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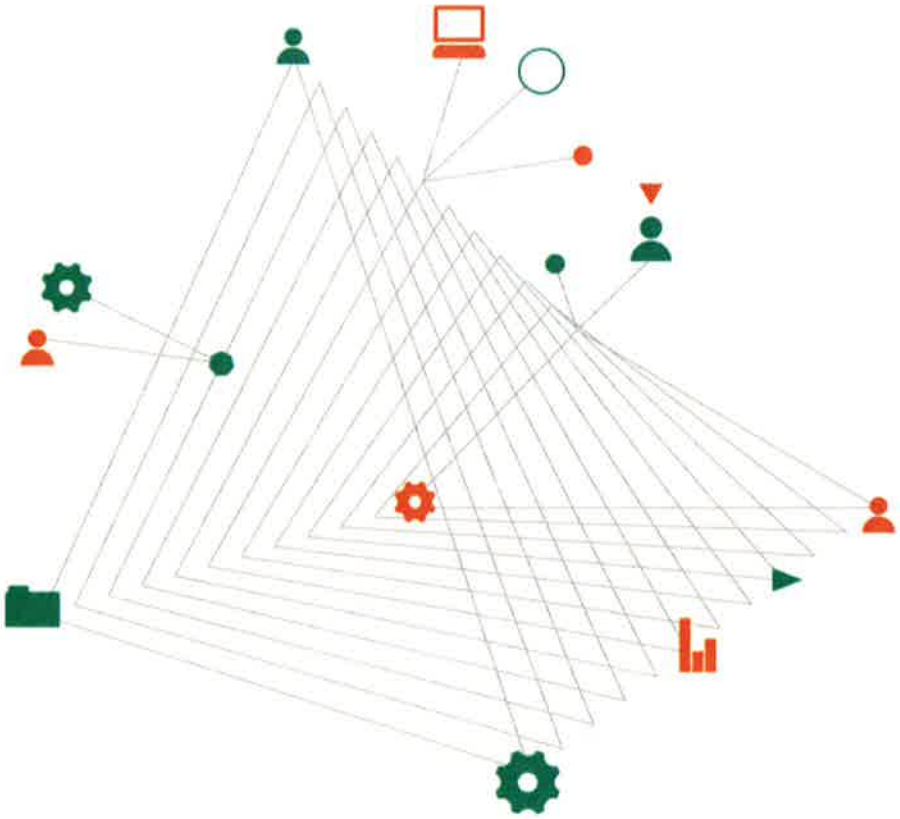
Campion College

Phase 2: Detailed Site Investigation

119 Rausch Street,
Old Toongabbie, NSW 2146

4 April 2016



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Phase 2: Detailed Site Investigation

Prepared for
Campion College

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1. Introduction

1.1. General

This report presents the findings of a Phase 2 Detailed Site Investigation (DSI) prepared by Coffey Environments Australia Pty Ltd (Coffey) for Campion College, which located at 119 Rausch Street, Old Toongabbie, NSW (the 'site').

The assessment was commissioned by Gardner Wetherill Associated Pty Ltd (GWA) on behalf of Campion College, and was undertaken in general accordance with Coffey's fee proposal dated 8th December 2015 (Ref: ENAURHOD04835AB-P01).

The site location is shown in Figure 1.

1.2. Project Background

Campion College is a tertiary college seeking to redevelop parts of the site, including the provision of additional educational, library, sporting and accommodation facilities, and a chapel. A basement car park will also be provided beneath the proposed library.

To support the Development Application, Coffey undertook a desktop contamination assessment for the site, which was presented in the following report:

- Coffey (Nov 2015); *Preliminary Site Contamination Assessment, Campion College 119 Rausch Street, Old Toongabbie, NSW 2146* (Report ref. ENAURHOD04835AA-R01a, dated 26 November 2015).

Based on findings of the above assessment, the site as a whole was considered to have a low potential risk of significant contamination being present. However, it was assessed that the current and historic uses of the northwestern portion of the site gives rise to an increased potential for contamination to be present. Specifically, the following potential sources of contamination were identified:

- An old diesel bowser, tank fill/dip points and suspected below ground fuel distribution lines and an underground storage tank (UST) that possibly remains in-situ.
- A soil stockpile containing various wastes and fragments of fibre cement sheeting suspected to contain asbestos (i.e. Bonded ACM).
- Uncontrolled storage of miscellaneous wastes.
- Storage of small quantities of paint, solvents, and chemicals within a maintenance workshop.

The Preliminary Site Contamination Assessment recommended that a Phase 2 Detailed Site Investigation is undertaken to assess ground conditions in the vicinity of the above potential sources of contamination.

1.3. Objectives

In summary, the objectives of the assessment are to:

- Conduct a programme of intrusive investigations within the northwestern portion of the site to assess the significance of contamination arising from the potential sources of contamination identified within the Preliminary Site Contamination Assessment (Coffey Nov 2015).
- Interpret the findings of the intrusive investigation works and provide an opinion on the suitability for the site for the proposed development in accordance with State Environment Planning Policy No. 55 – Remediation of Land (SEPP55).

1.4. Proposed Development

Campion College are seeking to expand the facilities of the existing tertiary college, and have lodged a Development Application to redevelop part of their site to provide additional educational, library, sporting and accommodation facilities, and a chapel. A single storey basement car park will also be provided beneath the proposed library. The extent of the proposed development is outlined within plans provided in Appendix A.

The proposed land uses identified within the northwestern portion of the site will comprise student accommodation blocks 'House 2' and 'House 3'. These accommodation blocks comprise bedrooms for students attending the college, with a common kitchen, laundry and study rooms within the ground floor. It is understood that land surrounding the footprint of these blocks shall comprise soft landscaped areas and paved footpaths. It is noted that the library and basement car park is situated approximately 15m south of the investigation area.

2. Site Location and Setting

2.1. Site location and identification

The generic site location information relating to the site is summarised in Table 2.1. The location and site layout plan of the site is shown in Figures 1 and 2, respectively.

Table 2.1: Site Identification

Site Address:	Property No. 119 Rausch Street, Old Toongabbie, NSW 2146
Site Identification:	Lot 111 of Deposit Plan (DP) 749237
Current Zoning:	Zone R2 – Low Density Residential under Parramatta City Council Local Environmental Plan 2011
Area	Total Area of College Site - 4.2 ha Investigation Area – approximately 0.25ha

2.2. Site description

The site comprises a tertiary college with the main college building, library and classrooms established on the western portion of the site. The eastern portion of the site remains undeveloped, landscaped grounds. A small pond is located on the north-eastern portion of the site. A detailed description of the college grounds is provided within the Preliminary Site Contamination Assessment (Coffey, Nov 2015), which was based on a site walkover survey and discussions with site representatives on the 13th November 2015.

As summary of the key features of the northwestern area of the site relevant to the investigation works conducted as part of this assessment are provided below:

- A cluster of three small structures are present within this part of the site. The largest, western-most structure is used as a workshop and storage area. Materials stored within this structure included old wooden furniture, paints, soil, pesticides/herbicides/fertiliser and landscaping equipment. The small rectangular structure situated immediately east of the workshop/storage building is used as a gymnasium where weight-lifting equipment, stationary bikes and rowing machines are stored. A shipping container situated to the north of these structures is used to store documents and office materials.

Photo 1: View of gymnasium and storage sheds located within northwestern portion of the site.

- Two metal waste skip containers (bins) were observed in this area, which are used to store putrescible and recyclable wastes generated by the college. We understand that these skip bins are routinely collected by a waste management provider for offsite disposal.
- An old 'Mobil Distillate' fuel bowser is present in this area adjacent to gymnasium. A rectangular concrete slab lies adjacent to the bowser measuring an area of approximately 4m by 4m. Two small caps are present on the slab indicate that an underground storage tank (UST) is present beneath the slab. The small caps were removed as part of the field investigation conducted as part of this study, to assess their purpose. One of the caps revealed a graduated dipstick, which provided a strong indication that a UST remains in-situ. The Coffey field engineer supervising the investigation works confirmed the base of the tank was 1.88mbgs and there was a small volume of water in the base of the tank. The water did not contain visible sheens or odours, suggesting the UST does not contain clearly perceptible petroleum residues.

Photo 2: concrete slab situated over UST. Disused fuel bowser located adjacent to waste skip bin.

Photo 3: UST dipstick located beneath cap on concrete slab.

- During the walkover conducted as part of the Preliminary Site Contamination Assessment (Coffey, Nov 2015), various waste materials were stockpiled/stored in open areas adjacent to buildings/shipping containers including wooden furniture, metal, old electricity wood poles, plastic containers, old domestic appliances and metal pipes. Wastes were observed across the grassed area located to the north of the structures including plastic, metal, brick, wood, electricity poles and a small stockpile of soil with fragments of fibre cement sheeting suspected to contain asbestos (Bonded ACM).
- As part of the field investigation works, the investigation area was re-inspected to assess the distribution of visible asbestos containing materials (ACM). This inspection was undertaken by an experienced Coffey engineer on the 26th February 2016 following the removal of overgrown vegetation. In summary no visible ACM were identified within the investigation area during the inspection.

2.3. Description of surrounding land uses

The existing college buildings are located to the south and south east of the workshop and storage structures noted above. The eastern portion of the site comprises largely undeveloped landscaped grounds, with a small pond and access road linking the college building with Wooberry Place.

In summary, the site is situated in an area predominated by low density residential land uses. Table 2.2 provides a summary of the land uses surrounding the site.

Table 2.2: Summary of land uses surrounding the college

Direction	Land Uses
North	• Land immediately to the north of the site and further north to Hurley Street comprises residential properties.
West	• Land immediately to the west comprises residential properties, Jago Place and Guiren Place and further west Hurley Street.
East	• Land immediately to the east comprises residential properties and further east Austin Woodbury Place and Reynolds Street.
South	• Land immediately to the south comprises residential properties and further south Rausch Street and Austin Woodbury Place.

2.4. Geology, hydrogeology and hydrology

The anticipated geological sequence at the site will comprise fill materials or residual clay soil, overlying Ashfield Shale bedrock (Geological Survey of New South Wales, 1991; Sheet 9030). The Ashfield Shale Formation comprises dark-grey to black claystone-siltstone and fine sandstone-siltstone laminite. Given the anticipated geological setting within the site, it is assessed that acid sulphate soils are not expected within the site

The topography of the investigation site was observed to be relatively level and it is expected that infiltration would percolate into the sub-surface soils (where permeability allows) or pool at the surface. Topographic survey records show a slight fall in ground levels towards the west and northwesterly direction.

Groundwater was anticipated to exist within fractures of underlying shale bedrock or as perched lenses in the upper soil profile or at the soil/rock interface, particularly after periods of rainfall. No licensed groundwater abstraction bores were located within a 500m around the site (Coffey, Nov 2015).

A pond is located on the eastern portion of the campus, approximately 180m east of the investigation area. The site is situated approximately 380m south of Toongabbie Creek. The confluence of Girraween and Pendle Creek is located approximately 720m west of the site.

2.5. Summary of historic land uses

A detailed appraisal of the historic land uses is presented in the Preliminary Site Contamination Assessment (Coffey, Nov 2015). A summary of historic land uses is presented below:

- Available records indicate that the site was used for agricultural purposes between 1794 and 1936, which included poultry and dairy farming.
- Between 1936 and 1997, the site formed part of a Marist Seminary and Centre with diary and farm activities ceasing in circa 1960s. The main college building at the site was built during this period.

- Between 1997 and 2001, the land belonged to the Diocese of Parramatta. At this time, the site was mainly used for conferences and meetings.
- Campion Foundation Limited acquired the land in 2001 and Campion College Australia started operations in 2006 following minor refurbishments to the existing buildings.
- The earliest available aerial photographs indicate that land surrounding the site in the early 1940's was predominantly open space with low density residential and/or commercial land uses to the west.
- The site was re-developed between 2001 and 2006 to add a classroom building and to set up the library in two Nissen army huts. These huts are no longer on site.
- Land surrounding the site was developed as residential land use between 1950s and 1990s, with agricultural uses noted prior to the 1950's.

Limited information exists regarding the UST and associated fuel bowser on site. Workcover NSW confirmed that they held no license records to store dangerous goods within the site (Coffey, Nov 2015). Anecdotal evidence provided by representatives of the college indicates that the bowser was present on-site at the time the College was established and that it is unknown if a UST is present on site. It was understood that the UST and bowser were installed on site by Marists to provide a source of fuel for their vehicles and farm equipment.

3. Preliminary conceptual site model

Table 3.1 presents a preliminary conceptual site model, based on the known historic site uses and observations made during recent site walkover surveys.

Table 3.1: Preliminary Conceptual Site Model

Potential Contaminating Activity	Contaminants of Potential Concern	Potential Exposure Pathways	Receptors	Comments
Potential weathering or remnants of hazardous building material from former structures located in the north-western portion of the site.	Asbestos and Metals (e.g. zinc, lead)	Inhalation of dusts and fibres Ingestion of dusts Dermal contact	• Current Site Users • Ground workers (Construction) • Future Site Users • Ground workers (future maintenance event)	Fibrous cement sheeting was commonly used as a building material until c.1980s. Aerial images indicated that small structures, sheds or buildings, were historically present in the north-western portion of the site. A heritage assessment prepared for the site also identified records of fibre cement buildings in this part of the site (NBRS, 2015). Suspected asbestos containing materials (Bonded ACM) were not observed in external walls of the small structures located on the north-western portion of the site however fragments of Bonded ACM were observed in surface soils/stockpile located on the north-western portion of the site, possibly resulting from demolition of former structures. Bonded ACM was observed to be in a reasonable condition showing little evidence of extensive weathering. Such materials present a low risk in its current state although may present greater health risks to workers during construction of future sub-surface maintenance event where ground disturbance may release fibres. Certain heavy metals (e.g. zinc and lead) could have historically been present in building materials such as flashing and paints. Impacts associated with weathering or remnants of demolition of former structures containing hazardous materials would likely be within the near surface soils. Such materials may pose health risks via inhalation/ingestion of dusts and dermal contact pathways.
Storage of fuels, oils, paints and chemicals in outbuildings and in open areas on the north-western area of the site.	TPH, BTEX, PAH, Metals, Solvents, OCP/OPP.	Inhalation of dusts Inhalation of vapours Ingestion of dusts Dermal contact	• Current Site Users • Ground workers (Construction) • Ground workers (future maintenance event) • Future Site Users	The cluster of small structures present on the north-western area of the site, are used as a workshop and to store small quantities of fuel/oil, paints, solvents and chemicals for gardening and maintenance. Other miscellaneous wastes were also noted in areas surrounding these structures. Spills and subsequent leakage of oil, paints, solvents and herbicides/pesticides may be present in near surface soil. Given the small quantities of these materials observed, the resulting impact from accidental spills/leaks (if any) is expected to be minor and relatively localised. Where present, these chemicals have the potential to pose health risks to current and future site users via the ingestion/inhalation of dusts, inhalation of vapours and dermal contact pathways. Infiltration also has the potential to mobilise soil-bound contamination, posing potential risks to groundwater underlying the site, and surface water receptors. Given the small quantities of chemicals stored and the distance between site and the nearest surface water bodies, it is assessed that these sources of potential contamination are unlikely to pose significant risks to surface water receptors.
		Leaching Lateral groundwater migration Migration along preferential flow pathways Surface water runoff	• Groundwater underlying the site • Surface water (off site)	
Historic agricultural land uses at the site	Metals, Pesticides, Herbicides, Nitrate, Ammonia.	Inhalation and ingestion of dusts Dermal contact	• Current Site Users • Ground workers (construction) • Future Site Users • Ground workers (future maintenance event)	Records indicate that the northwest and central northern parts of the site were used for land cultivation until c.1960s, and the site was historically used for poultry and dairy farming prior to development of the college building in c.1930's, and continued on a smaller scale until c.1960s. Pesticides and herbicide residues associated with historic land cultivation activities would typically be present in shallow soils and may present a potential health risk via the inhalation/ingestion and dermal contact pathways, although given that such uses substantially ceased in the 1960s, it is assessed the potential risks are low. Animal husbandry has the potential to generate a source of organic animal wastes which may build up within the soils. These wastes can cause a build of nitrate and ammonia within the soil although given the nature of these contaminants, and that it has been approximately 50years since this land use occurred within the site, it is considered that contaminants associated with animal waste residues pose a very low environmental risk.

Potential Contaminating Activity	Contaminants of Potential Concern	Potential Exposure Pathways	Receptors	Comments
Historic use of fuel on the north-western portion of the site	TPH, BTEX, PAH and lead.	Ingestion of dusts and vapours Dermal contact Leaching Lateral groundwater migration Migration along preferential flow pathways Surface water runoff	• Current Site Users • Future Site Users • Groundwater underlying the site • Surface water (off site)	An old fuel bowser is present within the north-western portion of the site. A concrete slab adjacent to the bowser with fill/dip points indicating a UST remains in-situ. Accidental spillages and product loss from bowser, tank and dispensing lines has the potential to result in significant contamination. Fuel has the potential to pose health risks to current site users where they are exposed to surface soils impacted by spillages. Volatile components of fuels can also pose health risks via the vapour inhalation pathway, where vapours can accumulate in enclosed spaces. Infiltration also has the potential to mobilise soil-bound contamination, posing potential risks to groundwater underlying the site, and surface water receptors. Infiltration also has the potential to mobilise soil-bound contamination, posing potential risks to groundwater underlying the site, and surface water receptors.
Fill materials and waste of unknown origin	TPH, BTEX, PAH, Metals, OCP/OPP, asbestos	Dermal contact Ingestion/inhalation of dusts Inhalation of fibres	• Current Site Users • Ground workers (construction) • Future Site Users • Ground workers (future maintenance event)	Whilst fill materials may have been imported to the site historically, observations made during the site walkover and historic sequence of site development suggests that the substantial quantities of fill materials have not been imported to site. It is assessed that fill (if present) is unlikely to pose a significant contamination source. As noted above, observations made during the site walkover indicate certain components of the waste materials and soil stockpiles within the north-western area of the site have the potential to pose health risks via the dermal contact and inhalation/ingestion pathways.

Notes:

Metals = arsenic, chromium, cadmium, copper, lead, nickel, mercury and zinc.

TPH = Total Petroleum Hydrocarbon

BTEX = Benzene, Toluene, Ethylbenzene and Xylenes

OCP = Organochlorine Pesticides

OPP = Organophosphate Pesticides

PAH = Polycyclic Aromatic Hydrocarbons

4. Project data quality objectives

As stated in Section 5 of Schedule B2 – Guideline on Site Characterisation of the *National Environment Protection (Assessment of Site Contamination) Measure 1999* (the 'ASC NEPM') (NEPC 2013), the data quality objectives (DQO) process is used to define the type, quantity and quality of data needed to support decisions relating to the environmental condition of a site.

The seven-step DQO process adopted for this assessment is provided below:

Step 1: State the Problem

The primary objectives of this assessment are to assess:

- Evaluate whether a UST is present within the northwestern part of the site, and assess whether the historic storage of fuel has resulted in contamination impacts.
- Assess the distribution of visible ACM within the northwestern part of the site.
- Interpret the findings of the investigations and provide an opinion on whether the site is suitable for the proposed development from a contamination perspective, in accordance with SEPP 55.

Based on this, the main problems are:

- What is the most appropriate methods of investigation to assess the types of contamination anticipated within the northwestern part of the site?
- How many sampling locations should be established within the site, and where?
- To what depths should sampling locations be extended to?
- At what depth should soil samples be collected?
- Are there restrictions present that may influence the outcome of the investigation, or location of the sampling point?
- What are the contaminants of potential concern?

Step 2: Identify the Decision

Is the site suitable for the proposed residential redevelopment?

Step 3: Identify Inputs to the Decision

The primary inputs to assessing the above include:

- Information presented in the Preliminary Site Contamination Assessment (Coffey, Nov 2015).
- Observations made by Coffey during field investigations.
- Results of current investigations undertaken on-site.
- Relevant legislation and regulatory guidelines.

Step 4: Define the Study Boundaries

The boundary of the investigation area is shown in Figure 2. The vertical boundary is defined by the expected extent of impact.

Step 5: Develop a Decision Rule

The decision rule to assess the suitability of the site will be as follows:

- Quality Assurance / Quality Control (QA/QC) assessment indicates that the data is usable; and
- Where contaminant concentrations are reported below the adopted health and environmental assessment criteria, or
- No plausible exposure mechanisms where human or environmental receptors may be exposed to potentially contaminated media in the context of the proposed future use of the site.

Step 6: Specify Limits of Decision Errors

There are two sources of error for input to decisions:

- Sampling errors, which occur when the samples collected are not representative of the conditions within the investigation area; and
- Measurement errors, which occur during sample collection, handling, preparation, analysis and data reduction.

The null hypothesis for this study is:

- Contaminant concentrations within the soil and groundwater beneath the site are less than the adopted investigation levels.

These errors may lead to the following decision errors:

- Type I - deciding that the soil/groundwater is not contaminated and, therefore, the site is suitable for the proposed residential development when the reverse is true; and
- Type II - deciding that the soil is contaminated and, therefore, the site is not suitable for the proposed residential development when the reverse is true.

The acceptable limit on decision errors is a 5% probability of a false negative (i.e. assessing that the average concentrations of COPC in are less than the adopted soil investigation levels when they are actually greater than the investigation levels).

Where data sets are sufficiently populated, the 95% Upper Confidence Limit (UCL) of the arithmetic mean will be used to calculate this probability. The 95% UCLs are to be less than the investigation level and standard deviation of the sample population shall be less than 50% of the investigation level.

The investigation levels for assessment are nominated in Section 6 of this report.

Step 7: Optimise the Design for Obtaining Data

Based on the previous Steps 1 to 6 of the DQO process, the optimal design for obtaining the required data is presented in the following sections (i.e. proposed field and laboratory programs).

5. Sampling plan and methodology

5.1. Soil sampling methodology

Soil sampling was undertaken by experienced Coffey environmental scientists in accordance with the sampling methodology and QA / QC procedures summarised in Table 5.1.

Table 5.1: Soil Sampling Methodology

Activity	Details
Date of Fieldwork	26th February 2016
Assessment Locations	Soil sampling locations are shown on Figure 3.Sampling locations included the following: • Hand auger boreholes HA01 to HA05 were drilled in areas adjacent to the structures located in the northwestern corner of the site to assess the presence of contaminated fill material within the upper portion of the subsurface. • Boreholes BH01 to BH03 were drilled in areas triangulating the former UST and bowser. Each of these boreholes were converted to a groundwater monitoring well.
Borehole Drilling	Boreholes HA01 to HA05 were drilled using a hand auger to depths between 0.5m and 1.0mbgs. Disturbed soil samples were collected directly from the hand auger at the required depths. Boreholes BH01 to BH03 were drilled using a mechanical drill rig equipped with disposable push tubes. Discrete soil samples were collected from the dedicated push tube sleeves to minimise the potential for cross contamination. Push tube drilling techniques refused on shale bedrock at 2mbgs. Each borehole was subsequently advanced to a depth of 6.5mbgl using solid flight augers. Samples of shale cuttings were collected directly from the auger bit for soil headspace measurements and laboratory analysis.
Soil Logging	Soil was logged in general accordance with the relevant Coffey Standard Operating Procedure (SOP) and the United Soil Classification System (USCS) by qualified and experienced Coffey scientists. The presence and absence of stained or odorous soils, or other man-made inclusions were also noted on the borehole logs. Borehole logs are presented in Appendix B.
Sample Handling & Transportation	Sample collection, storage and transport were in general accordance with the relevant Coffey SOP. Soil samples collected for chemical analysis were immediately placed into laboratory supplied jars and filled to capacity, with Teflon lined seals to limit volatile loss and placed into an ice chilled cooler. Soil samples collected for asbestos analysis were placed into ziplock plastic bags and securely sealed. Samples were dispatched to NATA accredited laboratories under chain of custody control.
Soil Screening for volatile organic compounds	Soil headspace screening was carried out for the presence of VOC using a Photo-Ionisation Detector (PID) fitted with a 10.6eV lamp which was calibrated by the equipment supplier at the start of the fieldworks to 0.0ppm and 100ppm using isobutylene calibration gas. Field

Activity	Details
	calibration records are presented in Appendix C. Soil headspace screening was undertaken on soils at discrete depths at each borehole location by placing a small quantity of soil inside a zip-locked plastic bag and sealed. The sample was agitated and then the plastic bag was pierced using the tip of the PID. The readings on the PID were observed and the maximum reading recorded on the field log sheet. The PID readings are presented in each borehole log.
QA/QC Samples	To measure the accuracy and precision of the data generated by the field and laboratory procedures carried out in this assessment, the following additional samples were collected for QA / QC purposes: • one intra-laboratory duplicate soil sample (DUP1) analysed by the project laboratory; • one inter-laboratory triplicate soil sample (DUP1A) analysed by a secondary laboratory; • one trip blank sample (TB 160225-16) to assess whether volatile contamination may have been introduced to samples during handling and shipping; and • one trip spike sample (TS 160225-16) analysed to assess the loss of volatiles from samples during transit.
Decontamination of sampling equipment	Non-disposable sampling equipment was decontaminated with approximately 5% Decon 90 solution in potable water, and rinsed with potable water prior to use and between each sample location. Soil samples were collected from the sampling equipment using a new pair of nitrile gloves for each sample.
Disposal of soil cuttings	Soil cuttings from each borehole were used as backfill to reinstate each borehole upon completion of sampling. Surplus soil was placed in a sealed drum for offsite disposal.

5.2. Groundwater sampling methodology

Groundwater sampling was undertaken in accordance with the sampling methodology summarised in Table 5.2.

Table 5.2: Groundwater Sampling Methodology

Activity	Detail / Comments
Date of Work	Monitoring wells were installed on 26th February 2016. Groundwater sampling was carried out on 3rd March 2016.
Well Construction and Development	Boreholes BH01, BH02 and BH03 were converted into groundwater monitoring wells, denoted MW01, MW02 and MW03, respectively. The location of each monitoring well is shown on Figure 3. The monitoring wells were constructed of 50mm diameter screw threaded PVC casing, with a length of machine slotted PVC screen positioned to intercept the groundwater table. As distinct water strikes were not observed during drilling, the top of the well screen was positioned below the estimated depth of the UST (i.e. 1.9mbgs), so as to intersect water

Activity	Detail / Comments
	which may have been impacted by petroleum hydrocarbons. The well annulus was backfilled with 2mm to 3mm diameter gravel from the base of the well to approximately 0.5m above the top of the well screen. A 1m thick bentonite seal was placed over the gravel pack, with the remainder of the bore reinstated with soil cuttings. The well casing was extended to surface and covered with a flush-mounted cast iron road box, set within concrete. The monitoring well construction details are presented within the bore logs in Appendix B. Well development records are presented in Appendix D.
Well Gauging	Monitoring wells were gauged on the 3rd March 2016 using an oil/water interface probe (IP) to assess the depth to groundwater and the presence (and thickness) of PSH, if any. The IP was calibrated prior to use. Calibration certificates are presented in Appendix C. The IP was decontaminated between each measurement.
Well Purging and Sampling	Monitoring wells were purged and sampled in general accordance with the relevant Coffey SOP. Prior to sampling, monitoring wells were purged using a disposable bailer until at least three well volumes of water were removed and water quality parameters stabilised (±10%), or the well was purged dry, whichever occurred first. Field groundwater quality parameters were recorded between each well volume removed from the well. The water quality meter was calibrated prior to use. Calibration certificates are presented in Appendix C.
Sample Handling and Transportation	Sample collection, storage and transport were conducted in general accordance with the relevant Coffey SOP. Groundwater samples were immediately placed into laboratory supplied bottles, with Teflon lined seals and placed into an ice chilled cooler. Sample containers for analysis of volatile compounds were filled to eliminate headspace. Samples collected for heavy metals were filtered in the field using disposable 0.45micron filter. Samples were dispatched to NATA accredited laboratories under chain of custody control.
QA/QC Samples	To measure the accuracy and precision of the data generated by the field and laboratory procedures carried out in this assessment, the following additional samples were collected for QA/QC purposes: • One intra-laboratory duplicate groundwater sample (DUP1) analysed by the primary laboratory. • One rinsate sample (RB1) collected off the water quality meter following decontamination to assess the effectiveness of field decontamination process; • One trip blank sample (TB160301-2) analysed to assess whether contamination may have been introduced to samples during handling and shipping; and • One trip spike sample (TS160301-2) analysed to assess the loss of volatiles from

Activity	Detail / Comments
	samples during transit.
Decontamination of sampling equipment	All non-disposable sampling equipment was decontaminated with approximately 5% Decon 90 solution in potable water, and rinsed with potable water prior to use and between each sample location.
Disposal of purged groundwater	Purged groundwater was placed in sealed drums for appropriate off-site disposal by a licensed contractor.

5.3. Laboratory analysis

Laboratory analysis of soil and groundwater samples was carried out by NATA accredited laboratories as follows:

- Primary laboratory: Eurofins | MGT at Lane Cove West, NSW
- Secondary laboratory: ALS in Smithfield, NSW

6. Investigation levels

6.1. Basis for assessment criteria

The assessment criteria applied in this project were sourced from:

- (NEPC, 2013); Schedule B1 'Guideline on the Investigation Levels for Soil and Groundwater' of the *National Environment Protection (Assessment of Site Contamination) Measure 1999*, (ASC NEPM)
- CRC Care Technical Report No.10: *Health Screening Levels for Petroleum Hydrocarbons in Soil & Groundwater* (Friebel & Nadebaum, 2010).
- ANZECC & ARMCANZ (2000), *National Water Quality Management Strategy, Australian and New Zealand Guidelines for Fresh and Marine Water Quality.*

6.2. Soil assessment criteria

6.2.1. Health-based investigation and screening levels

Schedule B1 of the ASC NEPM (NEPC, 2013) states that '*the selection and use of investigation levels should be considered in the context of the iterative development of a Conceptual Site Model*'. Based on information describing the proposed development, Coffey considers the proposed future use of the investigation area is broadly consistent with the generic low density residential setting (HIL A) defined in Schedule B7 of ASC NEPM (NEPC, 2013) given that:

- The primary human receptor within the proposed development will comprise teenage or adult students, who attend the adjoining college. Students are anticipated to reside within the accommodation during term periods that are estimated to be up to 40weeks per annum.
- Areas of gardens and accessible soils will be provided surrounding each dormitory. It is noted that a vegetable patch exists adjacent to the investigation, and it is considered feasible that areas surrounding the dormitories may be used to grow small quantities of fruit/vegetables for human consumption.

Direct contact HSL for low density residential land uses (HSL-A) presented within CRC Care Technical Report No.10 (Friebel & Nadebaum, 2010) were adopted for non-volatile petroleum hydrocarbons (i.e. >C_{16}+).

The HILs for heavy metals, PAH, OCP, OPP and non-volatile petroleum hydrocarbons in soils are summarised in Table 6.1.

Table 6.1: Summary of HILs in Soil

Analyte	HILs for Residential A (mg/kg)
Arsenic (total)	100
Cadmium	20
Chromium (VI)[1]	100
Copper	6,000
Lead	300
Mercury (inorganic)	40
Nickel	400
Zinc	7,400

Analyte	HILs for Residential A (mg/kg)
Benzo(a)pyrene as TEQ[2]	3
Total PAHs	300
Aldrin + Dieldrin	6
Chlordane	50
DDT+DDD+DDE	240
Endosulfan	270
Endrin	10
Heptachlor	6
HCB	10
Methoxchlor	300
Toxaphene	20
Chlorpyrifos	160
>C_{16}-C_{34} (F3)	4,500[3]
>C_{34}-C_{40} (F4)	6,300[3]

Notes:
1. Soil was tested for Total Chromium, which comprises both Chromium (III) and Chromium (VI) valence states. The HIL for Chromium (VI) has been adopted as a conservative assessment threshold.
2. TEQ = Toxicity Equivalence Quotient
3. 3. Soil Health Screening Levels for Direct Contact (Friebel & Nadebaum, 2010)

Volatile TRH fractions, BTEX and naphthalene concentrations were assessed against the HSLs presented in Schedule B1 of the ASC NEPM (NEPC, 2013) for vapour intrusion from the relevant depth and soil matrix for the following exposure scenario:

- "Low to high density Residential" (HSL A & B).

The HSLs for TRH, BTEX and naphthalene in soils are summarised in Table 6.2. Given the investigation recorded sandy fill over clayey residual soils, the assessment has adopted screening levels for a sandy soil, as a conservative measure.

Table 6.2: Summary of HSLs in Soil

Chemical	HSL A & B Low to high density Residential (for sandy soils) (mg/kg)		
	0m to <1m	1m to <2m	2m to <4m
Benzene	0.5	0.5	0.5
Toluene	160	220	310
Ethylbenzene	55	NL	NL
Xylenes	40	60	95
Naphthalene	3	NL	NL
C_6-C_{10} (F1)	45	70	110
>C_{10}-C_{16} (F2)	110	240	440

Notes:
1. NL: non-limiting (i.e. contaminant is not considered to pose a risk to human health).

Selected soils samples were submitted for assessment of the presence of asbestos in soil in accordance with AS4964-2004 'Polarized Light Microscopy with Dispersion Staining Method'.

For the purpose of this assessment, a criterion of "no asbestos fines or asbestos containing materials detected in soils" was adopted. For clarity, *asbestos fines* refers to friable forms of asbestos in soil.

6.2.2. Ecological investigation and screening levels

To assess the impact on ecosystems, including site vegetation, from contamination within the upper 2m of the subsurface, the ASC NEPM presents Ecological Investigation Levels (EILs) and Ecological Screening Levels (ESLs) for different land uses. The generic urban residential/public open space land use was considered to be applicable to the proposed development. The EILs derived for heavy metals, DDT and naphthalene in soils are summarised in Table 6.3. It is noted that EIL were adjusted using EIL Calculation Spreadsheet published by the NEPC, based the soil pH, Total Organic Carbon (TOC) and Cation Exchange Capacity (CEC) recorded within the site.

Table 6.3: Summary of EILs in Soil

Chemical	Urban residential and public open space (mg/kg)
Arsenic	100 [1]
Chromium	190 [2,7]
Copper	230 [3,7]
Lead	1,100 [4]
Nickel	280 [5]
Zinc	770 [6,7]
DDT	180 [1]
Naphthalene	170 [1]

1. Table 1B(5) - Schedule B(1), Guideline on the Investigation Levels for Soil and Groundwater (NEPC, 1999)
2. The Added Contaminant Limit (ACL) selected for Chromium conservatively assumes conservatively a clay content of 1%.
3. The ACL selected for Copper assumes an estimated average soil pH of 6.7, an average CEC of 20.5cmol$_c$/kg and an average TOC of 9.2%.
4. Table 1B(4) - Schedule B(1), Guideline on the Investigation Levels for Soil and Groundwater (NEPC, 1999).
5. The ACL selected for Nickel assumes an average CEC of 20.5cmol$_c$/kg.
6. The ACL selected for Zinc assumes an estimated average soil pH of 6.7, and an average CEC of 20.5cmol$_c$/kg.
7. Ambient Background Concentration (ABC) was adopted for NSW assuming low traffic volume, where relevant.

The ESLs for TRH, BTEX and benzo(a)pyrene in soils from the ASC NEPM (NEPC, 2013) are summarised in Table 6.4. The adopted screening levels were selected in consideration of the shallow sandy fill recorded on site.

Table 6.4: Summary of ESLs in Soil

Chemical	ESL – Urban residential and public open space (for sandy soils) (mg/kg)
F1 TRH C_6-C_{10} – BTEX	180
F2 TRH C_{10}-C_{16} - Naphthalene	120
F3 TRH >C_{16}-C_{34}	300
F4 TRH >C_{34}-C_{40}	2,800
Benzene	50
Toluene	85
Ethylbenzene	70
Xylenes	105
Benzo(a)pyrene	0.7

6.2.3. Soil – other considerations

Management limits

In accordance with Section 2.9 of Schedule B(1) of the ASC NEPM, consideration of management limits will been undertaken to assess whether the reported soil and sediment conditions have the potential to pose a potential risk to buried infrastructure, present a fire or explosion risk, or result in the formation of non-aqueous phase liquids (NAPL).

The management limits for soil are summarised in Table 6.5. The adopted screening levels were selected in consideration of the shallow sandy fill recorded on site.

Table 6.5: Summary of Management Limits

Chemical	Residential, parkland and public open space (for fine grained soils) (mg/kg)
F1: TRH C_6-C_9 - BTEX	700
F2: TRH C_{10}-C_{16} – Naphthalene	1,000
F3: TRH >C_{16}-C_{34}	2,500
F4: TRH >C_{34}-C_{40}	10,000

Aesthetic criteria

Although no specific numeric aesthetic guideline values are provided, Schedule B1 of the ASC NEPM (NEPC, 2013) requires the consideration of aesthetic issues (as a result of contamination) arising from soils within the site. The following assessment criteria were adopted when considering soil aesthetics:

- no persistently malodourous soils, taking into consideration the natural state of the soil at the site;
- no staining or discolouration in soils, taking into consideration the natural state of the soil; and
- no large or frequently occurring anthropogenic materials present (to the extent practicable).

6.3. Groundwater assessment criteria

6.3.1. Groundwater HSLs for Vapour Intrusion

The HSLs adopted for vapour intrusion for volatile hydrocarbon constituents comprise the Limiting Criteria derived using methodology described in Appendix F7 and F6 of Health Screening Levels for Petroleum Hydrocarbons in Soil and Groundwater - Part 1 (Friebel and Nadebaum, 2011).

Table 6.6 summarises the groundwater health screening levels for volatile petroleum hydrocarbons (i.e. TRH C_6-C_{16}), BTEX and Naphthalene adopted for this assessment.

Table 6.6: Summary of groundwater HSL for vapour intrusion

Chemical Constituent	Groundwater Health Screening Levels Recreational / Open Space (HSL A) (mg/L)
Benzene	5
Toluene	NL

Chemical Constituent	Groundwater Health Screening Levels Recreational / Open Space (HSL A) (mg/L)
Ethylbenzene	NL
Total Xylene	NL
Naphthalene	NL
F1: TRH C_6-C_9 – BTEX	NL
F2: TRH C_{10}-C_{16} - Naphthalene	NL

Notes:
1. Groundwater occurs between 4m to 8m below ground surface, and the predominant classification of residual soil is clay.
2. NL: non-limiting (i.e. contaminant is not considered to pose a risk to human health).

6.3.2. Groundwater Investigation Levels

The ANZECC/ARMCANZ (2000) guidelines provide Trigger Values for organic and inorganic chemicals in freshwater and marine aquatic environments. The nearest surface water receptor is the freshwater Girraween/Pendle Creek which are likely to have been impacted (to varying degrees) by urban run-off. As such, the screening criteria selected for the site are the freshwater aquatic criteria for moderately disturbed ecosystems (95% level of protection).

ANZECC/ARMCANZ (2000) states that there is currently insufficient data to derive a high reliability trigger value for TPH but propose a low reliability trigger value for TPH of 7µg/L. This guideline is generally considered by industry to be overly conservative and is also well below the TPH detection limit that most laboratories can achieve. Therefore the LOR is adopted as an appropriate screening trigger for TPH assessment (NSW DECC, 2007).

No registered groundwater bores have been identified within a 500m radius of the site. Given that reticulated drinking water is readily available within the site and properties surrounding the site, and the regional geology suggests the underlying bedrock would not support the abstraction of adequate volumes of water for potable water and/or irrigation, it is considered unlikely that exposure to groundwater, either through consumption and domestic uses, or through incidental exposure associated with recreational or irrigation uses would occur.

A summary of the adopted groundwater investigation levels is presented in Table 6.7.

Table 6.7: Summary of Groundwater Investigation Levels

Analyte	Laboratory Limit of Reporting	ANZECC 2000 95% Trigger Values[1] (µg/L)	Adopted Groundwater Investigation Level (µg/L)
Lead	1	3.4	3.4
Benzo(a)pyrene	1	0.2[LR]	1[2]
Naphthalene	1	16	16
Anthracene	1	0.4[LR]	1[2]
Phenanthrene	1	2[LR]	2
Fluoranthene	1	1.4[LR]	1.4
TPH C_6-C_9	20	-	20[3]
TPH C_{10}-C_{14}	50	-	50[3]
TPH C_{15}-C_{28}	100	-	100[3]

Analyte	Laboratory Limit of Reporting	ANZECC 2000 95% Trigger Values[1] (µg/L)	Adopted Groundwater Investigation Level (µg/L)
TPH C_{35}-C_{36}	100	-	100 [3]
Benzene	1	950	1
Toluene	1	180 [LR]	180
Ethylbenzene	1	80 [LR]	80
Xylene (m&p)	2	75[LR][4]	75
Xylene (o)	1	350[LR]	350
Xylenes	3	-	600

Notes:
(1) Australian and New Zealand Environment and Conservation (2000) National Water Quality Management Strategy - Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Trigger values under the 95% protection level for freshwater – where biological or chemical data has not been gathered for a slightly to moderately disturbed ecosystem.
(2) As the practical limit of reporting is above the nominated groundwater investigation level for this analyte, the laboratory limit of reporting will be used as the investigation levels (NSW DECC, 2007).
(3) In the absence of a nominated guideline value, the laboratory LOR has been taken as the nominal trigger value for the presence of TPH compounds in groundwater as will be used as the investigation levels (NSW DECC, 2007).
(4) Trigger level adopted for Xylene (m&p) is the low reliability trigger level for Xylene (m) as set out within ANZECC (2000).
(LR) Low Reliability trigger values for 95% protection level, due to its potential bioaccumulation effects, recommended by ANZECC/ARMCANZ (2000). To be used as an indicative interim working level only.

7. Quality assurance / quality control

7.1. General

The following QA / QC assessment addresses data completeness, comparability, representativeness, precision and accuracy based on field and laboratory considerations and the processes for assessment of data quality provided in Section 19 (Appendix C) of Schedule B(2) 'Guideline on Site Characterisation' of the ASC NEPM (NEPC, 2013).

7.2. Field QA/QC measures

The following QA/QC measures were implemented by Coffey in carrying out the investigation fieldworks described herein:

- All fieldworks were undertaken by experienced and appropriately qualified environmental scientists/engineers.
- Fieldworks were undertaken in general accordance with Coffey's SOPs which are based on guidance presented in relevant industry standards, including the relevant schedules of the ASC NEPM (2013) and AS4482 *Guide to the Investigation and Sampling of Site with Potentially Contaminated Soil* (Standards Australia, 2005; Parts 1 and 2).
- Field equipment including the PID, IP and water quality meter was calibrated by the equipment supplier prior to use. The calibration certificates are provided in Appendix C.
- Quality control samples were collected and analysed as part of the sampling program. This included blind duplicate and triplicate samples, a rinsate blank sample, trip spike and trip blank samples. A discussion of these results is provided in the following sections.

7.3. Field duplicate and triplicate samples

A total of 11 primary soil samples were collected from the site and submitted for analysis. One intra-laboratory duplicate soil sample and one inter-laboratory duplicate soil sample were also collected and analysed. The number of inter-lab and intra-lab duplicate samples exceeded the target sampling rate of 5% of the total number of primary samples analysed.

A total of three primary groundwater samples were collected and submitted for analysis. One intra-laboratory duplicate groundwater sample was also collected and analysed. The number of intra-lab duplicate samples exceeded the target sampling rate of 5% of the total number of primary samples analysed. No inter-lab duplicate groundwater samples were collected due to the poor well recharge rates which resulted in insufficient sample volume.

Primary, duplicate and triplicate sample combinations are summarised in Table 7.1.

Table 7.1: Duplicate and Triplicate Samples

Primary Sample	Duplicate Sample	Laboratory	Triplicate Sample	Laboratory
BH02/3.3-3.5	DUP1	Eurofins	DUP1A	ALS
BH02/MW02	DUP1	Eurofins	-	-

Relative Percentage Difference (RPD) results for the above duplicate sample pairs were calculated as shown in Tables 4 and 5 (attached). Acceptable RPD results are considered within 30% - 50%, with

results at the higher range expected for organic analyses. However, no RPD acceptance limit is considered to apply in the following situations where exaggerated RPD results may be expected:

- QC sample pairs where one sample reported a detectable concentration and the alternate sample reported a concentration below the laboratory LOR.
- QC sample pairs where one or more of the primary and/or duplicate samples reported contaminant concentration less than, or equal to, ten times the laboratory LOR as no RPD acceptance limit applies.

All duplicate pairs reported RPD values within the acceptable range of 30% to 50% for all samples.

7.4. Field QC samples

One trip blank sample was collected during the soil sampling programme, and one trip blank sample was collected during the groundwater sampling event to assess whether contamination may have been introduced to samples during shipping and field handling activities. Both trip blank samples reported concentrations below the laboratory LOR, indicated that a low likelihood that cross contamination has occurred as a result of sample handling activities.

Similarly, two trip spike samples were collected during fieldwork; one sample during the soil sampling programme and one sample during the groundwater sampling event. Both trip spike samples reported recoveries within the acceptable range, indicating that there was a low likelihood that the loss of volatiles had occurred during the transportation of samples from site to the laboratory.

One rinsate sample was collected during groundwater sampling to assess the effectiveness of decontamination techniques in minimising cross contamination. The rinsate sample (RB1) reported concentrations below the laboratory LOR.

7.5. Laboratory QA/QC

In accordance with standard industry practice, the project laboratories performed an internal QA / QC assessment. The assessment is typically described as a multi-level approach whereby standard laboratory control procedures are implemented, including laboratory duplicates, method blanks, matrix spikes and surrogate spikes.

Laboratory QC analytical results are summarised below:

- Laboratory analysis of samples was undertaken by NATA accredited environmental testing laboratories.
- All samples were extracted and analysed within recommended holding times.
- No target analytes were detected in any of the method blanks.
- RPDs for the laboratory duplicate samples were within the acceptable range for all samples, when the LOR was considered.
- Percentage recovery results for laboratory control samples were within the acceptable range for all samples.
- Percentage recovery results for surrogate samples were within the acceptable range for all samples.

- Percentage recovery results for matrix spikes were within the acceptable range for all samples.
- The laboratory internal standards, calibration blanks and mid-range calibration verifications were all within the acceptable range.

7.6. Data quality assessment

Based on an assessment of the field and laboratory QA / QC data, Coffey considers that the data obtained is representative of subsurface conditions at the sampling locations, and the results are directly usable for the purposes of this assessment.

8. Field observations and analytical results

The following provides a summary of the results of the fieldwork and laboratory analytical results collected from the investigation works undertaken within the site during February and March 2016.

8.1. Ground conditions encountered

The inferred subsurface profile encountered at the investigation locations is summarised in Table 8.1.

Table 8.1: Subsurface Profile

Unit	Depth to top of Unit (m bgs)	Thickness (m)	Description
Fill	0.0	0.5 – 0.7	Topsoil or bitumen road pavement. Sand, medium grained, brown to black with some siltstone/shale gravel and silt. Fragments of plastic, metal, and bitumen.
Residual Soil	0.5 – 0.7	1.3 – 1.4	Clay: medium to high plasticity, firm to stiff, orange-brown with trace shale gravels.
Bedrock	2.0	Not proven	Moderately weathered Shale grading from light brown to grey.

Groundwater inflow was not encountered during drilling, with the exception of slight inflows noted at BH01 at a depth of 6mbgs. Groundwater was encountered in monitoring wells MW01 to MW03 following well installation at depths between 5.86mbgs (MW02) and 6.39mbgs (MW03). Each well was subsequently developed to remove sediment introduced during well installation and improve connectivity with the surrounding aquifer. Poor recovery was noted in each well during well development where only 0.5L to 3L was removed. No odours or visible sheens were noted during well development.

Table 8.2 presents a summary of the standing water levels recorded in monitoring wells installed on site on the 3rd March 2016.

Table 8.2: Summary of Standing Water Levels

Monitoring Well	Top of Casing[1] (mRL)	Standing Water Level	
		mbTOC	mRL
BH01 / MW01	29.7	5.7	23.9
BH02 / MW02	29.9	5.6	24.3
BH03 / MW03	29.6	5.4	24.2

Notes:
1. Top of Casing Relative Levels were interpreted from the topographic survey of the college prepared by Hammond Smealie (Drawing Ref: 12599; Issue B; dated 19/01/2012)

Based on the standing water levels recorded, it is assessed that groundwater flows in a westerly direction.

8.2. Field screening and observations

Soil samples collected from the subsurface of the site were screened in the field using a PID for the presence of ionisable VOCs. Soil headspace measurements recorded from samples of fill and shallow residual soil ranged between 0.1ppm and 4.3ppm, which indicates a low potential for detectable concentrations of ionisable VOCs to be present. No odours or stained soils were noted in samples of fill and shallow residual soils.

Soil headspace measurements recorded from samples of deeper residual soil and shale bedrock collected from BH01 and BH02 at depths between 2m and 5mbgs ranged from 70ppm and 1125ppm. These readings correlated with slight hydrocarbon odours noted from soils and are considered likely to be associated with petroleum impacts from the adjoining UST and/or fuel bowser. No distinctly stained soils were noted.

Anthropogenic (man-made) material was observed within the fill material in some areas of the site and generally consisted of fragments of plastic, metal and bitumen.

As part of the field investigation works, overgrown vegetation was removed from the investigation area to improve the efficiency of identifying visible ACM. In summary no additional visible ACM were identified within the investigation area during the inspection.

Various waste materials were noted in open areas adjacent to buildings/shipping containers. It is assessed that these materials may pose aesthetic issues, if they were retained on site as part of the development.

8.3. Results

Laboratory certificates and chain of custody records are presented in Appendix E. A comparison of the soil and groundwater analytical results compared to the relevant assessment criteria is presented in Tables 1 to 3 in Appendix F. In summary, the laboratory data identified the following potential sources of contamination:

- Asbestos detected as small fibre cement fragments in shallow samples of fill collected from HA01 and HA02. It is assessed that ACM in soil derives from the demolition of historic structures that were known to be present in this part of the site and/or the weathering of building materials within the existing structures that contain asbestos.
- Lead detected in shallow fill collected from HA02 exceeds the HIL of 300mg/kg. Given the location of HA02, it is assessed that the lead in soil derives from paint residues containing lead, rather than lead-based additives derived from petroleum. On review of the dataset available to assess the concentration of lead in soil from paint residues, it is considered that insufficient number of samples was collected to derive a representative concentration using statistical methods with sufficient confidence.
- Volatile petroleum hydrocarbons (TRH F1) were detected in a soil sample collected from weathered bedrock from BH01 at 3.3-3.5mbgs at concentrations exceeding the HIL. This sample corresponds with hydrocarbon odours and a PID reading of 1125ppm, indicating the soil impact derives from petroleum impacts from the petroleum storage/distribution infrastructure located immediately adjacent to BH01. Volatile petroleum hydrocarbons were also detected in n a soil sample collected from weathered bedrock from BH02 although at concentrations below the HIL.
- Volatile petroleum hydrocarbons (TPH C6-C9), Ethylbenzene, Toluene and Xylene were also detected in groundwater samples collected from MW01 and MW02, with the most significant impact detected in MW01 situated down hydraulic gradient of the UST and bowser. Semi-volatile

petroleum hydrocarbons (TRH C10-C16) were also detected at levels slightly above the Limit of Detection in MW01.

- Given the presence of volatile petroleum hydrocarbons, and the absence of chemical indicators typically associated with diesel fuels, it is assessed that the UST is likely to have stored petroleum historically. Recovery of the tank dipstick and gauging of the tank indicates that the tank no longer contains petroleum, although some water is present within the UST which is likely to have derived from infiltration.
- Soil samples did not report concentrations exceed the ecological assessment criteria with the exception of TRH F3 (C16-C34) in sample HA02 (0.0-0.15m).
- Analysis of soil samples reported concentrations of petroleum hydrocarbons below the adopted Management Limits presented in Table 6.5. Similarly, the reported concentration of petroleum hydrocarbons did not exceed the vapour inhalation HSL presented in Table 6.6.

Samples detecting asbestos or reporting chemical concentrations levels above the health and/or ecological criteria are considered further within the Conceptual Site Model.

9. Conceptual site model

9.1. General

A conceptual site model (CSM) is a representation of site related information regarding contamination sources, receptors and exposure pathways between those sources and receptors. The following sections summarises the known potential sources of contamination, receptors and presents a discussion on the plausible linkages between sources and receptors via contaminant transport and exposure mechanisms.

9.2. Contaminant sources

The primary sources of contamination impact at the site are considered to be:

- Fragments of Bonded ACM encountered within stockpile to the north of the gardener's storage shed, and detected in samples of shallow fill collected from HA01 and HA02. ACM may also be potentially present in other areas where demolition wastes were encountered, and adjacent to facades of the existing structures.
- Lead in shallow fill collected from HA02. Based on the location of HA02, it is assessed that the source of lead derives from paint residues containing lead, rather than lead-based additives derived from petroleum.
- Volatile petroleum hydrocarbons detected in soil and groundwater samples collected from BH01/MW01 and BH02/MW02, situated adjacent to disused petroleum storage infrastructure.
- TRH F3 detected in shallow fill collected from HA02 exceeding the adopted ecological assessment criteria.

9.3. Contaminant transport and exposure mechanisms

The primary transport mechanisms for migration of contamination at the site include:

- Transport of contamination as dusts and vapours;
- Infiltration, and vertical and lateral contaminant migration;
- Surface runoff / overland flow;
- Contaminant migration along preferential flow pathways (e.g. intermittent gravel layers within the subsurface, existing or new service corridors, building foundations, etc.);
- Seepage of water into the library basement; and
- Plant uptake.

Exposure pathways to the human receptors include:

- Inhalation of vapours, dusts and fibres;
- Ingestion of soils;
- Dermal contact with soils.

9.4. Potential receptors

The following potentially sensitive areas and possible receptors have been considered during site development and future uses:

- Future student and associated commercial workers residents within the site;
- Future maintenance workers involved in subsurface excavations;
- Future construction workers involved with the redevelopment of the site;
- Surface water receptors - Girraween Creek and Pendle Creek, situated approximately 720m west (down hydraulic gradient) of the site, and Toongabbie Creek situated 380m north.
- Users of land adjoining the site;
- Landscaping introduced as part of the development;
- Below ground infrastructure;

9.5. Plausible pollutant linkages

The sections present a discussion on the source – pathway – receptor relationships that have been identified in the context of the proposed redevelopment of the site:

9.5.1. Student residents & commercial workers

The proposed development will introduce student residents within the area which is currently occupied by storage sheds, gym and disused petroleum storage infrastructure. It is also assessed that this area will be accessed intermittently by site visitors and commercial workers maintaining the student accommodation, including cleaning and teaching staff.

Investigations have recorded ACM and Lead in fill materials exceeding the adopted health assessment criteria. ACM and Lead are assessed to derive from the demolition of historic structures that were known to be present in this part of the site and/or the weathering of building materials within the existing storage sheds that contain asbestos and lead-based paints. Given the suspected origins of these materials, it is assessed that surface and near surface soils surrounding the storage sheds, and stockpiled waste/soil have the potential to contain randomly distributed ACM and Lead.

Asbestos poses a potential risk via the inhalation of airborne fibres. The fragments of Bonded ACM identified in the soil stockpile to the north of the storage sheds was observed to be in relatively good condition showing no significant signs of excessive weathering. Fragments of Bonded ACM are considered to represent a low health risk (in their current state) to current site users. However, Bonded ACM that remains on site following site development has the potential to pose unacceptable risks to student residents and commercial workers using the site in the future, particularly where these materials remain within shallow soils and are susceptible further weathering/deterioration.

Samples of shallow fill collected in areas adjacent to shed facade also detected small fragments of fibre cement sheeting which are assessed to be asbestos fines (i.e. friable forms of asbestos). Friable forms of asbestos pose increased health risks due to their capacity to weather and allow fibres to become airborne.

Soils surrounding the UST at depths between 2m and 5mbgs have recorded some evidence of petroleum impact, with samples collected from BH01 at 3.3-3.5mbgs recording concentrations of volatile hydrocarbons which may pose a risk to these student residents via the vapour inhalation

pathway. Building foundations and deeper services introduced as part of the proposed development has the potential to create preferential vapour migration pathways.

A single storey basement car park of circa 3m deep is currently proposed approximately 15m south of the UST and associated bowser. Given that groundwater was recorded by Coffey at depths between 5.4mbgs and 5.7mbgs, groundwater seepage into the basement is not expected in significant quantities.

Groundwater has been assessed by Coffey based on the standing water levels recorded in this study to flow in a westerly direction. Given the basement is situated cross gradient from the UST and volatile hydrocarbons were recorded in all groundwater samples at concentrations below the HSL, it is assessed that vapour inhalation pathway is not complete.

9.5.2. Construction & maintenance workers

Workers carrying out excavations within the site as part of the proposed development or future maintenance event may be exposed to soil materials via the inhalation, ingestion and dermal contact pathways. Given the depth to groundwater, workers are unlikely to be exposed to groundwater on site in typical 'maintenance' works, including tree planting. However, it is considered plausible that construction workers involved with foundation piling may inadvertently be exposed to groundwater.

9.5.3. Surface water receptors

Three surface water receptors have been identified in the vicinity of the site; namely Toongabbie Creek situated 380m north of the site, the confluence of Girraween and Pendle Creeks located approximately 720m west of the site, and a pond located approximately 180m east.

Based on the westerly hydraulic gradient recorded during the investigation, it is assessed that groundwater is unlikely to impact aquatic receptors within the Toongabbie Creek to the north or pond to the east of the site. It is also assessed that that pond is of insufficient depth to intersect the groundwater table at 5.4mbgs.

Available topographic data indicates that runoff from the site will flow in a westerly and northwesterly direction. As surface water flows will be intersected by stormwater drains located with residential streets (i.e. Jago Place and Hurley Street). As such, the surface water runoff pathway is considered to be incomplete.

Groundwater samples collected from MW01, and to a lesser extent MW02, reported concentrations of petroleum hydrocarbons. In consideration of the westerly hydraulic gradient, it is assessed that the lateral migration of groundwater from the site has the potential to flow towards Girraween and Pendle Creeks. However, given that these water bodies are located approximately 720m west of the site, and flow within concrete culvert, it is assessed that the risk to aquatic receptors is low.

9.5.4. Users of land adjoining the site

Land uses surrounding the college comprise low density residential dwellings situated within Jago Place and Hurley Street. Occupants of these properties may be exposed to contamination recorded within soil on site via the inhalation of vapours/dusts/fibres deriving from the site during construction or future ground maintenance event.

Groundwater impacted with petroleum hydrocarbons has the potential to migrate offsite in a westerly direction. However, given that volatile hydrocarbons were recorded in all groundwater samples at concentrations below the HSL, and attenuation mechanisms including dispersion, dilution and biodegradation would reduce the concentration of petroleum hydrocarbons in groundwater with increased distance from the source (UST and/or bowser), it is assessed that users of land adjoining

the site will not be exposed to hydrocarbon vapours derived from impacted groundwater. Notwithstanding this, it is recommended that further assessment is undertaken during site redevelopment to evaluate whether groundwater impacted with petroleum hydrocarbons has the potential to migrate offsite.

9.5.5. Landscaping

Landscaping introduced as part of the development has the potential to be exposed to soil-bound contamination recorded in fill via plant uptake mechanisms. However, given that that shallow fill samples which reported TRH F3 above the adopted ecological assessment criteria would require removal to mitigate potential health risks from asbestos fines, it is assessed the potential risks to landscaping is low.

9.5.6. Below ground infrastructure

Investigations have not reported concentrations of hydrocarbons exceeding the management limits adopted for this site. On this basis, it is assessed that the potential risk to below ground infrastructure is low.

10. Conclusions & recommendations

10.1. Summary of site conditions & history

The site comprises a tertiary college situated on a 4.2ha property off Rausch Street, Old Toongabbie. The main college building, library and classrooms are currently established on the western portion of the site. The eastern portion of the site remains undeveloped, landscaped grounds.

Available records indicate that the site historically was used for agricultural purposes until c. 1936 when it was acquired by the Marist Brothers. Between 1936 and 1997, the site formed part of a Marist Seminary and Centre with diary and farm activities ceasing in circa 1960s. Between 1997 and 2001 the land belonged to the Diocese of Parramatta. At this time, the site was mainly used for conferences and meetings. The site was acquired by Campion College in 2001 and has subsequently operated as a tertiary college since that time.

The investigation works focused on the northwestern portion of the site where a cluster of three small structures are present, which are currently used as a workshop, gym and store. An old fuel bowser is situated adjacent to the gym. A rectangular concrete slab adjacent to the bowser has two small caps. Removal of one of the caps revealed a graduated dipstick, which provided a strong indication that a UST remains in-situ beneath the slab. Observations made by the Coffey field engineer indicate that the base of the tank was 1.88mbgs and there was a small volume of water in the base of the tank. The water did not contain visible sheens or odours, suggesting the UST does not contain clearly perceptible petroleum residues.

Fragments of fibre cement sheeting suspected to contain asbestos (Bonded ACM) were identified during a walkover conducted as part of a Preliminary Site Contamination Assessment (Coffey, Nov 2015). As part of the field investigation works, the investigation area was re-inspected to assess the distribution of visible asbestos containing materials (ACM). In summary no visible ACM were identified within the investigation area during the inspection.

10.2. Ground conditions encountered

Coffey completed a programme of intrusive investigation where eight boreholes were located in areas surrounding the structures, fuel bowser and UST present within the northwestern portion of the site. Three of these boreholes were positioned surrounding the UST and fuel bowser and converted to groundwater monitoring wells to check for the presence of petroleum impacts.

In summary, the investigations recorded a shallow layer of Sand fill overlying medium to high plasticity, firm to stiff Clay residual soils. Shale bedrock was encountered at depths of 2mbgs. In general groundwater ingress was not encountered during drilling. Standing water levels recorded in the vicinity of the UST ranged between 5.4m and 5.7mbgs, indicating groundwater flows in a westerly direction.

In summary, the following potential sources of contamination were identified:

Fill Materials

- Fragments of Bonded ACM encountered within stockpile to the north of the gardener's storage shed, and asbestos fines detected in samples of shallow fill collected from HA01 and HA02. It is assessed that ACM in soil derives from the demolition of historic structures that were known to be present in this part of the site and/or the weathering of building materials within the existing structures that contain asbestos. ACM may also be potentially present in other areas where demolition wastes are encountered, and adjacent to facades of the existing structures.

- Lead was detected in shallow fill collected from HA02 above the health-based assessment criteria. Based on the location of HA02, it is assessed that the source of lead derives from paint residues containing lead, rather than lead-based additives derived from petroleum. Lead paint residues typically concentrate within shallow fill in areas adjacent to structures.
- Petroleum hydrocarbons were detected in shallow fill collected from HA02 above the ecological assessment criteria.
- Various waste materials were noted in open areas adjacent to buildings/shipping containers. It is assessed that these materials may pose aesthetic issues, if they were retained on site as part of the development.

Petroleum Storage Infrastructure

- Volatile petroleum hydrocarbons detected in soil and groundwater samples collected from BH01/MW01 and BH02/MW02, situated adjacent to disused petroleum storage infrastructure. In consideration of the field and laboratory data, the most significant soil impact appears to exist at the base of the tank which corresponds to the soil/rock interface at 2mbgs. The depth of petroleum impacts in soil has not been fully delineated although soil headspace measurements indicating petroleum impact may extend below 5mbgs at the southwestern end of the UST.
- Petroleum hydrocarbons, Ethylbenzene, Toluene and Xylene were also detected in groundwater samples, with the most significant impact detected in MW01 situated down hydraulic gradient of the UST and bowser.
- Given the presence of volatile petroleum hydrocarbons, and the absence of chemical indicators typically associated with diesel fuels, it is assessed that the UST is likely to have stored petroleum historically. Recovery of the tank dipstick and gauging of the tank indicates that the tank contains no longer contains petroleum, although some water is present within the UST which is likely to have derived from infiltration.

10.3. Conclusions

The Conceptual Site Model developed as part of this assessment has identified plausible pollutant linkages, which require further consideration as part of the proposed site redevelopment. The following plausible pollutant linkages require further consideration:

- ACM and Lead in fill material have the potential to pose health risks to workers involved in the redevelopment of the site via the dermal contact, ingestion and inhalation pathways. Where fill materials impacted with ACM and Lead remain on site following site development, these materials may also pose health risks to student residents and commercial workers using the site in the future.
- Soils surrounding the UST and bowser have been impacted with petroleum hydrocarbons, which may pose a risk to the student accommodation residents via the vapour inhalation pathway. Site development works have the potential to create preferential vapour migration pathways, should the impacted soils remain on site following development.
- Groundwater impacted with petroleum hydrocarbons has been identified in an area immediately adjacent to the UST and fuel bowser. Although the reported concentrations are below the health assessment criteria adopted for this site, it is assessed that impacted groundwater has the potential to migrate off site in a westerly direction.
- Shallow fill impacted with petroleum hydrocarbons presents a potential risk to landscaping introduced as part of the development.

Based on the findings of the investigation, it is concluded that the site can be made suitable for the proposed development as per the requirements set out within Clause 7 of SEPP55 – Remediation of Land, subject to the implementation of a Remedial Action Plan (RAP) to mitigate the health and ecological risks associated with the pollutant linkages outlined above.

In summary, following the review of the available site history information and available investigation data, Coffey considers that investigations carried out to date are adequate for the purpose of:

- Characterising the nature of contamination (soil and groundwater) expected within the site for the type and extent of redevelopment proposed.
- Developing a Conceptual Site Model and strategy to manage the known types of contamination present within the site to make the site suitable for the proposed uses.
- Developing a framework to manage unexpected contamination encountered during the redevelopment of the site.
- Developing a framework to manage asbestos impact in fill material reasonably assumed to be encountered during the redevelopment of the site.

10.4. Recommendations

Based on the findings of this investigation, it is recommended that a RAP is developed in accordance with the guidance set out within the ASC NEPM (NEPC, 2013) and other guidance published or endorsed by the NSW EPA. It is recommended that the RAP specifically addresses the following aspects:

- Demolition of existing structures. Prior to demolition works commencing, it is recommended that a pre-demolition survey of these structures is undertaken to accurately identify hazardous building materials. Hazardous building materials should be removed prior to demolition.
- Removal of the UST, fuel bowser, and associated fuel distribution and ventilation lines. Removal of soil impacted with petroleum hydrocarbons to a level which mitigates the identified health risks.
- Removal of fill materials surrounding the structures that have been impacted with ACM, Lead and hydrocarbons
- Removal of stockpiled wastes that have the potential to pose aesthetic issues.

The RAP should also document:

- A list of permits, licenses and notifications required to implement the remediation works.
- A site management plan including site set up controls and monitoring works to assess the effectiveness of the plan.
- A strategy to manage unexpected finds of contamination.
- A procedure to classify soil materials excavated from site as part of the site redevelopment process.
- Remediation validation protocols and reporting requirements.

The investigation has identified groundwater that has been impacted by petroleum hydrocarbons. To inform the preparation of the RAP, it is recommended that a number of additional monitoring wells are installed hydraulically down gradient of the UST to assess the lateral extent of the impact with the view of assessing whether the contamination plume is migrating offsite at level of concern. Data from

this supplementary works would also be used to assess the requirement to notify the NSW EPA under the Duty to Report Guidelines (NSW EPA, 2015).

11. References

- ANZECC/ARMCANZ (2000). *Australian Water Quality Guidelines for Fresh and Marine Water Quality*. Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, Canberra, October 2000.
- Coffey (Nov 2015); *Preliminary Site Contamination Assessment, Campion College 119 Rausch Street, Old Toongabbie, NSW 2146* (Report ref. ENAURHOD04835AA-R01a, dated 26 November 2015).
- Friebel & Nadebaum (2011). *Health Screening Levels for Petroleum Hydrocarbons in Soil and Groundwater* (Technical Paper No.10) Guidelines, CRC for Contamination Assessment and Remediation of the Environment (CRC CARE)
- Geological Survey of New South Wales (1991); *Penrith Geological Map* (Sheet 9030; Scale 1:100,000)
- NEPC (2013) *National Environmental Protection (Assessment of Site Contamination)* Measure 1999, as amended in 2013, National Environment Protection Council.
- NSW EPA (2015); *Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997*
- Standards Australia (2004); *AS4964; Polarized Light Microscopy with Dispersion Staining Method.*
- Standards Australia (2005). AS 4482 - *Guide to the Sampling and Investigation of Potentially Contaminated Soil.* (Parts 1 and 2)

Important information about your **Coffey** Environmental Report

Introduction

This report has been prepared by Coffey for you, as Coffey's client, in accordance with our agreed purpose, scope, schedule and budget.

The report has been prepared using accepted procedures and practices of the consulting profession at the time it was prepared, and the opinions, recommendations and conclusions set out in the report are made in accordance with generally accepted principles and practices of that profession.

The report is based on information gained from environmental conditions (including assessment of some or all of soil, groundwater, vapour and surface water) and supplemented by reported data of the local area and professional experience. Assessment has been scoped with consideration to industry standards, regulations, guidelines and your specific requirements, including budget and timing. The characterisation of site conditions is an interpretation of information collected during assessment, in accordance with industry practice,

This interpretation is not a complete description of all material on or in the vicinity of the site, due to the inherent variation in spatial and temporal patterns of contaminant presence and impact in the natural environment. Coffey may have also relied on data and other information provided by you and other qualified individuals in preparing this report. Coffey has not verified the accuracy or completeness of such data or information except as otherwise stated in the report. For these reasons the report must be regarded as interpretative, in accordance with industry standards and practice, rather than being a definitive record.

Your report has been written for a specific purpose

Your report has been developed for a specific purpose as agreed by us and applies only to the site or area investigated. Unless otherwise stated in the report, this report cannot be applied to an adjacent site or area, nor can it be used when the nature of the specific purpose changes from that which we agreed.

For each purpose, a tailored approach to the assessment of potential soil and groundwater contamination is required. In most cases, a key objective is to identify, and if possible quantify, risks that both recognised and potential contamination pose in the context of the agreed purpose. Such risks may be financial (for example, clean up costs or constraints on site use) and/or physical (for example, potential health risks to users of the site or the general public).

Limitations of the Report

The work was conducted, and the report has been prepared, in response to an agreed purpose and scope, within time and budgetary constraints, and in reliance on certain data and information made available to Coffey.

The analyses, evaluations, opinions and conclusions presented in this report are based on that purpose and scope, requirements, data or information, and they could change if such requirements or data are inaccurate or incomplete.

This report is valid as of the date of preparation. The condition of the site (including subsurface conditions) and extent or nature of contamination or other environmental hazards can change over time, as a result of either natural processes or human influence. Coffey should be kept appraised of any such events and should be consulted for further investigations if any changes are noted, particularly during construction activities where excavations often reveal subsurface conditions.

In addition, advancements in professional practice regarding contaminated land and changes in applicable statues and/or guidelines may affect the validity of this report. Consequently, the currency of conclusions and recommendations in this report should be verified if you propose to use this report more than 6 months after its date of issue.

The report does not include the evaluation or assessment of potential geotechnical engineering constraints of the site.

Interpretation of factual data

Environmental site assessments identify actual conditions only at those points where samples are taken and on the date collected. Data derived from indirect field measurements, and sometimes other reports on the site, are interpreted by geologists, engineers or scientists to provide an opinion about overall site conditions, their likely impact with respect to the report purpose and recommended actions.

Variations in soil and groundwater conditions may occur between test or sample locations and actual conditions may differ from those inferred to exist. No environmental assessment program, no matter how comprehensive, can reveal all subsurface details and anomalies. Similarly, no professional, no matter how well qualified, can reveal what is hidden by earth, rock or changed through time.

The actual interface between different materials may be far more gradual or abrupt than assumed based on the facts obtained. Nothing can be done to change the actual site conditions which exist, but

steps can be taken to reduce the impact of unexpected conditions.

For this reason, parties involved with land acquisition, management and/or redevelopment should retain the services of a suitably qualified and experienced environmental consultant through the development and use of the site to identify variances, conduct additional tests if required, and recommend solutions to unexpected conditions or other unrecognised features encountered on site. Coffey would be pleased to assist with any investigation or advice in such circumstances.

Recommendations in this report

This report assumes, in accordance with industry practice, that the site conditions recognised through discrete sampling are representative of actual conditions throughout the investigation area. Recommendations are based on the resulting interpretation.

Should further data be obtained that differs from the data on which the report recommendations are based (such as through excavation or other additional assessment), then the recommendations would need to be reviewed and may need to be revised.

Report for benefit of client

Unless otherwise agreed between us, the report has been prepared for your benefit and no other party. Other parties should not rely upon the report or the accuracy or completeness of any recommendation and should make their own enquiries and obtain independent advice in relation to such matters.

Coffey assumes no responsibility and will not be liable to any other person or organisation for, or in relation to, any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report.

To avoid misuse of the information presented in your report, we recommend that Coffey be consulted before the report is provided to another party who may not be familiar with the background and the purpose of the report. In particular, an environmental disclosure report for a property vendor may not be suitable for satisfying the needs of that property's purchaser. This report should not be applied for any purpose other than that stated in the report.

Interpretation by other professionals

Costly problems can occur when other professionals develop their plans based on misinterpretations of a report. To help avoid misinterpretations, a suitably qualified and experienced environmental consultant should be retained to explain the implications of the report to other professionals referring to the report and then review plans and specifications produced to see how other professionals have incorporated the report findings.

Given Coffey prepared the report and has familiarity with the site, Coffey is well placed to provide such assistance. If another party is engaged to interpret the recommendations of the report, there is a risk that the contents of the report may be misinterpreted and Coffey disowns any responsibility for such misinterpretation.

Data should not be separated from the report

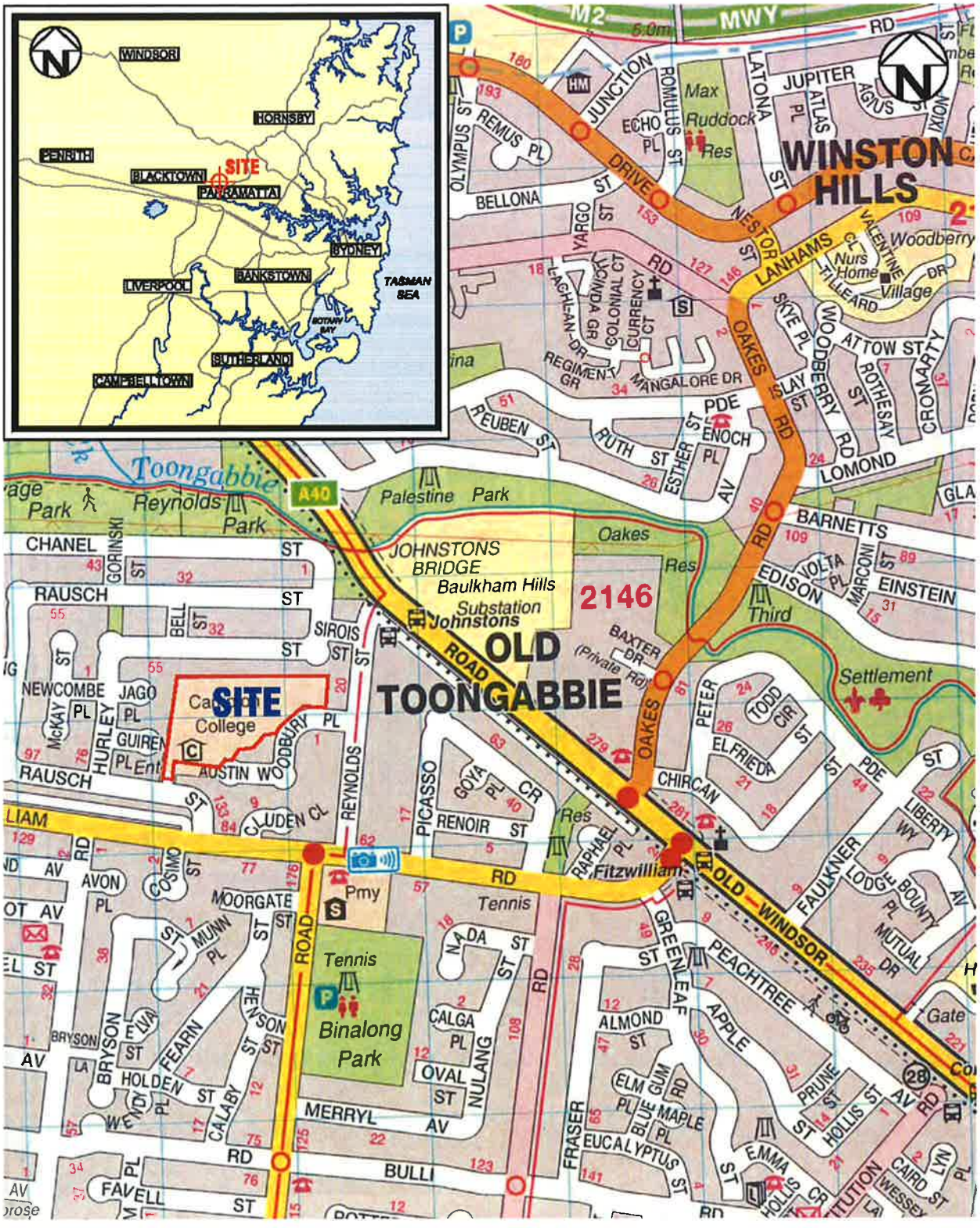
The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way. Logs, figures, laboratory data, drawings, etc. are customarily included in our reports and are developed by scientists or engineers based on their interpretation of field logs, field testing and laboratory evaluation of samples. This information should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way.

This report should be reproduced in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties.

Responsibility

Environmental reporting relies on interpretation of factual information using professional judgement and opinion and has a level of uncertainty attached to it, which is much less exact than other design disciplines. This has often resulted in claims being lodged against consultants, which are unfounded. As noted earlier, the recommendations and findings set out in this report should only be regarded as interpretive and should not be taken as accurate and complete information about all environmental media at all depths and locations across the site.

Figures



SOURCE: UBD STREET DIRECTORY GREGORYS SYDNEY & BLUE MOUNTAINS, NEW SOUTH WALES EDITION 51, 2015, MAP: 190

drawn	MV	coffey	client:	CAMPION COLLEGE	
approved	ACM		project:	DETAILED SITE INVESTIGATION CAMPION COLLEGE REDEVELOPMENT, 119 RAUSCH STREET, TOONGABBIE NSW	
date	13/03/16		title:	SITE LOCATION PLAN	
scale	AS SHOWN		project no: ENAU04835AB-R01	figure no: FIGURE 1	rev: A
original size	A4				

PLOT DATE: 17/11/2015 2:41:58 PM DWG FILE: F:\ENVIPROJECTS\ENAURHO\ENAURHO004 GOVIND\ENAURHO004800-04899\ENAURHO004835 GARDNER WETHERILL ASSOCIATES\ENAURHO004835AA CAMPION COLLEGE\FIGURES\CAD\ENAURHO004835AA-R01-D01.DWG

revision no.	description	drawn	approved	date
A	ORIGINAL ISSUE			

10 0 20 40 60
Scale (metres) 1:1250

AERIAL IMAGE SOURCE: GOOGLE EARTH PRO 7.1.2.2041
AERIAL IMAGE ©: IMAGE © 2014 DIGITALGLOBE

drawn	ML / AW
approved	-
date	18 / 03 / 16
scale	AS SHOWN
original size	A3

coffey

client: CAMPION COLLEGE

project: DETAILED SITE INVESTIGATION
CAMPION COLLEGE REDEVELOPMENT,
119 RAUSCH STREET, TOONGABBIE NSW

title: SITE LAYOUT PLAN

project no: ENAURHOD04835AB-R01 | figure no: FIGURE 2 | rev: A

PLOT DATE: 18/03/2016 11:54:47 AM DWG FILE: P:\ENAM\PROJECTS\ENAURHOD\ENAURHOD04835-CAMPION COLLEGE REDEVELOPMENT\GIS\MXD\ENAURHOD04835 CAMPION COLLEGE TOONGABBIE\ENAURHOD04835AB PHASE 2 - CAMPION COLLEGE\ENAURHOD04835AB-R01.DWG

no.	description	drawn	approved	date
A	ORIGINAL ISSUE			

revision

2.5 0 2.5 5 7.5 10

Scale (metres) 1:200

drawn	ML / AW
approved	-
date	18 / 03 / 16
scale	AS SHOWN
original size	A3

coffey

client: CAMPION COLLEGE

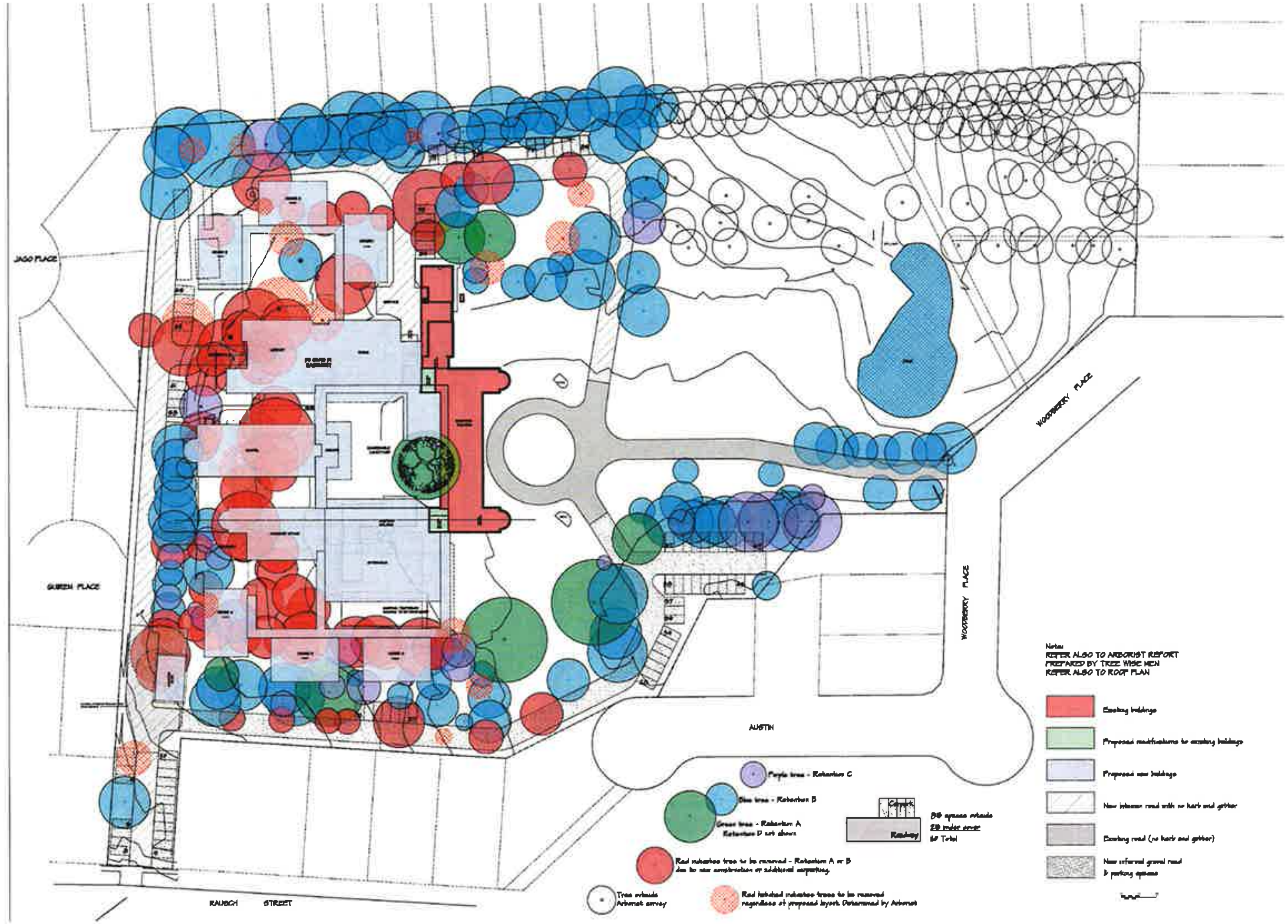
project: DETAILED SITE INVESTIGATION CAMPION COLLEGE REDEVELOPMENT, 119 RAUSCH STREET, TOONGABBIE NSW

title: SITE INVESTIGATION LAYOUT PLAN

project no: ENAURHOD04835AB-R01 | figure no: FIGURE 3 | rev: A

Appendix A - Proposed Development Drawings

SITE PLAN
1:500 @ B1
True North



CAMPION COLLEGE AUSTRALIA

Campion College Australia
PO Box 952
Toongabbie East NSW 2146
02 9896 9317

Campion College Redevelopment
8-14 Austin Woodbury Place
Old Toongabbie NSW 2146

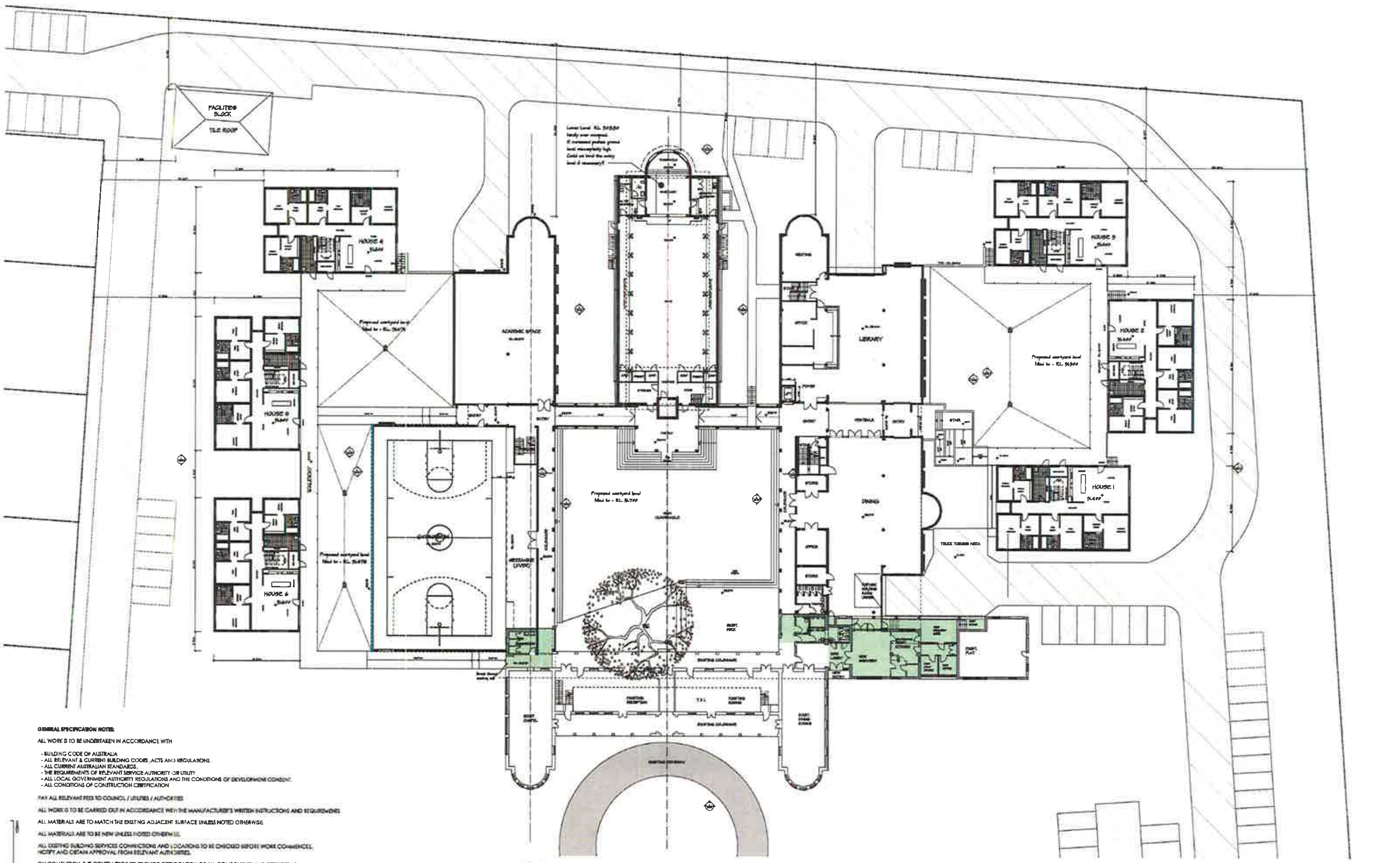
PLANS
SITE PLAN

14027 | DA 03 | D

As Shown | B1

GARDNER WETHERILL
ASSOCIATES
LEVEL 2 Suite 2.01
460 Pacific Highway
St Leonards 2065
T (02) 9929 6777
F (02) 9929 3999
E design@gardnerwetherill.com.au

Development Application



GROUND
SCALE - 1:200

GENERAL SPECIFICATION NOTES:

ALL WORK IS TO BE UNDERTAKEN IN ACCORDANCE WITH

- BUILDING CODE OF AUSTRALIA
- ALL RELEVANT & CURRENT BUILDING CODES, ACTS AND REGULATIONS
- ALL CURRENT AUSTRALIAN STANDARDS
- THE REQUIREMENTS OF RELEVANT SERVICE AUTHORITY OR UTILITY
- ALL LOCAL GOVERNMENT AUTHORITY REGULATIONS AND THE CONDITIONS OF DEVELOPMENT CONSENT
- ALL CONDITIONS OF CONSTRUCTION CERTIFICATION

PAY ALL RELEVANT FEES TO COUNCIL / UTILITIES / AUTHORITIES

ALL WORK IS TO BE CARRIED OUT IN ACCORDANCE WITH THE MANUFACTURER'S WRITTEN INSTRUCTIONS AND REQUIREMENTS

ALL MATERIALS ARE TO MATCH THE EXISTING ADJACENT SURFACE UNLESS NOTED OTHERWISE

ALL MATERIALS ARE TO BE NEW UNLESS NOTED OTHERWISE

ALL EXISTING BUILDING SERVICES CONNECTIONS AND LOCATIONS TO BE CHECKED BEFORE WORK COMMENCES. NOTIFY AND OBTAIN APPROVAL FROM RELEVANT AUTHORITIES.

ON COMPLETION, THE CONTRACTOR TO PROVIDE CERTIFICATION OF ALL COMPONENTS AND SERVICES AS REQUIRED BY THE CONSTRUCTION CERTIFICATE AND THE CERTIFYING AUTHORITY

A	Preliminary Issue to Client	[illegible]
B	Issue for coordination	[illegible]
C	[illegible]	[illegible]
D	DA ISSUE	[illegible]

CAMPION COLLEGE AUSTRALIA

North

Campion College Australia
PO Box 852
Toongabbie East NSW 2146
02 9896 9317

Campion College Redevelopment
8-14 Austin Woodbury Place
Old Toongabbie NSW 2146

PLANS
GROUND FLOOR

14027 | DA 05 | D
As Shown | B1

GARDNER WETHERILL ASSOCIATES
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Development Application

Appendix B - Borehole Logs

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Engineering Log - Borehole

Borehole No.	**HA01**
Sheet	1 of 1
Office Job No.:	**ENAURHOD04835AB**
Date started:	**26.2.2016**
Date completed:	**26.2.2016**
Logged by:	**PA**
Checked by:	**ML**

Client: **Campion College**

Principal:

Project: **Detailed Site Investigation**

Borehole Location: **Refer figure 2**

drill model and mounting: Hand Auger | Easting: | slope: -90° | R.L. Surface:

hole diameter: 50 mm | Northing | bearing: | datum: -

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
HA									GRASS AND TOPSOIL	D	MD		FILL. No staining, odour or ACM
				E+1.1ppm					FILL, SAND, medium grained, some silt and gravel, minor rootlets, brown,				
				E+0.7ppm		0.5		CL	SANDY CLAY, medium grained, brown, minor gravel and siltstone, increasing clay content				
				E+0.6ppm		1.0		CL	CLAY, orange/brown, medium plasticity, some medium grained sand, trace shale and gravel.		F		Residual soil.
						1.5			Borehole HA01 terminated at 1m				
						2.0							

method

DT	diatube
FT	push tube
SS	solid stem flight auger
HS	hollow stem flight auger
VT	V Bit, T Bit
AH	air hammer
CP	cable percussive
HA	hand auger
NDD	non-destructive digging
RC	rock corer

support: M mud, C casing, N nil

penetration: 1 2 3 4 — no resistance ranging to refusal

water: 10/1/96 water level on date shown; water inflow; water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

BOREHOLE ENAURHOD04835AB.GPJ COFFEY.GDT 21.3.16

Form GEO 5.3 Issue 3 Rev.2

coffey

Engineering Log - Borehole

Borehole No. **HA02**

Sheet 1 of 1

Office Job No.: **ENAURHOD04835AB**

Client: **Campion College**

Date started: **26.2.2016**

Principal:

Date completed: **26.2.2016**

Project: **Detailed Site Investigation**

Logged by: **PA**

Borehole Location: **Refer figure 2**

Checked by: **ML**

drill model and mounting: Hand Auger | Easting: | slope: -90° | R.L. Surface:

hole diameter: 50 mm | Northing | bearing: | datum: -

drilling information							material substance						
method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
HA				E+0.7ppm					FILL, SAND AND SHALE, medium grained, brown, minor gravel, clay and metal fragments	D	MD		FILL. No odour, staining or ACM
				E+1.9ppm		0.5		SC	SANDY CLAY, brown, low plasticity, minor gravel		S		
				E+1.5ppm				CL	CLAY, orange/brown, low plasticity, minor rootlets		F		Residual soil
						1.0			Borehole HA02 terminated at 0.9m				
						1.5							
						2.0							

method

DT	diatube
PT	push tube
SS	solid stem flight auger
HS	hollow stem flight auger
VT	V Bit, T Bit
AH	air hammer
CP	cable percussive
HA	hand auger
NDD	non-destructive digging
RC	rock corer

support

M mud N nil

C casing

penetration 1 2 3 4 — no resistance / ringing to refusal

water

10/1/96 water level on date shown

water inflow

water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

BOREHOLE ENAURHOD04835AB.GPJ COFFEY.GDT 21.3.16

Form GEO 5.3 Issue 3 Rev 2

coffey

Engineering Log - Borehole

Borehole No.	HA03
Sheet	1 of 1
Office Job No.:	ENAURHOD04835AB
Date started:	26.2.2016
Date completed:	26.2.2016
Logged by:	PA
Checked by:	ML

Client: Campion College

Principal:

Project: Detailed Site Investigation

Borehole Location: Refer figure 2

drill model and mounting: Hand Auger | Easting: | slope: -90° | R.L. Surface:

hole diameter: 50 mm | Northing | bearing: | datum: -

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
HA				E+4.3ppm					FILL: SAND, medium grained, brown, minor gravel, clay and rootlets, metal fragments	D	MD		FILL: No odour, staining or ACM
						0.5		CL	SANDY CLAY, medium grained, grey to brown, low plasticity, minor gravel and siltstone		F		
				E+0.4ppm				CL	CLAY, orange/brown, high plasticity		St		Residual soil
				E+0.0ppm									
						1.0			Borehole HA03 terminated at 0.9m				
						1.5							
						2.0							

method

DT	diatube
PT	push tube
SS	solid stem flight auger
HS	hollow stem flight auger
VT	V Bit, T Bit
AH	air hammer
CP	cable percussive
HA	hand auger
NDD	non-destructive digging
RC	rock corer

support

M mud N nil
C casing

penetration

1 2 3 4
no resistance
ranging to refusal

water

10/1/96 water level on date shown
water inflow
water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description

based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

BOREHOLE ENAURHOD04835AB.GPJ COFFEY.GDT 21.3.16

Form GEO 5.3 Issue 3 Rev 2

coffey

Engineering Log - Borehole

Borehole No.	HA04
Sheet	1 of 1
Office Job No.:	ENAURHOD04835AB
Client:	Campion College
Date started:	26.2.2016
Principal:	
Date completed:	26.2.2016
Project:	Detailed Site Investigation
Logged by:	PA
Borehole Location:	Refer figure 2
Checked by:	ML

drill model and mounting:	Hand Auger	Easting:	slope: -90°	R.L. Surface:	
hole diameter:	50 mm	Northing	bearing:	datum:	-

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
HA				E+0.4ppm					FILL: SAND, medium grained, brown, minor gravel and rootlets	D	MD		FILL: No staining, odour or ACM
				E+1.2ppm		0.5		SC	SANDY CLAY, low plasticity, brown, minor gravel and siltstone, medium grained sand				
						1.0			Borehole HA04 terminated at 0.5m				
						1.5							
						2.0							

method
- DT diatube
- PT push tube
- SS solid stem flight auger
- HS hollow stem flight auger
- VT V Bit, T Bit
- AH air hammer
- CP cable percussive
- HA hand auger
- NDD non-destructive digging
- RC rock corer

support
- M mud
- C casing
- N nil

penetration: 1 2 3 4 — no resistance ranging to refusal

water
- 10/1/86 water level on date shown
- water inflow
- water outflow

notes, samples, tests
- U_{50} undisturbed sample 50mm diameter
- U_{63} undisturbed sample 63mm diameter
- D disturbed sample
- N standard penetration test (SPT)
- N* SPT - sample recovered
- Nc SPT with solid cone
- V vane shear (kPa)
- P pressuremeter
- Bs bulk sample
- E environmental sample
- R refusal

classification symbols and soil description based on unified classification system

moisture
- D dry
- M moist
- W wet
- W_p plastic limit
- W_L liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

BOREHOLE ENAURHOD04835AB.GPJ COFFEY.GDT 21.3.16

Form GEO 5.3 Issue 3 Rev 2

coffey

Engineering Log - Borehole

Borehole No.	HA05
Sheet	1 of 1
Office Job No.:	ENAURHOD04835AB
Date started:	26.2.2016
Date completed:	26.2.2016
Logged by:	PA
Checked by:	ML

Client: Campion College

Principal:

Project: Detailed Site Investigation

Borehole Location: Refer figure 2

drill model and mounting: Hand Auger | Easting: | slope: -90° | R.L. Surface:

hole diameter: 50 mm | Northing | bearing: | datum: -

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa (100 200 300 400)	structure and additional observations
HA				E+0.6ppm					FILL, SILTY SAND, medium grained, brown, minor gravel, clay and rootlets	D	S		FILL: No odour, staining or ACM
								SC	Sandy CLAY, low plasticity grey to brown, slightly moist, with some medium grained sand Becoming orange brown with some siltstone	M	F		
				E+0.3ppm		0.5		CL	CLAY, orange/brown, high plasticity		St		Residual soil
				E+0.2ppm									
						1.0			Borehole HA05 terminated at 0.9m				
						1.5							
						2.0							

method

DT	diatube
PT	push tube
SS	solid stem flight auger
HS	hollow stem flight auger
VT	V Bit, T Bit
AH	air hammer
CP	cable percussive
HA	hand auger
NDD	non-destructive digging
RC	rock corer

support

M mud N nil
C casing

penetration 1 2 3 4 — no resistance ranging to refusal

water
10/1/86 water level on date shown
water inflow
water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
U_{63}	undisturbed sample 63mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
V	vane shear (kPa)
P	pressuremeter
Bs	bulk sample
E	environmental sample
R	refusal

classification symbols and soil description based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

BOREHOLE ENAURHOD04835AB.GPJ COFFEY.GDT 21.3.16

Form GEO 5.3 Issue 3 Rev.2

coffey

Borehole No. **BH01/MW01**

Engineering Log - Monitoring Well

Sheet 1 of 1

Office Job No.: **ENAURHOD04835AB**

Client: **Campion College**

Date started: **26.2.2016**

Principal:

Date completed: **26.2.2016**

Project: **Detailed Site Investigation**

Logged by: **PA**

Borehole Location: **Refer figure 2**

Checked by: **ML**

drill model & mounting: Geoprobe Trace | Easting: | slope: -90° | R.L. Surface:

hole diameter: 50 | Northing: | bearing: | datum: -

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	well details	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	structure and additional observations
HA				E+0.1ppm						GRAVEL AND ROADBASE	D	MD	Potential bitumen particles in sample at 0.05 - 0.2m. No odour FILL. No odour, staining or ACM.
				E+0.1ppm						FILL, SAND, black, medium grained, some silt, gravel and plastic fragments. Increasing gravels and siltstone			
				E+0.3ppm			1		CL	CLAY, some sand, orange/brown, medium plasticity, trace shale and gravel.			Residual soil.
PT										Becoming grey		F	
				E+70.9ppm			2			Increasing shale content			
SB										SHALE, moderately weathered, light brown, some sand, some silt content.			Bedrock
				E+171ppm			3						Slight HC odour
				E+1125ppm			4			Clay lense			Slight HC odour
							5						Slight HC odour
				E+216ppm						Softer			
				E+234ppm			6						
							7			Borehole terminated at 7m			
							8						

method
- DT diatube
- PT push tube
- SS solid stem flight auger
- HS hollow stem flight auger
- VT V Bit, T Bit
- AH air hammer
- CP cable percussive
- HA hand auger
- NDD non-destructive digging
- RC rock corer

support
- C casing
- N nil

penetration 1 2 3 4 — no resistance ranging to refusal

water
- 10/1/96 water level on date shown
- water inflow
- water outflow

notes, samples, tests
- U_{50} undisturbed sample 50mm diameter
- D disturbed sample
- N standard penetration test (SPT)
- N* SPT - sample recovered
- Nc SPT with solid cone
- P pressure meter
- Bs bulk sample
- R refusal
- E environmental sample
- PID PID measurement
- WS water sample
- PZ piezometer
- ALT air lift test

classification symbols and soil description based on unified classification system

moisture
- D dry
- M moist
- W wet
- Wp plastic limit
- W_L liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

PIEZOMETER ENAURHOD04835AB.GPJ COFFEY.GDT 21.3.16

Form GEO 5.10 Issue 3 Rev.0

coffey

Engineering Log - Monitoring Well

Borehole No. **BH02/MW02**

Sheet 1 of 1

Office Job No.: **ENAURHOD04835AB**

Client: **Campion College**

Date started: **26.2.2016**

Principal:

Date completed: **26.2.2016**

Project: **Detailed Site Investigation**

Logged by: **PA**

Borehole Location: **Refer figure 2**

Checked by: **ML**

drill model & mounting: Geoprobe Trace | Easting: | slope: -90° | R.L. Surface:

hole diameter: 50 | Northing: | bearing: | datum: -

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	well details	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	structure and additional observations
HA				E+0.7ppm						GRASS AND TOPSOIL	D	MD	FILL. No odour, staining or ACM
										FILL, SAND, medium grained, some silt and gravel, minor rootlets, brown,.			
				E+0.6ppm									
				E+0.4ppm					CL	CLAY, orange/brown, medium plasticity, trace shale gravel.			Residual soil
PT							1					F	
							2			Becoming grey and increasing shale content			
SS				E+0.6ppm						SHALE, moderately weathered, light brown to grey			Bedrock Slight HC odour
							3						Slight HC odour
				E+635ppm						Clay lense			
							4						Slight HC odour
				E+53.5ppm						4.5m: Becoming darker brown			
							5						
				E+5ppm			6						
							7						
							8			Borehole terminated at 7m			

method

DT	diatube
PT	push tube
SS	solid stem flight auger
HS	hollow stem flight auger
VT	V Bit, T Bit
AH	air hammer
CP	cable percussive
HA	hand auger
NDD	non-destructive digging
RC	rock corer

support: C casing, N nil

penetration: 1 2 3 4 — no resistance ranging to refusal

water: 10/1/96 water level on date shown; water inflow; water outflow

notes, samples, tests

U_{50}	undisturbed sample 50mm diameter
D	disturbed sample
N	standard penetration test (SPT)
N*	SPT - sample recovered
Nc	SPT with solid cone
P	pressure meter
Be	bulk sample
R	refusal
E	environmental sample
PID	PID measurement
WS	water sample
PZ	piezometer
ALT	air lift test

classification symbols and soil description based on unified classification system

moisture

D	dry
M	moist
W	wet
Wp	plastic limit
W_L	liquid limit

consistency/density index

VS	very soft
S	soft
F	firm
St	stiff
VSt	very stiff
H	hard
Fb	friable
VL	very loose
L	loose
MD	medium dense
D	dense
VD	very dense

PIEZOMETER ENAURHOD04835AB.GPJ COFFEY.GDT 21.3.16

Form GEO 6.10 Issue 3 Rev.0

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Engineering Log - Monitoring Well

Borehole No. **BH03/MW03**

Sheet 1 of 1

Office Job No.: **ENAURHOD04835AB**

Client: **Campion College**

Date started: **26.2.2016**

Principal:

Date completed: **26.2.2016**

Project: **Detailed Site Investigation**

Logged by: **PA**

Borehole Location: **Refer figure 2**

Checked by: **ML**

drill model & mounting: Geoprobe Trace | Easting: | slope: -90° | R.L. Surface:

hole diameter: 50 | Northing: | bearing: | datum: -

drilling information | **material substance**

method	penetration 1 2 3	support	water	notes samples, tests, etc	well details	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	structure and additional observations
HA										GRASS AND TOPSOIL	D	MD	FILL: No staining, odour or ACM
				E+3.1ppm						FILL, SAND, medium grained, medium grained, some silt, gravel and plastic fragments.			
				E+1.1ppm									
				E+1.6ppm			1		CL	CLAY, orange/brown, medium plasticity, trace shale gravels.		F	Residual soil
PT										Becoming grey			
				E+1.7ppm			2						
SS										SHALE, moderately weathered light brown to grey			Bedrock
							3						
				E+1.9ppm						Clay lense			
							4						
				E+2.3ppm						Becoming darker brown			
							5						
				E+2.3ppm			6						
							7			Borehole terminated at 7m			
							8						

method
DT diatube
PT push tube
SS solid stem flight auger
HS hollow stem flight auger
VT V Bit, T Bit
AH air hammer
CP cable percussive
HA hand auger
NDD non-destructive digging
RC rock corer

support
C casing N nil

penetration 1 2 3 4 — no resistance ranging to refusal

water
10/1/96 water level on date shown
water inflow
water outflow

notes, samples, tests
U_{50} undisturbed sample 50mm diameter
D disturbed sample
N standard penetration test (SPT)
N* SPT - sample recovered
Nc SPT with solid cone
P pressure meter
Be bulk sample
R refusal
E environmental sample
PID PID measurement
WS water sample
PZ piezometer
ALT air lift test

classification symbols and soil description based on unified classification system

moisture
D dry
M moist
W wet
Wp plastic limit
W_L liquid limit

consistency/density index
VS very soft
S soft
F firm
St stiff
VSt very stiff
H hard
Fb friable
VL very loose
L loose
MD medium dense
D dense
VD very dense

PIEZOMETER ENAURHOD04835AB.GPJ COFFEY.GDT 21.3.16

Form GEO 5.10 Issue 3 Rev.0

Appendix C - Equipment Calibration Records

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RENTALS

Equipment Report - MINIRAE 2000 PID

This Gas Meter has been performance checked and calibrated as follows:

Lamp	Compound	Concentration	Zero	Span	Traceability Lot #	Pass?
10.6 eV	Isobutylene	100 ppm	0.0 ppm	97.9 ppm	1808481C2	☑

Alarm Limits

High	100 ppm
Low	50 ppm

Bump Test

Date	Target Gas	Reading	Pass?
25/02/2016	100 ppm	97.8 ppm	☑

☑ Battery Status 100% 5.4V
☑ 10 minutes test complete
☑ Spare battery status (Min 5.5 volts)
☑ Electrical Safety Tag attached (AS/NZS 3760)

☑ Performance check (pump, lamp, sensor)
☑ Data cleared
☑ Filters checked

Tag No: 000384

Valid to: 13/05/2016

Date: 25/02/2016

Signed: [signature]

Please check that the following items are received and that all items are cleaned and decontaminated before return. A minimum $30 cleaning / service / repair charge may be applied to any unclean or damaged items. Items not returned will be billed for at the full replacement cost.

Sent	Returned	Item
☑	☐	MiniRAE 2000 PID / Operational Check / Battery Status 5.4V
☑	☐	Lamp 10.6 eV, Compound Set to: ISOBUTYLENE Correction Factor: 1
☑	☐	Protective yellow rubber boot
☑	☐	Inlet probe (attached to PID)
☑	☐	Spare water trap filter(s) Qty 1
☑	☐	Charger 240V to 12V 500mA
☑	☐	Instruction Manual behind foam on the lid of case "
☑	☐	Quick Guide Sheet behind foam on the lid of case "
☑	☐	Spare Alkaline Battery Compartment with batteries
☑	☐	Inline Moisture trap Filter Guide Laminated
☑	☐	Calibration regulator & tubing (optional) RE671356
☒	☐	Data cable and Software CD (optional)
☑	☐	Carry Case
☑	☐	Check to confirm electrical safety (tag must be valid)

Date: 25/02/2016

Signed: [signature]

TFS Reference	CS0042110	Return Date:	/ /
Customer Reference		Return Time:	
Equipment ID	PIDMINSI	Condition on return:	
Equipment Serial No.	110006051		

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RENTALS

Equipment Report – Solinst Model 122 Interface Meter

This Meter has been performance checked / calibrated* as follows:

Cleaned/Tested **Pass?** ☑ **Yes** ☐ **No**

☑ Probe

☑ Tape/Reel

☑ Performance Test & Battery Voltage Check (v) 8.0v minimum

Date: 24/02/2016 Checked by: MD

Signed:

Please check that the following items are received and that all items are cleaned and decontaminated before return. A minimum $20 cleaning / service / repair charge may be applied to any unclean or damaged items. Items not returned will be billed for at the full replacement cost.

Sent	Received	Returned	Item
☑	☐	☐	Operations check OK
☑	☐	☐	Plastic Box / Bag
☑	☐	☐	Spare 9V Battery Qty 1
☑	☐	☐	Probe Cleaning Brush
☐	☐	☐	Decon
☑	☐	☐	Instruction leaflet
☑	☐	☐	Tape Guide
☐	☐	☐	

Processors Signature/ Initials MS

Quote Reference	CS0042210	Condition on return
Customer Ref		
Equipment ID	SOL122-8	
Equipment serial no.	2306569	
Return Date	/ /	
Return Time		

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RENTALS

Equipment Certification Report – TPS 90FLMV Water Quality Meter

This Water Quality Meter has been performance checked and calibrated as follows:

Sensor	Concentration	Span 1	Span 2	Traceability Lot #	Pass?
pH	pH 7.00 / pH 4.00	7.00 pH	4.00 pH	1	☑
Conductivity	12.88mS/cm	0.00 mS/cm	12.88 mS/cm		☑
TDS	36 ppk	N/A ppk	N/A ppk	check only	☑
Dissolved Oxygen	Sodium Sulphite / Air	0.00 ppm in Sodium Sulphite	8.94 ppm Saturation in Air		☑

Check only

Redox (ORP) *	Electrode operability test	240mV +/- 10%	229 mV		☑

* This meter uses an Ag/AgCl ORP electrode. To convert readings to SHE (Standard Hydrogen Electrode), add 199mV to the mV reading.

☑ Battery Status 7.8 (min 7.2V)
☑ Electrical Safety Tag attached (AS/NZS 3760)

☑ Temperature 22.5 °C
☐ Electrodes Cleaned and checked

Tag No: 000396

Valid to: 12/04/2016

Date: 01/03/2016

Signed: DW

Please check that the following items are received and that all items are cleaned and decontaminated before return. A minimum $30 cleaning / service / repair charge may be applied to any unclean or damaged items. Items not returned will be billed for at the full replacement cost.

Sent	Returned	Item
☑	☐	90FLMV Unit. Ops check/Battery status: 8.00
☑	☐	pH sensor with wetting cap, 5m
☑	☐	Conductivity/TDS/Temperature K=10 sensor, 5m
☑	☐	Dissolved oxygen YSI5739 sensor with wetting cap, 5m
☑	☐	Redox (ORP) sensor with wetting cap, 5m
☑	☐	Power supply 240V to 12V DC 200mA
☑	☐	Instruction Manual
☑	☐	Quick Guide
☑	☐	Syringe with storage solution for pH and ORP sensors
☑	☐	Carry Case
☑	☐	Check to confirm electrical safety (tag must be valid)

Date: 01/03/2016

Signed: DW

TFS Reference	CS0042457	Return Date:	/ /
Customer Reference		Return Time:	
Equipment ID	90FLMVSF	Condition on return:	
Equipment Serial No.	S1815		

Appendix D - Well Sampling Records

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50

coffey

Groundwater Sampling Form (A) - General

PROJECT NAME: Cameron College **PROJECT NUMBER:** ER04855AB

FIELD PERSONNEL: M. Locke **DATE:** 2/3/16

PROJECT MANAGER: M. Locke

WELL ID: BH02 / MW02 **METER ID& TYPE:** SOL122-99 **TOTAL WELL DEPTH:** 6.5 **SCREEN INTERVAL:** 2.5 - 6.5

EQUIPMENT USED: BAILER ☒ WATERRA ☐ OTHER _____ **WELL DIAMETER:** 50mm ϕ **WELL STICK-UP:** No

WELL GAUGING AND PURGE VOLUME CALCULATIONS

(TOTAL WELL DEPTH) – (DEPTH TO WATER) = (WATER COLUMN)

6.5 m - 5.58 = 0.92 m

Use water column calculation together with the procedures in 'SOP- Groundwater Sampling - Bailers' to determine the correct volume to be purged from the well (enter this value in the field to the right)

LITRES PER 1 WELL VOLUME _____ L

WELL HEADSPACE PID READING

PID READING

PPM: _____

ORP REFERENCE ELECTRODE: (circle) SHE / Calomel Saturated KCl / Ag/AgCl 1M KCl / Ag/AgCl 4M KCl / Ag/AgCl Saturated KCl

TIME OF DAY	CYCLE/ PUMP RATE (ml/min)	VOLUME (L)	DEPTH TO WATER (m)	DISSOLVED OXYGEN (mg/l)		ELECTRICAL CONDUCTIVITY (mS or µS/cm)		pH (pH units)		REDOX POTENTIAL (mV)		TEMPERATURE (°C)		CLARITY – tick one					COMMENTS
				READING	CHANGE*	READING	CHANGE*	READING	CHANGE*	READING	CHANGE*	READING	CHANGE	Clear	Slightly Cloudy	Cloudy	Very Cloudy	Turbid	ODOUR, COLOUR, SEDIMENTS, PSH COLLECTED, etc
13:56	Gauging		5.58				EC µS/cm												No odour/sheen
14:22		1.5L	6.31	3.2		9.60	1500	6.4		96		20.8		x				x	No odour/sheen clear to cloudy
14:32		0.38L	6.99																
		Purged dry - bailer lost down well. Sample collected from purged water																	
STABILISATION CRITERIA (3 readings within following ranges)				± 10%		± 3%		± 0.1 unit		± 10mV		± 0.2°C							

DUPLICATE COLLECTED: Y ☒ N ☐ DUPLICATE ID: DUP1 Insufficient sample volume to collect duplicate for metals analysis **TRIPLICATE COLLECTED:** Y ☐ N ☒ TRIPLICATE ID: _____

WERE METALS FIELD FILTERED? Y ☒ N ☐ Unfiltered samples must not be put into a preserved container (i.e. 'metals' bottle) **HAS THIS FORM BEEN COMPLETED IN FULL?** Y ☐ N ☐

coffey

Groundwater Sampling Form (A) - General

PROJECT NAME: Campion College **PROJECT NUMBER:** ER04835AB

FIELD PERSONNEL: M. Locke **DATE:** 2/3/16

PROJECT MANAGER: M Locke

WELL ID: BH01/MW01 **METER ID& TYPE:** SOL122-44 **TOTAL WELL DEPTH:** 6.5 **SCREEN INTERVAL:** 2.5 - 6.5

EQUIPMENT USED: BAILER ☑ WATERRA ☐ OTHER _____ **WELL DIAMETER:** 50mm **WELL STICK-UP:** No

WELL GAUGING AND PURGE VOLUME CALCULATIONS

(TOTAL WELL DEPTH) – (DEPTH TO WATER) = (WATER COLUMN)

6.5 m - 5.75 = 0.75 m

Use water column calculation together with the procedures in 'SOP- Groundwater Sampling - Bailers' to determine the correct volume to be purged from the well (enter this value in the field to the right)

LITRES PER 1 WELL VOLUME _____ L

WELL HEADSPACE PID READING

PID READING

PPM: _____

ORP REFERENCE ELECTRODE: (circle) SHE / Calomel Saturated KCl / Ag/AgCl 1M KCl / Ag/AgCl 4M KCl / Ag/AgCl Saturated KCl

TIME OF DAY	CYCLE/ PUMP RATE (ml/min)	VOLUME (L)	DEPTH TO WATER (m)	DISSOLVED OXYGEN (mg/l)		ELECTRICAL CONDUCTIVITY (mS or µS/cm)		pH (pH units)		REDOX POTENTIAL (mV)		TEMPERATURE (°C)		CLARITY – tick one					COMMENTS
				READING	CHANGE*	READING	CHANGE*	READING	CHANGE*	READING	CHANGE*	READING	CHANGE	Clear	Slightly Cloudy	Cloudy	Very Cloudy	Turbid	ODOUR, COLOUR, SEDIMENTS, PSH COLLECTED, etc
13:52	Lowering Pump		5.75			TDS	EC µS/cm												No odour | clear
14:15		0.9L	6.22	2.10		8.40	1310	6.30		86		23.2		x				x	No odour | clear
14:21	purged dry.	0.55L	6.5	1.93		8.60	1340	6.17		79		22.9					x		No odour | clear
15:15		0.1L	6.45	☒															
			purged dry 2.2			8.6	1380	6.3		62		23.1						x	No odour | clear
				sample collected from purged water.															
STABILISATION CRITERIA (3 readings within following ranges)				± 10%		± 3%		± 0.1 unit		± 10mV		± 0.2°C							

DUPLICATE COLLECTED: Y ☐ N ☒ DUPLICATE ID: _____ **TRIPLICATE COLLECTED:** Y ☐ N ☐ TRIPLICATE ID: _____

WERE METALS FIELD FILTERED? Y ☒ N ☐ Unfiltered samples must not be put into a preserved container (i.e. 'metals' bottle) **HAS THIS FORM BEEN COMPLETED IN FULL?** Y ☒ N ☐

coffey

Groundwater Sampling Form (A) - General

PAGE 1 OF 1

PROJECT NAME: Camden College **PROJECT NUMBER:** ER04833AB

FIELD PERSONNEL: M.L **DATE:** 2/3/16

PROJECT MANAGER: ML

WELL ID: MW03 B1103 **METER ID& TYPE:** SOL122-44 **TOTAL WELL DEPTH:** 6.5 **SCREEN INTERVAL:** 2-5-6.5

EQUIPMENT USED: BAILER ☒ WATERRA ☐ OTHER _____ **WELL DIAMETER:** 50mm **WELL STICK-UP:** No.

WELL GAUGING AND PURGE VOLUME CALCULATIONS

(TOTAL WELL DEPTH) – (DEPTH TO WATER) = (WATER COLUMN)

6.5 m - 5.37 = 1.13 m

Use water column calculation together with the procedures in 'SOP- Groundwater Sampling - Bailers' to determine the correct volume to be purged from the well (enter this value in the field to the right)

LITRES PER 1 WELL VOLUME _____ L

WELL HEADSPACE PID READING

PID READING

PPM: _____

ORP REFERENCE ELECTRODE: (circle) SHE / Calomel Saturated KCl / Ag/AgCl 1M KCl / Ag/AgCl 4M KCl / Ag/AgCl Saturated KCl

TIME OF DAY	CYCLE/ PUMP RATE (ml/min)	VOLUME (L)	DEPTH TO WATER (m)	DISSOLVED OXYGEN (mg/l)		ELECTRICAL CONDUCTIVITY (mS or µS/cm) TDS ppm		pH (pH units)		REDOX POTENTIAL (mV)		TEMPERATURE (°C)		CLARITY – tick one					COMMENTS
				READING	CHANGE*	READING	CHANGE*	READING	CHANGE*	READING	CHANGE*	READING	CHANGE	Clear	Slightly Cloudy	Cloudy	Very Cloudy	Turbid	ODOUR, COLOUR, SEDIMENTS, PSH COLLECTED, etc
13.50 gauging			5.37			TDS	EC uS/cm												no odour/sheen
14.10	~	1.35L	6.05	3.7		9.39	1470	6.85		112		21.1				X			" "
14.18	~	0.65L	6.38	3.98		9.41	1470	6.39		97		20.9					X		
14.52			6.21	4.2		9.40	1470.	6.4		99		21.2						X	"
15.00		0.5L	6.49	dry		sample	collected			from purged water									
STABILISATION CRITERIA (3 readings within following ranges)				± 10%		± 3%		± 0.1 unit		± 10mV		± 0.2°C							

DUPLICATE COLLECTED: Y ☐ N ☒ DUPLICATE ID: _____ **TRIPLICATE COLLECTED:** Y ☐ N ☒ TRIPLICATE ID: _____

WERE METALS FIELD FILTERED? Y ☒ N ☐ Unfiltered samples must not be put into a preserved container (i.e. 'metals' bottle) **HAS THIS FORM BEEN COMPLETED IN FULL?** Y ☒ N ☐

Appendix E - Laboratory Test Certificates & Chain of Custody Documentation

coffey

Chain of Custody

No: 07705

Laboratory Quotation / Order No:

Job No: ER04835AB Sheet 1 of 3

Dispatch to: (Address & Phone No.) EUROFINS MGT LANE COVE	Sampled by: P. ALMA	Consigning Officer: Sigmak 24/02/16 15:36
		Date Dispatched:
Attention: SAMPLE RECEIPT	Project Manager: (report results to) M. LOCKE	Courier Service:
		Consignment Note No. 4490 931

Relinquished by:	Date:	Time:	Received by: Sigmak	Date:	Time:
M. LOCKE	29/2				

Comments	Sample Matrix	Container Type and Preservative	Sample No.	Date Sampled	Analysis Required: Suite B4 (PAH/TRH/BTEX), OC/OP, Asbestos (ID/QA), VOC, CEC, pH, TOC, TRH C6-9, BTEX	Sample Condition on Receipt
	Soil	PHIAL	TS 160225-17	25/02/16		
	"	"	TB 160225-16	"		
		JAR	DUP1	26/2/16		
*SEND SAMPLE DUP1A TO ALS		"	DUP1A	"		
			BH01/3.5-3.7			
			BH01/0.05-0.2			
			BH01/2.4-2.5			
			BH01/5.3-5.5			
			BH01/5.8-6.0			
			BH01/0.9-1.0			
			BH01/0.4-0.5			
			BH01/1.8-2.0			
			BH02/0.05-0.2			
			BH02/0.5-0.6			
			BH02/2.2-2.4			
			BH02/5.6-6.0			
			BH02/3.3-3.5			

Special Laboratory Instructions:

Detection Limits:

Turnaround Required: Standard.

JOB NUMBER MUST BE REFERENCED ON ALL SUBSEQUENT PAGES

M2209-06

Copies: WHITE: Sign on release. YELLOW: If dispatched to interstate Lab, Lab to sign on receipt and fax back to Coffey. BLUE: To be returned with results.

coffey

Chain of Custody

No: 07706

Laboratory Quotation / Order No:

Job No: ER04835AB Sheet 2 of 3

Dispatch to: (Address & Phone No.) EUROFINS MGT	Sampled by: P. ALMA	Consigning Officer: / Date Dispatched:
Attention: SAMPLE RECEIPT	Project Manager: (report results to) M. LOCKE	Courier Service: / Consignment Note No.

Relinquished by:	Date:	Time	Received by:	Date:	Time:
	29/2				

Comments	Sample Matrix	Container Type and Preservative	Sample No.	Date Sampled	Analysis Required: PAHs	TPHs	MAHs + BTEX	Metals:	SUITE M8	SUITE B4	OC/OP	Asbestos (AS)	VOC	CEC	pH	TOC	TRH C6-9	BTEX		Sample Condition on Receipt
	SOIL	JAR	BH02/0.7-0.8	26/2/16																
			BH02/4.5-4.8																	
			BH03/0.5-0.6																	
			BH03/0.05-0.2							/										
			~~BH03/0.5-0.6~~																	
			BH03/3.0-3.1																	
			BH03/4.0-4.2																	
			BH03/5.4-5.5																	
			BH03/1.9-2.0							/										
			BH03/0.8-0.9																	
			HA02/0.0-0.15						/	/	/	/		/	/	/				
			HA02/0.3-0.5																	
			HA02/0.8-0.9																	
			HA01/0.9-1.0																	
			HA01/0.4-0.5																	
	2		HA01/0.05-0.15						/	/	/	/		/	/	/				
	2		HA03/0-0.15	2																

Special Laboratory Instructions:

Detection Limits: Turnaround Required:

JOB NUMBER MUST BE REFERENCED ON ALL SUBSEQUENT PAGES

Copies: WHITE: Sign on release YELLOW: if dispatched to interstate Lab. Lab to sign on receipt and fax back to Coffey BLUE: To be returned with results.

coffey

Chain of Custody

Laboratory Quotation / Order No:

Job No: ER04835AB

No: 07707

Sheet 3 of 3

Dispatch to: (Address & Phone No.) EUROFINS MGT	Sampled by: P. ALMA	Consigning Officer:	
		Date Dispatched:	
Attention: SAMPLE RECEIPT.	Project Manager: (report results to) M. LOCKE	Courier Service	
		Consignment Note No:	

Relinquished by:	Date:	Time:	Received by: Siamak	Date:	Time:
	29/2			26/02/16	

Comments	Sample Matrix	Container Type and Preservative	Sample No.	Date Sampled	~~TRH~~	~~TPH~~	~~MAH-BTEX~~	~~Metals~~	Suite M8	Suite B4	OP/OC	Asbestos (HA)	VOC	CEC	pH	TOC				Sample Condition on Receipt
	SOIL	JAR	HA03/0.5-0.6	26/2/16					/	/	/	/								
			HA03/0.8-0.9																	
			HA04/0.3-0.4																	
			HA04/0.0-0.15						/	/	/	/								
			HA05/0.0-0.15						/	/	/	/								
			HA05/0.5-0.6																	
			HA05/0.8-0.9																	
			SP01-1																	

Special Laboratory Instructions:

Detection Limits:

Turnaround Required:

JOB NUMBER MUST BE REFERENCED ON ALL SUBSEQUENT PAGES

Copies: WHITE: Sign on release YELLOW: If dispatched to interstate Lab, Lab to sign on receipt and fax back to Coffey BLUE: To be returned with results.

642209 06

Sean 1/3 11:36

From: Nibha Vaidya [mailto:NibhaVaidya@eurofins.com]
Sent: Tuesday, 1 March 2016 11:36 AM
To: EnviroSampleNSW
Subject: FW: Eurofins | mgt Sample Receipt Advice - Report 490931 : Site ER04835AB

Please add the below to 490931.

From: Matthew Locke [mailto:Matthew.Locke@coffey.com]
Sent: Tuesday, 1 March 2016 11:27 AM
To: enquiriessyd@eurofins.com.au
Cc: NibhaVaidya@eurofins.com.au
Subject: RE: Eurofins | mgt Sample Receipt Advice - Report 490931 : Site ER04835AB

Dear Eurofins,

Can I please request the following additional analysis the following samples in this batch:

Analyte Sample ID
Lead DUP1
DUP1A
BH01/0.4-0.5
BH01/3.5-3.7
BH02/0.5-0.6
BH02/3.3-3.7
BH03/0.05-0.2
BH03/1.9-2.0

Please undertake this analysis on a standard turnaround basis.

Regards,

Matt

eurofins | mgt

ABN – 50 005 085 521 e.mail : EnviroSales@eurofins.com.au web : www.eurofins.com.au

Melbourne
3-5 Kingston Town Close
Oakleigh Vic 3166
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

Sydney
Unit F3, Building F
16 Mars Road
Lane Cove West NSW 2066
Phone : +61 2 9900 8400
NATA # 1261 Site # 18217

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

Sample Receipt Advice

Company name:	Coffey Environments Pty Ltd NSW
Contact name:	Matthew Locke
Project name:	ER04835AB
COC number:	7705-7707
Turn around time:	5 Day
Date/Time received:	Feb 29, 2016 3:36 PM
Eurofins | mgt reference:	490931

Sample Information

- ☑ A detailed list of analytes logged into our LIMS, is included in the attached summary table.
- ☑ Sample Temperature of a random sample selected from the batch as recorded by Eurofins | mgt Sample Receipt : 6.6 degrees Celsius.
- ☑ All samples have been received as described on the above COC.
- ☑ COC has been completed correctly.
- ☑ Attempt to chill was evident.
- ☑ Appropriately preserved sample containers have been used.
- ☑ All samples were received in good condition.
- ☑ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
- ☑ Appropriate sample containers have been used.
- ☒ Some samples have been subcontracted.
- N/A Custody Seals intact (if used).

Contact notes

If you have any questions with respect to these samples please contact:

Charl Du Preez on Phone : +61 (2) 9900 8400 or by e.mail: charldupreez@eurofins.com.au

Results will be delivered electronically via e.mail to Matthew Locke - Matthew_Locke@coffey.com.

Note: A copy of these results will also be delivered to the general Coffey Environments Pty Ltd NSW email address.

eurofins | mgt

Certificate of Analysis

NATA Accredited
Accreditation Number 1261
Site Number 18217

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

Coffey Environments Pty Ltd NSW
Level 20, Tower B, Citadel Tower 799 Pacific Highway
Chatswood
NSW 2067

Attention: Matthew Locke

Report 490931-S
Project name ER04835AB
Received Date Feb 29, 2016

Client Sample ID			TS 160225-17	TB 160225-16	DUP1	BH01/3.5-3.7
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins | mgt Sample No.			S16-Fe27128	S16-Fe27129	S16-Fe27131	S16-Fe27132
Date Sampled			Feb 25, 2016	Feb 25, 2016	Feb 25, 2016	Feb 25, 2016
Test/Reference	LOR	Unit				
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	-	< 20	-	-
% Moisture	1	%	-	-	13	10
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	98%	< 20	< 20	78
TRH C10-C14	20	mg/kg	-	-	< 20	< 20
TRH C15-C28	50	mg/kg	-	-	< 50	< 50
TRH C29-C36	50	mg/kg	-	-	< 50	< 50
TRH C10-36 (Total)	50	mg/kg	-	-	< 50	< 50
BTEX						
Benzene	0.1	mg/kg	96%	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	99%	< 0.1	0.3	3.0
Ethylbenzene	0.1	mg/kg	96%	< 0.1	0.6	3.9
m&p-Xylenes	0.2	mg/kg	99%	< 0.2	2.5	18
o-Xylene	0.1	mg/kg	99%	< 0.1	2.0	7.8
Xylenes - Total	0.3	mg/kg	99%	< 0.3	4.5	26
4-Bromofluorobenzene (surr.)	1	%	72	70	87	78
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH C6-C10	20	mg/kg	96%	< 20	-	-
Volatile Organics						
Naphthalene[N02]	0.5	mg/kg	-	< 0.5	-	-
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	-	-	2.1	4.8
TRH C6-C10	20	mg/kg	-	-	38	160
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	-	-	33	130
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	-	-	< 50	< 50
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	-	-	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	-	-	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	-	-	1.2	1.2
Acenaphthene	0.5	mg/kg	-	-	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	-	-	< 0.5	< 0.5
Anthracene	0.5	mg/kg	-	-	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	-	-	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	-	-	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	-	-	< 0.5	< 0.5
Benzo(g,h,i)perylene	0.5	mg/kg	-	-	< 0.5	< 0.5

Client Sample ID			TS 160225-17	TB 160225-16	DUP1	BH01/3.5-3.7
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins | mgt Sample No.			S16-Fe27128	S16-Fe27129	S16-Fe27131	S16-Fe27132
Date Sampled			Feb 25, 2016	Feb 25, 2016	Feb 25, 2016	Feb 25, 2016
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Benzo(k)fluoranthene	0.5	mg/kg	-	-	< 0.5	< 0.5
Chrysene	0.5	mg/kg	-	-	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	-	-	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	-	-	< 0.5	< 0.5
Fluorene	0.5	mg/kg	-	-	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	-	-	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	-	-	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	-	-	< 0.5	< 0.5
Pyrene	0.5	mg/kg	-	-	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	-	-	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	-	-	88	98
p-Terphenyl-d14 (surr.)	1	%	-	-	98	111
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	50	mg/kg	-	-	< 50	< 50
TRH >C16-C34	100	mg/kg	-	-	< 100	< 100
TRH >C34-C40	100	mg/kg	-	-	< 100	< 100
Heavy Metals						
Lead	5	mg/kg	-	-	19	18

Client Sample ID			BH01/0.4-0.5	BH02/0.5-0.6	BH02/3.3-3.5	BH03/0.05-0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins | mgt Sample No.			S16-Fe27133	S16-Fe27134	S16-Fe27135	S16-Fe27136
Date Sampled			Feb 25, 2016	Feb 25, 2016	Feb 25, 2016	Feb 25, 2016
Test/Reference	LOR	Unit				
% Moisture	1	%	10	12	10	14
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	< 50	< 50	< 50
TRH C29-C36	50	mg/kg	< 50	< 50	< 50	< 50
TRH C10-36 (Total)	50	mg/kg	< 50	< 50	< 50	< 50
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	0.2	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	0.4	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	2.1	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	2.2	< 0.1
Xylenes - Total	0.3	mg/kg	< 0.3	< 0.3	4.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	87	85	85	71
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	1.8	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	39	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	34	< 20
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50	< 50

eurofins | mgt

Client Sample ID			BH01/0.4-0.5	BH02/0.5-0.6	BH02/3.3-3.5	BH03/0.05-0.2
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins | mgt Sample No.			S16-Fe27133	S16-Fe27134	S16-Fe27135	S16-Fe27136
Date Sampled			Feb 25, 2016	Feb 25, 2016	Feb 25, 2016	Feb 25, 2016
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g,h,i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a,h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1,2,3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	94	95	94	97
p-Terphenyl-d14 (surr.)	1	%	105	109	108	111
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100	< 100
Heavy Metals						
Lead	5	mg/kg	72	74	21	140

Client Sample ID			BH03/1.9-2.0	HA02/0.0-0.15	HA01/0.05-0.15	HA03/0.5-0.6
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins | mgt Sample No.			S16-Fe27137	S16-Fe27138	S16-Fe27139	S16-Fe27140
Date Sampled			Feb 25, 2016	Feb 25, 2016	Feb 25, 2016	Feb 25, 2016
Test/Reference	LOR	Unit				
Conductivity (1:5 aqueous extract at 25°C)	10	uS/cm	-	74	25	-
pH (1:5 Aqueous extract)	0.1	pH Units	-	6.8	6.6	-
Total Organic Carbon[M10]	0.1	%	-	11	7.4	-
% Moisture	1	%	14	10	8.9	15
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	190	< 50	< 50
TRH C29-C36	50	mg/kg	< 50	300	63	< 50
TRH C10-36 (Total)	50	mg/kg	< 50	490	63	< 50

Client Sample ID			BH03/1.9-2.0	HA02/0.0-0.15	HA01/0.05-0.15	HA03/0.5-0.6
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins | mgt Sample No.			S16-Fe27137	S16-Fe27138	S16-Fe27139	S16-Fe27140
Date Sampled			Feb 25, 2016	Feb 25, 2016	Feb 25, 2016	Feb 25, 2016
Test/Reference	LOR	Unit				
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	71	90	89	90
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH C8-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C8-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50	< 50
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g,h,i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a,h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1,2,3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	96	94	103	93
p-Terphenyl-d14 (surr.)	1	%	107	108	112	108
Organochlorine Pesticides						
Chlordanes - Total	0.1	mg/kg	-	< 0.1	< 0.1	< 0.1
4,4'-DDD	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05
4,4'-DDE	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05
4,4'-DDT	0.05	mg/kg	-	0.06	< 0.05	< 0.05
a-BHC	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05
Aldrin	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05
b-BHC	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05
d-BHC	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05
Dieldrin	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05
Endosulfan I	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05
Endosulfan II	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05
Endosulfan sulphate	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05
Endrin	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05

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Client Sample ID			BH03/1.9-2.0	HA02/0.0-0.15	HA01/0.05-0.15	HA03/0.5-0.6
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins | mgt Sample No.			S16-Fe27137	S16-Fe27138	S16-Fe27139	S16-Fe27140
Date Sampled			Feb 25, 2016	Feb 25, 2016	Feb 25, 2016	Feb 25, 2016
Test/Reference	LOR	Unit				
Organochlorine Pesticides						
Endrin aldehyde	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05
Endrin ketone	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05
g-BHC (Lindane)	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05
Heptachlor	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05
Heptachlor epoxide	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05
Hexachlorobenzene	0.05	mg/kg	-	< 0.05	< 0.05	< 0.05
Methoxychlor	0.2	mg/kg	-	< 0.2	< 0.2	< 0.2
Toxaphene	1	mg/kg	-	< 1	< 1	< 1
Dibutylchlorendate (surr.)	1	%	-	71	72	73
Tetrachloro-m-xylene (surr.)	1	%	-	74	74	79
Organophosphorus Pesticides (OP)						
Chlorpyrifos	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Coumaphos	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Demeton (total)	1	mg/kg	-	< 1	< 1	< 1
Diazinon	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Dichlorvos	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Dimethoate	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Disulfoton	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Ethoprop	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Fenitrothion	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Fensulfothion	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Fenthion	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Methyl azinphos	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Malathion	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Methyl parathion	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Mevinphos	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Monocrotophos	10	mg/kg	-	< 10	< 10	< 10
Parathion	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Phorate	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Profenofos	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Prothiofos	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Ronnel	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Stirophos	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Trichloronate	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Triphenylphosphate (surr.)	1	%	-	78	90	99
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	480	< 100	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100	< 100
Heavy Metals						
Arsenic	2	mg/kg	-	7.1	6.6	9.8
Cadmium	0.4	mg/kg	-	0.8	0.6	< 0.4
Chromium	5	mg/kg	-	22	23	40
Copper	5	mg/kg	-	77	28	< 5
Lead	5	mg/kg	100	500	170	24
Mercury	0.05	mg/kg	-	0.07	0.17	< 0.05
Nickel	5	mg/kg	-	17	14	8.7
Zinc	5	mg/kg	-	530	310	59
Ion Exchange Properties						
Cation Exchange Capacity	0.05	meq/100g	-	29	12	-

Client Sample ID			HA04/0.0-0.15	HA05/0.0-0.15
Sample Matrix			Soil	Soil
Eurofins | mgt Sample No.			S16-Fe27141	S16-Fe27142
Date Sampled			Feb 25, 2016	Feb 25, 2016
Test/Reference	LOR	Unit		
% Moisture	1	%	16	17
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				
TRH C6-C9	20	mg/kg	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	< 50
TRH C29-C36	50	mg/kg	< 50	< 50
TRH C10-36 (Total)	50	mg/kg	< 50	< 50
BTEX				
Benzene	0.1	mg/kg	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1
Xylenes - Total	0.3	mg/kg	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	89	81
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50
Polycyclic Aromatic Hydrocarbons				
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5
Benzo(g,h,i)perylene	0.5	mg/kg	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5
Dibenz(a,h)anthracene	0.5	mg/kg	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5
Indeno(1,2,3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	100	95
p-Terphenyl-d14 (surr.)	1	%	114	108
Organochlorine Pesticides				
Chlordanes - Total	0.1	mg/kg	< 0.1	< 0.1
4,4'-DDD	0.05	mg/kg	< 0.05	< 0.05
4,4'-DDE	0.05	mg/kg	< 0.05	< 0.05
4,4'-DDT	0.05	mg/kg	< 0.05	< 0.05
a-BHC	0.05	mg/kg	< 0.05	< 0.05

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Client Sample ID Sample Matrix Eurofins | mgt Sample No. Date Sampled Test/Reference	LOR	Unit	HA04/0.0-0.15 Soil S16-Fe27141 Feb 25, 2016	HA05/0.0-0.15 Soil S16-Fe27142 Feb 25, 2016
Organochlorine Pesticides				
Aldrin	0.05	mg/kg	< 0.05	< 0.05
b-BHC	0.05	mg/kg	< 0.05	< 0.05
d-BHC	0.05	mg/kg	< 0.05	< 0.05
Dieldrin	0.05	mg/kg	< 0.05	< 0.05
Endosulfan I	0.05	mg/kg	< 0.05	< 0.05
Endosulfan II	0.05	mg/kg	< 0.05	< 0.05
Endosulfan sulphate	0.05	mg/kg	< 0.05	< 0.05
Endrin	0.05	mg/kg	< 0.05	< 0.05
Endrin aldehyde	0.05	mg/kg	< 0.05	< 0.05
Endrin ketone	0.05	mg/kg	< 0.05	< 0.05
g-BHC (Lindane)	0.05	mg/kg	< 0.05	< 0.05
Heptachlor	0.05	mg/kg	< 0.05	< 0.05
Heptachlor epoxide	0.05	mg/kg	< 0.05	< 0.05
Hexachlorobenzene	0.05	mg/kg	< 0.05	< 0.05
Methoxychlor	0.2	mg/kg	< 0.2	< 0.2
Toxaphene	1	mg/kg	< 1	< 1
Dibutylchlorendate (surr.)	1	%	74	71
Tetrachloro-m-xylene (surr.)	1	%	83	84
Organophosphorus Pesticides (OP)				
Chlorpyrifos	0.5	mg/kg	< 0.5	< 0.5
Coumaphos	0.5	mg/kg	< 0.5	< 0.5
Demeton (total)	1	mg/kg	< 1	< 1
Diazinon	0.5	mg/kg	< 0.5	< 0.5
Dichlorvos	0.5	mg/kg	< 0.5	< 0.5
Dimethoate	0.5	mg/kg	< 0.5	< 0.5
Disulfoton	0.5	mg/kg	< 0.5	< 0.5
Ethoprop	0.5	mg/kg	< 0.5	< 0.5
Fenitrothion	0.5	mg/kg	< 0.5	< 0.5
Fensulfothion	0.5	mg/kg	< 0.5	< 0.5
Fenthion	0.5	mg/kg	< 0.5	< 0.5
Methyl azinphos	0.5	mg/kg	< 0.5	< 0.5
Malathion	0.5	mg/kg	< 0.5	< 0.5
Methyl parathion	0.5	mg/kg	< 0.5	< 0.5
Mevinphos	0.5	mg/kg	< 0.5	< 0.5
Monocrotophos	10	mg/kg	< 10	< 10
Parathion	0.5	mg/kg	< 0.5	< 0.5
Phorate	0.5	mg/kg	< 0.5	< 0.5
Profenofos	0.5	mg/kg	< 0.5	< 0.5
Prothiofos	0.5	mg/kg	< 0.5	< 0.5
Ronnel	0.5	mg/kg	< 0.5	< 0.5
Stirophos	0.5	mg/kg	< 0.5	< 0.5
Trichloronate	0.5	mg/kg	< 0.5	< 0.5
Triphenylphosphate (surr.)	1	%	98	94
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				
TRH >C10-C16	50	mg/kg	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100

Client Sample ID			HA04/0.0-0.15	HA05/0.0-0.15
Sample Matrix			Soil	Soil
Eurofins | mgt Sample No.			S16-Fe27141	S16-Fe27142
Date Sampled			Feb 25, 2016	Feb 25, 2016
Test/Reference	LOR	Unit		
Heavy Metals				
Arsenic	2	mg/kg	11	10
Cadmium	0.4	mg/kg	0.6	< 0.4
Chromium	5	mg/kg	36	49
Copper	5	mg/kg	33	19
Lead	5	mg/kg	89	78
Mercury	0.05	mg/kg	0.09	0.09
Nickel	5	mg/kg	8.4	7.4
Zinc	5	mg/kg	260	180

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Sample History

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

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
TRH C6-C10 less BTEX (F1)	Sydney	Feb 29, 2016	14 Day
- Method: LM-LTM-ORG-2010			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Sydney	Mar 02, 2016	14 Day
- Method: TRH C6-C38 - LTM-ORG-2010			
BTEX	Sydney	Mar 02, 2016	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Mar 01, 2016	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Volatile Organics	Sydney	Mar 01, 2016	7 Day
- Method: E016 Volatile Organic Compounds (VOC)			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Mar 02, 2016	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Conductivity (1:5 aqueous extract at 25°C)	Melbourne	Mar 02, 2016	7 Day
- Method: LTM-INO-4030			
Ion Exchange Properties	Melbourne	Mar 03, 2016	
pH (1:5 Aqueous extract)	Sydney	Mar 02, 2016	7 Day
- Method: LTM-GEN-7090 pH in soil by ISE			
Total Organic Carbon	Melbourne	Mar 02, 2016	28 Day
- Method: APHA 5310B Total Organic Carbon			
Organochlorine Pesticides	Sydney	Mar 02, 2016	14 Day
- Method: E013 Organochlorine Pesticides (OC)			
Organophosphorus Pesticides (OP)	Sydney	Mar 02, 2016	14 Day
- Method: E014 Organophosphorus Pesticides (OP)			
Metals M8	Sydney	Mar 02, 2016	28 Day
- Method: LTM-MET-3040_R0 TOTAL AND DISSOLVED METALS AND MERCURY IN WATERS BY ICP-MS			
Heavy Metals	Sydney	Mar 02, 2016	180 Day
- Method: LTM-MET-3030 by ICP-OES (hydride ICP-OES for Mercury)			
% Moisture	Sydney	Feb 29, 2016	14 Day
- Method: LTM-GEN-7080 Moisture			
Eurofins | mgt Suite B4			
Polycyclic Aromatic Hydrocarbons	Sydney	Mar 02, 2016	14 Day
- Method: E007 Polyaromatic Hydrocarbons (PAH)			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Mar 02, 2016	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			

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NATA # 1261 Site # 20794

Company Name:	Coffey Environments Pty Ltd NSW	**Order No.:**	
Address:	Level 20, Tower B, Citadel Tower 799 Pacific Highway Chatswood NSW 2067	**Report #:**	490931
		Phone:	+61 2 9406 1000
		Fax:	+61 2 9406 1004
Project Name:	ER04835AB		

Received:	Feb 29, 2016 3:36 PM
Due:	Mar 7, 2016
Priority:	5 Day
Contact Name:	Matthew Locke

Eurofins | mgt Client Manager: Cheri Du Preez

Sample Detail					Asbestos Absence /Presence	HOLD	Lead	pH (1:5 Aqueous extract)	Total Organic Carbon	Organochlorine Pesticides	Metals M8	Organophosphorus Pesticides (OP)	Moisture Set	Cation Exchange Capacity	Eurofins | mgt Suite B4	BTEX and Volatile TRH
Laboratory where analysis is conducted																
Melbourne Laboratory - NATA Site # 1254 & 14271									X					X		
Sydney Laboratory - NATA Site # 18217					X	X	X	X		X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794																
External Laboratory																
Sample ID	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**												
TS 160225-17	Feb 25, 2016		Soil	S16-Fe27128												X
TB 160225-16	Feb 25, 2016		Soil	S16-Fe27129												X
DUP1	Feb 25, 2016		Soil	S16-Fe27131			X						X		X	
BH01/3.5-3.7	Feb 25, 2016		Soil	S16-Fe27132			X						X		X	
BH01/0.4-0.5	Feb 25, 2016		Soil	S16-Fe27133			X						X		X	
BH02/0.5-0.8	Feb 25, 2016		Soil	S16-Fe27134			X						X		X	
BH02/3.3-3.5	Feb 25, 2016		Soil	S16-Fe27135			X						X		X	
BH03/0.05-0.2	Feb 25, 2016		Soil	S16-Fe27136			X						X		X	
BH03/1.9-2.0	Feb 25, 2016		Soil	S16-Fe27137			X						X		X	
HA02/0.0-0.15	Feb 25, 2016		Soil	S16-Fe27138	X			X	X	X	X	X	X	X	X	

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NATA # 1261 Site # 20794

Company Name:	Coffey Environments Pty Ltd NSW	**Order No.:**	
Address:	Level 20, Tower B, Citadel Tower 799 Pacific Highway Chatswood NSW 2067	**Report #:**	490931
		Phone:	+61 2 9406 1000
		Fax:	+61 2 9406 1004
Project Name:	ER04835AB		

Received:	Feb 29, 2016 3:36 PM
Due:	Mar 7, 2016
Priority:	5 Day
Contact Name:	Matthew Locke

Eurofins | mgt Client Manager: Charl Du Preez

Sample Detail					Asbestos Absence /Presence	HOLD	Lead	pH (1:5 Aqueous extract)	Total Organic Carbon	Organochlorine Pesticides	Metals M8	Organophosphorus Pesticides (OP)	Moisture Set	Cation Exchange Capacity	Eurofins | mgt Suite B4	BTEX and Volatile TRH
Laboratory where analysis is conducted																
Melbourne Laboratory - NATA Site # 1254 & 14271									X					X		
Sydney Laboratory - NATA Site # 18217					X	X	X	X		X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794																
External Laboratory																
HA01/0.05-0.15	Feb 25, 2016		Soil	S16-Fe27139	X			X	X	X	X	X	X	X	X	
HA03/0.5-0.8	Feb 25, 2016		Soil	S16-Fe27140	X					X	X	X	X		X	
HA04/0.0-0.15	Feb 25, 2016		Soil	S16-Fe27141	X					X	X	X	X		X	
HA05/0.0-0.15	Feb 25, 2016		Soil	S16-Fe27142	X					X	X	X	X		X	
BH01/0.05-0.2	Feb 25, 2016		Soil	S16-Fe27143		X										
BH01/2.4-2.5	Feb 25, 2016		Soil	S16-Fe27144		X										
BH01/5.3-5.5	Feb 25, 2016		Soil	S16-Fe27145		X										
BH01/5.8-6.0	Feb 25, 2016		Soil	S16-Fe27146		X										
BH01/0.9-1.0	Feb 25, 2016		Soil	S16-Fe27147		X										
BH01/1.8-2.0	Feb 25, 2016		Soil	S16-Fe27148		X										
BH02/0.05-0.2	Feb 25, 2016		Soil	S16-Fe27149		X										

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		Phone:	+61 2 9406 1000
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Received:	Feb 29, 2016 3:36 PM
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Contact Name:	Matthew Locke

Eurofins | mgt Client Manager: Charl Du Preez

Sample Detail					Asbestos Absence /Presence	HOLD	Lead	pH (1:5 Aqueous extract)	Total Organic Carbon	Organochlorine Pesticides	Metals M8	Organophosphorus Pesticides (OP)	Moisture Set	Cation Exchange Capacity	Eurofins | mgt Suite B4	BTEX and Volatile TRH
Laboratory where analysis is conducted																
Melbourne Laboratory - NATA Site # 1254 & 14271									X					X		
Sydney Laboratory - NATA Site # 18217					X	X	X	X		X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794																
External Laboratory																
BH02/2.2-2.4	Feb 25, 2016		Soil	S16-Fe27150		X										
BH02/5.6-6.0	Feb 25, 2016		Soil	S16-Fe27151		X										
BH02/0.7-0.8	Feb 25, 2016		Soil	S16-Fe27152		X										
BH02/4.2-4.8	Feb 25, 2016		Soil	S16-Fe27153		X										
BH03/0.5-0.6	Feb 25, 2016		Soil	S16-Fe27154		X										
BH03/3.0-3.1	Feb 25, 2016		Soil	S16-Fe27155		X										
BH03/4.0-4.2	Feb 25, 2016		Soil	S16-Fe27156		X										
BH03/5.4-5.5	Feb 25, 2016		Soil	S16-Fe27157		X										
BH03/0.6-0.9	Feb 25, 2016		Soil	S16-Fe27158		X										
HA02/0.3-0.5	Feb 25, 2016		Soil	S16-Fe27159		X										
HA02/0.6-0.9	Feb 25, 2016		Soil	S16-Fe27160		X										

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Company Name:	Coffey Environments Pty Ltd NSW	**Order No.:**		**Received:**	Feb 29, 2016 3:36 PM
Address:	Level 20, Tower B, Citadel Tower 799 Pacific Highway Chatswood NSW 2067	**Report #:**	490931	**Due:**	Mar 7, 2016
		Phone:	+61 2 9406 1000	**Priority:**	5 Day
		Fax:	+61 2 9406 1004	**Contact Name:**	Matthew Locke
Project Name:	ER04835AB				

Eurofins | mgt Client Manager: Charl Du Preez

Sample Detail					Asbestos Absence /Presence	HOLD	Lead	pH (1:5 Aqueous extract)	Total Organic Carbon	Organochlorine Pesticides	Metals M8	Organophosphorus Pesticides (OP)	Moisture Set	Cation Exchange Capacity	Eurofins | mgt Suite B4	BTEX and Volatile TRH
Laboratory where analysis is conducted																
Melbourne Laboratory - NATA Site # 1254 & 14271									X					X		
Sydney Laboratory - NATA Site # 18217					X	X	X	X		X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794																
External Laboratory																
HA01/0.9-1.0	Feb 25, 2016		Soil	S16-Fe27161		X										
HA01/0.4-0.5	Feb 25, 2016		Soil	S16-Fe27162		X										
HA03/0.0-0.15	Feb 25, 2016		Soil	S16-Fe27163		X										
HA03/0.6-0.9	Feb 25, 2016		Soil	S16-Fe27164		X										
HA04/0.3-0.4	Feb 25, 2016		Soil	S16-Fe27165		X										
HA05/0.5-0.6	Feb 25, 2016		Soil	S16-Fe27166		X										
HA05/0.6-0.9	Feb 25, 2016		Soil	S16-Fe27167		X										
SP01-1	Feb 25, 2016		Soil	S16-Fe27168		X										

Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

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

Units

mg/kg: milligrams per Kilogram

ug/l: micrograms per litre

ppb: Parts per billion

org/100ml: Organisms per 100 millilitres

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

mg/l: milligrams per litre

ppm: Parts per million

%: Percentage

NTU: Nephelometric Turbidity Units

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery
CRM	Certified Reference Material - reported as percent recovery
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands. In the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
Batch Duplicate	A second piece of analysis from a sample outside of the clients batch of samples but run within the laboratory batch of analysis.
Batch SPIKE	Spike recovery reported on a sample from outside of the clients batch of samples but run within the laboratory batch of analysis.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
ASLP	Australian Standard Leaching Procedure (Eurofins | mgt uses NATA accredited in-house method LTM-GEN-7010)
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

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

Results <10 times the LOR : No Limit

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

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

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

QC Data General Comments

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

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Conductivity (1:5 aqueous extract at 25°C)	uS/cm	< 10			10	Pass	
Total Organic Carbon	%	< 0.1			0.1	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	mg/kg	< 20			20	Pass	
TRH C10-C14	mg/kg	< 20			20	Pass	
TRH C15-C28	mg/kg	< 50			50	Pass	
TRH C29-C36	mg/kg	< 50			50	Pass	
Method Blank							
BTEX							
Benzene	mg/kg	< 0.1			0.1	Pass	
Toluene	mg/kg	< 0.1			0.1	Pass	
Ethylbenzene	mg/kg	< 0.1			0.1	Pass	
m&p-Xylenes	mg/kg	< 0.2			0.2	Pass	
o-Xylene	mg/kg	< 0.1			0.1	Pass	
Xylenes - Total	mg/kg	< 0.3			0.3	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH C6-C10	mg/kg	< 20			20	Pass	
Method Blank							
Volatile Organics							
Naphthalene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/kg	< 0.5			0.5	Pass	
TRH C6-C10	mg/kg	< 20			20	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/kg	< 0.5			0.5	Pass	
Acenaphthylene	mg/kg	< 0.5			0.5	Pass	
Anthracene	mg/kg	< 0.5			0.5	Pass	
Benz(a)anthracene	mg/kg	< 0.5			0.5	Pass	
Benzo(a)pyrene	mg/kg	< 0.5			0.5	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Benzo(g,h,i)perylene	mg/kg	< 0.5			0.5	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Chrysene	mg/kg	< 0.5			0.5	Pass	
Dibenz(a,h)anthracene	mg/kg	< 0.5			0.5	Pass	
Fluoranthene	mg/kg	< 0.5			0.5	Pass	
Fluorene	mg/kg	< 0.5			0.5	Pass	
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.5			0.5	Pass	
Naphthalene	mg/kg	< 0.5			0.5	Pass	
Phenanthrene	mg/kg	< 0.5			0.5	Pass	
Pyrene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Organochlorine Pesticides							
Chlordanes - Total	mg/kg	< 0.1			0.1	Pass	
4,4'-DDD	mg/kg	< 0.05			0.05	Pass	
4,4'-DDE	mg/kg	< 0.05			0.05	Pass	
4,4'-DDT	mg/kg	< 0.05			0.05	Pass	
a-BHC	mg/kg	< 0.05			0.05	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Aldrin	mg/kg	< 0.05			0.05	Pass	
b-BHC	mg/kg	< 0.05			0.05	Pass	
d-BHC	mg/kg	< 0.05			0.05	Pass	
Dieldrin	mg/kg	< 0.05			0.05	Pass	
Endosulfan I	mg/kg	< 0.05			0.05	Pass	
Endosulfan II	mg/kg	< 0.05			0.05	Pass	
Endosulfan sulphate	mg/kg	< 0.05			0.05	Pass	
Endrin	mg/kg	< 0.05			0.05	Pass	
Endrin aldehyde	mg/kg	< 0.05			0.05	Pass	
Endrin ketone	mg/kg	< 0.05			0.05	Pass	
g-BHC (Lindane)	mg/kg	< 0.05			0.05	Pass	
Heptachlor	mg/kg	< 0.05			0.05	Pass	
Heptachlor epoxide	mg/kg	< 0.05			0.05	Pass	
Hexachlorobenzene	mg/kg	< 0.05			0.05	Pass	
Methoxychlor	mg/kg	< 0.2			0.2	Pass	
Toxaphene	mg/kg	< 1			1	Pass	
Method Blank							
Organophosphorus Pesticides (OP)							
Chlorpyrifos	mg/kg	< 0.5			0.5	Pass	
Coumaphos	mg/kg	< 0.5			0.5	Pass	
Diazinon	mg/kg	< 0.5			0.5	Pass	
Dichlorvos	mg/kg	< 0.5			0.5	Pass	
Dimethoate	mg/kg	< 0.5			0.5	Pass	
Disulfoton	mg/kg	< 0.5			0.5	Pass	
Ethoprop	mg/kg	< 0.5			0.5	Pass	
Fenitrothion	mg/kg	< 0.5			0.5	Pass	
Fensulfothion	mg/kg	< 0.5			0.5	Pass	
Fenthion	mg/kg	< 0.5			0.5	Pass	
Methyl azinphos	mg/kg	< 0.5			0.5	Pass	
Malathion	mg/kg	< 0.5			0.5	Pass	
Methyl parathion	mg/kg	< 0.5			0.5	Pass	
Mevinphos	mg/kg	< 0.5			0.5	Pass	
Monocrotophos	mg/kg	< 10			10	Pass	
Parathion	mg/kg	< 0.5			0.5	Pass	
Phorate	mg/kg	< 0.5			0.5	Pass	
Profenofos	mg/kg	< 0.5			0.5	Pass	
Prothiofos	mg/kg	< 0.5			0.5	Pass	
Ronnel	mg/kg	< 0.5			0.5	Pass	
Stirophos	mg/kg	< 0.5			0.5	Pass	
Trichloronate	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH >C10-C16	mg/kg	< 50			50	Pass	
TRH >C16-C34	mg/kg	< 100			100	Pass	
TRH >C34-C40	mg/kg	< 100			100	Pass	
Method Blank							
Heavy Metals							
Arsenic	mg/kg	< 2			2	Pass	
Cadmium	mg/kg	< 0.4			0.4	Pass	
Chromium	mg/kg	< 5			5	Pass	
Copper	mg/kg	< 5			5	Pass	
Lead	mg/kg	< 5			5	Pass	
Mercury	mg/kg	< 0.05			0.05	Pass	
Nickel	mg/kg	< 5			5	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Zinc	mg/kg	< 5			5	Pass	
Method Blank							
Ion Exchange Properties							
Cation Exchange Capacity	meq/100g	< 0.05			0.05	Pass	
LCS - % Recovery							
Total Organic Carbon	%	125			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	92			70-130	Pass	
TRH C10-C14	%	74			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	98			70-130	Pass	
Toluene	%	85			70-130	Pass	
Ethylbenzene	%	88			70-130	Pass	
m&p-Xylenes	%	90			70-130	Pass	
o-Xylene	%	90			70-130	Pass	
Xylenes - Total	%	90			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH C6-C10	%	98			70-130	Pass	
LCS - % Recovery							
Volatile Organics							
Naphthalene	%	81			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	85			70-130	Pass	
TRH C6-C10	%	104			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	118			70-130	Pass	
Acenaphthylene	%	100			70-130	Pass	
Anthracene	%	123			70-130	Pass	
Benz(a)anthracene	%	104			70-130	Pass	
Benzo(a)pyrene	%	102			70-130	Pass	
Benzo(b&j)fluoranthene	%	110			70-130	Pass	
Benzo(g,h,i)perylene	%	90			70-130	Pass	
Benzo(k)fluoranthene	%	111			70-130	Pass	
Chrysene	%	115			70-130	Pass	
Dibenz(a,h)anthracene	%	100			70-130	Pass	
Fluoranthene	%	113			70-130	Pass	
Fluorene	%	118			70-130	Pass	
Indeno(1,2,3-cd)pyrene	%	99			70-130	Pass	
Naphthalene	%	126			70-130	Pass	
Phenanthrene	%	123			70-130	Pass	
Pyrene	%	116			70-130	Pass	
LCS - % Recovery							
Organochlorine Pesticides							
Chlordanes - Total	%	120			70-130	Pass	
4,4'-DDD	%	129			70-130	Pass	
4,4'-DDE	%	119			70-130	Pass	
4,4'-DDT	%	71			70-130	Pass	
a-BHC	%	118			70-130	Pass	
Aldrin	%	122			70-130	Pass	

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Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
b-BHC	%	111			70-130	Pass	
d-BHC	%	125			70-130	Pass	
Dieldrin	%	120			70-130	Pass	
Endosulfan I	%	118			70-130	Pass	
Endosulfan II	%	117			70-130	Pass	
Endosulfan sulphate	%	122			70-130	Pass	
Endrin	%	109			70-130	Pass	
Endrin aldehyde	%	127			70-130	Pass	
Endrin ketone	%	119			70-130	Pass	
g-BHC (Lindane)	%	114			70-130	Pass	
Heptachlor	%	117			70-130	Pass	
Heptachlor epoxide	%	117			70-130	Pass	
Hexachlorobenzene	%	112			70-130	Pass	
Methoxychlor	%	83			70-130	Pass	
Toxaphene	%	73			70-130	Pass	
LCS - % Recovery							
Organophosphorus Pesticides (OP)							
Chlorpyrifos	%	122			70-130	Pass	
Coumaphos	%	71			70-130	Pass	
Diazinon	%	85			70-130	Pass	
Dimethoate	%	128			70-130	Pass	
Disulfoton	%	129			70-130	Pass	
Methyl azinphos	%	118			70-130	Pass	
Malathion	%	129			70-130	Pass	
Methyl parathion	%	124			70-130	Pass	
Parathion	%	127			70-130	Pass	
Phorate	%	128			70-130	Pass	
Stirophos	%	121			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH >C10-C16	%	74			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	80			70-130	Pass	
Cadmium	%	86			70-130	Pass	
Chromium	%	94			70-130	Pass	
Copper	%	94			70-130	Pass	
Lead	%	90			70-130	Pass	
Mercury	%	89			70-130	Pass	
Nickel	%	76			70-130	Pass	
Zinc	%	95			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C10-C14	S16-Fe27133	CP	%	83			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
TRH >C10-C16	S16-Fe27133	CP	%	84			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S16-Fe27135	CP	%	83			70-130	Pass	
Cadmium	S16-Fe27135	CP	%	92			70-130	Pass	
Chromium	S16-Fe27135	CP	%	87			70-130	Pass	
Copper	S16-Fe27135	CP	%	75			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Lead	S16-Fe27135	CP	%	93			70-130	Pass	
Mercury	S16-Fe27135	CP	%	97			70-130	Pass	
Nickel	S16-Fe27135	CP	%	85			70-130	Pass	
Zinc	S16-Fe27135	CP	%	75			70-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	S16-Fe27136	CP	%	113			70-130	Pass	
Acenaphthylene	S16-Fe27136	CP	%	99			70-130	Pass	
Anthracene	S16-Fe27136	CP	%	118			70-130	Pass	
Benz(a)anthracene	S16-Fe27136	CP	%	106			70-130	Pass	
Benzo(a)pyrene	S16-Fe27136	CP	%	108			70-130	Pass	
Benzo(b&j)fluoranthene	S16-Fe27136	CP	%	105			70-130	Pass	
Benzo(g,h,i)perylene	S16-Fe27136	CP	%	98			70-130	Pass	
Benzo(k)fluoranthene	S16-Fe27136	CP	%	116			70-130	Pass	
Chrysene	S16-Fe27136	CP	%	113			70-130	Pass	
Dibenz(a,h)anthracene	S16-Fe27136	CP	%	103			70-130	Pass	
Fluoranthene	S16-Fe27136	CP	%	118			70-130	Pass	
Fluorene	S16-Fe27136	CP	%	113			70-130	Pass	
Indeno(1,2,3-cd)pyrene	S16-Fe27136	CP	%	100			70-130	Pass	
Naphthalene	S16-Fe27136	CP	%	118			70-130	Pass	
Phenanthrene	S16-Fe27136	CP	%	120			70-130	Pass	
Pyrene	S16-Fe27136	CP	%	118			70-130	Pass	
Spike - % Recovery									
Organochlorine Pesticides				Result 1					
Chlordanes - Total	S16-Fe26148	NCP	%	88			70-130	Pass	
4,4'-DDD	S16-Fe26148	NCP	%	79			70-130	Pass	
4,4'-DDE	S16-Fe26148	NCP	%	86			70-130	Pass	
4,4'-DDT	S16-Fe26148	NCP	%	77			70-130	Pass	
a-BHC	S16-Fe26148	NCP	%	90			70-130	Pass	
Aldrin	S16-Fe26148	NCP	%	95			70-130	Pass	
b-BHC	S16-Fe26148	NCP	%	82			70-130	Pass	
d-BHC	S16-Fe26148	NCP	%	101			70-130	Pass	
Dieldrin	S16-Fe26148	NCP	%	83			70-130	Pass	
Endosulfan I	S16-Fe26148	NCP	%	87			70-130	Pass	
Endosulfan II	S16-Fe26148	NCP	%	77			70-130	Pass	
Endosulfan sulphate	S16-Fe26148	NCP	%	80			70-130	Pass	
Endrin	S16-Fe26148	NCP	%	83			70-130	Pass	
Endrin aldehyde	S16-Fe26148	NCP	%	70			70-130	Pass	
Endrin ketone	S16-Fe26148	NCP	%	85			70-130	Pass	
g-BHC (Lindane)	S16-Fe26148	NCP	%	83			70-130	Pass	
Heptachlor	S16-Fe26148	NCP	%	103			70-130	Pass	
Heptachlor epoxide	S16-Fe26148	NCP	%	83			70-130	Pass	
Hexachlorobenzene	S16-Fe26148	NCP	%	89			70-130	Pass	
Methoxychlor	S16-Fe26148	NCP	%	81			70-130	Pass	
Toxaphene	S16-Ma02116	NCP	%	74			70-130	Pass	
Spike - % Recovery									
Organophosphorus Pesticides (OP)				Result 1					
Chlorpyrifos	S16-Ma01179	NCP	%	84			70-130	Pass	
Coumaphos	S16-Ma02242	NCP	%	79			70-130	Pass	
Diazinon	S16-Ma01179	NCP	%	84			70-130	Pass	
Fenitrothion	S16-Ma01179	NCP	%	104			70-130	Pass	
Methyl azinphos	S16-Ma01179	NCP	%	82			70-130	Pass	
Malathion	S16-Ma01179	NCP	%	81			70-130	Pass	
Phorate	S16-Ma01179	NCP	%	85			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Stirophos	S16-Ma01179	NCP	%	75			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S16-Ma01134	NCP	%	86			70-130	Pass	
Cadmium	S16-Ma01134	NCP	%	100			70-130	Pass	
Chromium	S16-Ma01134	NCP	%	96			70-130	Pass	
Copper	S16-Ma01134	NCP	%	91			70-130	Pass	
Mercury	S16-Ma01134	NCP	%	94			70-130	Pass	
Nickel	S16-Ma01134	NCP	%	91			70-130	Pass	
Zinc	S16-Ma01995	NCP	%	107			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	S16-Fe27140	CP	%	84			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	S16-Fe27140	CP	%	115			70-130	Pass	
Toluene	S16-Fe27140	CP	%	94			70-130	Pass	
Ethylbenzene	S16-Fe27140	CP	%	91			70-130	Pass	
m&p-Xylenes	S16-Fe27140	CP	%	93			70-130	Pass	
o-Xylene	S16-Fe27140	CP	%	94			70-130	Pass	
Xylenes - Total	S16-Fe27140	CP	%	93			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
TRH C6-C10	S16-Fe27140	CP	%	93			70-130	Pass	
Spike - % Recovery									
Volatile Organics				Result 1					
Naphthalene	S16-Fe27140	CP	%	82			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S16-Fe27132	CP	%	10	9.7	5.0	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C10-C14	S16-Fe27132	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	S16-Fe27132	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C29-C36	S16-Fe27132	CP	mg/kg	< 50	< 50	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
TRH >C10-C16	S16-Fe27132	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C16-C34	S16-Fe27132	CP	mg/kg	< 100	< 100	<1	30%	Pass	
TRH >C34-C40	S16-Fe27132	CP	mg/kg	< 100	< 100	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S16-Fe27134	CP	mg/kg	12	13	10	30%	Pass	
Cadmium	S16-Fe27134	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	S16-Fe27134	CP	mg/kg	37	44	16	30%	Pass	
Copper	S16-Fe27134	CP	mg/kg	19	15	24	30%	Pass	
Lead	S16-Fe27134	CP	mg/kg	74	64	14	30%	Pass	
Mercury	S16-Fe27134	CP	mg/kg	0.33	0.32	5.0	30%	Pass	
Nickel	S16-Fe27134	CP	mg/kg	5.4	< 5	19	30%	Pass	
Zinc	S16-Fe27134	CP	mg/kg	100	78	29	30%	Pass	

Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	S16-Fe27135	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	S16-Fe27135	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	S16-Fe27135	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	S16-Fe27135	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	S16-Fe27135	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	S16-Fe27135	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g,h,i)perylene	S16-Fe27135	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	S16-Fe27135	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	S16-Fe27135	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a,h)anthracene	S16-Fe27135	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	S16-Fe27135	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	S16-Fe27135	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1,2,3-cd)pyrene	S16-Fe27135	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	S16-Fe27135	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	S16-Fe27135	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	S16-Fe27135	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (1:5 aqueous extract at 25°C)	M16-Ma00750	NCP	uS/cm	53	47	13	30%	Pass	
pH (1:5 Aqueous extract)	S16-Fe28121	NCP	pH Units	4.9	4.9	pass	30%	Pass	
Duplicate									
Organophosphorus Pesticides (OP)				Result 1	Result 2	RPD			
Chlorpyrifos	S16-Ma01178	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Coumaphos	S16-Ma01178	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Diazinon	S16-Ma01178	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dichlorvos	S16-Ma01178	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dimethoate	S16-Ma01178	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Disulfoton	S16-Ma01178	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Ethoprop	S16-Ma01178	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fenitrothion	S16-Ma01178	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fensulfothion	S16-Ma01178	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fenthion	S16-Ma01178	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Methyl azinphos	S16-Ma01178	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Malathion	S16-Ma01178	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Methyl parathion	S16-Ma01178	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Mevinphos	S16-Ma01178	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Monocrotophos	S16-Ma01178	NCP	mg/kg	< 10	< 10	<1	30%	Pass	
Parathion	S16-Ma01178	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phorate	S16-Ma01178	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Profenofos	S16-Ma01178	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Prothiofos	S16-Ma01178	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Ronnel	S16-Ma01178	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Stirophos	S16-Ma01178	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Trichloronate	S16-Ma01178	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Total Organic Carbon	S16-Fe27139	CP	%	7.4	8.6	16	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	S16-Fe27139	CP	mg/kg	< 20	< 20	<1	30%	Pass	

Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	S16-Fe27139	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	S16-Fe27139	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	S16-Fe27139	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	S16-Fe27139	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	S16-Fe27139	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total	S16-Fe27139	CP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C10	S16-Fe27139	CP	mg/kg	< 20	< 20	<1	30%	Pass	
Duplicate									
Volatile Organics				Result 1	Result 2	RPD			
Naphthalene	S16-Fe27139	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Organochlorine Pesticides				Result 1	Result 2	RPD			
Chlordanes - Total	S16-Fe27139	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
4,4'-DDD	S16-Fe27139	CP	mg/kg	< 0.05	0.07	200	30%	Fail	Q15
4,4'-DDE	S16-Fe27139	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4,4'-DDT	S16-Fe27139	CP	mg/kg	< 0.05	0.40	160	30%	Fail	Q15
a-BHC	S16-Fe27139	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Aldrin	S16-Fe27139	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
b-BHC	S16-Fe27139	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
d-BHC	S16-Fe27139	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Dieldrin	S16-Fe27139	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan I	S16-Fe27139	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan II	S16-Fe27139	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan sulphate	S16-Fe27139	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin	S16-Fe27139	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin aldehyde	S16-Fe27139	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin ketone	S16-Fe27139	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
g-BHC (Lindane)	S16-Fe27139	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor	S16-Fe27139	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor epoxide	S16-Fe27139	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Hexachlorobenzene	S16-Fe27139	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Methoxychlor	S16-Fe27139	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Toxaphene	S16-Fe27139	CP	mg/kg	< 1	< 1	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S16-Fe27142	CP	%	17	16	7.0	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C10-C14	S16-Fe27142	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	S16-Fe27142	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C29-C36	S16-Fe27142	CP	mg/kg	< 50	< 50	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
TRH >C10-C16	S16-Fe27142	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C16-C34	S16-Fe27142	CP	mg/kg	< 100	< 100	<1	30%	Pass	
TRH >C34-C40	S16-Fe27142	CP	mg/kg	< 100	< 100	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S16-Fe27142	CP	mg/kg	10	13	26	30%	Pass	
Cadmium	S16-Fe27142	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	S16-Fe27142	CP	mg/kg	49	34	36	30%	Fail	Q15
Copper	S16-Fe27142	CP	mg/kg	19	18	5.0	30%	Pass	

Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S16-Fe27142	CP	mg/kg	78	77	1.0	30%	Pass	
Mercury	S16-Fe27142	CP	mg/kg	0.09	0.09	3.0	30%	Pass	
Nickel	S16-Fe27142	CP	mg/kg	7.4	8.9	19	30%	Pass	
Zinc	S16-Fe27142	CP	mg/kg	180	180	3.0	30%	Pass	

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Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
M10	NATA accreditation does not cover the performance of this service in soil matrices
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QA/QC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
Q05	The matrix spike recovery is outside of the recommended acceptance criteria. An acceptable recovery was obtained for the laboratory control sample indicating a sample matrix interference
Q15	The RPD reported passes Eurofins | mgt's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised By

Cheri Du Preez	Analytical Services Manager
Bob Symons	Senior Analyst-Inorganic (NSW)
Emily Rosenberg	Senior Analyst-Metal (VIC)
Huong Le	Senior Analyst-Inorganic (VIC)
Ivan Taylor	Senior Analyst-Metal (NSW)
Rhys Thomas	Senior Analyst-Asbestos (NSW)
Ryan Hamilton	Senior Analyst-Organic (NSW)
Ryan Hamilton	Senior Analyst-Volatile (NSW)

Glenn Jackson
National Operations Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

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

Uncertainty data is available on request

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Certificate of Analysis

NATA Accredited
Accreditation Number 1261
Site Number 18217

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

Coffey Environments Pty Ltd NSW
Level 20, Tower B, Citadel Tower 799 Pacific Highway
Chatswood
NSW 2067

Attention:	Matthew Locke
Report	490931-AID
Project Name	ER04835AB
Received Date	Feb 29, 2016
Date Reported	Mar 08, 2016

Methodology:

Asbestos ID	Conducted in accordance with the Australian Standard AS 4964 – 2004: Method for the Qualitative Identification of Asbestos in Bulk Samples and in-house Method LTM-ASB-8020 by polarised light microscopy (PLM) and dispersion staining (DS) techniques. Bulk samples include building materials, soils and ores.
Subsampling Soil Samples	The whole sample submitted is first dried and then sieved through a 10mm sieve followed by a 2mm sieve. All fibrous matter viz greater than 10mm, greater than 2mm as well as the material passing through the 2mm sieve are retained and analysed for the presence of asbestos. If the sub 2mm fraction is greater than approximately 30 to 60g then a sub-sampling routine based on ISO 3082:2009(E) Iron ores - Sampling and Sample preparation procedures is employed. Depending on the nature and size of the soil sample, the sub-2 mm residue material may need to be sub-sampled for trace analysis in accordance with AS 4964-2004.
Bonded asbestos-containing material (ACM)	The material is first examined and any fibres isolated and where required interfering organic fibres or matter may be removed by treating the sample for several hours at a temperature not exceeding 400 ± 30°C. The resultant material is then ground and examined in accordance with AS 4964-2004.
Limit of Reporting	The nominal detection limit of the AS4964 method is around 0.01%. The examination of large sample sizes (at least 500 ml is recommended) may improve the likelihood of identifying asbestos material in the greater than 2 mm fraction. The NEPM screening level of 0.001% w/w asbestos in soil for FA and AF (i.e. non-bonded/friable asbestos) only applies where the FA and AF are able to be quantified by gravimetric procedures. This screening level is not applicable to free fibres. NOTE: NATA News, September 2011 – page 34, states, "Weighing of fibres is problematic and can lead to loss of fibres and potential exposure for laboratory analysts. To request laboratories to report information which is outside the scope of AS 4964-2004 and the scope of their accreditation is misleading and is most unwise" therefore such values reported are outside the scope of Eurofins | mgt NATA accreditation as designated by an asterisk.

Project Name ER04835AB
Project ID
Date Sampled Feb 25, 2016
Report 490931-AID

Client Sample ID	Eurofins | mgt Sample No.	Date Sampled	Sample Description	Result
HA02/0.0-0.15	16-Fe27138	Feb 25, 2016	Approximate Sample 78g Sample consisted of: Brown fine grain soil and rocks	Chrysotile and crocidolite asbestos detected in fibre cement fragments. Approximate raw weight of asbestos containing material = 0.0147g Organic fibre detected. No respirable fibres detected.
HA01/0.05-0.15	16-Fe27139	Feb 25, 2016	Approximate Sample 77g Sample consisted of: Brown fine grain soil and rocks	Chrysotile asbestos detected in weathered fibre cement fragments. Approximate raw weight of asbestos containing material = 0.0019g Organic fibre detected. No respirable fibres detected.
HA03/0.5-0.8	16-Fe27140	Feb 25, 2016	Approximate Sample 70g Sample consisted of: Brown fine grain soil and rocks	No asbestos detected. Organic fibre detected. No respirable fibres detected.
HA04/0.0-0.15	16-Fe27141	Feb 25, 2016	Approximate Sample 67g Sample consisted of: Brown fine grain soil and rocks	No asbestos detected. Organic fibre detected. No respirable fibres detected.
HA05/0.0-0.15	16-Fe27142	Feb 25, 2016	Approximate Sample 64g Sample consisted of: Brown fine grain soil and rocks	No asbestos detected. Organic fibre detected. No respirable fibres detected.

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Sample History

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

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Asbestos - LTM-ASB-8020	Sydney	Mar 07, 2016	Indefinite

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NATA # 1261
Site # 1254 & 14271

Sydney
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Lane Cove West NSW 2066
Phone : +61 2 9900 8400
NATA # 1261 Site # 18217

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

Company Name:	Coffey Environments Pty Ltd NSW	**Order No.:**		**Received:**	Feb 29, 2016 3:36 PM
Address:	Level 20, Tower B, Citadel Tower 799 Pacific Highway Chatswood NSW 2067	**Report #:**	490931	**Due:**	Mar 7, 2016
		Phone:	+61 2 9406 1000	**Priority:**	5 Day
		Fax:	+61 2 9406 1004	**Contact Name:**	Matthew Locke
Project Name:	ER04835AB				

Eurofins | mgt Client Manager: Cheri Du Preez

Sample Detail					Asbestos Absence /Presence	HOLD	Lead	pH (1:5 Aqueous extract)	Total Organic Carbon	Organochlorine Pesticides	Metals M8	Organophosphorus Pesticides (OP)	Moisture Set	Cation Exchange Capacity	Eurofins | mgt Suite B4	BTEX and Volatile TRH
Laboratory where analysis is conducted																
Melbourne Laboratory - NATA Site # 1254 & 14271									X					X		
Sydney Laboratory - NATA Site # 18217					X	X	X	X		X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794																
External Laboratory																
Sample ID	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**												
TS 160225-17	Feb 25, 2016		Soil	S16-Fe27128												X
TB 160225-16	Feb 25, 2016		Soil	S16-Fe27129												X
DUP1	Feb 25, 2016		Soil	S16-Fe27131			X						X		X	
BH01/3.5-3.7	Feb 25, 2016		Soil	S16-Fe27132			X						X		X	
BH01/0.4-0.5	Feb 25, 2016		Soil	S16-Fe27133			X						X		X	
BH02/0.5-0.6	Feb 25, 2016		Soil	S16-Fe27134			X						X		X	
BH02/3.3-3.5	Feb 25, 2016		Soil	S16-Fe27135			X						X		X	
BH03/0.05-0.2	Feb 25, 2016		Soil	S16-Fe27136			X						X		X	
BH03/1.9-2.0	Feb 25, 2016		Soil	S16-Fe27137			X						X		X	
HA02/0.0-0.15	Feb 25, 2016		Soil	S16-Fe27138	X			X	X	X	X	X	X	X	X	

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NATA # 1261 Site # 20794

Company Name:	Coffey Environments Pty Ltd NSW	**Order No.:**	
Address:	Level 20, Tower B, Citadel Tower 799 Pacific Highway Chatswood NSW 2067	**Report #:** **Phone:** **Fax:**	490931 +61 2 9406 1000 +61 2 9406 1004
Project Name:	ER04835AB		

Received:	Feb 29, 2016 3:36 PM
Due:	Mar 7, 2016
Priority:	5 Day
Contact Name:	Matthew Locke

Eurofins | mgt Client Manager: Charl Du Preez

Sample Detail					Asbestos Absence /Presence	HOLD	Lead	pH (1:5 Aqueous extract)	Total Organic Carbon	Organochlorine Pesticides	Metals M8	Organophosphorus Pesticides (OP)	Moisture Set	Cation Exchange Capacity	Eurofins | mgt Suite B4	BTEX and Volatile TRH
Laboratory where analysis is conducted																
Melbourne Laboratory - NATA Site # 1254 & 14271									X					X		
Sydney Laboratory - NATA Site # 18217					X	X	X	X		X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794																
External Laboratory																
HA01/0.05-0.15	Feb 25, 2016		Soil	S16-Fe27139	X			X	X	X	X	X	X	X	X	
HA03/0.5-0.8	Feb 25, 2016		Soil	S16-Fe27140	X					X	X	X	X		X	
HA04/0.0-0.15	Feb 25, 2016		Soil	S16-Fe27141	X					X	X	X	X		X	
HA05/0.0-0.15	Feb 25, 2016		Soil	S16-Fe27142	X					X	X	X	X		X	
BH01/0.05-0.2	Feb 25, 2016		Soil	S16-Fe27143		X										
BH01/2.4-2.5	Feb 25, 2016		Soil	S16-Fe27144		X										
BH01/5.3-5.5	Feb 25, 2016		Soil	S16-Fe27145		X										
BH01/5.8-6.0	Feb 25, 2016		Soil	S16-Fe27146		X										
BH01/0.9-1.0	Feb 25, 2016		Soil	S16-Fe27147		X										
BH01/1.8-2.0	Feb 25, 2016		Soil	S16-Fe27148		X										
BH02/0.05-0.2	Feb 25, 2016		Soil	S16-Fe27149		X										

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Site # 1254 & 14271

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NATA # 1261 Site # 18217

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

Company Name:	Coffey Environments Pty Ltd NSW	**Order No.:**	
Address:	Level 20, Tower B, Citadel Tower 799 Pacific Highway Chatswood NSW 2067	**Report #:**	490931
		Phone:	+61 2 9406 1000
		Fax:	+61 2 9406 1004
Project Name:	ER04835AB		

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Laboratory where analysis is conducted																
Melbourne Laboratory - NATA Site # 1254 & 14271									X					X		
Sydney Laboratory - NATA Site # 18217					X	X	X	X		X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794																
External Laboratory																
BH02/2.2-2.4	Feb 25, 2016		Soil	S16-Fe27150		X										
BH02/5.6-6.0	Feb 25, 2016		Soil	S16-Fe27151		X										
BH02/0.7-0.8	Feb 25, 2016		Soil	S16-Fe27152		X										
BH02/4.2-4.8	Feb 25, 2016		Soil	S16-Fe27153		X										
BH03/0.5-0.6	Feb 25, 2016		Soil	S16-Fe27154		X										
BH03/3.0-3.1	Feb 25, 2016		Soil	S16-Fe27155		X										
BH03/4.0-4.2	Feb 25, 2016		Soil	S16-Fe27156		X										
BH03/5.4-5.5	Feb 25, 2016		Soil	S16-Fe27157		X										
BH03/0.8-0.9	Feb 25, 2016		Soil	S16-Fe27158		X										
HA02/0.3-0.5	Feb 25, 2016		Soil	S16-Fe27159		X										
HA02/0.8-0.9	Feb 25, 2016		Soil	S16-Fe27160		X										

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Address:	Level 20, Tower B, Citadel Tower 799 Pacific Highway Chatswood NSW 2067	**Report #:** **Phone:** **Fax:**	490931 +61 2 9406 1000 +61 2 9406 1004
Project Name:	ER04835AB		

Received:	Feb 29, 2016 3:36 PM
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Sample Detail					Asbestos Absence /Presence	HOLD	Lead	pH (1:5 Aqueous extract)	Total Organic Carbon	Organochlorine Pesticides	Metals M8	Organophosphorus Pesticides (OP)	Moisture Set	Cation Exchange Capacity	Eurofins | mgt Suite B4	BTEX and Volatile TRH
Laboratory where analysis is conducted																
Melbourne Laboratory - NATA Site # 1254 & 14271									X					X		
Sydney Laboratory - NATA Site # 18217					X	X	X	X		X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794																
External Laboratory																
HA01/0.9-1.0	Feb 25, 2016		Soil	S16-Fe27161		X										
HA01/0.4-0.5	Feb 25, 2016		Soil	S16-Fe27162		X										
HA03/0.0-0.15	Feb 25, 2016		Soil	S16-Fe27163		X										
HA03/0.8-0.9	Feb 25, 2016		Soil	S16-Fe27164		X										
HA04/0.3-0.4	Feb 25, 2016		Soil	S16-Fe27165		X										
HA05/0.5-0.8	Feb 25, 2016		Soil	S16-Fe27166		X										
HA05/0.8-0.9	Feb 25, 2016		Soil	S16-Fe27167		X										
SP01-1	Feb 25, 2016		Soil	S16-Fe27168		X										

Internal Quality Control Review and Glossary

General

1. QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Samples were analysed on an 'as received' basis.
4. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (OS3001).

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

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

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

Units

% w/w: weight for weight basis	grams per kilogram
Filter loading:	fibres/100 graticule areas
Reported Concentration:	fibres/mL
Flowrate:	L/min

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
COC	Chain of custody
SRA	Sample Receipt Advice
ISO	International Standards Organisation
AS	Australian Standards
WA DOH	Western Australia Department of Health
NOHSC	National Occupational Health and Safety Commission
ACM	Bonded asbestos-containing material means any material containing more than 1% asbestos and comprises asbestos-containing-material which is in sound condition, although possibly broken or fragmented, and where the asbestos is bound in a matrix such as cement or resin. Common examples of ACM include but are not limited to: pipe and boiler insulation, sprayed-on fireproofing, troweled-on acoustical plaster, floor tile and mastic, floor linoleum, transite shingles, roofing materials, wall and ceiling plaster, ceiling tiles, and gasket materials. This term is restricted to material that cannot pass a 7 mm x 7 mm sieve. This sieve size is selected because it approximates the thickness of common asbestos cement sheeting and for fragments to be smaller than this would imply a high degree of damage and hence potential for fibre release.
FA	FA comprises friable asbestos material and includes severely weathered cement sheet, insulation products and woven asbestos material. This type of friable asbestos is defined here as asbestos material that is in a degraded condition such that it can be broken or crumbled by hand pressure. This material is typically unbonded or was previously bonded and is now significantly degraded (crumbling).
PACM	Presumed Asbestos-Containing Material means thermal system insulation and surfacing material found in buildings, vessels, and vessel sections constructed no later than 1980 that are assumed to contain greater than one percent asbestos but have not been sampled or analyzed to verify or negate the presence of asbestos.
AF	Asbestos fines (AF) are defined as free fibres, or fibre bundles, smaller than 7mm. It is the free fibres which present the greatest risk to human health, although very small fibres (< 5 microns in length) are not considered to be such a risk. AF also includes small fragments of bonded ACM that pass through a 7 mm x 7 mm sieve. (Note that for bonded ACM fragments to pass through a 7 mm x 7 mm sieve implies a substantial degree of damage which increases the potential for fibre release.)
AC	Asbestos cement means a mixture of cement and asbestos fibres (typically 90:10 ratio).

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Comments

The samples received were not collected in approved asbestos bags and were therefore sub-sampled from the 250mL glass jars. Valid sub-sampling procedures were applied so as to ensure that the sub-samples to be analysed accurately represented the samples received.

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N/A	Not applicable

Authorised by:

Rhys Thomas Senior Analyst-Asbestos (NSW)

Glenn Jackson
National Operations Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

Uncertainty data is available on request

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: ES1604693	Page	: 1 of 4
Client	: COFFEY ENVIRONMENTS PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR MATTHEW LOCKE	Contact	: Angelene Kumar
Address	: 8/12 MARS ROAD LANE COVE WEST NSW, AUSTRALIA 2066	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: matthew.locke@coffey.com	E-mail	: angelene.kumar@alsglobal.com
Telephone	: +61 02 9911 1000	Telephone	: +61 2 8784 8555
Facsimile	: +61 +61 9911 1001	Facsimile	: +61-2-8784 8500
Project	: ER04835AB	QC Level	: NEPM 2013 B3 & ALS QC Standard
Order number	: 07705	Date Samples Received	: 01-Mar-2016 14:50
C-O-C number	: 07705	Date Analysis Commenced	: 03-Mar-2016
Sampler	: PRESTON ALMA	Issue Date	: 08-Mar-2016 18:35
Site	:		
		No. of samples received	: 1
Quote number	: —	No. of samples analysed	: 1

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Pabi Subba	Senior Organic Chemist	Sydney Inorganics, Smithfield, NSW
Pabi Subba	Senior Organic Chemist	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.

- EG005T: Poor precision was obtained for Lead on sample and ES1604579 #001 due to sample heterogeneity.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.8mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	DUP1-A	—	—	—	—
			Client sampling date / time	[26-Feb-2016]	—	—	—	—
Compound	CAS Number	LOR	Unit	ES1604693-001	------	------	------	------
				Result	Result	Result	Result	Result
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	—	1	%	9.3	—	—	—	—
EG005T: Total Metals by ICP-AES								
Lead	7439-92-1	5	mg/kg	19	—	—	—	—
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	—	—	—	—
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	—	—	—	—
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	—	—	—	—
Fluorene	86-73-7	0.5	mg/kg	<0.5	—	—	—	—
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	—	—	—	—
Anthracene	120-12-7	0.5	mg/kg	<0.5	—	—	—	—
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	—	—	—	—
Pyrene	129-00-0	0.5	mg/kg	<0.5	—	—	—	—
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	—	—	—	—
Chrysene	218-01-9	0.5	mg/kg	<0.5	—	—	—	—
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	—	—	—	—
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	—	—	—	—
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	—	—	—	—
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	—	—	—	—
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	—	—	—	—
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	—	—	—	—
^ Sum of polycyclic aromatic hydrocarbons	—	0.5	mg/kg	<0.5	—	—	—	—
^ Benzo(a)pyrene TEQ (zero)	—	0.5	mg/kg	<0.5	—	—	—	—
^ Benzo(a)pyrene TEQ (half LOR)	—	0.5	mg/kg	0.6	—	—	—	—
^ Benzo(a)pyrene TEQ (LOR)	—	0.5	mg/kg	1.2	—	—	—	—
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	—	10	mg/kg	<10	—	—	—	—
C10 - C14 Fraction	—	50	mg/kg	<50	—	—	—	—
C15 - C28 Fraction	—	100	mg/kg	<100	—	—	—	—
C29 - C36 Fraction	—	100	mg/kg	<100	—	—	—	—
^ C10 - C36 Fraction (sum)	—	50	mg/kg	<50	—	—	—	—
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	—	—	—	—
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10	—	—	—	—

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	DUP1-A	—	—	—	—
				Client sampling date / time	[26-Feb-2016]	—	—	—	—
Compound	CAS Number	LOR	Unit		ES1604693-001	———	———	———	———
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
>C10 - C16 Fraction	—	50	mg/kg		<50	—	—	—	—
>C16 - C34 Fraction	—	100	mg/kg		<100	—	—	—	—
>C34 - C40 Fraction	—	100	mg/kg		<100	—	—	—	—
^ >C10 - C40 Fraction (sum)	—	50	mg/kg		<50	—	—	—	—
^ >C10 - C16 Fraction minus Naphthalene (F2)	—	50	mg/kg		<50	—	—	—	—
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	—	—	—	—
Toluene	108-88-3	0.5	mg/kg		<0.5	—	—	—	—
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	—	—	—	—
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	—	—	—	—
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	—	—	—	—
^ Sum of BTEX	—	0.2	mg/kg		<0.2	—	—	—	—
^ Total Xylenes	1330-20-7	0.5	mg/kg		<0.5	—	—	—	—
Naphthalene	91-20-3	1	mg/kg		<1	—	—	—	—
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		89.9	—	—	—	—
2-Chlorophenol-D4	93951-73-6	0.5	%		88.1	—	—	—	—
2.4.6-Tribromophenol	118-79-6	0.5	%		67.3	—	—	—	—
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		88.3	—	—	—	—
Anthracene-d10	1719-06-8	0.5	%		121	—	—	—	—
4-Terphenyl-d14	1718-51-0	0.5	%		88.9	—	—	—	—
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		121	—	—	—	—
Toluene-D8	2037-26-5	0.2	%		117	—	—	—	—
4-Bromofluorobenzene	460-00-4	0.2	%		121	—	—	—	—

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: ES1604693	Page	: 1 of 8
Client	: COFFEY ENVIRONMENTS PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR MATTHEW LOCKE	Contact	: Angelene Kumar
Address	: 8/12 MARS ROAD LANE COVE WEST NSW, AUSTRALIA 2066	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: matthew.locke@coffey.com	E-mail	: angelene.kumar@alsglobal.com
Telephone	: +61 02 9911 1000	Telephone	: +61 2 8784 8555
Facsimile	: +61 +61 9911 1001	Facsimile	: +61-2-8784 8500
Project	: ER04835AB	QC Level	: NEPM 2013 B3 & ALS QC Standard
Order number	: 07705	Date Samples Received	: 01-Mar-2016
C-O-C number	: 07705	Date Analysis Commenced	: 03-Mar-2016
Sampler	: PRESTON ALMA	Issue Date	: 08-Mar-2016
Site	:	No. of samples received	: 1
Quote number	: —	No. of samples analysed	: 1

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

NATA WORLD RECOGNISED ACCREDITATION

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Pabi Subba	Senior Organic Chemist	Sydney Inorganics, Smithfield, NSW
Pabi Subba	Senior Organic Chemist	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: SOIL

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA055: Moisture Content (QC Lot: 384286)									
ES1604660-007	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	—	1	%	18.3	18.1	1.10	0% - 50%
ES1604670-002	Anonymous	EA055-103: Moisture Content (dried @ 103°C)	—	1	%	6.0	4.9	19.2	No Limit
EG005T: Total Metals by ICP-AES (QC Lot: 383569)									
ES1604579-001	Anonymous	EG005T: Lead	7439-92-1	5	mg/kg	114	# 90	23.9	0% - 20%
ES1604758-005	Anonymous	EG005T: Lead	7439-92-1	5	mg/kg	12	21	53.6	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 382159)									
ES1604631-008	Anonymous	EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	—	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	—	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
ES1604631-001	Anonymous	EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	—	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

Sub-Matrix: SOIL

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report: LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 382159) - continued									
ES1604631-001	Anonymous	EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	—	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 382158)									
ES1604631-008	Anonymous	EP071: C15 - C28 Fraction	—	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	—	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	—	50	mg/kg	<50	<50	0.00	No Limit
ES1604631-001	Anonymous	EP071: C15 - C28 Fraction	—	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	—	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	—	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 383407)									
ES1604876-001	Anonymous	EP080: C6 - C9 Fraction	—	10	mg/kg	<10	<10	0.00	No Limit
ES1604876-006	Anonymous	EP080: C6 - C9 Fraction	—	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 382158)									
ES1604631-008	Anonymous	EP071: >C16 - C34 Fraction	—	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	—	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	—	50	mg/kg	<50	<50	0.00	No Limit
ES1604631-001	Anonymous	EP071: >C16 - C34 Fraction	—	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	—	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	—	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 383407)									
ES1604876-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
ES1604876-006	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EP080: BTEXN (QC Lot: 383407)									
ES1604876-001	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
ES1604876-006	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit

Sub-Matrix: SOIL

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080: BTEXN (QC Lot: 383407) - continued									
ES1604876-006	Anonymous	EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005T: Total Metals by ICP-AES (QCLot: 383569)								
EG005T: Lead	7439-92-1	5	mg/kg	<5	40 mg/kg	91.2	80	114
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 382159)								
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	109	73	127
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	102	72	124
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	113	77	127
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	96.0	69	123
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	101	70	126
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	6 mg/kg	95.3	68	118
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	78.0	63	121
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	104	74	126
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	103	75	127
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	85.2	62	118
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	111	73	127
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	108	72	126
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	81.4	61	121
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	107	77	125
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	108	75	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	113	74	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 382158)								
EP071: C10 - C14 Fraction	---	50	mg/kg	<50	200 mg/kg	115	75	129
EP071: C15 - C28 Fraction	---	100	mg/kg	<100	300 mg/kg	122	77	131
EP071: C29 - C36 Fraction	---	100	mg/kg	<100	200 mg/kg	110	71	129
EP080/071: Total Petroleum Hydrocarbons (QCLot: 383407)								
EP080: C6 - C9 Fraction	---	10	mg/kg	<10	26 mg/kg	94.4	68	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 382158)								
EP071: >C10 - C16 Fraction	---	50	mg/kg	<50	250 mg/kg	115	77	125
EP071: >C16 - C34 Fraction	---	100	mg/kg	<100	350 mg/kg	122	74	138
EP071: >C34 - C40 Fraction	---	100	mg/kg	<100	150 mg/kg	96.5	63	131
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 383407)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	93.7	68	128
EP080: BTEXN (QCLot: 383407)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	87.2	62	116
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	81.1	65	117

Sub-Matrix: SOIL

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Laboratory Control Spike (LCS) Report: Spike Recovery (%): LCS	Laboratory Control Spike (LCS) Report: Recovery Limits (%): Low	Laboratory Control Spike (LCS) Report: Recovery Limits (%): High
EP080: BTEXN (QCLot: 383407) - continued								
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	84.7	66	118
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	90.2	63	119
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	86.6	68	120
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	88.3	67	121

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: SOIL

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	Matrix Spike (MS) Report: SpikeRecovery(%): MS	Matrix Spike (MS) Report: Recovery Limits (%): Low	Matrix Spike (MS) Report: Recovery Limits (%): High
EG005T: Total Metals by ICP-AES (QCLot: 383569)							
ES1604579-002	Anonymous	EG005T: Lead	7439-92-1	250 mg/kg	94.1	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 382159)							
ES1604631-001	Anonymous	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	97.1	70	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	115	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 382158)							
ES1604631-001	Anonymous	EP071: C10 - C14 Fraction	---	523 mg/kg	95.3	73	137
		EP071: C15 - C28 Fraction	---	2319 mg/kg	104	53	131
		EP071: C29 - C36 Fraction	---	1714 mg/kg	121	52	132
EP080/071: Total Petroleum Hydrocarbons (QCLot: 383407)							
ES1604676-001	Anonymous	EP080: C6 - C9 Fraction	---	32.5 mg/kg	126	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 382158)							
ES1604631-001	Anonymous	EP071: >C10 - C16 Fraction	---	660 mg/kg	93.6	73	137
		EP071: >C16 - C34 Fraction	---	3223 mg/kg	112	53	131
		EP071: >C34 - C40 Fraction	---	1058 mg/kg	114	52	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 383407)							
ES1604676-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	122	70	130
EP080: BTEXN (QCLot: 383407)							
ES1604676-001	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	105	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	105	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	111	70	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	116	70	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	112	70	130

Sub-Matrix: SOIL

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080: BTEXN (QCLot: 383407) - continued							
ES1604876-001	Anonymous	EP080: Toluene	108-88-3	2.5 mg/kg	102	70	130

coffey

Chain of Custody

491532

No: 07709

Laboratory Quotation / Order No:

Job No: ENAURHOD 094835AB

Sheet 1 of 1

Dispatch to: (Address & Phone No.) Eurofins MGT. Lane Cove.	Sampled by: M. Locke	Consigning Officer: / Date Dispatched:
Attention: Sample Receipt	Project Manager: (report results to) M. Locke	Courier Service: / Consignment Note No:

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
M. Locke Coffey	3/3/16	AM	Sean	3/3	2:18

Comments	Sample Matrix	Container Type and Preservative	Sample No.	Date Sampled	Analyses Required: TPH/BTEX/PAH Suite B4	Lead	TRH C6-9	BTEX	Sample Condition on Receipt
*plastic preserved with HNO3	Liquid	1x Amber, 2x vial, 1 plastic	MW01	2/3/16	/	/			
# AG plastic filtered in field	"	"	MW02	"	/	/			
	"	"	MW03	"	/	/			
	"	1x Amber 2x vial	RB1	"	/	/			
	"	1x Amber 2x vial	DUP1	"	/				
		1x vial	TB	"			/	/	
		1x vial	TS160301-2	"			/	/	

Special Laboratory Instructions:

Detection Limits: Standard

Turnaround Required: Standard

JOB NUMBER MUST BE REFERENCED ON ALL SUBSEQUENT PAGES

Copies: WHITE: Sign on release. YELLOW: If dispatched to interstate Lab, Lab to sign on receipt and fax back to Coffey. BLUE: To be returned with results.

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Murarrie QLD 4172
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NATA # 1261 Site # 20794

Sample Receipt Advice

Company name:	Coffey Environments Pty Ltd NSW
Contact name:	Matthew Locke
Project name:	ENAURHOD04835AB
COC number:	Not provided
Turn around time:	5 Day
Date/Time received:	Mar 3, 2016 2:18 PM
Eurofins | mgt reference:	491532

Sample Information

- ☑ A detailed list of analytes logged into our LIMS, is included in the attached summary table.
- ☑ Sample Temperature of a random sample selected from the batch as recorded by Eurofins | mgt Sample Receipt : 4.6 degrees Celsius.
- ☑ All samples have been received as described on the above COC.
- ☑ COC has been completed correctly.
- ☑ Attempt to chill was evident.
- ☑ Appropriately preserved sample containers have been used.
- ☑ All samples were received in good condition.
- ☑ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
- ☑ Appropriate sample containers have been used.
- ☑ Sample containers for volatile analysis received with zero headspace.
- ☒ Some samples have been subcontracted.
- N/A Custody Seals intact (if used).

Notes

Vials not received for RB1. Subsampled from amber|

Contact notes

If you have any questions with respect to these samples please contact:

Charl Du Preez on Phone : +61 (2) 9900 8400 or by e.mail: charldupreez@eurofins.com.au

Results will be delivered electronically via e.mail to Matthew Locke - Matthew_Locke@coffey.com.

Note: A copy of these results will also be delivered to the general Coffey Environments Pty Ltd NSW email address.

eurofins | mgt

Certificate of Analysis

NATA Accredited
Accreditation Number 1261
Site Number 18217

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

Coffey Environments Pty Ltd NSW
Level 20, Tower B, Citadel Tower 799 Pacific Highway
Chatswood
NSW 2067

Attention: **Matthew Locke**

Report **491532-W**
Project name ENAURHOD04835AB
Received Date Mar 03, 2016

Client Sample ID			MW01	MW02	MW03	RB1
Sample Matrix			Water	Water	Water	Water
Eurofins | mgt Sample No.			S16-Ma03691	S16-Ma03692	S16-Ma03693	S16-Ma03694
Date Sampled			Mar 02, 2016	Mar 02, 2016	Mar 02, 2016	Mar 02, 2016
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	0.02	mg/L	2.1	0.39	< 0.02	< 0.02
TRH C10-C14	0.05	mg/L	0.08	< 0.05	< 0.05	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH C10-36 (Total)	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
BTEX						
Benzene	0.001	mg/L	0.15	0.027	< 0.001	< 0.001
Toluene	0.001	mg/L	0.52	0.084	< 0.001	< 0.001
Ethylbenzene	0.001	mg/L	0.11	0.018	< 0.001	< 0.001
m&p-Xylenes	0.002	mg/L	0.33	0.053	< 0.002	< 0.002
o-Xylene	0.001	mg/L	0.22	0.039	< 0.001	< 0.001
Xylenes - Total	0.003	mg/L	0.56	0.092	< 0.003	< 0.003
4-Bromofluorobenzene (surr.)	1	%	90	82	89	104
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.01	mg/L	< 0.01	< 0.01	< 0.01	< 0.01
TRH C6-C10	0.02	mg/L	2.7	0.51	< 0.02	< 0.02
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	1.4	0.29	< 0.02	< 0.02
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	0.08	< 0.05	< 0.05	< 0.05
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(g,h,i)perylene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Chrysene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Dibenz(a,h)anthracene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluoranthene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Fluorene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Indeno(1,2,3-cd)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Naphthalene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Phenanthrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Total PAH*	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001

Client Sample ID Sample Matrix Eurofins | mgt Sample No. Date Sampled Test/Reference	LOR	Unit	MW01 Water S16-Ma03691 Mar 02, 2016	MW02 Water S16-Ma03692 Mar 02, 2016	MW03 Water S16-Ma03693 Mar 02, 2016	RB1 Water S16-Ma03694 Mar 02, 2016
Polycyclic Aromatic Hydrocarbons						
2-Fluorobiphenyl (surr.)	1	%	84	84	80	70
p-Terphenyl-d14 (surr.)	1	%	71	111	104	99
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	0.05	mg/L	0.08	< 0.05	< 0.05	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1	< 0.1	< 0.1	< 0.1
Heavy Metals						
Lead (filtered)	0.001	mg/L	< 0.001	< 0.001	< 0.001	-

Client Sample ID Sample Matrix Eurofins | mgt Sample No. Date Sampled Test/Reference	LOR	Unit	DUP1 Water S16-Ma03695 Mar 02, 2016	TB Water S16-Ma03696 Mar 02, 2016	TS160301-2 Water S16-Ma03697 Mar 02, 2016
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	-	< 0.02	-
Total Recoverable Hydrocarbons - 1999 NEPM Fractions					
TRH C6-C9	0.02	mg/L	0.39	< 0.02	85%
TRH C10-C14	0.05	mg/L	< 0.05	-	-
TRH C15-C28	0.1	mg/L	< 0.1	-	-
TRH C29-C36	0.1	mg/L	< 0.1	-	-
TRH C10-36 (Total)	0.1	mg/L	< 0.1	-	-
BTEX					
Benzene	0.001	mg/L	0.025	< 0.001	103%
Toluene	0.001	mg/L	0.068	< 0.001	87%
Ethylbenzene	0.001	mg/L	0.017	< 0.001	98%
m&p-Xylenes	0.002	mg/L	0.050	< 0.002	110%
o-Xylene	0.001	mg/L	0.039	< 0.001	104%
Xylenes - Total	0.003	mg/L	0.089	< 0.003	108%
4-Bromofluorobenzene (surr.)	1	%	90	78	92
Total Recoverable Hydrocarbons - 2013 NEPM Fractions					
TRH C6-C10	0.02	mg/L	-	< 0.02	101%
Volatile Organics					
Naphthalene[N02]	0.01	mg/L	-	< 0.01	93%
Total Recoverable Hydrocarbons - 2013 NEPM Fractions					
Naphthalene[N02]	0.01	mg/L	< 0.01	-	-
TRH C6-C10	0.02	mg/L	0.50	-	-
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	0.28	-	-
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	< 0.05	-	-
Polycyclic Aromatic Hydrocarbons					
Acenaphthene	0.001	mg/L	< 0.001	-	-
Acenaphthylene	0.001	mg/L	< 0.001	-	-
Anthracene	0.001	mg/L	< 0.001	-	-
Benz(a)anthracene	0.001	mg/L	< 0.001	-	-
Benzo(a)pyrene	0.001	mg/L	< 0.001	-	-
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001	-	-
Benzo(g,h,i)perylene	0.001	mg/L	< 0.001	-	-

Client Sample ID Sample Matrix Eurofins | mgt Sample No. Date Sampled Test/Reference	LOR	Unit	DUP1 Water S16-Ma03695 Mar 02, 2016	TB Water S16-Ma03696 Mar 02, 2016	TS160301-2 Water S16-Ma03697 Mar 02, 2016
Polycyclic Aromatic Hydrocarbons					
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	-	-
Chrysene	0.001	mg/L	< 0.001	-	-
Dibenz(a,h)anthracene	0.001	mg/L	< 0.001	-	-
Fluoranthene	0.001	mg/L	< 0.001	-	-
Fluorene	0.001	mg/L	< 0.001	-	-
Indeno(1,2,3-cd)pyrene	0.001	mg/L	< 0.001	-	-
Naphthalene	0.001	mg/L	< 0.001	-	-
Phenanthrene	0.001	mg/L	< 0.001	-	-
Pyrene	0.001	mg/L	< 0.001	-	-
Total PAH*	0.001	mg/L	< 0.001	-	-
2-Fluorobiphenyl (surr.)	1	%	68	-	-
p-Terphenyl-d14 (surr.)	1	%	71	-	-
Total Recoverable Hydrocarbons - 2013 NEPM Fractions					
TRH >C10-C16	0.05	mg/L	< 0.05	-	-
TRH >C16-C34	0.1	mg/L	< 0.1	-	-
TRH >C34-C40	0.1	mg/L	< 0.1	-	-

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Sample History

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

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
TRH C6-C10 less BTEX (F1)	Sydney	Mar 04, 2016	14 Day
- Method: LM-LTM-ORG-2010			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Sydney	Mar 05, 2016	7 Day
- Method: TRH C6-C36 - LTM-ORG-2010			
BTEX	Sydney	Mar 04, 2016	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Mar 05, 2016	7 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Volatile Organics	Sydney	Mar 05, 2016	7 Day
- Method: E016 Volatile Organic Compounds (VOC)			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Mar 04, 2016	7 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Eurofins | mgt Suite B4			
Polycyclic Aromatic Hydrocarbons	Sydney	Mar 05, 2016	7 Day
- Method: E007 Polyaromatic Hydrocarbons (PAH)			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Mar 05, 2016	7 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Heavy Metals (filtered)	Sydney	Mar 04, 2016	180 Day
- Method: LTM-MET-3040 Metals in Waters by ICP-MS			

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NATA # 1261 Site # 20794

Company Name:	Coffey Environments Pty Ltd NSW	**Order No.:**		**Received:**	Mar 3, 2016 2:18 PM
Address:	Level 20, Tower B, Citadel Tower 799 Pacific Highway Chatswood NSW 2067	**Report #:** **Phone:** **Fax:**	491532 +61 2 9406 1000 +61 2 9406 1004	**Due:** **Priority:** **Contact Name:**	Mar 10, 2016 5 Day Matthew Locke
Project Name:	ENAURHOD04835AB				

Eurofins | mgt Client Manager: Cheri Du Preez

Sample Detail					Lead (filtered)	Eurofins | mgt Suite B4	BTEX and Volatile TRH
Laboratory where analysis is conducted							
Melbourne Laboratory - NATA Site # 1254 & 14271							
Sydney Laboratory - NATA Site # 18217					X	X	X
Brisbane Laboratory - NATA Site # 20794							
External Laboratory							
Sample ID	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**			
MW01	Mar 02, 2016		Water	S16-Ma03691	X	X	
MW02	Mar 02, 2016		Water	S16-Ma03692	X	X	
MW03	Mar 02, 2016		Water	S16-Ma03693	X	X	
RB1	Mar 02, 2016		Water	S16-Ma03694		X	
DUP1	Mar 02, 2016		Water	S16-Ma03695		X	
TB	Mar 02, 2016		Water	S16-Ma03696			X
TS160301-2	Mar 02, 2016		Water	S16-Ma03697			X

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Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

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

Units

mg/kg: milligrams per Kilogram
ug/l: micrograms per litre
ppb: Parts per billion
org/100ml: Organisms per 100 millilitres
MPN/100mL: Most Probable Number of organisms per 100 millilitres
mg/l: milligrams per litre
ppm: Parts per million
%: Percentage
NTU: Nephelometric Turbidity Units

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery
CRM	Certified Reference Material - reported as percent recovery
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands. In the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
Batch Duplicate	A second piece of analysis from a sample outside of the clients batch of samples but run within the laboratory batch of analysis.
Batch SPIKE	Spike recovery reported on a sample from outside of the clients batch of samples but run within the laboratory batch of analysis.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
ASLP	Australian Standard Leaching Procedure (Eurofins | mgt uses NATA accredited in-house method LTM-GEN-7010)
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

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

Results <10 times the LOR : No Limit

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

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

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

QC Data General Comments

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

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Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	mg/L	< 0.02			0.02	Pass	
TRH C10-C14	mg/L	< 0.05			0.05	Pass	
TRH C15-C28	mg/L	< 0.1			0.1	Pass	
TRH C29-C36	mg/L	< 0.1			0.1	Pass	
Method Blank							
BTEX							
Benzene	mg/L	< 0.001			0.001	Pass	
Toluene	mg/L	< 0.001			0.001	Pass	
Ethylbenzene	mg/L	< 0.001			0.001	Pass	
m&p-Xylenes	mg/L	< 0.002			0.002	Pass	
o-Xylene	mg/L	< 0.001			0.001	Pass	
Xylenes - Total	mg/L	< 0.003			0.003	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH C6-C10	mg/L	< 0.02			0.02	Pass	
Method Blank							
Volatile Organics							
Naphthalene	mg/L	< 0.01			0.01	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/L	< 0.001			0.001	Pass	
Acenaphthylene	mg/L	< 0.001			0.001	Pass	
Anthracene	mg/L	< 0.001			0.001	Pass	
Benz(a)anthracene	mg/L	< 0.001			0.001	Pass	
Benzo(a)pyrene	mg/L	< 0.001			0.001	Pass	
Benzo(b&j)fluoranthene	mg/L	< 0.001			0.001	Pass	
Benzo(g,h,i)perylene	mg/L	< 0.001			0.001	Pass	
Benzo(k)fluoranthene	mg/L	< 0.001			0.001	Pass	
Chrysene	mg/L	< 0.001			0.001	Pass	
Dibenz(a,h)anthracene	mg/L	< 0.001			0.001	Pass	
Fluoranthene	mg/L	< 0.001			0.001	Pass	
Fluorene	mg/L	< 0.001			0.001	Pass	
Indeno(1,2,3-cd)pyrene	mg/L	< 0.001			0.001	Pass	
Naphthalene	mg/L	< 0.001			0.001	Pass	
Phenanthrene	mg/L	< 0.001			0.001	Pass	
Pyrene	mg/L	< 0.001			0.001	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH >C10-C16	mg/L	< 0.05			0.05	Pass	
TRH >C16-C34	mg/L	< 0.1			0.1	Pass	
TRH >C34-C40	mg/L	< 0.1			0.1	Pass	
Method Blank							
Heavy Metals							
Lead (filtered)	mg/L	< 0.001			0.001	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	111			70-130	Pass	
TRH C10-C14	%	92			70-130	Pass	
LCS - % Recovery							
BTEX							

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Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Benzene	%	96			70-130	Pass	
Toluene	%	104			70-130	Pass	
Ethylbenzene	%	89			70-130	Pass	
m&p-Xylenes	%	94			70-130	Pass	
o-Xylene	%	90			70-130	Pass	
Xylenes - Total	%	93			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH C6-C10	%	104			70-130	Pass	
LCS - % Recovery							
Volatile Organics							
Naphthalene	%	94			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	94			70-130	Pass	
TRH C6-C10	%	104			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	91			70-130	Pass	
Acenaphthylene	%	89			70-130	Pass	
Anthracene	%	94			70-130	Pass	
Benz(a)anthracene	%	89			70-130	Pass	
Benzo(a)pyrene	%	88			70-130	Pass	
Benzo(b&j)fluoranthene	%	88			70-130	Pass	
Benzo(g.h.i)perylene	%	81			70-130	Pass	
Benzo(k)fluoranthene	%	87			70-130	Pass	
Chrysene	%	89			70-130	Pass	
Dibenz(a.h)anthracene	%	90			70-130	Pass	
Fluoranthene	%	94			70-130	Pass	
Fluorene	%	91			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	88			70-130	Pass	
Naphthalene	%	88			70-130	Pass	
Phenanthrene	%	92			70-130	Pass	
Pyrene	%	92			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH >C10-C16	%	101			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Lead (filtered)	%	110			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	S16-Ma02717	NCP	%	90			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	S16-Ma02717	NCP	%	87			70-130	Pass	
Toluene	S16-Ma02717	NCP	%	79			70-130	Pass	
Ethylbenzene	S16-Ma02717	NCP	%	87			70-130	Pass	
m&p-Xylenes	S16-Ma02717	NCP	%	92			70-130	Pass	
o-Xylene	S16-Ma02717	NCP	%	89			70-130	Pass	
Xylenes - Total	S16-Ma02717	NCP	%	91			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
TRH C6-C10	S16-Ma02717	NCP	%	93			70-130	Pass	
Spike - % Recovery									
Volatile Organics				Result 1					
Naphthalene	S16-Ma02717	NCP	%	92			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Lead (filtered)	S16-Ma03435	NCP	%	79			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	S16-Ma03416	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	S16-Ma03416	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Toluene	S16-Ma03416	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Ethylbenzene	S16-Ma03416	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
m&p-Xylenes	S16-Ma03416	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
o-Xylene	S16-Ma03416	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Xylenes - Total	S16-Ma03416	NCP	mg/L	< 0.003	< 0.003	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C10	S16-Ma03416	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Duplicate									
Volatile Organics				Result 1	Result 2	RPD			
Naphthalene	S16-Ma03416	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead (filtered)	S16-Ma03434	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	

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Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	No
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

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

Authorised By

Cheri Du Preez	Analytical Services Manager
Ivan Taylor	Senior Analyst-Metal (NSW)
Ryan Hamilton	Senior Analyst-Organic (NSW)
Ryan Hamilton	Senior Analyst-Volatile (NSW)

Glenn Jackson
National Operations Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

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

Uncertainty data is available on request

Appendix F - Laboratory Results: Summary Tables

Table 1: Soil Analytical Data Compared Against Health Assessment Criteria
Campion College, Toongabbie

Group	Chemical	Units	LOR	NEPM 2013 HILs Residential A Soil	NEPM 2013 HSL Residential A&B (0-1m)	NEPM 2013 HSL Residential A&B (1-2m)	NEPM 2013 HSL Residential A&B (2-4m)	BH01/0.4-0.5	BH01/3.5-3.7	BH02/0.5-0.6	BH02/3.3-3.5	DUP1	DUP1A	BH03/0.05-0.2	BH03/1.9-2.0	HA01/0.05-0.15	HA02/0.0-0.15	HA03/0.5-0.6	HA04/0.0-0.15	HA05/0.0-0.15
							LocCode	BH01	BH01	BH02	BH02	BH02	BH02	BH03	BH03	HA01	HA02	HA03	HA04	HA05
							Sample_Depth_Range	0.4-0.5	3.5-3.7	0.5-0.6	3.3-3.5	3.3-3.5	3.3-3.5	0.05-0.2	1.9-2	0.05-0.15	0-0.15	0.5-0.6	0-0.15	0-0.15
							Sampled_Date-Time	25/02/2016	25/02/2016	25/02/2016	25/02/2016	25/02/2016	25/02/2016	25/02/2016	25/02/2016	25/02/2016	25/02/2016	25/02/2016	25/02/2016	25/02/2016
Miscellaneous	Moisture Content (dried @ 103°C)	%	1					10	10	12	10	18	9.3	14	14	8.9	10	15	18	17
	pH (aqueous extract)	pH_Units	0.1					-	-	-	-	-	-	-	-	6.6	6.8	-	-	-
Heavy Metal	Arsenic	mg/kg	2	100				-	-	-	-	-	-	-	-	6.8	7.1	9.8	11	20
	Cadmium	mg/kg	0.4	20				-	-	-	-	-	-	-	-	0.5	0.8	<0.4	0.6	<0.4
	Chromium	mg/kg	5	100				-	-	-	-	-	-	-	-	23	22	40	86	40
	Copper	mg/kg	5	6000				-	-	-	-	-	-	-	-	28	77	<5	93	29
	Lead	mg/kg	5	300				72	18	74	21	15	18	140	100	170	500	24	89	76
	Mercury	mg/kg	0.05	40				-	-	-	-	-	-	-	-	0.17	0.07	<0.05	0.08	0.09
	Nickel	mg/kg	5	400				-	-	-	-	-	-	-	-	14	17	8.7	6.4	7.4
	Zinc	mg/kg	5	7400				-	-	-	-	-	-	-	-	310	530	59	260	180
Asbestos	Asbestos	-		Detect				-	-	-	-	-	-	-	-	Detect	Detect	Non-Detect	Non-Detect	Non-Detect
BTEX	Benzene	mg/kg	0.1		0.5	0.5	0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Ethylbenzene	mg/kg	0.1		55	NL	NL	<0.1	3.9	<0.1	0.4	0.6	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Toluene	mg/kg	0.1		160	220	310	<0.1	3	<0.1	0.2	0.3	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene (m & p)	mg/kg	0.2					<0.2	18	<0.2	2.1	2.5	<0.5	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Xylene (o)	mg/kg	0.1					<0.1	7.8	<0.1	2.2	2	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene Total	mg/kg	0.3		40	60	95	<0.3	26	<0.3	4.3	4.5	<0.5	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
PAH	Acenaphthene	mg/kg	0.5					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Acenaphthylene	mg/kg	0.5					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Anthracene	mg/kg	0.5					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)anthracene	mg/kg	0.5					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)pyrene	mg/kg	0.5					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(a)pyrene TEQ (half LOR)	mg/kg	0.5					0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Benzo(a)pyrene TEQ (LOR)	mg/kg	0.5	3				1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
	Benzo(a)pyrene TEQ (zero)	mg/kg	0.5					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(g,h,i)perylene	mg/kg	0.5					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(k)fluoranthene	mg/kg	0.5					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Chrysene	mg/kg	0.5					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Benzo(b+j)fluoranthene	mg/kg	0.5					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Dibenz(a,h)anthracene	mg/kg	0.5					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Fluoranthene	mg/kg	0.5					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Fluorene	mg/kg	0.5					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Naphthalene	mg/kg	0.5		3	NL	NL	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Phenanthrene	mg/kg	0.5					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Pyrene	mg/kg	0.5					<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Total PAHs	mg/kg	0.5	300				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TRH	TRH F1 (C6-C9-BTEX)	mg/kg	20		45	70	110	<20	130	<20	34	33	<10	<20	<20	<10	<20	<20	<20	<20
	TRH F2 (C10-C16-Naphthalene)	mg/kg	50		110	240	440	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
	Naphthalene	mg/kg	0.5		3	NL	NL	<0.5	4.4	<0.5	1.8	2.1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	TRH F3 (C16-C34)	mg/kg	100	4500				<100	<100	<100	<100	<100	<100	<100	<100	<100	480	<100	<100	<100
	TRH F4 (C34-C40)	mg/kg	100	6300				<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
	C10 - C14	mg/kg	20					<20	<20	<20	<20	<20	<50	<20	<20	<20	<20	<20	<20	<20
	C15 - C28	mg/kg	50					<50	<50	<50	<50	<50	<100	<50	<50	<50	190	<50	<50	<50
	C29 - C36	mg/kg	50					<50	<50	<50	<50	<50	<100	<50	<50	63	300	<50	<50	<50
	C10 - C36 (Sum of total)	mg/kg	50					<50	<50	<50	<50	<50	<50	<50	<50	63	490	<50	<50	<50
OCP	4,4-DDE	mg/kg	0.05					-	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	<0.05	<0.05
	Aldrin + Dieldrin	mg/kg	0.05	6				-	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	<0.05	<0.05
	a-BHC	mg/kg	0.05					-	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	<0.05	<0.05
	Aldrin	mg/kg	0.05					-	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	<0.05	<0.05
	b-BHC	mg/kg	0.05					-	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	<0.05	<0.05
	Chlordane	mg/kg	0.1	50				-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.1
	d-BHC	mg/kg	0.05					-	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	<0.05	<0.05
	DDD	mg/kg	0.05					-	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	<0.05	<0.05
	DDT	mg/kg	0.05					-	-	-	-	-	-	-	-	<0.05	0.06	<0.05	<0.05	<0.05
	DDT+DDD+DDE	mg/kg	0.05	240				-	-	-	-	-	-	-	-	<0.05	0.06	<0.05	<0.05	<0.05
	Dieldrin	mg/kg	0.05					-	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	<0.05	<0.05
	Endosulfan I	mg/kg	0.05	270				-	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	<0.05	<0.05
	Endosulfan II	mg/kg	0.05	270				-	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	<0.05	<0.05
	Endosulfan sulphate	mg/kg	0.05					-	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	<0.05	<0.05
	Endrin	mg/kg	0.05	10				-	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	<0.05	<0.05
	Endrin aldehyde	mg/kg	0.05					-	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	<0.05	<0.05
	Endrin ketone	mg/kg	0.05					-	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	<0.05	<0.05
	g-BHC (Lindane)	mg/kg	0.05					-	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	<0.05	<0.05
	Heptachlor	mg/kg	0.05	6				-	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	<0.05	<0.05
	Heptachlor epoxide	mg/kg	0.05					-	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	<0.05	<0.05
	Hexachlorobenzene	mg/kg	0.05	10				-	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	<0.05	<0.05
	Methoxychlor	mg/kg	0.2	300				-	-	-	-	-	-	-	-	<0.2	<0.2	<0.2	<0.2	<0.2
	Toxaphene	mg/kg	1	20				-	-	-	-	-	-	-	-	<1	<1	<1	<1	<1
OPP	Azinophos methyl	mg/kg	0.5					-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5
	Chlorpyrifos	mg/kg	0.5	160				-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5
	Coumaphos	mg/kg	0.5					-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5
	Demeton (total)	mg/kg	1					-	-	-	-	-	-	-	-	<1	<1	<1	<1	<1
	Diazinon	mg/kg	0.5					-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5
	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
	Disulfoton	mg/kg	0.5					-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5
	Ethoprop	mg/kg	0.5					-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5
	Fenitrothion	mg/kg	0.5					-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5
	Fensulfothion	mg/kg	0.5					-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5

Table 1: Soil Analytical Data Compared Against Health Assessment Criteria
Campion College, Youngabilla

								Field_ID	BH01/0.4-0.5	BH01/0.5-0.7	BH02/0.5-0.6	BH02/3.3-3.5	DUP1	DUP1A	BH03/0.05-0.2	BH03/1.9-2.0	HA01/0.05-0.15	HA02/0.0-0.15	HA03/0.5-0.6	HA04/0.0-0.15	HA05/0.0-0.15
								LocCode	BH01	BH01	BH01	BH02	BH02	BH02	BH03	BH03	HA01	HA02	HA03	HA04	HA05
								Sample_Depth_Range	0.4-0.5	0.5-0.7	0.5-0.6	3.3-3.5	3.3-3.5	3.3-3.5	0.05-0.2	1.9-2	0.05-0.15	0-0.15	0.5-0.6	0-0.15	0-0.15
								Sampled_Date-Time	25/02/2016	25/02/2016	25/02/2016	25/02/2016	25/02/2016	25/02/2016	25/02/2016	25/02/2016	25/02/2016	25/02/2016	25/02/2016	25/02/2016	25/02/2016
Group	Chemitems	Units	LOR	NEPM 2013 HILs Residential A Soil	NEPM 2013 HSL Residential A&B (0 1m)	NEPM 2013 HSL Residential A&B (1-2m)	NEPM 2013 HSL Residential A&B (2-4m)														
	Fenitrion	mg/kg	0.5					-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5
	Malathion	mg/kg	0.5					-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5
	Methyl parathion	mg/kg	0.5					-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5
	Mevinphos (Phosdrin)	mg/kg	0.5					-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5
	Monocrotophos	mg/kg	10					-	-	-	-	-	-	-	-	<10	<10	<10	<10	<10
	Parathion	mg/kg	0.5					-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5
	Phorate	mg/kg	0.5					-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5
	Profenofos	mg/kg	0.5					-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5
	Prothiofos	mg/kg	0.5					-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5
	Ronnel	mg/kg	0.5					-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5
	Sulprofos	mg/kg	0.5					-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5
	Trichloronate	mg/kg	0.5					-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	<0.5

Table 1: Soil Analytical Data Compared Against Ecological Assessment Criteria
Campion College, Toongabbie

				Field_ID	BH01/0.4-0.5	BH01/3.5-3.7	BH02/0.5-0.6	BH02/3.3-3.5	BH03/0.05-0.2	BH03/1.9-2.0	HA01/0.05-0.15	HA02/0.0-0.15	HA03/0.5-0.6	HA04/0.0-0.15	HA05/0.0-0.15
				LocCode	BH01	BH01	BH02	BH02	BH03	BH03	HA01	HA02	HA03	HA04	HA05
				Sample_Depth_Range	0.4-0.5	3.5-3.7	0.5-0.6	3.3-3.5	0.05-0.2	1.9-2	0.05-0.15	0-0.15	0.5-0.6	0-0.15	0-0.15
				Sampled_Date-Time	25/02/2016	25/02/2016	25/02/2016	25/02/2016	25/02/2016	25/02/2016	25/02/2016	25/02/2016	25/02/2016	25/02/2016	25/02/2016
				NEPM 2013 ESL / ESL Residential & Public Open Space											
Method_Type	ChemName	Units	LOR												
Miscellaneous	Moisture Content (dried @ 103°C)	%	1		10	10	12	10	14	14	8.9	10	15	16	17
	pH (aqueous extract)	pH_Units	0.1		-	-	-	-	-	-	6.6	6.8	-	-	-
Heavy Metal	Arsenic	mg/kg	2	100	-	-	-	-	-	-	6.6	7.1	9.8	11	10
	Cadmium	mg/kg	0.4		-	-	-	-	-	-	0.6	0.8	<0.4	0.8	<0.4
	Chromium	mg/kg	5	100	-	-	-	-	-	-	33	22	40	36	49
	Copper	mg/kg	5	210	-	-	-	-	-	-	28	77	<5	33	19
	Lead	mg/kg	5	1100	72	18	74	21	140	300	170	500	24	89	78
	Mercury	mg/kg	0.05		-	-	-	-	-	-	0.17	0.07	<0.05	0.09	0.08
	Nickel	mg/kg	5	280	-	-	-	-	-	-	14	17	8.7	6.4	7.4
	Zinc	mg/kg	5	770	-	-	-	-	-	-	310	530	59	290	180
BTEX	Benzene	mg/kg	0.1	50	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Ethylbenzene	mg/kg	0.1	70	<0.1	3.9	<0.1	0.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Toluene	mg/kg	0.1	85	<0.1	3	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene (m & p)	mg/kg	0.2		<0.2	18	<0.2	2.1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	Xylene (o)	mg/kg	0.1		<0.1	7.6	<0.1	2.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Xylene Total	mg/kg	0.3	105	<0.3	26	<0.3	4.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
PAH	Benzo(a)pyrene	mg/kg	0.5	0.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Naphthalene	mg/kg	0.5	170	<0.5	4.8	<0.5	1.8	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
TRH	TRH F1 (C6-C9-BTEX)	mg/kg	20	180	<20	130	<20	34	<20	<20	<20	<20	<20	<20	<20
	TRH F2 (C10-C16-Naphthalene)	mg/kg	50	120	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
	TRH F3 (C16-C34)	mg/kg	100	300	<100	<100	<100	<100	<100	<100	<100	480	<100	<100	<100
	TRH F4 (C34-C40)	mg/kg	100	2800	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
OCP	DDT	mg/kg	0.05	180	-	-	-	-	-	-	<0.05	0.05	<0.05	<0.05	<0.05

Table 3: Groundwater Analytical Data Compared Against Groundwater Assessment Criteria
Campion College, Toongabbie

				Field_ID	MW01	MW02	DUP1	MW03
				LocCode	MW01	MW02	DUP1	MW03
				WellCode			MW02	
				Sampled_Date-Time	2/03/2016	2/03/2016	2/03/2016	2/03/2016
				ANZECC (2000) Freshwater Groundwater Investigation Levels				
Group	ChemName	Units	LOR					
Heavy Metal	Lead (Filtered)	µg/L	0.001	3.4	<1	<1	-	<1
TPH	Naphthalene	µg/L	10	16	<10	<10	<10	<10
	C6 - C9	µg/L	20	20	2100	390	390	<20
	C10-C16	µg/L	50	50	80	<50	<50	<50
	C16-C34	µg/L	100	100	<100	<100	<100	<100
	C34-C40	µg/L	100	100	<100	<100	<100	<100
PAH	Acenaphthene	µg/L	1		<1	<1	<1	<1
	Acenaphthylene	µg/L	1		<1	<1	<1	<1
	Anthracene	µg/L	1		<1	<1	<1	<1
	Benzo(a)anthracene	µg/L	1		<1	<1	<1	<1
	Benzo(a)pyrene	µg/L	1		<1	<1	<1	<1
	Benzo(g,h,i)perylene	µg/L	1		<1	<1	<1	<1
	Benzo(k)fluoranthene	µg/L	1		<1	<1	<1	<1
	Chrysene	µg/L	1		<1	<1	<1	<1
	Benzo[b+j]fluoranthene	µg/L	1		<1	<1	<1	<1
	Dibenz(a,h)anthracene	µg/L	1		<1	<1	<1	<1
	Fluoranthene	µg/L	1		<1	<1	<1	<1
	Fluorene	µg/L	1		<1	<1	<1	<1
	Indeno(1,2,3-c,d)pyrene	µg/L	1		<1	<1	<1	<1
	Naphthalene	µg/L	1	16	<1	<1	<1	<1
	Phenanthrene	µg/L	1		<1	<1	<1	<1
	Pyrene	µg/L	1		<1	<1	<1	<1
	Total PAHs	µg/L	1		<1	<1	<1	<1
Volatile	Benzene	µg/L	1	950	150	27	26	<1
	Ethylbenzene	µg/L	1	80	110	18	17	<1
	Toluene	µg/L	1	180	520	84	88	<1
	Xylene (m & p)	µg/L	2	75	330	53	50	<2
	Xylene (o)	µg/L	1	350	220	39	39	<1
	Xylene Total	µg/L	3		550	92	89	<3

Table 4: Comparison of Primary Duplicate Soil Samples
Campion College, Toongabbie

		Field_ID	BH02/3.3-3.5	DUP1	RPD %	BH02/3.3-3.5	DUP1A	RPD %
		LocCode	BH02	BH02		BH02	BH02	
		Sample_Depth_Range	3.3-3.5	3.3-3.5		3.3-3.5	3.3-3.5	
		Sampled_Date-Time	25/02/2016	25/02/2016		25/02/2016	25/02/2016	
Method_Type	ChemName	Units	EQL					
Miscellaneous	Moisture Content (dried @ 103°C)	%	1	10	13	26%	10	9.3	7%
	pH (aqueous extract)	pH_Units	0.1	-	-	-	-	-	-
Heavy Metal	Arsenic	mg/kg	2	-	-	-	-	-	-
	Cadmium	mg/kg	0.4	-	-	-	-	-	-
	Chromium	mg/kg	5	-	-	-	-	-	-
	Copper	mg/kg	5	-	-	-	-	-	-
	Lead	mg/kg	5	21	19	10%	21	19	10%
	Mercury	mg/kg	0.05	-	-	-	-	-	-
	Nickel	mg/kg	5	-	-	-	-	-	-
	Zinc	mg/kg	5	-	-	-	-	-	-
Asbestos	Asbestos	-		-	-	-	-	-	-
BTEX	Benzene	mg/kg	0.1	<0.1	<0.1	-	<0.1	<0.2	-
	Ethylbenzene	mg/kg	0.1	0.4	0.6	40%	0.4	<0.5	-
	Toluene	mg/kg	0.1	0.2	0.3	40%	0.2	<.5	-
	Xylene (m & p)	mg/kg	0.2	2.1	2.5	17%	2.1	<0.5	-
	Xylene (o)	mg/kg	0.1	2.2	2	10%	2.2	<0.5	-
	Xylene Total	mg/kg	0.3	4.3	4.5	5%	4.3	<0.5	-
PAH	Acenaphthene	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	-
	Acenaphthylene	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	-
	Anthracene	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	-
	Benzo(a)anthracene	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	-
	Benzo(a)pyrene	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	-
	Benzo(g,h,i)perylene	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	-
	Benzo(k)fluoranthene	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	-
	Chrysene	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	-
	Benzo[b+j]fluoranthene	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	-
	Dibenz(a,h)anthracene	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	-
	Fluoranthene	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	-
	Fluorene	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	-
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	-
	Naphthalene	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	-
	Phenanthrene	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	-
	Pyrene	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	-
	Total PAHs	mg/kg	0.5	<0.5	<0.5	-	<0.5	<0.5	-
TRH	TRH F1 (C6-C9-BTEX)	mg/kg	20	34	33	3%	34	<10	-
	TRH F2 (C10-C16-Naphthalene)	mg/kg	50	<50	<50	-	<50	<50	-
	Naphthalene	mg/kg	0.5	1.8	2.1	15%	1.8	<1	-
	TRH F3 (C16-C34)	mg/kg	100	<100	<100	-	<100	<100	-
	TRH F4 (C34-C40)	mg/kg	100	<100	<100	-	<100	<100	-
	C10 - C14	mg/kg	20	<20	<20	-	<20	<50	-
	C15 - C28	mg/kg	50	<50	<50	-	<50	<100	-
	C29 - C36	mg/kg	50	<50	<50	-	<50	<100	-
	C10 - C36 (Sum of total)	mg/kg	50	<50	<50	-	<50	<50	-

Table 5: Comparison of Primary Duplicate Groundwater Samples
Campion College, Toongabbie

				Field_ID	MW02	DUP1	RPD %
				LocCode	MW02	DUP1	
				WellCode		MW02	
				Sampled_Date-Time	2/09/2016	2/09/2016	
Method_Type	ChemName	Units	EQL				
Heavy Metal	Lead (Filtered)	µg/L	0.001		<1	-	-
TPH	Naphthalene	µg/L	10		<10	<10	-
	C6 - C9	µg/L	20		390	390	0%
	C10-C16	µg/L	50		<50	<50	-
	C16-C34	µg/L	100		<100	<100	-
	C34-C40	µg/L	100		<100	<100	-
PAH	Acenaphthene	µg/L	1		<1	<1	-
	Acenaphthylene	µg/L	1		<1	<1	-
	Anthracene	µg/L	1		<1	<1	-
	Benzo(a)anthracene	µg/L	1		<1	<1	-
	Benzo(a)pyrene	µg/L	1		<1	<1	-
	Benzo(g,h,i)perylene	µg/L	1		<1	<1	-
	Benzo(k)fluoranthene	µg/L	1		<1	<1	-
	Chrysene	µg/L	1		<1	<1	-
	Benzo[b+j]fluoranthene	µg/L	1		<1	<1	-
	Dibenz(a,h)anthracene	µg/L	1		<1	<1	-
	Fluoranthene	µg/L	1		<1	<1	-
	Fluorene	µg/L	1		<1	<1	-
	Indeno(1,2,3-c,d)pyrene	µg/L	1		<1	<1	-
	Naphthalene	µg/L	1		<1	<1	-
	Phenanthrene	µg/L	1		<1	<1	-
	Pyrene	µg/L	1		<1	<1	-
	Total PAHs	µg/L	1		<1	<1	-
Volatile	Benzene	µg/L	1		27	26	4%
	Ethylbenzene	µg/L	1		18	17	6%
	Toluene	µg/L	1		84	88	5%
	Xylene (m & p)	µg/L	2		53	50	6%
	Xylene (o)	µg/L	1		39	39	0%
	Xylene Total	µg/L	3		92	89	3%

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