2.9	72
			Ethylbenzene	mg/kg	0.1	2.1	<0.1	2.9	73
			m/p-xylene	mg/kg	0.2	4.2	<0.2	5.8	72

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub -sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

VOC's in Soil (continued)

Method: ME-(AU)-[ENV]AN433

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE155671.001	LB107350.004	Monocyclic	o-xylene	mg/kg	0.1	2.1	<0.1	2.9	73
		Aromatic	Styrene (Vinyl benzene)	mg/kg	0.1	<0.1	<0.1	-	-
			Isopropylbenzene (Cumene)	mg/kg	0.1	<0.1	<0.1	-	-
			n-propylbenzene	mg/kg	0.1	<0.1	<0.1	-	-
			1,3,5-trimethylbenzene	mg/kg	0.1	<0.1	<0.1	-	-
			tert-butylbenzene	mg/kg	0.1	<0.1	<0.1	-	-
			1,2,4-trimethylbenzene	mg/kg	0.1	<0.1	<0.1	-	-
			sec-butylbenzene	mg/kg	0.1	<0.1	<0.1	-	-
			p-isopropyltoluene	mg/kg	0.1	<0.1	<0.1	-	-
			n-butylbenzene	mg/kg	0.1	<0.1	<0.1	-	-
		Nitrogenous	Acrylonitrile	mg/kg	0.1	<0.1	<0.1	-	-
		Compounds	2-nitropropane	mg/kg	10	<10	<10	-	-
		Oxygenated	Acetone (2-propanone)	mg/kg	10	<10	<10	-	-
		Compounds	MtBE (Methyl-tert-butyl ether)	mg/kg	0.1	<0.1	<0.1	-	-
			Vinyl acetate	mg/kg	10	<10	<10	-	-
			MEK (2-butanone)	mg/kg	10	<10	<10	-	-
			MIBK (4-methyl-2-pentanone)	mg/kg	1	<1	<1	-	-
			2-hexanone (MBK)	mg/kg	5	<5	<5	-	-
		Polycyclic	Naphthalene	mg/kg	0.1	<0.1	<0.1	-	-
		Sulphonated	Carbon disulfide	mg/kg	0.5	<0.5	<0.5	-	-
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	5.5	3.8	-	110
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	5.9	4.1	-	119
			d8-toluene (Surrogate)	mg/kg	-	4.4	5.2	-	88
			Bromofluorobenzene (Surrogate)	mg/kg	-	4.8	5.8	-	95
		Totals	Total Xylenes*	mg/kg	0.3	6.3	<0.3	-	-
			Total BTEX	mg/kg	0.6	13	<0.6	-	-
		Trihalometha	Chloroform	mg/kg	0.1	2.8	<0.1	2.56	108
		nes	Bromodichloromethane	mg/kg	0.1	<0.1	<0.1	-	-
			Chlorodibromomethane	mg/kg	0.1	<0.1	<0.1	-	-
			Bromoform	mg/kg	0.1	<0.1	<0.1	-	-

Volatile Petroleum Hydrocarbons in Soil

Method: ME-(AU)-[ENV]AN433

QC Sample	Sample Number		Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE155671.001	LB107350.004		TRH C6-C10	mg/kg	25	<25	<25	24.65	83
			TRH C6-C9	mg/kg	20	<20	<20	23.2	69
		Surrogates	Dibromofluoromethane (Surrogate)	mg/kg	-	3.7	3.8	-	73
			d4-1,2-dichloroethane (Surrogate)	mg/kg	-	4.0	4.1	-	81
			d8-toluene (Surrogate)	mg/kg	-	4.9	5.9	-	97
			Bromofluorobenzene (Surrogate)	mg/kg	-	4.6	4.8	-	92
		VPH F	Benzene (F0)	mg/kg	0.1	NVL	NVL	NVL	NVL
		Bands	TRH C6-C10 minus BTEX (F1)	mg/kg	25	NVL	NVL	NVL	NVL

MATRIX SPIKE DUPLICATES

SE155671 R0

Matrix spike duplicates are calculated as Relative Percent Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The original result is the analyte concentration of the matrix spike. The Duplicate result is the analyte concentration of the matrix spike duplicate.

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No matrix spike duplicates were required for this job.

Samples analysed as received.

Solid samples expressed on a dry weight basis.

QC criteria are subject to internal review according to the SGS QA/QC plan and may be provided on request or alternatively can be found here: http://www.sgs.com.au/~/media/Local/Australia/Documents/Technical Documents/MP-AU-ENV-QU-022 QA QC Plan.pdf

*	NATA accreditation does not cover tthe performance of this service.
-	Sample not analysed for this analyte.

IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
LOR	Limit of reporting.
QFH	QC result is above the upper tolerance.
QFL	QC result is below the lower tolerance.

①	At least 2 of 3 surrogates are within acceptance criteria.
②	RPD failed acceptance criteria due to sample heterogeneity.
③	Results less than 5 times LOR preclude acceptance criteria for RPD.
④	Recovery failed acceptance criteria due to matrix interference.
⑤	Recovery failed acceptance criteria due to the presence of significant concentration of analyte (i.e. the concentration of analyte exceeds the spike level).
⑥	LOR was raised due to sample matrix interference.
⑦	LOR was raised due to dilution of significantly high concentration of analyte in sample.
⑧	Reanalysis of sample in duplicate confirmed sample heterogeneity and inconsistency of results.
⑨	Recovery failed acceptance criteria due to sample heterogeneity.
⑩	LOR was raised due to high conductivity of the sample (required dilution).
†	Refer to Analytical Report comments for further information.

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

Contact	Emmanuel Woelders
Client	Environmental Investigations
Address	Suite 6.01, 55 Miller Street NSW 2009
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Email	Emmanuel.Woelders@eiaustralia.com.au
Project	**E22282 - 12-24 Rothschild Ave, Rosebery**
Order Number	**E22282**
Samples	7

LABORATORY DETAILS

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Laboratory	SGS Alexandria Environmental
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Telephone	+61 2 8594 0400
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Email	au.environmental.sydney@sgs.com
SGS Reference	**SE155671 R0**
Date Received	08 Aug 2016
Date Reported	15 Aug 2016

COMMENTS

Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562(4354).

No respirable fibres detected in all samples using trace analysis technique.

Asbestos analysed by Approved Identifier Yusuf Kuthpudin.

SIGNATORIES

Andy Sutton
Senior Organic Chemist

Dong Liang
Metals/Inorganics Team Leader

Kamrul Ahsan
Senior Chemist

Ly Kim Ha
Organic Section Head

Yusuf Kuthpudin
Asbestos Analyst

ANALYTICAL REPORT

RESULTS

Fibre Identification in soil — Method AN602

Laboratory Reference	Client Reference	Matrix	Sample Description	Date Sampled	Fibre Identification	
SE155671.001	BH202_0.1-0.2	Soil	137g Sand, Rocks	06 Aug 2016	No Asbestos Found	<0.01
SE155671.003	BH206_0.35-0.45	Soil	97g Sand	06 Aug 2016	No Asbestos Found	<0.01
SE155671.005	BH207_0.3-0.4	Soil	140g Sand, Soil	06 Aug 2016	No Asbestos Found	<0.01
SE155671.007	BH208_0.1-0.2	Soil	170g Sand, Rocks	06 Aug 2016	No Asbestos Found	<0.01
SE155671.009	BH209_0.1-0.2	Soil	132g Sand, Rocks	06 Aug 2016	No Asbestos Found	<0.01
SE155671.011	BH210_0.2-0.4	Soil	180g Sand	06 Aug 2016	No Asbestos Found	<0.01
SE155671.013	BH211_0.3-0.4	Soil	178g Sand, Soil, Rocks	06 Aug 2016	No Asbestos Found	<0.01

METHOD SUMMARY

METHOD	METHODOLOGY SUMMARY
AN602	Qualitative identification of chrysotile, amosite and crocidolite in bulk samples by polarised light microscopy (PLM) in conjunction with dispersion staining (DS). AS4964 provides the basis for this document. Unequivocal identification of the asbestos minerals present is made by obtaining sufficient diagnostic `clues`, which provide a reasonable degree of certainty, dispersion staining is a mandatory `clue` for positive identification. If sufficient `clues` are absent, then positive identification of asbestos is not possible. This procedure requires removal of suspect fibres/bundles from the sample which cannot be returned.
AN602	Fibres/material that cannot be unequivocably identified as one of the three asbestos forms, will be reported as unknown mineral fibres (umf).
AN602	AS4964.2004 Method for the Qualitative Identification of Asbestos in Bulk Samples , Section 8.4, Trace Analysis Criteria, Note 4 states:"Depending upon sample condition and fibre type, the detection limit of this technique has been found to lie generally in the range of 1 in 1,000 to 1 in 10,000 parts by weight, equivalent to 1 to 0.1 g/kg."
AN602	The sample can be reported “no asbestos found at the reporting limit of 0.1 g/kg” (<0.01%w/w) where AN602 section 4.5 of this method has been followed, and if- (a) no trace asbestos fibres have been detected (i.e. no ‘respirable’ fibres): (b) the estimated weight of non-respirable asbestos fibre bundles and/or the estimated weight of asbestos in asbestos-containing materials are found to be less than 0.1g/kg: and (c) these non-respirable asbestos fibre bundles and/or the asbestos containing materials are only visible under stereo-microscope viewing conditions.

FOOTNOTES

Amosite	-	Brown Asbestos	NA	-	Not Analysed
Chrysotile	-	White Asbestos	LNR	-	Listed, Not Required
Crocidolite	-	Blue Asbestos	*	-	NATA accreditation does not cover the performance of this service .
Amphiboles	-	Amosite and/or Crocidolite	**	-	Indicative data, theoretical holding time exceeded.

(In reference to soil samples only) This report does not comply with the analytical reporting recommendations in the Western Australian Department of Health Guidelines for the Assessment and Remediation and Management of Asbestos Contaminated sites in Western Australia - May 2009.

Sampled by the client.

Where reported: 'Asbestos Detected': Asbestos detected by polarised light microscopy, including dispersion staining.
Where reported: 'No Asbestos Found': No Asbestos Found by polarised light microscopy, including dispersion staining.
Where reported: 'UMF Detected': Mineral fibres of unknown type detected by polarised light microscopy, including dispersion staining. Confirmation by another independent analytical technique may be necessary.

Even after disintegration it can be very difficult, or impossible, to detect the presence of asbestos in some asbestos -containing bulk materials using polarised light microscopy. This is due to the low grade or small length or diameter of asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here : http://www.sgs.com.au/~/media/Local/Australia/Documents/Technical Documents/MP-AU-ENV-QU-022 QA QC Plan.pdf

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CERTIFICATE OF ANALYSIS 151436

Client:

EI Australia
Suite 6.01, 55 Miller Street
Pyrmont
NSW 2009

Attention: Benjamin Yuan

Sample log in details:

Your Reference:	**E22282, Rosebery**
No. of samples:	1 Soil
Date samples received / completed instructions received	05/08/2016 / 08/08/2016

Analysis Details:

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

Report Details:

Date results requested by: / Issue Date:	15/08/16 / 12/08/16
Date of Preliminary Report:	Not Issued

NATA accreditation number 2901. This document shall not be reproduced except in full.
Accredited for compliance with ISO/IEC 17025 - Testing **Tests not covered by NATA are denoted with *.**

Results Approved By:

David Springer
General Manager

vTRH(C6-C10)/BTEXN in Soil		
Our Reference:	UNITS	151436-1
Your Reference	---------- -	QT100
Date Sampled	----------	6/08/2016
Type of sample		Soil
Date extracted	-	09/08/2016
Date analysed	-	11/08/2016
TRH C_6 - C_9	mg/kg	<25
TRH C_6 - C_{10}	mg/kg	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25
Benzene	mg/kg	<0.2
Toluene	mg/kg	<0.5
Ethylbenzene	mg/kg	<1
m+p-xylene	mg/kg	<2
o-Xylene	mg/kg	<1
naphthalene	mg/kg	<1
Surrogate aaa-Trifluorotoluene	%	115

svTRH (C10-C40) in Soil		
Our Reference:	UNITS	151436-1
Your Reference	---------- -	QT100
Date Sampled	----------	6/08/2016
Type of sample		Soil
Date extracted	-	09/08/2016
Date analysed	-	09/08/2016
TRHC$_{10}$ - C$_{14}$	mg/kg	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	<100
TRH>C$_{10}$-C$_{16}$	mg/kg	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	<50
TRH>C$_{16}$-C$_{34}$	mg/kg	<100
TRH>C$_{34}$-C$_{40}$	mg/kg	<100
Surrogate o-Terphenyl	%	88

Acid Extractable metals in soil		
Our Reference:	UNITS	151436-1
Your Reference	----------	QT100
	-	
Date Sampled	----------	6/08/2016
Type of sample		Soil
Date prepared	-	09/08/2016
Date analysed	-	09/08/2016
Arsenic	mg/kg	<4
Cadmium	mg/kg	<0.4
Chromium	mg/kg	1
Copper	mg/kg	4
Lead	mg/kg	12
Mercury	mg/kg	<0.1
Nickel	mg/kg	<1
Zinc	mg/kg	5

Moisture		
Our Reference:	UNITS	151436-1
Your Reference	----------	QT100
	-	
Date Sampled	----------	6/08/2016
Type of sample		Soil
Date prepared	-	09/08/2016
Date analysed	-	10/08/2016
Moisture	%	2.5

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. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Inorg-008	Moisture content determined by heating at 105+/-5 deg C for a minimum of 12 hours.

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			11/08/2016	[NT]	[NT]	LCS-8	09/08/2016
Date analysed	-			11/08/2016	[NT]	[NT]	LCS-8	11/08/2016
TRHC$_6$ - C$_9$	mg/kg	25	Org-016	<25	[NT]	[NT]	LCS-8	113%
TRHC$_6$ - C$_{10}$	mg/kg	25	Org-016	<25	[NT]	[NT]	LCS-8	113%
Benzene	mg/kg	0.2	Org-016	<0.2	[NT]	[NT]	LCS-8	111%
Toluene	mg/kg	0.5	Org-016	<0.5	[NT]	[NT]	LCS-8	106%
Ethylbenzene	mg/kg	1	Org-016	<1	[NT]	[NT]	LCS-8	114%
m+p-xylene	mg/kg	2	Org-016	<2	[NT]	[NT]	LCS-8	116%
o-Xylene	mg/kg	1	Org-016	<1	[NT]	[NT]	LCS-8	112%
naphthalene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%		Org-016	116	[NT]	[NT]	LCS-8	114%

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			09/08/2016	[NT]	[NT]	LCS-8	09/08/2016
Date analysed	-			09/08/2016	[NT]	[NT]	LCS-8	09/08/2016
TRHC$_{10}$ - C$_{14}$	mg/kg	50	Org-003	<50	[NT]	[NT]	LCS-8	84%
TRHC$_{15}$ - C$_{28}$	mg/kg	100	Org-003	<100	[NT]	[NT]	LCS-8	112%
TRHC$_{29}$ - C$_{36}$	mg/kg	100	Org-003	<100	[NT]	[NT]	LCS-8	114%
TRH>C$_{10}$-C$_{16}$	mg/kg	50	Org-003	<50	[NT]	[NT]	LCS-8	84%
TRH>C$_{16}$-C$_{34}$	mg/kg	100	Org-003	<100	[NT]	[NT]	LCS-8	112%
TRH>C$_{34}$-C$_{40}$	mg/kg	100	Org-003	<100	[NT]	[NT]	LCS-8	114%
Surrogate o-Terphenyl	%		Org-003	89	[NT]	[NT]	LCS-8	100%

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 prepared	-			09/08/2016	[NT]	[NT]	LCS-8	09/08/2016
Date analysed	-			09/08/2016	[NT]	[NT]	LCS-8	09/08/2016
Arsenic	mg/kg	4	Metals-020	<4	[NT]	[NT]	LCS-8	99%
Cadmium	mg/kg	0.4	Metals-020	<0.4	[NT]	[NT]	LCS-8	100%
Chromium	mg/kg	1	Metals-020	<1	[NT]	[NT]	LCS-8	100%
Copper	mg/kg	1	Metals-020	<1	[NT]	[NT]	LCS-8	96%
Lead	mg/kg	1	Metals-020	<1	[NT]	[NT]	LCS-8	95%
Mercury	mg/kg	0.1	Metals-021	<0.1	[NT]	[NT]	LCS-8	94%
Nickel	mg/kg	1	Metals-020	<1	[NT]	[NT]	LCS-8	95%
Zinc	mg/kg	1	Metals-020	<1	[NT]	[NT]	LCS-8	97%

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
NR: 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 batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS

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Project	**E22282 - 12-24 Rothschild Ave Rosebery**
Order Number	**E22282**
Samples	8

LABORATORY DETAILS

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SGS Reference	**SE156129 R0**
Date Received	18/8/2016
Date Reported	26/8/2016

COMMENTS

Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562(4354).

SIGNATORIES

Andy Sutton
Senior Organic Chemist

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Metals/Inorganics Team Leader

Kamrul Ahsan
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VOCs in Water [AN433] Tested: 23/8/2016

PARAMETER	UOM	LOR	MW3 WATER - 17/8/2016 SE156129.001	202M WATER - 17/8/2016 SE156129.002	203M WATER - 17/8/2016 SE156129.003	205M WATER - 17/8/2016 SE156129.004	GWQD1 WATER - 17/8/2016 SE156129.005
Benzene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
m/p-xylene	µg/L	1	<1	<1	<1	<1	<1
o-xylene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total Xylenes	µg/L	1.5	<1.5	<1.5	<1.5	<1.5	<1.5
Total BTEX	µg/L	3	<3	<3	<3	<3	<3
Naphthalene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichlorodifluoromethane (CFC-12)	µg/L	5	<5	<5	<5	<5	<5
Chloromethane	µg/L	5	<5	<5	<5	<5	<5
Vinyl chloride (Chloroethene)	µg/L	0.3	<0.3	<0.3	<0.3	**2.1**	**2.5**
Bromomethane	µg/L	10	<10	<10	<10	<10	<10
Chloroethane	µg/L	5	<5	<5	<5	<5	<5
Trichlorofluoromethane	µg/L	1	<1	<1	<1	<1	<1
Acetone (2-propanone)	µg/L	10	<10	<10	<10	<10	<10
Iodomethane	µg/L	5	<5	<5	<5	<5	<5
1,1-dichloroethene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acrylonitrile	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloromethane (Methylene chloride)	µg/L	5	<5	<5	<5	<5	<5
Allyl chloride	µg/L	2	<2	<2	<2	<2	<2
Carbon disulfide	µg/L	2	<2	<2	<2	<2	<2
trans-1,2-dichloroethene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
MtBE (Methyl-tert-butyl ether)	µg/L	2	<2	<2	<2	<2	<2
1,1-dichloroethane	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Vinyl acetate	µg/L	10	<10	<10	<10	<10	<10
MEK (2-butanone)	µg/L	10	<10	<10	<10	<10	<10
cis-1,2-dichloroethene	µg/L	0.5	<0.5	<0.5	<0.5	**8.1**	**8.2**
Bromochloromethane	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroform (THM)	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2,2-dichloropropane	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-dichloroethane	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-trichloroethane	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-dichloropropene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon tetrachloride	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromomethane	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-dichloropropane	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethene (Trichloroethylene,TCE)	µg/L	0.5	**1.3**	<0.5	<0.5	**36**	**38**
2-nitropropane	µg/L	100	<100	<100	<100	<100	<100
Bromodichloromethane (THM)	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
MIBK (4-methyl-2-pentanone)	µg/L	5	<5	<5	<5	<5	<5
cis-1,3-dichloropropene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,3-dichloropropene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-trichloroethane	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-dichloropropane	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane (THM)	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2-hexanone (MBK)	µg/L	5	<5	<5	<5	<5	<5
1,2-dibromoethane (EDB)	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethene (Perchloroethylene,PCE)	µg/L	0.5	**5.2**	<0.5	**4.7**	**64**	**65**
1,1,1,2-tetrachloroethane	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chlorobenzene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform (THM)	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
cis-1,4-dichloro-2-butene	µg/L	1	<1	<1	<1	<1	<1
Styrene (Vinyl benzene)	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2,2-tetrachloroethane	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2,3-trichloropropane	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,4-dichloro-2-butene	µg/L	1	<1	<1	<1	<1	<1

VOCs in Water [AN433] Tested: 23/8/2016 (continued)

PARAMETER	UOM	LOR	MW3 WATER - 17/8/2016 SE156129.001	202M WATER - 17/8/2016 SE156129.002	203M WATER - 17/8/2016 SE156129.003	205M WATER - 17/8/2016 SE156129.004	GWQD1 WATER - 17/8/2016 SE156129.005
Isopropylbenzene (Cumene)	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromobenzene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
n-propylbenzene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2-chlorotoluene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
4-chlorotoluene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3,5-trimethylbenzene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
tert-butylbenzene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2,4-trimethylbenzene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
sec-butylbenzene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-dichlorobenzene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-dichlorobenzene	µg/L	0.3	<0.3	<0.3	<0.3	<0.3	<0.3
p-isopropyltoluene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-dichlorobenzene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
n-butylbenzene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-dibromo-3-chloropropane	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2,4-trichlorobenzene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Hexachlorobutadiene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2,3-trichlorobenzene	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total VOC	µg/L	10	-	-	-	-	-

VOCs in Water [AN433] Tested: 23/8/2016 (continued)

PARAMETER	UOM	LOR	GWTB1 WATER - 17/8/2016 SE156129.006	GWQTS1 WATER - 17/8/2016 SE156129.007	GWQR1 WATER - 17/8/2016 SE156129.008
Benzene	µg/L	0.5	<0.5	[91%]	<0.5
Toluene	µg/L	0.5	<0.5	[101%]	<0.5
Ethylbenzene	µg/L	0.5	<0.5	[101%]	<0.5
m/p-xylene	µg/L	1	<1	[95%]	<1
o-xylene	µg/L	0.5	<0.5	[93%]	<0.5
Total Xylenes	µg/L	1.5	<1.5	-	<1.5
Total BTEX	µg/L	3	<3	-	<3
Naphthalene	µg/L	0.5	<0.5	-	<0.5
Dichlorodifluoromethane (CFC-12)	µg/L	5	-	-	-
Chloromethane	µg/L	5	-	-	-
Vinyl chloride (Chloroethene)	µg/L	0.3	-	-	-
Bromomethane	µg/L	10	-	-	-
Chloroethane	µg/L	5	-	-	-
Trichlorofluoromethane	µg/L	1	-	-	-
Acetone (2-propanone)	µg/L	10	-	-	-
Iodomethane	µg/L	5	-	-	-
1,1-dichloroethene	µg/L	0.5	-	-	-
Acrylonitrile	µg/L	0.5	-	-	-
Dichloromethane (Methylene chloride)	µg/L	5	-	-	-
Allyl chloride	µg/L	2	-	-	-
Carbon disulfide	µg/L	2	-	-	-
trans-1,2-dichloroethene	µg/L	0.5	-	-	-
MtBE (Methyl-tert-butyl ether)	µg/L	2	-	-	-
1,1-dichloroethane	µg/L	0.5	-	-	-
Vinyl acetate	µg/L	10	-	-	-
MEK (2-butanone)	µg/L	10	-	-	-
cis-1,2-dichloroethene	µg/L	0.5	-	-	-
Bromochloromethane	µg/L	0.5	-	-	-
Chloroform (THM)	µg/L	0.5	-	-	-
2,2-dichloropropane	µg/L	0.5	-	-	-
1,2-dichloroethane	µg/L	0.5	-	-	-
1,1,1-trichloroethane	µg/L	0.5	-	-	-
1,1-dichloropropene	µg/L	0.5	-	-	-
Carbon tetrachloride	µg/L	0.5	-	-	-
Dibromomethane	µg/L	0.5	-	-	-
1,2-dichloropropane	µg/L	0.5	-	-	-
Trichloroethene (Trichloroethylene,TCE)	µg/L	0.5	-	-	-
2-nitropropane	µg/L	100	-	-	-
Bromodichloromethane (THM)	µg/L	0.5	-	-	-
MIBK (4-methyl-2-pentanone)	µg/L	5	-	-	-
cis-1,3-dichloropropene	µg/L	0.5	-	-	-
trans-1,3-dichloropropene	µg/L	0.5	-	-	-
1,1,2-trichloroethane	µg/L	0.5	-	-	-
1,3-dichloropropane	µg/L	0.5	-	-	-
Dibromochloromethane (THM)	µg/L	0.5	-	-	-
2-hexanone (MBK)	µg/L	5	-	-	-
1,2-dibromoethane (EDB)	µg/L	0.5	-	-	-
Tetrachloroethene (Perchloroethylene,PCE)	µg/L	0.5	-	-	-
1,1,1,2-tetrachloroethane	µg/L	0.5	-	-	-
Chlorobenzene	µg/L	0.5	-	-	-
Bromoform (THM)	µg/L	0.5	-	-	-
cis-1,4-dichloro-2-butene	µg/L	1	-	-	-
Styrene (Vinyl benzene)	µg/L	0.5	-	-	-
1,1,2,2-tetrachloroethane	µg/L	0.5	-	-	-
1,2,3-trichloropropane	µg/L	0.5	-	-	-
trans-1,4-dichloro-2-butene	µg/L	1	-	-	-

VOCs in Water [AN433] Tested: 23/8/2016 (continued)

PARAMETER	UOM	LOR	GWTB1 WATER - 17/8/2016 SE156129.006	GWQTS1 WATER - 17/8/2016 SE156129.007	GWQR1 WATER - 17/8/2016 SE156129.008
Isopropylbenzene (Cumene)	µg/L	0.5	-	-	-
Bromobenzene	µg/L	0.5	-	-	-
n-propylbenzene	µg/L	0.5	-	-	-
2-chlorotoluene	µg/L	0.5	-	-	-
4-chlorotoluene	µg/L	0.5	-	-	-
1,3,5-trimethylbenzene	µg/L	0.5	-	-	-
tert-butylbenzene	µg/L	0.5	-	-	-
1,2,4-trimethylbenzene	µg/L	0.5	-	-	-
sec-butylbenzene	µg/L	0.5	-	-	-
1,3-dichlorobenzene	µg/L	0.5	-	-	-
1,4-dichlorobenzene	µg/L	0.3	-	-	-
p-isopropyltoluene	µg/L	0.5	-	-	-
1,2-dichlorobenzene	µg/L	0.5	-	-	-
n-butylbenzene	µg/L	0.5	-	-	-
1,2-dibromo-3-chloropropane	µg/L	0.5	-	-	-
1,2,4-trichlorobenzene	µg/L	0.5	-	-	-
Hexachlorobutadiene	µg/L	0.5	-	-	-
1,2,3-trichlorobenzene	µg/L	0.5	-	-	-
Total VOC	µg/L	10	-	-	-

Volatile Petroleum Hydrocarbons in Water [AN433] Tested: 23/8/2016

PARAMETER	UOM	LOR	MW3 WATER - 17/8/2016 SE156129.001	202M WATER - 17/8/2016 SE156129.002	203M WATER - 17/8/2016 SE156129.003	205M WATER - 17/8/2016 SE156129.004	GWQD1 WATER - 17/8/2016 SE156129.005
TRH C6-C9	µg/L	40	<40	<40	<40	**260**	**280**
Benzene (F0)	µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TRH C6-C10	µg/L	50	<50	<50	<50	**260**	**280**
TRH C6-C10 minus BTEX (F1)	µg/L	50	<50	<50	<50	**260**	**280**

PARAMETER	UOM	LOR	GWQR1 WATER - 17/8/2016 SE156129.008
TRH C6-C9	µg/L	40	<40
Benzene (F0)	µg/L	0.5	<0.5
TRH C6-C10	µg/L	50	<50
TRH C6-C10 minus BTEX (F1)	µg/L	50	<50

TRH (Total Recoverable Hydrocarbons) in Water [AN403] Tested: 19/8/2016

PARAMETER	UOM	LOR	MW3 WATER - 17/8/2016 SE156129.001	202M WATER - 17/8/2016 SE156129.002	203M WATER - 17/8/2016 SE156129.003	205M WATER - 17/8/2016 SE156129.004	GWQD1 WATER - 17/8/2016 SE156129.005
TRH C10-C14	µg/L	50	<50	<50	<50	<50	<50
TRH C15-C28	µg/L	200	<200	<200	<200	<200	<200
TRH C29-C36	µg/L	200	<200	<200	<200	<200	<200
TRH C37-C40	µg/L	200	<200	<200	<200	<200	<200
TRH >C10-C16 (F2)	µg/L	60	<60	<60	<60	<60	<60
TRH >C16-C34 (F3)	µg/L	500	<500	<500	<500	<500	<500
TRH >C34-C40 (F4)	µg/L	500	<500	<500	<500	<500	<500
TRH C10-C36	µg/L	450	<450	<450	<450	<450	<450
TRH C10-C40	µg/L	650	<650	<650	<650	<650	<650

PARAMETER	UOM	LOR	GWQR1 WATER - 17/8/2016 SE156129.008
TRH C10-C14	µg/L	50	<50
TRH C15-C28	µg/L	200	<200
TRH C29-C36	µg/L	200	<200
TRH C37-C40	µg/L	200	<200
TRH >C10-C16 (F2)	µg/L	60	<60
TRH >C16-C34 (F3)	µg/L	500	<500
TRH >C34-C40 (F4)	µg/L	500	<500
TRH C10-C36	µg/L	450	<450
TRH C10-C40	µg/L	650	<650

PAH (Polynuclear Aromatic Hydrocarbons) in Water [AN420] Tested: 19/8/2016

PARAMETER	UOM	LOR	MW3 WATER - 17/8/2016 SE156129.001	202M WATER - 17/8/2016 SE156129.002	203M WATER - 17/8/2016 SE156129.003	205M WATER - 17/8/2016 SE156129.004
Naphthalene	µg/L	0.1	**0.5**	**0.2**	**0.6**	**0.3**
2-methylnaphthalene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
1-methylnaphthalene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b&j)fluoranthene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(ah)anthracene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	µg/L	0.1	<0.1	<0.1	<0.1	<0.1
Total PAH (18)	µg/L	1	<1	<1	<1	<1

Total Phenolics in Water [AN289] Tested: 24/8/2016

PARAMETER	UOM	LOR	MW3 WATER - 17/8/2016 SE156129.001	202M WATER - 17/8/2016 SE156129.002	203M WATER - 17/8/2016 SE156129.003	205M WATER - 17/8/2016 SE156129.004
Total Phenols	mg/L	0.01	<0.01	<0.01	<0.01	<0.01

Trace Metals (Dissolved) in Water by ICPMS [AN318] Tested: 23/8/2016

PARAMETER	UOM	LOR	MW3 WATER - 17/8/2016 SE156129.001	202M WATER - 17/8/2016 SE156129.002	203M WATER - 17/8/2016 SE156129.003	205M WATER - 17/8/2016 SE156129.004	GWQD1 WATER - 17/8/2016 SE156129.005
Arsenic, As	µg/L	1	<1	4	2	<1	<1
Cadmium, Cd	µg/L	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium, Cr	µg/L	1	<1	<1	1	1	1
Copper, Cu	µg/L	1	3	3	5	3	3
Lead, Pb	µg/L	1	<1	<1	<1	<1	<1
Nickel, Ni	µg/L	1	<1	<1	<1	15	15
Zinc, Zn	µg/L	5	19	<5	8	59	60

PARAMETER	UOM	LOR	GWQR1 WATER - 17/8/2016 SE156129.008
Arsenic, As	µg/L	1	<1
Cadmium, Cd	µg/L	0.1	<0.1
Chromium, Cr	µg/L	1	<1
Copper, Cu	µg/L	1	1
Lead, Pb	µg/L	1	<1
Nickel, Ni	µg/L	1	<1
Zinc, Zn	µg/L	5	<5

Mercury (dissolved) in Water [AN311(Perth)/AN312] Tested: 22/8/2016

PARAMETER	UOM	LOR	MW3 WATER - 17/8/2016 SE156129.001	202M WATER - 17/8/2016 SE156129.002	203M WATER - 17/8/2016 SE156129.003	205M WATER - 17/8/2016 SE156129.004	GWQD1 WATER - 17/8/2016 SE156129.005
Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

PARAMETER	UOM	LOR	GWQR1 WATER - 17/8/2016 SE156129.008
Mercury	mg/L	0.0001	<0.0001

METHOD	METHODOLOGY SUMMARY
AN020	Unpreserved water sample is filtered through a 0.45µm membrane filter and acidified with nitric acid similar to APHA3030B.
AN289	Analysis of Total Phenols in Soil Sediment and Water: Steam distillable phenols react with 4-aminoantipyrine at pH 7.9±0.1 in the presence of potassium ferricyanide to form a coloured antipyrine dye analysed by Discrete Analyser. Reference APHA 5530 B/D.
AN311(Perth)/AN312	Mercury by Cold Vapour AAS in Waters: Mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500.
AN318	Determination of elements at trace level in waters by ICP-MS technique, in accordance with USEPA 6020A.
AN403	Total Recoverable Hydrocarbons: Determination of Hydrocarbons by gas chromatography after a solvent extraction. Detection is by flame ionisation detector (FID) that produces an electronic signal in proportion to the combustible matter passing through it. Total Recoverable Hydrocarbons (TRH) are routinely reported as four alkane groupings based on the carbon chain length of the compounds: C6-C9, C10-C14, C15-C28 and C29-C36 and in recognition of the NEPM 1999 (2013), >C10-C16 (F2), >C16-C34 (F3) and >C34-C40 (F4). F2 is not corrected for Naphthalene.
AN403	Additionally, the volatile C6-C9/C6-C10 fractions may be determined by a purge and trap technique and GC/MS because of the potential for volatiles loss. Total Petroleum Hydrocarbons (TPH) follows the same method of analysis after silica gel cleanup of the solvent extract. Aliphatic/Aromatic Speciation follows the same method of analysis after fractionation of the solvent extract over silica with differential polarity of the eluent solvents .
AN403	The GC/FID method is not well suited to the analysis of refined high boiling point materials (ie lubricating oils or greases) but is particularly suited for measuring diesel, kerosene and petrol if care to control volatility is taken. This method will detect naturally occurring hydrocarbons, lipids, animal fats, phenols and PAHs if they are present at sufficient levels, dependent on the use of specific cleanup/fractionation techniques. Reference USEPA 3510B, 8015B.
AN420	(SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols (etc) in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).
AN433	VOCs and C6-C9 Hydrocarbons by GC-MS P&T: VOC`s are volatile organic compounds. The sample is presented to a gas chromatograph via a purge and trap (P&T) concentrator and autosampler and is detected with a Mass Spectrometer (MSD). Solid samples are initially extracted with methanol whilst liquid samples are processed directly. References: USEPA 5030B, 8020A, 8260.

FOOTNOTES

*	NATA accreditation does not cover the performance of this service.	-	Not analysed.	UOM	Unit of Measure.
		NVL	Not validated.	LOR	Limit of Reporting.
**	Indicative data, theoretical holding time exceeded.	IS	Insufficient sample for analysis.	↑↓	Raised/lowered Limit of Reporting.
		LNR	Sample listed, but not received.		

Samples analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calculated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the " Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.
Note that in terms of units of radioactivity:

a. 1 Bq is equivalent to 27 pCi
b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here : http://www.sgs.com.au/~/media/Local/Australia/Documents/Technical%20Documents/MP-AU-ENV-QU-022%20QA%20QC%20Plan.pdf

STATEMENT OF QA/QC PERFORMANCE

SE156129 R0

CLIENT DETAILS

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Project	**E22282 - 12-24 Rothschild Ave Rosebery**
Order Number	**E22282**
Samples	8

LABORATORY DETAILS

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SGS Reference	**SE156129 R0**
Date Received	18 Aug 2016
Date Reported	26 Aug 2016

COMMENTS

All the laboratory data for each environmental matrix was compared to SGS' stated Data Quality Objectives (DQO). Comments arising from the comparison were made and are reported below.

The data relating to sampling was taken from the Chain of Custody document and was supplied by the Client.
This QA/QC Statement must be read in conjunction with the referenced Analytical Report.
The Statement and the Analytical Report must not be reproduced except in full.

All Data Quality Objectives were met with the exception of the following:

Matrix Spike	Trace Metals (Dissolved) in Water by ICPMS	2 items

SAMPLE SUMMARY

HOLDING TIME SUMMARY

SE156129 R0

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS “Field Sampling Guide for Containers and Holding Time” (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311(Perth)/AN312

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
MW3	SE156129.001	LB108116	17 Aug 2016	18 Aug 2016	14 Sep 2016	22 Aug 2016	14 Sep 2016	23 Aug 2016
202M	SE156129.002	LB108116	17 Aug 2016	18 Aug 2016	14 Sep 2016	22 Aug 2016	14 Sep 2016	23 Aug 2016
203M	SE156129.003	LB108116	17 Aug 2016	18 Aug 2016	14 Sep 2016	22 Aug 2016	14 Sep 2016	23 Aug 2016
205M	SE156129.004	LB108116	17 Aug 2016	18 Aug 2016	14 Sep 2016	22 Aug 2016	14 Sep 2016	23 Aug 2016
GWQD1	SE156129.005	LB108116	17 Aug 2016	18 Aug 2016	14 Sep 2016	22 Aug 2016	14 Sep 2016	23 Aug 2016
GWQR1	SE156129.008	LB108116	17 Aug 2016	18 Aug 2016	14 Sep 2016	22 Aug 2016	14 Sep 2016	23 Aug 2016

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
MW3	SE156129.001	LB108068	17 Aug 2016	18 Aug 2016	24 Aug 2016	19 Aug 2016	28 Sep 2016	25 Aug 2016
202M	SE156129.002	LB108068	17 Aug 2016	18 Aug 2016	24 Aug 2016	19 Aug 2016	28 Sep 2016	25 Aug 2016
203M	SE156129.003	LB108068	17 Aug 2016	18 Aug 2016	24 Aug 2016	19 Aug 2016	28 Sep 2016	25 Aug 2016
205M	SE156129.004	LB108068	17 Aug 2016	18 Aug 2016	24 Aug 2016	19 Aug 2016	28 Sep 2016	25 Aug 2016
GWQD1	SE156129.005	LB108068	17 Aug 2016	18 Aug 2016	24 Aug 2016	19 Aug 2016	28 Sep 2016	25 Aug 2016
GWQR1	SE156129.008	LB108068	17 Aug 2016	18 Aug 2016	24 Aug 2016	19 Aug 2016	28 Sep 2016	25 Aug 2016

Total Phenolics in Water

Method: ME-(AU)-[ENV]AN289

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
MW3	SE156129.001	LB108417	17 Aug 2016	18 Aug 2016	14 Sep 2016	24 Aug 2016	14 Sep 2016	25 Aug 2016
202M	SE156129.002	LB108417	17 Aug 2016	18 Aug 2016	14 Sep 2016	24 Aug 2016	14 Sep 2016	25 Aug 2016
203M	SE156129.003	LB108417	17 Aug 2016	18 Aug 2016	14 Sep 2016	24 Aug 2016	14 Sep 2016	25 Aug 2016
205M	SE156129.004	LB108417	17 Aug 2016	18 Aug 2016	14 Sep 2016	24 Aug 2016	14 Sep 2016	25 Aug 2016

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
MW3	SE156129.001	LB108179	17 Aug 2016	18 Aug 2016	13 Feb 2017	23 Aug 2016	13 Feb 2017	24 Aug 2016
202M	SE156129.002	LB108179	17 Aug 2016	18 Aug 2016	13 Feb 2017	23 Aug 2016	13 Feb 2017	24 Aug 2016
203M	SE156129.003	LB108179	17 Aug 2016	18 Aug 2016	13 Feb 2017	23 Aug 2016	13 Feb 2017	24 Aug 2016
205M	SE156129.004	LB108179	17 Aug 2016	18 Aug 2016	13 Feb 2017	23 Aug 2016	13 Feb 2017	24 Aug 2016
GWQD1	SE156129.005	LB108179	17 Aug 2016	18 Aug 2016	13 Feb 2017	23 Aug 2016	13 Feb 2017	24 Aug 2016
GWQR1	SE156129.008	LB108179	17 Aug 2016	18 Aug 2016	13 Feb 2017	23 Aug 2016	13 Feb 2017	24 Aug 2016

TRH (Total Recoverable Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN403

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
MW3	SE156129.001	LB108068	17 Aug 2016	18 Aug 2016	24 Aug 2016	19 Aug 2016	28 Sep 2016	25 Aug 2016
202M	SE156129.002	LB108068	17 Aug 2016	18 Aug 2016	24 Aug 2016	19 Aug 2016	28 Sep 2016	25 Aug 2016
203M	SE156129.003	LB108068	17 Aug 2016	18 Aug 2016	24 Aug 2016	19 Aug 2016	28 Sep 2016	25 Aug 2016
205M	SE156129.004	LB108068	17 Aug 2016	18 Aug 2016	24 Aug 2016	19 Aug 2016	28 Sep 2016	25 Aug 2016
GWQD1	SE156129.005	LB108068	17 Aug 2016	18 Aug 2016	24 Aug 2016	19 Aug 2016	28 Sep 2016	24 Aug 2016
GWQR1	SE156129.008	LB108068	17 Aug 2016	18 Aug 2016	24 Aug 2016	19 Aug 2016	28 Sep 2016	24 Aug 2016

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
MW3	SE156129.001	LB108202	17 Aug 2016	18 Aug 2016	24 Aug 2016	23 Aug 2016	02 Oct 2016	25 Aug 2016
202M	SE156129.002	LB108202	17 Aug 2016	18 Aug 2016	24 Aug 2016	23 Aug 2016	02 Oct 2016	25 Aug 2016
203M	SE156129.003	LB108202	17 Aug 2016	18 Aug 2016	24 Aug 2016	23 Aug 2016	02 Oct 2016	25 Aug 2016
205M	SE156129.004	LB108202	17 Aug 2016	18 Aug 2016	24 Aug 2016	23 Aug 2016	02 Oct 2016	25 Aug 2016
GWQD1	SE156129.005	LB108202	17 Aug 2016	18 Aug 2016	24 Aug 2016	23 Aug 2016	02 Oct 2016	25 Aug 2016
GWTB1	SE156129.006	LB108202	17 Aug 2016	18 Aug 2016	24 Aug 2016	23 Aug 2016	02 Oct 2016	25 Aug 2016
GWQTS1	SE156129.007	LB108202	17 Aug 2016	18 Aug 2016	24 Aug 2016	23 Aug 2016	02 Oct 2016	25 Aug 2016
GWQR1	SE156129.008	LB108202	17 Aug 2016	18 Aug 2016	24 Aug 2016	23 Aug 2016	02 Oct 2016	25 Aug 2016

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
MW3	SE156129.001	LB108202	17 Aug 2016	18 Aug 2016	24 Aug 2016	23 Aug 2016	02 Oct 2016	25 Aug 2016
202M	SE156129.002	LB108202	17 Aug 2016	18 Aug 2016	24 Aug 2016	23 Aug 2016	02 Oct 2016	25 Aug 2016
203M	SE156129.003	LB108202	17 Aug 2016	18 Aug 2016	24 Aug 2016	23 Aug 2016	02 Oct 2016	25 Aug 2016
205M	SE156129.004	LB108202	17 Aug 2016	18 Aug 2016	24 Aug 2016	23 Aug 2016	02 Oct 2016	25 Aug 2016
GWQD1	SE156129.005	LB108202	17 Aug 2016	18 Aug 2016	24 Aug 2016	23 Aug 2016	02 Oct 2016	25 Aug 2016
GWTB1	SE156129.006	LB108202	17 Aug 2016	18 Aug 2016	24 Aug 2016	23 Aug 2016	02 Oct 2016	25 Aug 2016
GWQTS1	SE156129.007	LB108202	17 Aug 2016	18 Aug 2016	24 Aug 2016	23 Aug 2016	02 Oct 2016	25 Aug 2016
GWQR1	SE156129.008	LB108202	17 Aug 2016	18 Aug 2016	24 Aug 2016	23 Aug 2016	02 Oct 2016	25 Aug 2016

HOLDING TIME SUMMARY

SE156129 R0

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS “Field Sampling Guide for Containers and Holding Time” (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
2-fluorobiphenyl (Surrogate)	MW3	SE156129.001	%	40 - 130%	52
	202M	SE156129.002	%	40 - 130%	46
	203M	SE156129.003	%	40 - 130%	50
	205M	SE156129.004	%	40 - 130%	66
d14-p-terphenyl (Surrogate)	MW3	SE156129.001	%	40 - 130%	78
	202M	SE156129.002	%	40 - 130%	68
	203M	SE156129.003	%	40 - 130%	70
	205M	SE156129.004	%	40 - 130%	92
d5-nitrobenzene (Surrogate)	MW3	SE156129.001	%	40 - 130%	52
	202M	SE156129.002	%	40 - 130%	46
	203M	SE156129.003	%	40 - 130%	52
	205M	SE156129.004	%	40 - 130%	68

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	MW3	SE156129.001	%	40 - 130%	101
	202M	SE156129.002	%	40 - 130%	94
	203M	SE156129.003	%	40 - 130%	98
	205M	SE156129.004	%	40 - 130%	100
	GWQD1	SE156129.005	%	40 - 130%	110
	GWTB1	SE156129.006	%	40 - 130%	94
	GWQTS1	SE156129.007	%	40 - 130%	107
	GWQR1	SE156129.008	%	40 - 130%	96
d4-1,2-dichloroethane (Surrogate)	MW3	SE156129.001	%	40 - 130%	127
	202M	SE156129.002	%	40 - 130%	127
	203M	SE156129.003	%	40 - 130%	124
	205M	SE156129.004	%	40 - 130%	128
	GWQD1	SE156129.005	%	40 - 130%	126
	GWTB1	SE156129.006	%	40 - 130%	121
	GWQTS1	SE156129.007	%	40 - 130%	117
	GWQR1	SE156129.008	%	40 - 130%	120
d8-toluene (Surrogate)	MW3	SE156129.001	%	40 - 130%	88
	202M	SE156129.002	%	40 - 130%	94
	203M	SE156129.003	%	40 - 130%	86
	205M	SE156129.004	%	40 - 130%	85
	GWQD1	SE156129.005	%	40 - 130%	88
	GWTB1	SE156129.006	%	40 - 130%	90
	GWQTS1	SE156129.007	%	40 - 130%	89
	GWQR1	SE156129.008	%	40 - 130%	92
Dibromofluoromethane (Surrogate)	MW3	SE156129.001	%	40 - 130%	118
	202M	SE156129.002	%	40 - 130%	116
	203M	SE156129.003	%	40 - 130%	121
	205M	SE156129.004	%	40 - 130%	117
	GWQD1	SE156129.005	%	40 - 130%	116
	GWTB1	SE156129.006	%	40 - 130%	111
	GWQTS1	SE156129.007	%	40 - 130%	106
	GWQR1	SE156129.008	%	40 - 130%	111

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
Bromofluorobenzene (Surrogate)	MW3	SE156129.001	%	40 - 130%	95
	202M	SE156129.002	%	40 - 130%	95
	203M	SE156129.003	%	40 - 130%	98
	205M	SE156129.004	%	40 - 130%	94
	GWQD1	SE156129.005	%	40 - 130%	95
	GWQR1	SE156129.008	%	40 - 130%	96
d4-1,2-dichloroethane (Surrogate)	MW3	SE156129.001	%	60 - 130%	120
	202M	SE156129.002	%	60 - 130%	120
	203M	SE156129.003	%	60 - 130%	126
	205M	SE156129.004	%	60 - 130%	121
	GWQD1	SE156129.005	%	60 - 130%	119
	GWQR1	SE156129.008	%	60 - 130%	120

Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Volatile Petroleum Hydrocarbons in Water (continued) — **Method: ME-(AU)-[ENV]AN433**

Parameter	Sample Name	Sample Number	Units	Criteria	Recovery %
d8-toluene (Surrogate)	MW3	SE156129.001	%	40 - 130%	90
	202M	SE156129.002	%	40 - 130%	101
	203M	SE156129.003	%	40 - 130%	91
	205M	SE156129.004	%	40 - 130%	89
	GWQD1	SE156129.005	%	40 - 130%	90
	GWQR1	SE156129.008	%	40 - 130%	92
Dibromofluoromethane (Surrogate)	MW3	SE156129.001	%	40 - 130%	114
	202M	SE156129.002	%	40 - 130%	112
	203M	SE156129.003	%	40 - 130%	117
	205M	SE156129.004	%	40 - 130%	113
	GWQD1	SE156129.005	%	40 - 130%	112
	GWQR1	SE156129.008	%	40 - 130%	111

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311(Perth)/AN312

Sample Number	Parameter	Units	LOR	Result
LB108116.001	Mercury	mg/L	0.0001	<0.0001

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result
LB108068.001		Naphthalene	µg/L	0.1	<0.1
		2-methylnaphthalene	µg/L	0.1	<0.1
		1-methylnaphthalene	µg/L	0.1	<0.1
		Acenaphthylene	µg/L	0.1	<0.1
		Acenaphthene	µg/L	0.1	<0.1
		Fluorene	µg/L	0.1	<0.1
		Phenanthrene	µg/L	0.1	<0.1
		Anthracene	µg/L	0.1	<0.1
		Fluoranthene	µg/L	0.1	<0.1
		Pyrene	µg/L	0.1	<0.1
		Benzo(a)anthracene	µg/L	0.1	<0.1
		Chrysene	µg/L	0.1	<0.1
		Benzo(a)pyrene	µg/L	0.1	<0.1
		Indeno(1,2,3-cd)pyrene	µg/L	0.1	<0.1
		Dibenzo(ah)anthracene	µg/L	0.1	<0.1
		Benzo(ghi)perylene	µg/L	0.1	<0.1
	Surrogates	d5-nitrobenzene (Surrogate)	%	-	110
		2-fluorobiphenyl (Surrogate)	%	-	102
		d14-p-terphenyl (Surrogate)	%	-	118

Total Phenolics in Water

Method: ME-(AU)-[ENV]AN289

Sample Number	Parameter	Units	LOR	Result
LB108417.001	Total Phenols	mg/L	0.01	<0.01

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Number	Parameter	Units	LOR	Result
LB108179.001	Arsenic, As	µg/L	1	<1
	Cadmium, Cd	µg/L	0.1	<0.1
	Chromium, Cr	µg/L	1	<1
	Copper, Cu	µg/L	1	<1
	Lead, Pb	µg/L	1	<1
	Nickel, Ni	µg/L	1	<1
	Zinc, Zn	µg/L	5	<5

TRH (Total Recoverable Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN403

Sample Number	Parameter	Units	LOR	Result
LB108068.001	TRH C10-C14	µg/L	50	<50
	TRH C15-C28	µg/L	200	<200
	TRH C29-C36	µg/L	200	<200
	TRH C37-C40	µg/L	200	<200

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB108202.001	Fumigants	2,2-dichloropropane	µg/L	0.5	<0.5
		1,2-dichloropropane	µg/L	0.5	<0.5
		cis-1,3-dichloropropene	µg/L	0.5	<0.5
		trans-1,3-dichloropropene	µg/L	0.5	<0.5
		1,2-dibromoethane (EDB)	µg/L	0.5	<0.5
	Halogenated Aliphatics	Dichlorodifluoromethane (CFC-12)	µg/L	5	<5
		Chloromethane	µg/L	5	<5
		Vinyl chloride (Chloroethene)	µg/L	0.3	<0.3
		Bromomethane	µg/L	10	<10
		Chloroethane	µg/L	5	<5
		Trichlorofluoromethane	µg/L	1	<1
		Iodomethane	µg/L	5	<5

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

VOCs in Water (continued)

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB108202.001	Halogenated Aliphatics	1,1-dichloroethene	µg/L	0.5	<0.5
		Dichloromethane (Methylene chloride)	µg/L	5	<5
		Allyl chloride	µg/L	2	<2
		trans-1,2-dichloroethene	µg/L	0.5	<0.5
		1,1-dichloroethane	µg/L	0.5	<0.5
		cis-1,2-dichloroethene	µg/L	0.5	<0.5
		Bromochloromethane	µg/L	0.5	<0.5
		1,2-dichloroethane	µg/L	0.5	<0.5
		1,1,1-trichloroethane	µg/L	0.5	<0.5
		1,1-dichloropropene	µg/L	0.5	<0.5
		Carbon tetrachloride	µg/L	0.5	<0.5
		Dibromomethane	µg/L	0.5	<0.5
		Trichloroethene (Trichloroethylene,TCE)	µg/L	0.5	<0.5
		1,1,2-trichloroethane	µg/L	0.5	<0.5
		1,3-dichloropropane	µg/L	0.5	<0.5
		Tetrachloroethene (Perchloroethylene,PCE)	µg/L	0.5	<0.5
		1,1,1,2-tetrachloroethane	µg/L	0.5	<0.5
		cis-1,4-dichloro-2-butene	µg/L	1	<1
		1,1,2,2-tetrachloroethane	µg/L	0.5	<0.5
		1,2,3-trichloropropane	µg/L	0.5	<0.5
		trans-1,4-dichloro-2-butene	µg/L	1	<1
		1,2-dibromo-3-chloropropane	µg/L	0.5	<0.5
		Hexachlorobutadiene	µg/L	0.5	<0.5
	Halogenated Aromatics	Chlorobenzene	µg/L	0.5	<0.5
		Bromobenzene	µg/L	0.5	<0.5
		2-chlorotoluene	µg/L	0.5	<0.5
		4-chlorotoluene	µg/L	0.5	<0.5
		1,3-dichlorobenzene	µg/L	0.5	<0.5
		1,4-dichlorobenzene	µg/L	0.3	<0.3
		1,2-dichlorobenzene	µg/L	0.5	<0.5
		1,2,4-trichlorobenzene	µg/L	0.5	<0.5
		1,2,3-trichlorobenzene	µg/L	0.5	<0.5
	Monocyclic Aromatic Hydrocarbons	Benzene	µg/L	0.5	<0.5
		Toluene	µg/L	0.5	<0.5
		Ethylbenzene	µg/L	0.5	<0.5
		m/p-xylene	µg/L	1	<1
		o-xylene	µg/L	0.5	<0.5
		Styrene (Vinyl benzene)	µg/L	0.5	<0.5
		Isopropylbenzene (Cumene)	µg/L	0.5	<0.5
		n-propylbenzene	µg/L	0.5	<0.5
		1,3,5-trimethylbenzene	µg/L	0.5	<0.5
		tert-butylbenzene	µg/L	0.5	<0.5
		1,2,4-trimethylbenzene	µg/L	0.5	<0.5
		sec-butylbenzene	µg/L	0.5	<0.5
		p-isopropyltoluene	µg/L	0.5	<0.5
		n-butylbenzene	µg/L	0.5	<0.5
	Nitrogenous Compounds	Acrylonitrile	µg/L	0.5	<0.5
	Oxygenated Compounds	Acetone (2-propanone)	µg/L	10	<10
		MtBE (Methyl-tert-butyl ether)	µg/L	2	<2
		Vinyl acetate	µg/L	10	<10
		MEK (2-butanone)	µg/L	10	<10
		MIBK (4-methyl-2-pentanone)	µg/L	5	<5
		2-hexanone (MBK)	µg/L	5	<5
	Polycyclic VOCs	Naphthalene	µg/L	0.5	<0.5
	Sulphonated	Carbon disulfide	µg/L	2	<2
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	112
		d4-1,2-dichloroethane (Surrogate)	%	-	123
		d8-toluene (Surrogate)	%	-	82
		Bromofluorobenzene (Surrogate)	%	-	97
	Trihalomethanes	Chloroform (THM)	µg/L	0.5	<0.5
		Bromodichloromethane (THM)	µg/L	0.5	<0.5

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

VOCs in Water (continued)

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB108202.001	Trihalomethanes	Dibromochloromethane (THM)	µg/L	0.5	<0.5
		Bromoform (THM)	µg/L	0.5	<0.5

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result
LB108202.001		TRH C6-C9	µg/L	40	<40
	Surrogates	Dibromofluoromethane (Surrogate)	%	-	108
		d4-1,2-dichloroethane (Surrogate)	%	-	116
		d8-toluene (Surrogate)	%	-	85
		Bromofluorobenzene (Surrogate)	%	-	98

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Mercury (dissolved) in Water — Method: ME-(AU)-[ENV]AN311(Perth)/AN312

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE156145.027	LB108116.014	Mercury	µg/L	0.0001	<0.0001	<0.0001	200	0
SE156201.002	LB108116.018	Mercury	µg/L	0.0001	<0.0001	<0.0001	200	0

Trace Metals (Dissolved) in Water by ICPMS — Method: ME-(AU)-[ENV]AN318

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE156129.004	LB108179.014	Arsenic, As	µg/L	1	<1	<1	177	0
		Cadmium, Cd	µg/L	0.1	<0.1	<0.1	167	0
		Chromium, Cr	µg/L	1	1	1	111	6
		Copper, Cu	µg/L	1	3	3	51	2
		Lead, Pb	µg/L	1	<1	<1	118	0
		Nickel, Ni	µg/L	1	15	15	22	0
		Zinc, Zn	µg/L	5	59	60	23	1
SE156201.002	LB108179.024	Arsenic, As	µg/L	1	<1	<1	200	0
		Cadmium, Cd	µg/L	0.1	<0.1	<0.1	200	0
		Chromium, Cr	µg/L	1	<1	<1	200	0
		Copper, Cu	µg/L	1	2	1	85	12
		Lead, Pb	µg/L	1	<1	<1	200	0
		Nickel, Ni	µg/L	1	<1	<1	200	0
		Zinc, Zn	µg/L	5	8	8	76	1

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

PAH (Polynuclear Aromatic Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN420

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB108068.002		Naphthalene	µg/L	0.1	30	40	60 - 140	74
		Acenaphthylene	µg/L	0.1	36	40	60 - 140	90
		Acenaphthene	µg/L	0.1	36	40	60 - 140	91
		Phenanthrene	µg/L	0.1	44	40	60 - 140	109
		Anthracene	µg/L	0.1	41	40	60 - 140	103
		Fluoranthene	µg/L	0.1	40	40	60 - 140	101
		Pyrene	µg/L	0.1	42	40	60 - 140	105
		Benzo(a)pyrene	µg/L	0.1	41	40	60 - 140	101
	Surrogates	d5-nitrobenzene (Surrogate)	µg/L	-	0.4	0.5	40 - 130	80
		2-fluorobiphenyl (Surrogate)	µg/L	-	0.4	0.5	40 - 130	84
		d14-p-terphenyl (Surrogate)	µg/L	-	0.6	0.5	40 - 130	112

Total Phenolics in Water

Method: ME-(AU)-[ENV]AN289

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB108417.002	Total Phenols	mg/L	0.01	0.23	0.25	80 - 120	93

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB108179.002		Arsenic, As	µg/L	1	20	20	80 - 120	99
		Cadmium, Cd	µg/L	0.1	22	20	80 - 120	110
		Chromium, Cr	µg/L	1	23	20	80 - 120	113
		Copper, Cu	µg/L	1	23	20	80 - 120	117
		Lead, Pb	µg/L	1	22	20	80 - 120	112
		Nickel, Ni	µg/L	1	22	20	80 - 120	112
		Zinc, Zn	µg/L	5	22	20	80 - 120	111

TRH (Total Recoverable Hydrocarbons) in Water

Method: ME-(AU)-[ENV]AN403

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB108068.002		TRH C10-C14	µg/L	50	980	1200	60 - 140	81
		TRH C15-C28	µg/L	200	1100	1200	60 - 140	92
		TRH C29-C36	µg/L	200	960	1200	60 - 140	80
	TRH F Bands	TRH >C10-C16 (F2)	µg/L	60	1100	1200	60 - 140	88
		TRH >C16-C34 (F3)	µg/L	500	1100	1200	60 - 140	92
		TRH >C34-C40 (F4)	µg/L	500	<500	600	60 - 140	80

VOCs in Water

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB108202.002	Halogenated	1,1-dichloroethene	µg/L	0.5	51	45.45	60 - 140	113
	Aliphatics	1,2-dichloroethane	µg/L	0.5	51	45.45	60 - 140	112
		Trichloroethene (Trichloroethylene,TCE)	µg/L	0.5	51	45.45	60 - 140	111
	Halogenated	Chlorobenzene	µg/L	0.5	51	45.45	60 - 140	111
	Monocyclic	Benzene	µg/L	0.5	51	45.45	60 - 140	112
	Aromatic	Toluene	µg/L	0.5	51	45.45	60 - 140	111
		Ethylbenzene	µg/L	0.5	51	45.45	60 - 140	112
		m/p-xylene	µg/L	1	100	90.9	60 - 140	111
		o-xylene	µg/L	0.5	51	45.45	60 - 140	111
	Surrogates	Dibromofluoromethane (Surrogate)	µg/L	-	4.8	5	60 - 140	96
		d4-1,2-dichloroethane (Surrogate)	µg/L	-	4.8	5	60 - 140	97
		d8-toluene (Surrogate)	µg/L	-	4.6	5	60 - 140	91
		Bromofluorobenzene (Surrogate)	µg/L	-	4.8	5	60 - 140	96
	Trihalomethan	Chloroform (THM)	µg/L	0.5	51	45.45	60 - 140	111

Volatile Petroleum Hydrocarbons in Water

Method: ME-(AU)-[ENV]AN433

Sample Number		Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB108202.002		TRH C6-C10	µg/L	50	970	946.63	60 - 140	102
		TRH C6-C9	µg/L	40	800	818.71	60 - 140	97
	Surrogates	Dibromofluoromethane (Surrogate)	µg/L	-	4.8	5	60 - 140	95
		d4-1,2-dichloroethane (Surrogate)	µg/L	-	4.8	5	60 - 140	96
		d8-toluene (Surrogate)	µg/L	-	5.4	5	60 - 140	108
		Bromofluorobenzene (Surrogate)	µg/L	-	5.2	5	60 - 140	104
	VPH F Bands	TRH C6-C10 minus BTEX (F1)	µg/L	50	660	639.67	60 - 140	104

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub -sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311(Perth)/AN312

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE156129.001	LB108116.004	Mercury	mg/L	0.0001	0.0066	<0.0001	0.008	83

Total Phenolics in Water

Method: ME-(AU)-[ENV]AN289

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE156214.001	LB108417.014	Total Phenols	mg/L	0.01	0.29	<0.05	0.25	113

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE156117.001	LB108179.004	Arsenic, As	µg/L	1	20	<1	20	97
		Cadmium, Cd	µg/L	0.1	22	0.4	20	109
		Chromium, Cr	µg/L	1	21	<1	20	101
		Copper, Cu	µg/L	1	22	5	20	85
		Lead, Pb	µg/L	1	22	<1	20	108
		Nickel, Ni	µg/L	1	97	83	20	69 ⑤
		Zinc, Zn	µg/L	5	250	240	20	46 ⑤

MATRIX SPIKE DUPLICATES

SE156129 R0

Matrix spike duplicates are calculated as Relative Percent Difference (RPD) using the formula: RPD = | OriginalResult - ReplicateResult | x 100 / Mean

The original result is the analyte concentration of the matrix spike. The Duplicate result is the analyte concentration of the matrix spike duplicate.

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: MAD = 100 x SDL / Mean + LR

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifer when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No matrix spike duplicates were required for this job.

Samples analysed as received.

Solid samples expressed on a dry weight basis.

QC criteria are subject to internal review according to the SGS QA/QC plan and may be provided on request or alternatively can be found here: http://www.sgs.com.au/~/media/Local/Australia/Documents/Technical Documents/MP-AU-ENV-QU-022 QA QC Plan.pdf

*	NATA accreditation does not cover tthe performance of this service.
-	Sample not analysed for this analyte.

IS	Insufficient sample for analysis.
LNR	Sample listed, but not received.
LOR	Limit of reporting.
QFH	QC result is above the upper tolerance.
QFL	QC result is below the lower tolerance.

①	At least 2 of 3 surrogates are within acceptance criteria.
②	RPD failed acceptance criteria due to sample heterogeneity.
③	Results less than 5 times LOR preclude acceptance criteria for RPD.
④	Recovery failed acceptance criteria due to matrix interference.
⑤	Recovery failed acceptance criteria due to the presence of significant concentration of analyte (i.e. the concentration of analyte exceeds the spike level).
⑥	LOR was raised due to sample matrix interference.
⑦	LOR was raised due to dilution of significantly high concentration of analyte in sample.
⑧	Reanalysis of sample in duplicate confirmed sample heterogeneity and inconsistency of results.
⑨	Recovery failed acceptance criteria due to sample heterogeneity.
⑩	LOR was raised due to high conductivity of the sample (required dilution).
†	Refer to Analytical Report comments for further information.

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CERTIFICATE OF ANALYSIS 152056

Client:

EI Australia
Suite 6.01, 55 Miller Street
Pyrmont
NSW 2009

Attention: A McAllister

Sample log in details:

Your Reference:	**E22282, Rosebery**
No. of samples:	1 Water
Date samples received / completed instructions received	18/08/2016 / 18/08/2016

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:	25/08/16 / 23/08/16
Date of Preliminary Report:	Not Issued

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

Results Approved By:

David Springer
General Manager

ACCREDITED FOR TECHNICAL COMPETENCE

vTRH(C6-C10)/BTEXN in Water		
Our Reference:	UNITS	152056-1
Your Reference	---------- -	GWQT1
Date Sampled	----------	17/08/2016
Type of sample		Water
Date extracted	-	18/08/2016
Date analysed	-	19/08/2016
TRHC$_6$ - C$_9$	µg/L	130
TRHC$_6$ - C$_{10}$	µg/L	130
TRHC$_6$ - C$_{10}$ less BTEX (F1)	µg/L	130
Benzene	µg/L	<1
Toluene	µg/L	<1
Ethylbenzene	µg/L	<1
m+p-xylene	µg/L	<2
o-xylene	µg/L	<1
Naphthalene	µg/L	<1
Surrogate Dibromofluoromethane	%	105
Surrogate toluene-d8	%	97
Surrogate 4-BFB	%	104

svTRH (C10-C40) in Water		
Our Reference:	UNITS	152056-1
Your Reference	----------	GWQT1
	-	
Date Sampled	----------	17/08/2016
Type of sample		Water
Date extracted	-	19/08/2016
Date analysed	-	19/08/2016
$TRHC_{10}$ - C_{14}	µg/L	<50
$TRHC_{15}$ - C_{28}	µg/L	<100
$TRHC_{29}$ - C_{36}	µg/L	<100
$TRH>C_{10}$ - C_{16}	µg/L	<50
$TRH>C_{10}$ - C_{16} less Naphthalene (F2)	µg/L	<50
$TRH>C_{16}$ - C_{34}	µg/L	<100
$TRH>C_{34}$ - C_{40}	µg/L	<100
Surrogate o-Terphenyl	%	91

HM in water - dissolved		
Our Reference:	UNITS	152056-1
Your Reference	----------	GWQT1
	-	
Date Sampled	----------	17/08/2016
Type of sample		Water
Date prepared	-	19/08/2016
Date analysed	-	19/08/2016
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	<0.05
Nickel-Dissolved	µg/L	13
Zinc-Dissolved	µg/L	52

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. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-013	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. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Metals-022 ICP-MS	Determination of various metals by ICP-MS.
Metals-021	Determination of Mercury by Cold Vapour AAS.

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			18/08/2016	[NT]	[NT]	LCS-W4	18/08/2016
Date analysed	-			19/08/2016	[NT]	[NT]	LCS-W4	19/08/2016
TRH C_6 - C_9	µg/L	10	Org-016	<10	[NT]	[NT]	LCS-W4	114%
TRH C_6 - C_{10}	µg/L	10	Org-016	<10	[NT]	[NT]	LCS-W4	114%
Benzene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W4	120%
Toluene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W4	126%
Ethylbenzene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W4	106%
m+p-xylene	µg/L	2	Org-016	<2	[NT]	[NT]	LCS-W4	109%
o-xylene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W4	108%
Naphthalene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Surrogate Dibromofluoromethane	%		Org-016	106	[NT]	[NT]	LCS-W4	105%
Surrogate toluene-d8	%		Org-016	96	[NT]	[NT]	LCS-W4	100%
Surrogate 4-BFB	%		Org-016	102	[NT]	[NT]	LCS-W4	103%

QUALITY CONTROL svTRH (C10-C40) in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base ll Duplicate ll %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			19/08/2016	[NT]	[NT]	LCS-W4	19/08/2016
Date analysed	-			19/08/2016	[NT]	[NT]	LCS-W4	19/08/2016
TRH C_{10} - C_{14}	µg/L	50	Org-003	<50	[NT]	[NT]	LCS-W4	90%
TRH C_{15} - C_{28}	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W4	86%
TRH C_{29} - C_{36}	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W4	104%
TRH>C_{10} - C_{16}	µg/L	50	Org-003	<50	[NT]	[NT]	LCS-W4	90%
TRH>C_{16} - C_{34}	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W4	86%
TRH>C_{34} - C_{40}	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W4	104%
Surrogate o-Terphenyl	%		Org-003	82	[NT]	[NT]	LCS-W4	105%

QUALITY CONTROL HM in water - dissolved	UNITS	PQL	METHOD	Blank
Date prepared	-			19/08/2016
Date analysed	-			19/08/2016
Arsenic-Dissolved	µg/L	1	Metals-022 ICP-MS	<1
Cadmium-Dissolved	µg/L	0.1	Metals-022 ICP-MS	<0.1
Chromium-Dissolved	µg/L	1	Metals-022 ICP-MS	<1
Copper-Dissolved	µg/L	1	Metals-022 ICP-MS	<1
Lead-Dissolved	µg/L	1	Metals-022 ICP-MS	<1
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05

QUALITY CONTROL HM in water - dissolved	UNITS	PQL	METHOD	Blank
Nickel-Dissolved	µg/L	1	Metals-022 ICP-MS	<1
Zinc-Dissolved	µg/L	1	Metals-022 ICP-MS	<1

QUALITY CONTROL HM in water - dissolved	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	[NT]	[NT]	LCS-W3	19/08/2016
Date analysed	-	[NT]	[NT]	LCS-W3	19/08/2016
Arsenic-Dissolved	µg/L	[NT]	[NT]	LCS-W3	96%
Cadmium-Dissolved	µg/L	[NT]	[NT]	LCS-W3	97%
Chromium-Dissolved	µg/L	[NT]	[NT]	LCS-W3	92%
Copper-Dissolved	µg/L	[NT]	[NT]	LCS-W3	90%
Lead-Dissolved	µg/L	[NT]	[NT]	LCS-W3	97%
Mercury-Dissolved	µg/L	[NT]	[NT]	LCS-W3	101%
Nickel-Dissolved	µg/L	[NT]	[NT]	LCS-W3	93%
Zinc-Dissolved	µg/L	[NT]	[NT]	LCS-W3	93%

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
NR: 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 batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

APPENDIX F
QA/QC Assessment

F1 QUALITY CONTROL PROGRAM

F1.1 INTRODUCTION

For the purpose of assessing the quality of data presented in this ASDI, EI collected field QC samples for analysis. The primary laboratory, SGS Australia Pty Ltd (SGS) and secondary laboratory, Envirolab Services Pty Ltd (Envirolab) also prepared and analysed internal QC samples. Details of the field and laboratory QC samples, with the allowable data acceptance ranges are presented in **Table F-1**.

Table F-1 Sampling Data Quality Indicators

QA/QC Measures	Data Quality Indicators	Have the DQIs Been Met?	Comment
Precision – A quantitative measure of the variability (or reproducibility) of data	Data precision would be assessed by reviewing the performance of blind field duplicate sample sets, through calculation of relative percentage differences (RPD). Data precision would be deemed acceptable if RPDs are found to be less than 30%. RPDs that exceed this range may be considered acceptable where: Results are less than 10 times the limits of reporting (LOR). Results are less than 20 times the LOR and the RPD is less than 50%. Heterogeneous materials or volatile compounds are encountered.	Yes	Calculated RPD values between primary and duplicate samples are presented in **Table F-2** and generally conformed with the acceptance criteria, as discussed in **Section F2**.
Accuracy – A quantitative measure of the closeness of reported data to the "true" value	Data accuracy would be assessed through the analysis of: Method blanks, which are analysed for the analytes targeted in the primary samples. Matrix spike and matrix spike duplicate sample sets. Laboratory control samples. Calibration of instruments against known standards.	Yes	As detailed in **Section F3**, method blanks, matrix spikes and laboratory control samples generally conformed to the data acceptance criteria.

QA/QC Measures	Data Quality Indicators	Have the DQIs Been Met?	Comment
Representativeness – The confidence (expressed qualitatively) that data are representative of each medium present onsite	To ensure the data produced by the laboratory is representative of conditions encountered in the field, the laboratory would carry out the following: Blank samples will be run in parallel with field samples to confirm there are no unacceptable instances of laboratory artefacts. Review of relative percentage differences (RPD) values for field and laboratory duplicates to provide an indication that the samples are generally homogeneous, with no unacceptable instances of significant sample matrix heterogeneities. The appropriateness of collection methodologies, handling, storage and preservation techniques will be assessed to ensure/confirm there was minimal opportunity for sample interference or degradation (i.e. volatile loss during transport due to incorrect preservation / transport methods).	Yes	As discussed in **Table 7-3** and **Table 7-4**, the collection methodologies, handling, storage and preservation techniques utilised is considered to be satisfactory.
Completeness – A measure of the amount of useable data from a data collection activity	Analytical data sets acquired during the assessment will be evaluated as complete, upon confirmation that: Standard operating procedures (SOPs) for sampling protocols were adhered to. Copies of all COC documentation are presented, reviewed and found to be properly completed. It can therefore be considered whether the proportion of "useable data" generated in the data collection activities is sufficient for the purposes of the land use assessment.	Yes	COC and SRA forms are attached in **Appendix D.** Although a small number of discrepancies were identified, the data generally confirms that the analytical results for soil and groundwater laboratory testing were valid and useable for interpretation purposes.
Comparability – The confidence (expressed qualitatively) that data may be considered to be equivalent for each sampling and analytical event	Given that a reported data set can comprise several data sets from separate sampling episodes, issues of comparability between data sets are reduced through adherence to SOPs and regulator-endorsed or published guidelines and standards on each data gathering activity. In addition the data will be collected by experienced samplers and NATA-accredited laboratory methodologies will be employed in all laboratory testing programs.	Yes	SOPs were adhered to during each soil and groundwater sampling event.

F1.2 CALCULATION OF RELATIVE PERCENTAGE DIFFERENCE (RPD)

The RPD values were calculated using the following equation:

$$RPD = \frac{|C_O - C_R|}{[(C_O + C_R)/2]} \times 100$$

Where:

C_O = Concentration obtained for the primary sample; and

C_R = Concentration obtained for the blind replicate or split duplicate sample.

F2 FIELD QA/QC DATA EVALUATION

The field quality assurance/quality control (QA/QC) soil and groundwater samples collected during the investigations were as follows:

- Blind field duplicates;
- Inter-laboratory duplicates;
- Trip blanks;
- Trip spikes; and
- Rinsate blanks.

Analytical results for tested soil and groundwater QA/QC samples, including calculated RPD values between primary and duplicate samples, are presented in **Table F-2**.

F2.1 SOIL INVESTIGATION

F2.1.1 Blind Field Duplicates

One blind field duplicate (BFD) soil sample was collected.

The preparation of the BFD sample (QD100 from primary sample BH206_0.35-0.45) involved the collection of a bulk quantity of soil from the same sampling point without mixing, before dividing the material into identical sampling vessels. The duplicate sample was then presented blind to the primary laboratory (SGS) to avoid any potential analytical bias. BFD soil sample was analysed for TRHs, BTEX, selected heavy metals and calculated RPD values were found to be within the Data Acceptance Criteria (**Appendix G**, **Table QC5).**

F2.1.2 Inter-Laboratory Duplicate

Sample QT100 was collected as an inter-laboratory duplicate (ILD) of the primary sample BH206_0.35-0.45.

The preparation of the ILD sample was identical to the BFD sample, as described above, and was analysed for TRHs, BTEX, selected heavy metals. The calculated RPD value exceeded the Data Acceptance Criteria (50% RPD, **Appendix G, Table QC5**) for copper (62.3%) and zinc (63.16%) due to material heterogeneity.

Furthermore, soil samples were placed immediately into jars following sampling to reduce the loss of volatiles from samples. Analytical results indicated that the samples collected were representative of the soils present at respective sampling locations.

F2.1.3 Trip Blank

One trip blank (TB) sample was prepared and analysed by the primary laboratory for BTEX and Naphthalene. Analytical results for this sample were below the laboratory LOR, indicating that ideal sample transport and handling conditions were achieved.

F2.1.4 Trip Spike

One trip spike (TS) sample was submitted to the primary laboratory for BTEX analysis, the results for which were reported within the RPD acceptance levels for trip spike recovery. It was therefore concluded that satisfactory sample transport and handling conditions were achieved.

F2.1.5 Rinsate Blank

One rinsate blank (RB) sample QR100 was submitted to the primary laboratory for PCBs analysis, the results for which were reported below laboratory LOR; therefore, it was concluded that decontamination procedures performed during the field works had been effective.

F2.2 GROUNDWATER INVESTIGATION

F2.2.1 Blind Field Duplicates

One groundwater BFD samples was collected. Sample GWQD1 was collected from the primary sample BH205M.

The preparation of BFD sample involved the decanting of the groundwater collected from the respective monitoring well into two separate groups of appropriately labelled sampling containers. Volumes were split equally between the groups of sampling bottles such that the sample contained in each individual bottle, contained a similar proportion of each water volume. Sample mixing did not occur prior to decanting, in order to preserve the concentrations of volatiles potentially present within the sample. The duplicate sample was then presented blind to the primary laboratory (SGS) to avoid any potential analytical bias. The BFDs were analysed for TRHs, BTEX, selected heavy metals. The RPD values calculated for all the analytes tested were found to be within the Data Acceptance Criteria (DAC).

F2.2.2 Inter-Laboratory Duplicate

One ILD sample was collected in total during groundwater sampling. Primary sample BH205M was split to form ILD sample GWQT1.

The preparation of a groundwater ILD sample was identical to the BFD sample as described above and also analysed for TRHs, BTEX, selected heavy metals. The RPD values calculated for the ILD sample was found to be within the Data Acceptance Criteria, with the exception of TRH fraction F1 (66.67%). The reported groundwater concentration for TRH fraction F1 was within ten times the laboratory LOR and was deemed to be acceptable. Despite the discrepancies, overall data quality was considered to be acceptable, in accordance with the laboratory DQOs presented in **Appendix L, Table QC5**.

F2.2.3 Trip Blanks

One trip blank (TB) sample (Trip Blank, GWQTB1), prepared by the primary laboratory, was analysed for BTEX by the primary laboratory during groundwater testing. TB results were reported below the laboratory LOR, indicating that ideal sample transport and handling conditions were achieved.

F2.2.4 Trip Spikes

One TS sample (GWTS1) was submitted to the primary laboratory for BTEX analysis, the results for which were all reported within the RPD acceptance levels for trip spike recovery. It was therefore concluded that satisfactory sample transport and handling conditions were achieved.

F2.2.5 Rinsate Blanks

One RB sample (GWQR1) was submitted to the primary laboratory for TRHs, BTEX and selected heavy metals analyses. Analytical results were reported below the laboratory LOR for most analytes, with the exception of copper (1 µg/L). The reported result was at the LOR of 1ug/L and not significant.

F3 LABORATORY QA/QC

F3.1 LABORATORY ACCREDITATION

To undertake all analytical testing, EI commissioned SGS as the primary laboratory and Envirolab as the secondary laboratory. SGS and Envirolab, both established analytical laboratories which operate in accordance with the guidelines set out in ISO/IEC Guide 25 “General requirements for the competence of calibration and testing laboratories”, conducted all respective analyses using National Association Testing Authorities (NATA)-registered procedures.

In relation to contingencies, should the pre-determined DQOs not be achieved, in accordance with each laboratory’s QC policy (**Appendix G**), respective tests would be accordingly repeated. Should the results again fall outside the DQOs, then sample heterogeneity may be assumed and written comment will be provided to this effect on the final laboratory certificate. The laboratory QA/QC reports are included in **Appendix G**.

F3.2 SAMPLE HOLDING TIMES

Sample holding times were generally within the laboratory DQOs, which were consistent with standard environmental protocols as tabulated in **Appendix G**, **Tables QC1** and **QC2**.

F3.3 TEST METHODS AND PRACTICAL QUANTITATION LIMITS (PQLS)

Practical Quantitation Limits for all tested parameters during the assessment of soils and groundwater are presented in **Appendix G**, **Tables QC3** and **QC4**.

Laboratory PQLs are below the adopted assessment criteria for soil and water. The methods employed by the laboratory are acceptable.

F3.4 METHOD BLANKS

Concentrations of all parameters in method blanks during the assessment were below the laboratory PQLs and were therefore within the DAC.

F3.5 LABORATORY DUPLICATE SAMPLES

The Laboratory Control Samples (LCS) for the analysis batches showed calculated RPDs that were within acceptable ranges and conformed to the DAC.

F3.6 LABORATORY CONTROL SAMPLES

The Laboratory Control Samples for the analysis batches were within acceptable ranges and conformed to the DAC.

F3.7 MATRIX SPIKES

All matrix spikes for the respective sample batches were within acceptable ranges and conformed to the DAC, with the exception:

- Zinc (141%) in trip spike sample LB107495.004 due to matrix interference; and
- Nickel (69%) and Zinc (46%) in trip spike LB108179.004 due to significant concentration of the analyte.

F3.8 SURROGATE

Recovery results for all surrogate samples conformed to the DAC.

F3.9 CONCLUDING REMARK

Based on the laboratory QA/QC results EI considers that although a small number of discrepancies were identified, which in most cases could be attributed to the non-homogenous nature of the submitted samples, the data generally confirms that the analytical results for the various phases of laboratory testing were valid and useable for interpretation purposes.

Table F-2 Summary of QA/QC results for investigation samples

Sample identification	Sampled Date	Description	TRH				BTEX						Heavy Metals							
			F1*	F2**	F3 (>C_{16} - C_{34})	F4 (>C_{34} - C_{40})	Benzene	Toluene	Ethylbenzene	Xylene (total)	m/p-xylene	o-xylene	Arsenic	Cadmium	Chromium (Total)	Copper	Lead	Mercury	Nickel	Zinc
Intra-laboratory Duplicate																				
BH206_0.35-0.45	6/8/2016	Fill Material	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	<0.2	<0.1	<3	<0.3	0.8	2.1	10	<0.05	<0.5	2.6
QD100	6/8/2016	Replicate of BH206_0.35-0.45	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	<0.2	<0.1	<3	<0.3	0.9	1.5	7	<0.05	<0.5	2
RPD			***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***11.76***	***33.33***	***35.29***	***0.00***	***0.00***	***26.09***
BH205M	17/8/2016	Groundwater	260	<60	<500	<500	<0.5	<0.5	<0.5	<1.5	<1	<0.5	<1	<0.1	1	3	<1	<0.1	15	59
GWQD1	17/8/2016	Replicate of BH205M	280	<60	<500	<500	<0.5	<0.5	<0.5	<1.5	<1	<0.5	<1	<0.1	1	3	<1	<0.1	15	60
RPD			***7.41***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***1.68***
Inter-laboratory Duplicate																				
BH206_0.35-0.45	6/8/2016	Fill Material	<25	<25	<90	<120	<0.1	<0.1	<0.1	<0.3	<0.2	<0.1	<3	<0.3	0.8	2.1	10	<0.05	<0.5	2.6
QT100	6/8/2016	Replicate of BH206_0.35-0.45	<25	<50	<100	<100	<0.2	<0.5	<1	<3	<2	<1	<4	<0.4	1	4	12	<0.1	<1	5
RPD			***0.00***	***NA***	***NA***	***NA***	***NA***	***NA***	***NA***	***NA***	***NA***	***NA***	***NA***	***NA***	***22.22***	**62.30**	***18.18***	***NA***	***NA***	**63.16**
BH205M	17/8/2016	Groundwater	260	<60	<500	<500	<0.5	<0.5	<0.5	<1.5	<1	<0.5	<1	<0.1	1	3	<1	<0.1	15	59
GWQT1	17/8/2016	Replicate of BH205M	130	<50	<100	<100	<1	<1	<1	<2	<1	<0.5	<1	<0.1	1	2	<1	<0.05	13	52
RPD			**66.67**	***NA***	***NA***	***NA***	***NA***	***NA***	***NA***	***NA***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***40.00***	***0.00***	***NA***	***14.29***	***12.61***
Trip Spike																				
QTS100	6/8/2016	Trip blank - soil	-	-	-	-	[84%]	[87%]	[85%]	N.A.	[83%]	[90%]	-	-	-	-	-	-	-	-
GWTS1	17/8/2016	De-ionised water	-	-	-	-	[91%]	[101%]	[101%]	N.A.	[95%]	[93%]	-	-	-	-	-	-	-	-
Trip Blanks																				
QTB100	6/8/2016	Trip blank - soil	-	-	-	-	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	-	-	-	-	-	-	-	-
GWTB1	17/8/2016	De-ionised water	-	-	-	-	<0.5	<0.5	<0.5	<1.5	<1	<0.5	-	-	-	-	-	-	-	-
Rinsate Blanks																				
QR100	6/8/2016	De-ionised water	<50	<60	<500	<500	<0.5	<0.5	<0.5	<1.5	<1	<0.5	<1	<0.1	<1	<1	<1	<0.1	<1	<5
QR100	17/8/2016	De-ionised water	<50	<60	<500	<500	<0.5	<0.5	<0.5	<1.5	<1	<0.5	<1	<0.1	<1	1	<1	<0.1	<1	<5

52.17	Indicates values where a single result is found to be less than detection, with the duplicate sample found to be over the detection limit.
82.35	RPD exceeds 30-50% range referenced from AS4482.1 (2005)

NOTE:

All soil results are reported in mg/kg . All water results are reported in µg/L.

* - to obtain F1 subtract the sum of BTEX concentrations from the C_6-C_{10} fraction

** - to obtain F2 subtract naphthalene from the > C_{10}-C_{16} fraction

APPENDIX G
Laboratory QA/AC Policies and DQOs

Table QC1 - Containers, Preservation Requirements and Holding Times - Soil			
Parameter	Container	Preservation	Maximum Holding Time
Acid digestible metals and metalloids - Total and TCLP (As,Cd.,Cu,Cr,Ni,Pb,Zn)	Glass with Teflon Lid	Nil	6 months
Mercury	Glass with Teflon Lid	Nil	28 days
TPH / BTEX / VOC / SVOC / CHC	Glass with Teflon Lid	4°C, zero headspace	14 days
PAHs (total and TCLP)	Glass with Teflon Lid	4°C [1]	14 days
Phenols	Glass with Teflon Lid	4°C [1]	14 days
OCPs, OPPs and total PCBs	Glass with Teflon Lid	4°C [1]	14 days
Asbestos	Sealed Plastic Bag	Nil	N/A

Table QC2 - Containers, Preservation Requirements and Holding Times - Water			
Parameter	Container Volume (mL)	Preservation	Maximum Holding Time
Heavy Metals	125mL Plastic	Field filtration 0.45μm HNO_3 / 4°C	6 months
Cyanide	125mL Amber Glass	pH > 12 NaOH / 4°C	6 months
TPH (C6-C9) / BTEX / VOCs SVOCs / CHCs	4 x 43mL Glass	HCl / 4°C [1]	14 days
TPH (C10-C36) / PAH / Phenolics OCP / OPP / TDS / pH	3 x 1L Amber Glass	None / 4°C [1]	28 days

Notes: [1] = Extraction within 14 days, Analysis within 40 days.

Table QC3 - Analytical Parameters, PQLs and Methods - Soil			
Parameter	**Unit**	**PQL**	**Method Reference**
Metals in Soil			
Arsenic - As[1]	mg / kg	1	USEPA 200.7
Cadmium - Cd[1]	mg / kg	0.5	USEPA 200.7
Chromium - Cr[1]	mg / kg	1	USEPA 200.7
Copper - Cu[1]	mg / kg	1	USEPA 200.7
Lead - Pb[1]	mg / kg	1	USEPA 200.7
Mercury - Hg[2]	mg / kg	0.1	USEPA 7471A
Nickel - Ni[1]	mg / kg	1	USEPA 200.7
Zinc - Zn[1]	mg / kg	1	USEPA 200.7
Total Petroleum Hydrocarbons (TPHs) in Soil			
C_6-C_9 fraction	mg / kg	25	USEPA 8260
C_{10}-C_{14} fraction	mg / kg	50	USEPA 8000
C_{15}-C_{28} fraction	mg / kg	100	USEPA 8000
C_{29}-C_{36} fraction	mg / kg	100	USEPA 8000
BTEX in Soil			
Benzene	mg / kg	1	USEPA 8260
Toluene	mg / kg	1	USEPA 8260
Ethylbenzene	mg / kg	1	USEPA 8260
m & p Xylene	mg / kg	2	USEPA 8260
o- Xylene	mg / kg	1	USEPA 8260
Other Organic Contaminants in Soil			
PAHs	mg / kg	0.05-0.2	USEPA 8270
CHCs	mg / kg	1	USEPA 8260
VOCs	mg / kg	1	USEPA 8260
SVOCs	mg / kg	1	USEPA 8260
OCPs	mg / kg	0.1	USEPA 8140, 8080
OPPs	mg / kg	0.1	USEPA 8140, 8080
PCBs	mg / kg	0.1	USEPA 8080
Phenolics	mg / kg	5	APHA 5530
Asbestos			
Asbestos	mg / kg	Presence / Absence	AS4964-2004

Notes:

1. Acid Soluble Metals by ICP-AES
2. Total Recoverable Mercury

Table QC4 - Analytical Parameters, PQLs and Methods - Groundwater

Parameter	Unit	PQL	Method
Heavy Metals			
Antimony - Sb	µg/L	1	USEPA 200.8
Arsenic - As	µg/L	1	USEPA 200.8
Beryllium - Be	µg/L	0.5	USEPA 200.8
Cadmium - Cd	µg/L	0.1	USEPA 200.8
Chromium - Cr	µg/L	1	USEPA 200.8
Cobalt - Co	µg/L	1	USEPA 200.8
Copper - Cu	µg/L	1	USEPA 200.8
Lead - Pb	µg/L	1	USEPA 200.8
Mercury - Hg	µg/L	0.5	USEPA 7471A
Molybdenum - Mo	µg/L	1	USEPA 200.8
Nickel - Ni	µg/L	1	USEPA 200.8
Selenium - Se	µg/L	1	USEPA 200.8
Silver - Ag	µg/L	1	USEPA 200.8
Tin (inorg.) - Sn	µg/L	1	USEPA 200.8
Nickel - Ni	µg/L	1	USEPA 200.8
Zinc - Zn	µg/L	1	USEPA 200.8
Total Petroleum Hydrocarbons (TPHs)			
C_6-C_9 fraction	µg/L	10	USEPA 8220A / 8000
C_{10}-C_{14} fraction	µg/L	50	USEPA 8000
C_{15}-C_{28} fraction	µg/L	100	USEPA 8000
C_{29}-C_{36} fraction	µg/L	100	USEPA 8000
BTEX			
Benzene	µg/L	1	USEPA 8220A
Toluene	µg/L	1	USEPA 8220A
Ethylbenzene	µg/L	1	USEPA 8220A
m- & p-Xylene	µg/L	2	USEPA 8220A
o-Xylene	µg/L	1	USEPA 8220A
Polyciclic Aromatic Hydrocarbons (PAHs)			
PAHs	µg/L	0.1	USEPA 8270
Benzo(a)pyrene	µg/L	0.01	USEPA 8270
OrganoChlorine Pesticides (OCPs)			
Aldrin	µg/L	0.001	USEPA 8081
Chlordane	µg/L	0.001	USEPA 8081
DDT	µg/L	0.001	USEPA 8081
Dieldrin	µg/L	0.001	USEPA 8081
Endosulfan	µg/L	0.001	USEPA 8081
Endrin	µg/L	0.001	USEPA 8081
Heptachlor	µg/L	0.001	USEPA 8081
Lindane	µg/L	0.001	USEPA 8081
Toxaphene	µg/L	0.001	USEPA 8081

Parameter	Unit	PQL	Method
Chlorinated Hydrocarbons (CHCs)			
1,2-dichlorobenzene	µg/L	1	USEPA 8260B
1,3-dichlorobenzene	µg/L	1	USEPA 8260B
1,4-dichlorobenzene	µg/L	1	USEPA 8260B
1,2,3-trichlorobenzene	µg/L	1	USEPA 8260B
1,2,4-trichlorobenzene	µg/L	1	USEPA 8260B
Hexachlorobutadeine	µg/L	1	USEPA 8260B
1,1,2-trichloroethane	µg/L	1	USEPA 8260B
Hexachloroethane	µg/L	10	USEPA 8270D
Other CHCs	µg/L	1	USEPA 8260B
Volatile Organic Compounds (VOCs)			
Aniline	µg/L	10	USEPA 8260B
2,4-dichloroaniline	µg/L	10	USEPA 8260B
3,4-dichloroaniline	µg/L	10	USEPA 8260B
Nitrobenzene	µg/L	50	USEPA 8260B
2,4-dinitrotoluene	µg/L	50	USEPA 8260B
2,4,6-trinitrotoluene	µg/L	50	USEPA 8260B
Phenolic Compounds			
Phenol	µg/L	10	USEPA 8041
2-chlorophenol	µg/L	10	USEPA 8041
4-chlorophenol	µg/L	10	USEPA 8041
2, 4-dichlorophenol	µg/L	10	USEPA 8041
2,4,6-trichlorophenol	µg/L	10	USEPA 8041
2,3,4,6-tetrachlorophenol	µg/L	10	USEPA 8041
Pentachlorophenol	µg/L	10	USEPA 8041
2,4-dinitrophenol	µg/L	10	USEPA 8041
Miscellaneous Parameters			
Total Cyanide	µg/L	5	APHA 4500C&E-CN
Fluoride	µg/L	10	APHA 4500 F-C
Salinity (TDS)	mg/L	1	APHA 2510
pH	units	0.1	APHA 4500H+
OrganoPhosphate Pesticides (OPPs)			
Azinphos Methyl	µg/L	0.01	USEPA 8141
Chloropyrifos	µg/L	0.01	USEPA 8141
Diazinon	µg/L	0.01	USEPA 8141
Dimethoate	µg/L	0.01	USEPA 8141
Fenitrothion	µg/L	0.01	USEPA 8141
Malathion	µg/L	0.01	USEPA 8141
Parathion	µg/L	0.01	USEPA 8141
Temephos	µg/L	0.01	USEPA 8141
Polychlorinated Biphenyls (PCBs)			
Individual PCBs	µg/L	0.01	USEPA 8081

Table QC5 - QC Sample Data Acceptance Criteria

QC Sample Type	Method of Assessment	Acceptable Range
Field QC		
Blind Duplicates and Split Samples	The assessment of split duplicate is undertaken by calculating the Relative Percent Difference (RPD) of the duplicate concentration compared with the primary sample concentration. The RPD is defined as: $RPD = 100 \times \frac{\lvert X_1 - X_2 \rvert}{\text{mean}(X1, X2)}$ Where: X_1 and X_2 are the concentrations of the primary and duplicate samples.	The acceptable range depends upon the levels detected: - 0-150% RPD (when the average concentration is <5 times the LOR/PQL) - 0-75% RPD (when the average concentration is 5 to 10 times the LOR/PQL) - 0-50% RPD (when the average concentration is >10 times the LOR/PQL)
Rinsate & Trip Blanks	Each blank is analysed as per the original samples.	Analytical Result <LOR/PQL
Laboratory prepared Trip Spike	The Trip Spike is analysed after returning from the field and the % recovery of the known spike is calculated.	70 - 130%
Laboratory QC		
Laboratory Duplicates	Assessment of Lab Duplicate RPD as per Blind Duplicates and Split Samples.	Lab Duplicate RPD < 15% (Inorganics) Lab Duplicate RPD < 30% (Organics) for sample results > 10 LOR
Surrogates Matrix Spikes Laboratory Control Samples	Assessment is undertaken by determining the percent recovery of the known surrogate spike (SS) or addition to the sample. $\%\ Recovery = 100 \times \frac{C - A}{B}$ Where: A = Concentration of analyte determined in the original sample; B = Added Concentration; and C = Calculated Concentration.	at least 2 SS recoveries to be within 70-130% subject to matrix effects (Organics) 80-120% (Inorganics / Metals) 60-140% (Organics) 10-140% (SVOC and Speciated Phenols) If the result is outside the above ranges, the result must be <3x Standard Deviation of the Historical Mean (calculated over the past 12 months).
Sample Matrix Spike Duplicates	Recovery RPD	<30% (Inorganics & Organics)
Calibration Check Standars	Continuous Calibration Verification (CCV)	CCV must be within ±15% (inorganics) CCV must be within ±25% (inorganics)
Reagent, Method & Calibration Check Blanks	Each blank is analysed as per the original samples.	Analytical Result <LOR/PQL

Note: PQL - Laboratory Practical Quantitation Limit (PQL) or the minimum detection limit for a particular analyte.
LOR = Limit of Reporting

SGS Environmental Services is accredited by NATA for Chemical Testing (Reg.No.2562) and Quality System compliance to ISO/IEC 17025. The QC parameters contained within are designed to meet NEPM 1999 requirements.

Quality Control samples included in any analytical run are listed below.

Reagent/Analysis Blank (BLK) **Method Blank (MB)**	Sample free reagents carried through the preparation/extraction/digestion procedure and analysed at the beginning of every sample batch analysis. A reagent blank is prepared and analysed with every batch of samples plus with each new batch of solvent prior to use.
Sample Matrix Spike (MS) & Matrix Spike Duplicate (MSD)	Sample replicates spiked with identical concentrations of target analyte(s). The spiking occurs during the sample preparation and prior to the extraction/digestion procedure. They are used to document the precision and bias of a method in a given sample matrix. Where there is not enough sample available to prepare a spiked sample, another known soil/sand or water may be used. A duplicate spiked sample is analysed at least every 20 samples.
Surrogate Spike (SS)	At least one but up to three surrogate compounds are added to all samples requiring analysis for organics prior to extraction. Used to determine the extraction efficiency. They are organic compounds which are similar to the target analyte(s) in chemical composition and behaviour in the analytical process, but which are not normally found in environmental samples. Where possible they are surrogate compounds recommended by the USEPA.
Control Matrix Spike (CMS)	To ensure spike recoveries can be determined for every batch of samples a control matrix is spiked with identical concentrations of target analyte(s) and then analysed. These results allow recoveries to be determined in the event that the matrix spikes are unusable (eg. matrix spikes performed on heavily contaminated samples). These are analysed at least every 20 samples.
Internal Standard (IS)	Added to all samples requiring analysis for organics (where relevant) after the extraction process; the compounds serve to give a standard of retention time and response, which is invariant from run-to-run with the instruments. Where possible they are standard compounds recommended by the USEPA.
Lab Duplicates (D)	A separate portion of a sample being analysed that is treated the same as the other samples in the batch. One duplicate is processed at least every 10 samples.
Lab Control Standards/Samples (LCS)	Prepared from a source independent of the calibration standards. At least one control standard is included in each run to confirm calibration validity. Thereafter they are analysed at least every one in 20 samples plus at the end of each analytical run. This data is not reported.
Continuous Calibration Verification (CCV) or **Calibration Check Standard & Blank**	A calibration check standard or CCV and blank are run after every 20 samples of an instrumental analysis run to assess analytical drift. Calibration Standards are checked old versus new with a criteria of ±10%

Quality Assurance Programs are listed below:

Statistical analysis of Quality Control data (SQC)	Quality control data is plotted on control charts using the APHA procedure with warning and control limits at 2 and 3 standard deviations respectively. See also QMS Procedure "Statistical Quality Control".
Certified Reference Materials (CRM/SRM)	Certified Reference Materials and Standards are regularly analysed. These materials/standards have certified reference values for various parameters.
Proficiency Testing	Regular proficiency test samples are analysed by our laboratories. SGS Environmental participates in a number of programs. Results and proficiency status are compiled and sent to participating laboratory post data interpretation. Failure to comply with acceptable values result in further investigations.
Inter-laboratory & Intra-laboratory Testing	SGS Environmental Services has schedules in the Quality Systems to participate in Inter/Intra laboratory testing conducted internally and by other parties.
Data Acceptance Criteria Unless otherwise specified in the method or method manual the following general criteria apply to all inorganic tests. All recoveries are to be reported to 3 significant figures.	Failure to meet the internal acceptance criteria will result in sample batch repeats dependent upon investigation outcomes. For data to be accepted: <u>Inorganics (water samples)</u> • For all inorganic analytes the Reagent & Method Blanks must be less than the LOR. • The Calibration Check Standards or Continuous Calibration Verification (CCV) must be within ±15%. • Control Standards must be 80-120% of the accepted value. • The Calibration Check Blanks must be less than the LOR. • Lab Duplicates RPD to be <15%*. Note: If client <u>field</u> duplicates do not meet this criteria it may indicate heterogeneity and shall be noted on the data reports for QC samples. • Sample (and if applicable Control) Matrix Spike♬ Duplicate recovery RPD to be <30%. • Where CRMs are used, results to be within ± 2 standard deviations of the expected value. <u>Inorganics (soil samples)</u> • For all inorganic analytes the Reagent & Method Blanks must be less than the LOR. • The Calibration Check Standards or Continuous Calibration Verification (CCV) must be within ±15%. • Control Standards must be 80-120% of the accepted value. • The Calibration Check Blanks must be less than the LOR. • Lab duplicate RPD to be <30%* for sample results greater than 10 times LOR. • Sample Matrix Spike Duplicate (MS♬/MSD) recovery RPD to be <30%. In the event that the matrix spike has been applied to samples whose matrix or contamination is problematic to the method then these acceptance criteria apply to the Control Matrix Spike (CMS/D). • Where CRMs are used, results to be within ± 2 standard deviations of the expected value.

Data Acceptance Criteria Unless otherwise specified in the method or method manual the following general criteria apply to all organic tests. All recoveries are to be reported to 3 significant figures.	Organics • Volatile & extractable Reagent & Method Blanks must contain levels less than or equal to LOR. • The Calibration Check Standards or Continuous Calibration Verification (CCV) must be within ±25%. Some analytes may have specific criteria. • Control Standards (LCS/CMS) and Certified Reference Materials (CRM) recoveries are to be within established control limits or as a default 60-140% unless compound specific limits apply. • Retention times are to vary by no more than 0.2 min. • **At least two of three** routine level soil sample Surrogate Spike (SS) recoveries are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as acceptance criterion. Any recoveries outside these limits will have comment. • Water sample Surrogates Spike (SS) recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion. Any recoveries outside these limits will have comment. • Lab Duplicates (D) must have a RPD <30%*. • Sample Matrix Spike Duplicate (MS♬/MSD) recovery RPD to be <30%. In the event that the matrix spike has been applied to samples whose matrix or contamination is problematic to the method then these acceptance criteria apply to the Control Matrix Spike (CMS/D).

*Only if results are at least 10 times the LOR otherwise no acceptance criteria for RPD's apply. Application of more stringent criteria shall be applied for clean water sample from water boards and any other nominated client contracts. Nominal 10xLOR criteria are dropped to 5xLOR where specified.
♬Matrix do not readily equate to definitive recovery due to inherent matrix interferences and thus do not have recovery compliance values set. As a guide inorganic recoveries should be between 70-130% and for organics 60-130%

Batch Structure Summary

An analytical batch is nominally considered as 20 samples or smaller. As a standard template the following should be **used as a guide** according to the above Quality Control Types:

1	MB	16	UNK_DUP
2	STD1	17	MS
3	STD2	18	MS_DUP
4	STD3	19	UNK 11
5	LCS	20	UNK 12
6	BLK	21	UNK 13
7	UNK 1	22	UNK 14
8	UNK 2	23	UNK 15
9	UNK 3	24	UNK 16
10	UNK 4	25	UNK 17
11	UNK 5	26	UNK 18
12	UNK 6	27	UNK 19
13	UNK 7	28	UNK 20 (SS if applicable)
14	UNK 8	29	UNK_DUP
15	UNK 9	30	CCV
16	UNK 10 (SS if applicable)	31	CRM / SRM / CMS / LCS