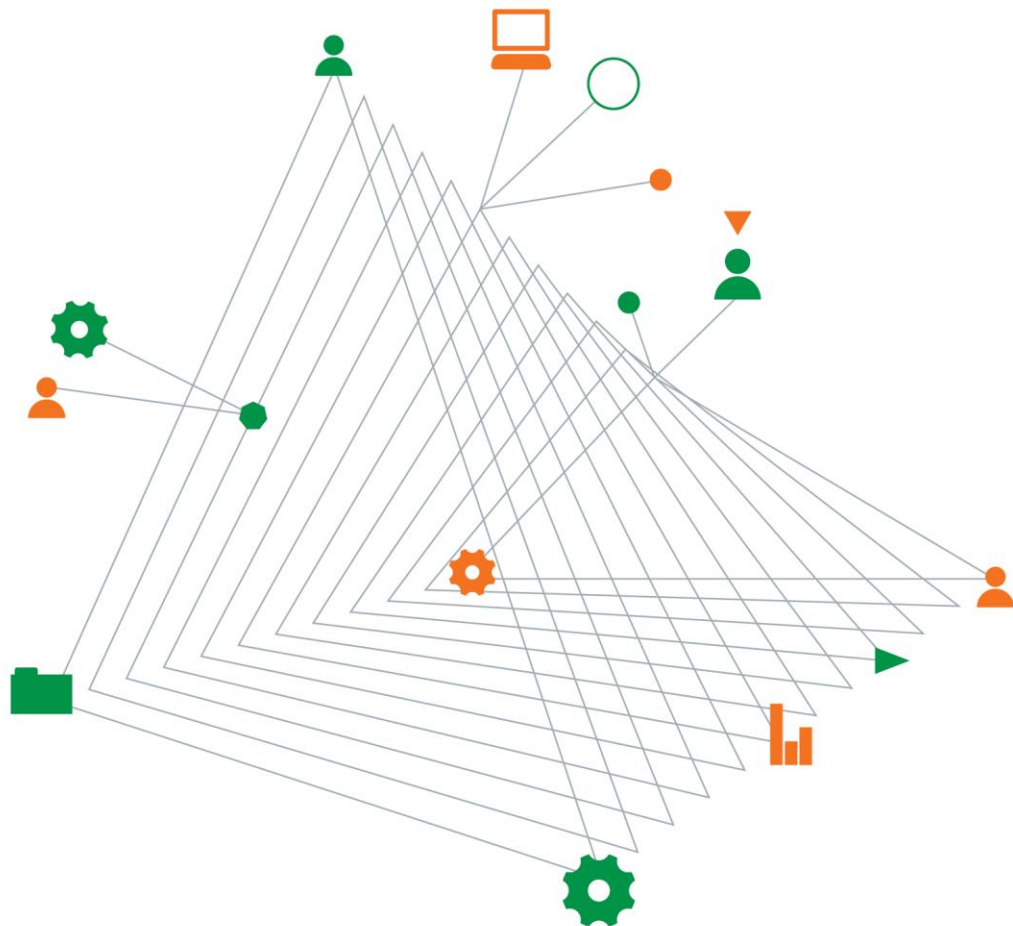


**Crescent Newcastle Pty Ltd C/- Stronach
Property Pty Ltd.**

Preliminary Contamination Assessment

Proposed Multi-Building Residential
Development 11-17 Mosbri Crescent, Cooks Hill



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Preliminary Contamination Assessment

Prepared for
Crescent Newcastle Pty Ltd C/- Stronach Property Pty Ltd.

Prepared by

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14 December 2018

754-NTLGE220504-AB

Quality information

Revision history

Revision	Description	Date	Originator	Reviewer	Approver
v1 draft	Draft	29/10/2018	Paul Wright	Laurie Fox	Paul Wright
AB	Final	30/10/2018	Paul Wright	Laurie Fox	Paul Wright
AB	Final	14/12/2018	Paul Wright	Mark Purdy/Richard Anderson	Paul Wright

Distribution

Report Status	No. of copies	Format	Distributed to	Date
V1 draft	1	PDF	Mark Purdy/Richard Anderson	29/10/2018
AB	1	PDF	Mark Purdy/Richard Anderson	14/12/2018

Executive Summary

Crescent Newcastle Pty Ltd (Stronach) engaged Coffey Services Australia Pty Ltd (Coffey) to carry out a Preliminary Contamination Assessment (PCA) for a proposed multi-building residential development to be constructed at 11-17 Mosbri Crescent, Cooks Hill, NSW (the Site). The proposed residential development is positioned within land parcel (Lot 1 DP 204077) and is identified for the construction of five separate buildings.

The objectives of the PCA were to:

- Identify evidence of potentially contaminating activities that may be currently occurring or has historically occurred on the site;
- Identify and assess Areas of Environmental Concern (AEC's) and Chemicals of Potential Concern (COPC's) for the site, and develop a preliminary conceptual site model if required;
- Provide recommendations for further assessment and or management, as required.

The site is currently occupied by the NBN Television broadcast facility constructed during the 1960's (1961-1962). A review of available information indicates the site was vacant land until the commencement of construction in 1961. An examination of historical, near ground level photographs (source: Newcastle Lost Facebook Group 2018 – Photo Credit Unknown) showing the construction of the NBN TV facility confirms the building was erected in a significantly cut portion of the hill (cut specifically for construction).

The site use has not changed since the 1960s and the number of buildings on site and their respective sizes, has progressively increased. Retaining walls were also constructed through the years along with the addition of significant areas of concrete pavement and bitumen roads.

As a result of the elevation profile across the site (elevation changes from approximately 36m to 52m AHD from Mosbri Crescent moving due east), fill depth is variable although typically quite shallow (i.e. < 1.0m bgs BH01 – BH03). It was observed that in BH04 the fill depth was deeper (2.8m thick) given the extensive fill used during retaining wall construction on the eastern side (rear) of the property.

Where sampled and analysed, the fill showed little evidence of chemical contamination, i.e. COPC tested resulted in concentrations below the investigation levels for the assessment. There was evidence of uncontrolled fill (building rubble including bricks, steel, concrete blocks etc.) at BH04. Given the location of BH04 along the retaining wall it is possible that the fill used historically may have been uncontrolled given the amount required for backfill purposes.

Given the significant area of building and hardstand cover on the site Coffey recommends that additional assessments are completed following the demolition of buildings and removal of existing structures to complete a more fulsome assessment of fill quality. Additional assessment should include intrusive sampling and analysis. The recommendation to undertake the assessment post demolition and post site clearance is also based on an elevated risk of encountering live services across the site (i.e. electrical, communications, water and sewer) as there is currently an extensive network within and around the Site.

Based on the findings of this assessment it is considered that the Site can be rendered suitable for the proposed residential land use, provided the following recommendations are carried out:

- **Detailed Site Investigation (Post-demolition of buildings and post-clearance and removal of hardstand and other structures)** – A detailed site investigation should be undertaken targeting the exposed fill areas following complete removal of the buildings and hardstand structures. This will allow a more fulsome assessment of the fill extent and quality and also establish a preliminary waste classification of the materials.

- **Review of the Hazardous Materials Register** – Any existing Hazardous Materials Register (s) should be reviewed for currency and an assessment made as to whether the Register is suitable to provide WHS guidance during demolition of building structures.
- **Hazardous Materials Survey** – Should a current Hazardous Materials Register not be available, it is recommended that a Hazardous Materials Survey be carried out on the main building and ancillary structures prior to demolition works. An up-to-date Hazardous Materials Register must be prepared following the completion of the Survey.
- **Construction Environmental Management Plan** – A Construction Environmental Management Plan (CEMP) must be prepared by the construction contractor and implemented prior to the commencement of bulk earthworks.
- **Unexpected Finds Protocol** – An unexpected finds protocol must be included as part of the CEMP or as a stand-alone document in order to manage potentially contaminated fill material that may be encountered during the civil construction phase.

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Appendix G – Groundwater Bore Search

Appendix H – Contaminated Land Register Search

Appendix I – Borehole Logs

Appendix J – Analytical Laboratory Results

1. Introduction

1.1. General

Crescent Newcastle Pty Ltd (Stronach) engaged Coffey Services Australia Pty Ltd (Coffey) to carry out a Preliminary Contamination Assessment (PCA) for a proposed multi-building residential development at 11-17 Mosbri Crescent, Cooks Hill, NSW (current NBN Broadcasting Building). The proposed residential development is positioned within land parcel (Lot 1 DP 204077) and is identified for the construction of five separate residential buildings.

This report addresses the contamination scope of work outlined in proposal 754-NTLGE220504-P02 – Proposal for Phase 1 Preliminary Contamination Assessment, Proposed Multi-Building Residential Development, 11-17 Mosbri Crescent, Cooks Hill, NSW, dated 8 August 2018. The report was prepared in conjunction with a Geotechnical Report for the Site (754-NTLGE220504-AG), aspects of which have contributed to this report.

This report was prepared in accordance with the relevant sections of Chapter 3 in Schedule B2, Guideline of Site Characterisation, in the National Environment Protection (Assessment of Site Contamination) Measure (NEPC 1999). The scope of this PSI is in accordance with SEPP 55.

1.2. Objectives

The objectives of the PSI were to:

- Identify evidence of potentially contaminating activities that may be currently occurring or has historically occurred on the site;
- Identify and assess Areas of Environmental Concern (AEC's) and Chemicals of Potential Concern (COPC's) for the site, and develop a preliminary conceptual site model if required; and
- Provide recommendations for further assessment and or management, as required.

1.3. Scope of works

To achieve the above objectives, the following scope of works were undertaken:

A historical review of past activities at the site with the potential to cause contamination, including:

- Review of published information and readily available information held in file by Coffey related to soils, geology and hydrogeology;
- A site walkover to help identify AECs and potential COCs;
- A review of previous site ownership (land titles search) for the lots comprising the site;
- A review of selected readily available historical aerial photography imagery over the past 64 years;
- A review of the Section 10.7 Planning Certificates held by Council for the lots comprising the site;
- A review of NSW Environment Protection Authority (EPA) notices under the Contaminated Land Management Act (1997) and a search of NSW Office of Water for records for nearby registered groundwater bores;

- Review and collation of the above information and identification of potential AECs and COPCs for the site and development of a preliminary CSM; and
- Preparation of this PCA report.

2. Site Description

2.1. Site Location and Identification

The Site is located at 11-17 Mosbri Crescent, Cooks Hill, NSW. The regional location is shown in Figure 1, Appendix A. The relevant site details are summarised in Table 1.

Table 1: Site Details

Site Address	11-17 Mosbri Crescent, Cooks Hill, NSW, 2300
Approximate Site Area	1.3 Hectares
Title Identification Details	Lot 1 DP 204077
Current Land Zoning	Per the Section 10.7 Report from the Newcastle City Council (NCC) the site is zoned as: • R3 Medium Density Residential
Current Land use	The site is currently occupied by the NBN Television Broadcast Studio
Previous Land use	The site has been used for TV broadcasting since 1962.
Adjoining Site Uses	• North – Medium density residential – Pit Street; • South – Medium Density Residential – Hillview Crescent; • East – Vacant bushland, Wolfe Street; • West – Medium Density Residential, Mosbri Crescent.
Site Coordinates	The centre of the site is located approximately at 32°55'54.18"S, 151°46'37.21"E

2.2. Geology and Soils

Based on the 1:100,000 scale Newcastle Coalfield Geology map (Sheet 9231), the site is underlain by the boundary between late Permian aged Lambton Subgroup and Adamstown Subgroup (Upper portions of the site) of the Newcastle Coal Measures. These subgroups comprising sandstone, siltstone, claystone, coal and tuff.

The Victoria Tunnel Seam (the base of the Adamstown Subgroup) was not observed during drilling at the site nor was the Merewether Conglomerate, indicating the site was probably within the Lambton Subgroup below the Adamstown Subgroup. The rocks at the site generally comprise interbedded and interlaminated siltstones and sandstones with layers of coal as indicated in the description for the Lambton Subgroup.

2.3. Acid Sulfate Soils

Reference to the Newcastle 1:25,000 Acid Sulfate Soil Risk Map indicates that the site is located in an area of no known occurrence of Acid Sulfate soils (ASS).

Table 2: Distribution of geological units

Borehole ID	Depth to base of inferred geotechnical unit (m)										
	Unit 1a	Unit 1b	Unit 2a	Unit 2b	Unit 3a	Unit 3b	Unit 3c	Unit 3d	Unit 3e	Unit 3f	Unit 3g
BH01	0.02	0.40	4.20	4.50	13.65	NE	20.12	25.05	29.70	33.30	>40.00
BH02	0.02	0.25	NE	NE	NC						
BH03	0.02	0.40	1.80	3.40	17.20	18.46	25.95	27.35	29.20	31.70	>40.00
BH04	0.02	2.80	4.60	4.70	NC						
Notes											
NE - Not encountered											
NC – Not cored											

2.4. Hydrogeology and Drainage

Groundwater beneath the site is anticipated to be present in an unconfined or semi-confined aquifer at depths greater than 10 metres below the ground surface (bgs). Regional groundwater flow is anticipated to follow the general slope of the region to the northwest ultimately discharging into the Hunter River located approximately 500m north of site.

Surface water is considered to follow the local topography and flow into municipal downstream stormwater drains forming part of the Cottage Creek Catchment. Water collected within the Cottage Creek Catchment discharge into the Harbour via a discharge point at Wharf Road, approximately 2km northeast of the Site.

A search of the NSW Office of Water for registered groundwater bores located within a 500 m radius of the site was undertaken. The search revealed that there is one (1) groundwater bore registered within this radius. The detail of the registered bore is summarised in Table 3. A copy of the groundwater bore search is included in Appendix G.

Table 3: Summary of Groundwater Bore Data

Bore ID	Status	Purpose	Approximate Distance from Site
GW202514	Active	Monitoring Bore	500m northwest

3. Desktop Review and Site Observations

3.1. Information Sources

A desktop study and site observations were conducted as part of the PCA, and included:

- A historical title search dating back 170 years;
- A review of aerial photography from the past 62 years;
- A review of the Section 149 Planning Certificate for the site held by Council;
- A review of NSW EPA notices applying to the site and nearby properties;
- Site walkover and a limited sampling and laboratory analysis of selected soil samples to observe potential areas of environmental concern and current site conditions; and

The information provided from the above reviews are summarised in the sections.

3.2. Site History Review

3.2.1. Historical Titles Search

A search of historical titles for the site (Lot 1 DP204077) was undertaken by Advanced Legal Searchers Pty Ltd. A list of past registered proprietors for the land parcels was obtained dating back to 1847. The results of the search are included in Appendix C and presented in Table 4.

Table 4 - Summary of Historical Titles (Lot 32 DP1198972)

Conveyance Book Details	Date	Proprietor	Inferred Land Use
Portion 268A Parish Newcastle – Crown Grant	1847 - 1952	Australia Agricultural Company	Private/Agricultural
Lot 40 Section F of the Australian Agricultural Company's subdivision and other land – Area 13 Acres 3 Roods 17 $\frac{3}{4}$ Perches – Conv Book 2206 No. 650)	1952 - 1958	Cecil Kay Orrett, master builder	Private
Part Lot 40 Section F of the Australian Agricultural Company's subdivision – Area 13 Acres 2 Roods 26 Perches – Conv Book 2461 No. 838	1958 - 1961	Orrett Bros. Pty. Limited	Private
Part Lot 40 Section F Newcastle of the Australian Agricultural Company's subdivision and	1961 - 1982	Newcastle Broadcasting and	Commercial

Conveyance Book Details	Date	Proprietor	Inferred Land Use
other land – Area 3 Acres 3 ½ Perches – Conv Book 2572 No. 435		Television Corporation Limited	
Lot 1 DP 204077 – CTVol 14876 Fol 122	1982 - 1987	NBN Limited (previously Newcastle Broadcasting and Television Corporation Limited)	Commercial
Lot 1 DP 204077	1988 – To Date	Various leases shown on Historical Folio 1/204077	Commercial
Lot 1 DP 204077	1987 – To Date	NBN Limited	Commercial

3.2.2. Aerial Photograph Review

Aerial photographs of the site were purchased from the Department of Land and Property Information and assessed by a Coffey Environmental Scientist. The results of the aerial photograph review are summarised in Table 5. The aerial photographs are presented in Appendix D.

Table 5: Historical Aerial Summary

Date	Site	Surrounding Land
1954	The site appears to be undeveloped vegetation with what appears to be patchy cleared areas in multiple locations, possibly indicative of land disturbance.	The site is surrounded by what appears to be residential allotments with a sporting facility to the east.
1966	The site contains what appears to be a large building that based on the historical record is probably houses the Newcastle Broadcasting and Television Corporation. There are no areas demarcated for parking/hardstand visible in the photo.	There are more residential allotments visible in all directions. A road to the west has been developed (currently Mosbri Crescent) with a continuation to the south (currently Hillview Crescent). A few houses are visible just east of the Hillview Crescent and south of Mosbri Crescent. There also appears to be some disturbance to the vacant land allotment to the east. There appear to be cleared areas and tracks visible.
1976	There is more development visible at the site with an additional building added to the north eastern extent. Parking lots and hardstand have been constructed to the north, west and south of the main building. A small shed/building has been added to the southern extent of the main building.	More residential development is visible to the south of the building in the allotment bound by Mosbri and Hillview Crescents. The vacant lot to the east also appears to be more disturbed with much of the vegetation either stripped with ruts, channels and clearings visible.

Date	Site	Surrounding Land
1987	Two extensions, one north and the other south of the main building is visible along with the placement of hardstand parking to the northwest of the Site. The internal roads have also been reconfigured given the increase in the size of the building footprint.	The surrounding areas are generally unchanged with significant vegetation regrowth visible in the vacant lot to the east.
1993	The site is generally unchanged when compared to the 1987 photograph.	No changes in the general surrounds are observed. Vegetation regrowth continues in the eastern vacant lot.
2004	The site is generally unchanged when compared to the 1993 photograph. Three satellite/communication dishes are visible on the eastern side of the main building.	No changes in the general surrounds are observed. Vegetation regrowth continues in the eastern vacant lot with a well-established tree canopy now in place.

3.3. Section 10.7 Planning Certificate

The section 10.7 Certificates for Lot 1 DP 204077 were obtained from Newcastle City Council. A copy of the certificates is provided in Appendix F. Table 6 summarises the information contained within the certificates.

Table 6: Information from Section 10.7 Planning Certificates

Address/Allotment	Current Zoning	Critical Habitats	Conservation Areas	Hazard Risk Restrictions	Site Contamination Notices
11-17 Mosbri Crescent, The Hill, NSW, 2300 (Lot 1 DP 204077)	R3 Medium Density Residential	None	None	Landslide Risk Bushfire Prone Land	None

3.4. NSW EPA Records

A search of the NSW EPA database revealed that 21 sites within the Newcastle City Council LGA are identified on the contaminated land register as having current and/or former notices. The 21 sites identified are all located outside of a 1km radius buffer zone from the site and are not considered to have an impact on the site. The 21 sites are listed in Table 7. A copy of the search is provided in Appendix H.

Table 7 - NSW EPA Record Search Results

Suburb	Address/Site name	Notices related to site	Distance from site
Hamilton	Clyde Street, Hamilton Gasworks	3 current notices and 1 former	5km
Hamilton	116 Tudor Street, Taxi Services	4 Former	5km
Hamilton North	56 Clyde Street, Black and Decker	1 Current	5km
Hamilton North	54 Clyde Street, ELMA	1 current and 1 former	5km

Suburb	Address/Site name	Notices related to site	Distance from site
Hamilton North	5 Chatham Street, Shell Newcastle Terminal	2 current and 2 former	5km
Hexham	Sparke Street, Forgacs Site	1 Current	6km
Hexham	64 Old Maitland Road, Trojay Pty Ltd.	1 Current	12km
Kooragang	Cormorant Road, BHP Kooragang	1 current and 1 former	12km
Kooragang	15 Greenleaf Road, Orica Kooragang island	4 current and 9 former	15km
Maryville	184-188 Hannell Street, 7-Eleven, Former Mobil Service Station	1 current	3km
Mayfield	The Buffer Zone extending directly adjacent to the Hunter River, near the Tourle Street Bridge, BHP Steel River	3 current and 1 former	9km
Mayfield	Industrial Drive., BHPB Supply Site	3 current and 7 former	7km
Mayfield	Industrial Drive, Onesteel (BHP)	5 current and 1 former	7km
Mayfield West	East of Woodstock Street and Tourle Street, Koppers Coal Tar	2 current and 1 former	7km
Newcastle	Bound by Hunter River, Selwyn Street & Industrial Drive, BHP Steelworks (Closure Site)	9 current and 3 former	7km
Newcastle	26-28 Honeysuckle Drive, Reclaimed Land	1 former	2km
Sandgate	Maitland Road, North Limited Storage Handling Facility	1 current and 7 former	14km
Shortland	1,2 and 28 Astra Street, Former Astra Street Landfill	3 current and 3 former	13km
Tarro	Woodland Close, Green Acres Farm	1 Current	21km
Tighes Hill	110 Elizabeth Street, Former Mobil Terminal	6 Former	6km
Wickham	156 Hannell Street, Caltex Terminal	1 Current	3km

3.5. Site Observations

A Coffey Environmental Scientist visited the site on 29 August 2018. Site photographs were taken during the visit, and are shown in Appendix E.

Observations made during the site walkover at 11-17 Mosbri Crescent (Lot 1 DP 204077) included:

- The site is used primarily for the NBN Television broadcast studios and includes the main and support buildings, hardstand parking and communications infrastructure (satellite dishes) – Appendix E, Photos 1 and 2;
- Site is located on a hillslope, with a general slope down to the west;
- The site is terraced on multiple levels, with an extensive network of retaining walls throughout as the site has been constructed using cut and fill – Appendix C, Photos 3 and 4 for terracing and Photo 12 for historical construction image);

- The asphalt surfaces were generally observed to be in good condition. Some cracking was observed in areas – Appendix E, Photos 5 and 6;
- A cooling tank/tower was observed in the eastern portion of the site – Appendix E, Photo 7;
- There were no chemical storage sheds observed, however there was some paint (a few paint cans of different volumes) observed in storage sheds on the eastern side of the property – Appendix E, Photo 8;
- Multiple underground services pits and access point were observed (including an extensive electrical network, water, sewer and communications) are present on site;
- There was some disused and scrap machinery and other pieces of large solid waste observed to the eastern side of the property – Appendix E, Photo 9;
- Satellite/communication dishes were observed along the eastern side of the property – Appendix E, Photo 10;
- An electrical stand-by generator was observed to the north-eastern extent (eastern side) of the property – Appendix E, Photo 11.

These observations were noted to be reasonably consistent with web-based aerial photography provided via google Earth.

3.6. Gaps in the Site History

The following information sources were referred to for this assessment:

- NSW EPA;
- Section 149 Planning Certificates provided by Newcastle City Council;
- Historical Land title search between 1847 and 2018;
- Aerial photographs and Google Earth images provided for the period between 1954 and 2004;
- Observations made in the field during the site walkover.

Activities prior to 1954 (period of Crown and Private ownership) cannot be substantiated by aerial imagery as there are no records available for examination.

4. Preliminary conceptual site model

Based on the site history review and site walkover, a preliminary conceptual site model (CSM) has been developed.

4.1. Potential areas and chemicals of environmental concern

The areas and chemicals of potential environmental concern are listed in Table 8.

Table 8 - Potential Areas and Chemicals of Environmental Concern

AEC	Potentially Contaminating Activity	Potential COCs	Likelihood of Contamination*	Comments
1 (Entire Site)	Extent and quality of fill (beneath and around existing buildings)	Heavy Metals, OCP, TPH, BTEX, PAH, Asbestos	Low to medium	Newcastle has a long industrial history and fill is known to be impacted with PAH and heavy metal.
2 Access road and parking pavements	Coal tar and slag used in pavement construction pre 1980s	TRH, BTEX and PAH	Medium	Pavements constructed prior to 1970s and 80s may contain coal tar and slag. Newer pavements (after 1980s) were sometimes constructed over older coal tar and slag pavements
3 Electrical generator	Potential for leaks and spills of oil and fuel	TRH, PAH	Low	Generator was placed on a hardstand pad, in a closed bunded enclosure.

Notes: * = This is a qualitative assessment of the probability of contamination being detected at the potential AEC.

Metals - Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel and Zinc; BTEX - Benzene, Toluene, Ethylbenzene and Xylenes; TRH - Total Recoverable Hydrocarbons; PAH - Polycyclic Aromatic Hydrocarbons; OCP - Organochlorine Pesticides; OPP - Organophosphorus Pesticides; PCB - Polychlorinated Biphenyls; VOC - Volatile Organic Compounds; SVOC - Semi-Volatile Organic Compounds

4.2. Potentially affected media, receptors and transport mechanisms

Table 9 summarises the potentially affected media, key potential receptors and transport mechanisms.

Table 9 - Potentially Affected Media, Receptors and Transport Mechanisms

Consideration	Information
Potentially Affected Media	Fill material and upper layers of natural residual soil.
Potential Transport Mechanisms & Exposure Pathways	Direct dermal contact with contaminated soil Ingestion of contaminated soil Inhalation of airborne dusts Inhalation of asbestos fibres
Potential Receptors of Contamination	Construction/maintenance workers Potential exposure via direct vapour inhalation Potential exposure via dermal contact with soil and ingestion of soil or former coal tar pavements.

Consideration	Information
	Potential exposure via secondary inhalation of airborne dusts (lead and asbestos). Future Site Users Potential exposure via dermal contact, and ingestion/inhalation of soil and dust. Contact with groundwater is considered unlikely due to groundwater depth anticipated to be greater than 10m bgs. Groundwater It is unlikely contaminants could leach from soils into groundwater due to groundwater depth anticipated to be greater than 10m bgs.

4.3. Potential exposure pathways

Table 10 summarises the identified key potential exposure pathways

Table 10 - Potential Exposure Pathways

Receptor	Exposure Pathway	Comment
Construction/ Maintenance Workers	Potentially Complete	There is a potential for workers conducting subsurface works to be exposed to soils containing potential contaminants via dermal contact, ingestion of soils, inhalation of organic vapours and asbestos fibres during demolition activities.
Future site users	Potentially Complete	There is a potential for future site users to be exposed to soils containing potential contaminants via dermal contact, ingestion and inhalation pathways.
Groundwater	Incomplete	Given the depth to groundwater is >10 mbgs, a complete exposure pathway probably does not exist.
Surface Water	Incomplete	Given that the distance between the site and nearest surface water body is approximately 2km, a complete exposure pathway probably does not exist.

5. Fieldwork and laboratory testing

Fieldwork activities were undertaken at the site on 16th and 17th August 2018 to further assess the identified plausible potentially complete exposure pathways set out in Table 10. The sampling locations are shown on Figure 2.

5.1. Scope of Works

The following scope of works was undertaken:

- Advancement of four test bores by assisted by a backhoe excavator with a 300mm auger attachment with sampling targeting fill layers (variable depths at each location);
- Nine (9) primary soil samples were collected. Two (2) samples were analysed from BH01, BH02 and BH03 with three samples analysed in BH04 (deeper fill to 3.0m bgs);
- Visual and olfactory observations were noted on field screening sheets. Soil samples were collected using a fresh pair of disposable nitrile gloves to prevent cross-contamination. Soil samples were placed in clean, laboratory supplied acid washed glass jars. Samples were stored on ice in a secure cooler while on site and in transit to the analytical laboratories; and
- The soil samples were submitted selectively for laboratory analysis for identified COPC's including Heavy metals (Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel and Zinc), TRH, BTEX, PAHs, Phenols, OCP Pesticides, PCB's and Asbestos in soil.

5.2. Investigation Levels

The screening criteria has been derived on the basis of conservative assumptions relating to land use, receptor behaviour, site, building and soil characteristics.

Soil analytical results have been compared against ASC NEPM (1999) health investigation levels (HILs) HIL-A & B 'Residential' based on assumptions regarding exposure settings related to non-sensitive land use.

Discussion of results has also been compared to the ASC NEPM (2013) Health Screening Levels (HSLs), (derived from CRC CARE HSLs (CRC CARE, 2011)) for vapour intrusion to provide further evaluation of potential risks to human health resulting from intrusion of hydrocarbon vapours emanating from soil impacts at the site, HSLs have been adopted based on the potential receptors, subsurface lithology and depth from impacts to soil.

To facilitate screening against HILs and HSLs relevant to the site, the following have been included in the soil analytical data table Appendix B, Table LR1 (HIL) and Table LR2 (HSL).

- ASC NEPM (2013) Health Investigation Levels, HIL-A and B, Residential;
- ASC NEPM (2013) Soil HSLs for Vapour Intrusion, HSL-A/B Residential, Sand, 0 to <2m;

The soil screening assessment criteria are for comparative purposes only and should not be regarded as "clean-up" levels.

Management Limits

The purpose of the Management Limits is to "*avoid or minimise*" potential effects of petroleum hydrocarbons. NEPM Schedule B1 provides these as an interim Tier 1 guidance to manage potential effects of:

- Formation of observable Non-Aqueous Phase Liquid (NAPL);
- Fire and explosive hazards; and
- Effects on buried infrastructure.

The application of the management limits requires the consideration of site-specific factors such as the depth of building services and depth to groundwater, to assess the maximum depth to which the limits should apply.

6. Analytical Laboratories

Samples were forwarded to NATA accredited laboratories (Eurofins MGT, Oakleigh Victoria (Primary Laboratory) and ALS Environmental, Springvale Victoria (Secondary Laboratory) for the analysis requested. A total of Seven (7) Primary samples, including 1 Intra-lab duplicate and 1 inter-lab triplicate sample were collected for field quality assurance/quality control (QA/QC) purposes.

Samples were accompanied by Chain of Custody documentation, received and acknowledged by the laboratories. Soil samples were dispatched on ice and received by the laboratory within recommended holding times.

6.1. QA/QC Results

In order to assess field quality assurance / quality control (QA/QC) procedures, the following field duplicate samples were collected and analysed with the primary samples.

Primary Sample	Field Quality Sample(s)
BH02 – 0.5	QC3 (Intra-Lab Duplicate)
BH02 – 0.5	QC4 (Intra-Lab Duplicate (Triplicate))

The relative percentage differences (RPDs) calculated for the contaminants tested were reported within relevant acceptance limit criteria of 50% (acceptable RPD) for the applicable EQL multiplier ranges. All concentrations measured were below 10 times the EQL with many just at or above the EQL.

The laboratory conducted internal quality control using laboratory duplicates, spikes and method blanks. The laboratory internal quality control showed duplicates with laboratory acceptable ranges. The method blank results were recorded below the laboratory limit of reporting and spike recoveries within control limits.

Based on the review of the QA/QC data, it is considered that soil results are likely to be representative of conditions at the sampling locations at the time of sampling and are suitable for use in this site assessment. The results of the QA/QC analysis are provided in Table LR3 (attached).

7. Investigation Results

7.1. Site Specific Geology

Based on the ground investigation results (Coffey Ref: 754-NTLGE220504-AG), the site is overlaid by fill material to depths ranging from 0.4m to 2.8m below ground surface (bgs) in the carpark level situated to the north and rear of the NBN building, respectively. The fill is underlain by residual soils grading into extremely weathered rock comprising clay materials to a depth of 4.7m. It is noted the boreholes were carried out in accessible areas only which comprise the current carpark or paved areas. Further drilling will be required at later stage to confirm the preliminary ground model.

The borehole location plan is provided as Figure 2, Appendix A and borehole logs from the site investigation, are provided in Appendix I. The interpreted geotechnical units encountered at the site are shown in Table 11.

Table 11 - Summary of generalised ground model

Unit	Material / Origin	Description
1a	Fill	WEARING COARSE: bitumen spray seal/s, up to 20mm thick varying within the site
1b	Fill	Sandy CLAY: low to medium plasticity, grey, dark brown, fine grained sand, with fine angular to sub-angular gravel Sandy GRAVEL: fine to coarse grained, sub-angular to angular, grey, with fine grained sand Clayey SAND: fine to coarse grained, brown and red Sandy CLAY: low to medium plasticity, dark brown, dark grey, mottled orange, fine grained sand, with fine, sub-angular to sub-rounded gravel and glass pieces
2a	Residual Soil	Sandy CLAY: low to medium plasticity, dark brown and dark grey, mottled red, fine to coarse grained sand CLAY: low to medium plasticity, grey to pale grey, orange laminations, mottled orange, red and brown, with fine grained sand and gravel Gravelly CLAY: low to medium plasticity, pale grey and grey, fine grained, rounded to sub-rounded gravel, trace of fine to coarse grained sand
2b	Extremely weathered rock	Sandy CLAY: low plasticity, orange, mottled pale brown, fine grained sand SANDSTONE: fine grained, pale grey and orange
3a	Distinctly to slightly weathered rock	SANDSTONE: fine to medium grained, brown/orange and grey, with siltstone bands and black carbonaceous laminations, distinctly to slightly weathered, low to medium strength
3b	Coal Seam	COAL: black, crushed seams, extremely weathered to highly weathered, very low to low strength, cleated
3c	Slightly weathered to fresh rock	SANDSTONE: fine to medium grained, grey to brown, with black carbonaceous veneer, moderately to slightly weathered, low to medium strength

Unit	Material / Origin	Description
3d	Moderately to slightly weathered rock	SILTSTONE: grey to dark grey, with some sandstone bands, slightly weathered to fresh, low to medium strength
3e	Coal Seam	COAL: black, crushed seams, extremely weathered to highly weathered, very low to low strength, cleated
3f	Moderately to slightly weathered rock	SILTSTONE: grey to dark grey, with some sandstone bands, slightly weathered to fresh, low to medium strength
3g	Slightly weathered to fresh rock	SANDSTONE: fine to medium grained, grey to brown, with black carbonaceous veneer, moderately to slightly weathered, low to medium strength

7.2. Analytical Results

Soil analytical results and comparisons to the relevant assessment investigation levels are presented in Appendix B, Table LR1 and Table LR2. Analytical Laboratory reports of and chain of custody (COC) documentation with analyses requested are provided in Appendix J.

Concentrations of COPC's, in each sample tested, were measured below the relevant ASC NEPM 1999 HIL/HSL A/B 'Residential' Guidelines. There was also no asbestos detected either visually in the samples collected and none detected in the samples analysed for asbestos presence/absence.

8. Conclusions and recommendations

The site is currently occupied by the NBN Television broadcast facility constructed during the 1960's (1961-1962). A review of available information indicates the site was vacant land until the commencement of construction in 1961. An examination of historical, near ground level photographs (source: Newcastle Lost Facebook Group 2018 – Photo Credit Unknown) showing the construction of the NBN TV facility confirms the building was erected in a significantly cut portion of the hill (cut specifically for construction).

The site use has not changed since the 1960s and the number of buildings on site and their respective sizes, has progressively increased. Retaining walls were also constructed through the years along with the addition of significant areas of concrete pavement and bitumen roads.

As a result of the elevation profile across the site (elevation changes from approximately 36m to 52m AHD from Mosbri Crescent moving due east), fill depth is variable although typically quite shallow (i.e. < 1.0m bgs BH01 – BH03). It was observed that in BH04 the fill depth was deeper (2.8m thick) given the fill used during retaining wall construction on the eastern side (rear) of the property.

Where sampled and analysed, the fill showed little evidence of chemical contamination, i.e. COPC tested resulted in concentrations below the investigation levels for the assessment. There was evidence of uncontrolled fill (building rubble including bricks, steel, concrete blocks etc.) at BH04. Given the location of BH04 along the retaining wall it is possible that the fill used historically may have been uncontrolled given the amount required for backfill purposes and the lack of regulation at the time governing the quality of imported fill.

Given the significant area of building and hardstand cover on the site Coffey recommends that additional assessments are completed following the demolition of buildings and removal of existing structures to complete a more fulsome assessment of fill quality. Additional assessment should include intrusive sampling and analysis. The recommendation to undertake the assessment post demolition and post site clearance is also based on an elevated risk of encountering live services across the site (i.e. electrical, communications, water and sewer) as there is currently an extensive network within and around the Site.

Based on the findings of this assessment it is considered that the Site can be rendered suitable for the proposed residential land use, provided the following recommendations are carried out:

- **Detailed Site Investigation (Post-demolition of buildings and post-clearance and removal of hardstand and other structures)** – A detailed site investigation should be undertaken targeting the exposed fill areas following complete removal of the buildings and hardstand structures. This will allow a more fulsome assessment of the fill extent and quality and also establish a preliminary waste classification of the materials.
- **Review of the Hazardous Materials Register** – Any existing Hazardous Materials Register (s) should be reviewed for currency and an assessment made as to whether the Register is suitable to provide WHS guidance during demolition of building structures.
- **Hazardous Materials Survey** – Should a current Hazardous Materials Register not be available, it is recommended that a Hazardous Materials Survey be carried out on the main building and ancillary structures prior to demolition works. An up-to-date Hazardous Materials Register must be prepared following the completion of the Survey.
- **Construction Environmental Management Plan** – A Construction Environmental Management Plan (CEMP) must be prepared by the construction contractor and implemented prior to the commencement of bulk earthworks.
- **Unexpected Finds Protocol** – An unexpected finds protocol must be included as part of the CEMP or as a stand-alone document in order to manage potentially contaminated fill material that may be encountered during the civil construction phase.

This report should be read in conjunction with the *attached Important Information about your Coffey Environmental Report*.

9. Limitations

Information is not readily available on the early history (pre-1954) of the site and therefore, some site activities may not have been identified. Aerial photographs are up to 12 years apart and other site history information available prior to 1954 is sparse. We cannot preclude that potentially contaminating activities took place during these periods. Allowances for uncertainties and potential unexpected finds should be made during planning and development phases.

It is the nature of contaminated site investigations that the degree of variability in site conditions cannot be known completely and no sampling and analysis program can eliminate all uncertainty concerning the condition of the site. Professional judgement must be exercised in the collection and interpretation of the data.

In preparing this report, current guidelines for assessment and management of contaminated land were followed. This work has been conducted in good faith in accordance with Coffey understanding of the client's brief and general accepted practice for environmental consulting.

This report was prepared for Crescent Newcastle Pty Ltd. to provide a preliminary assessment of land contamination at the subject site. No warranty, expressed or implied, is made as to the information and professional advice included in this report. Anyone using this document does so at their own risk and should satisfy themselves concerning its applicability and, where necessary, should seek expert advice in relation to the particular situation. Any use of information in this report must consider the uncertainties outlined in *Important Information about your Coffey Environmental Report*, which follows this text.

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 apprised 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 statutes 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.

Appendix A – Figures

PLOT DATE: 30/10/2018 12:54:42 PM DWG FILE: F:\GEO\TECHNICS\1 JOB FILES\NEWCASTLE PROJECTS\NTLGE220504 - NTLGE220504\754-NTLGE220504 - PROPOSED RESIDENTIAL DEVELOPMENT\NBN SITE\DRAWINGS\NBN SJB_RECOVER ENV.DWG

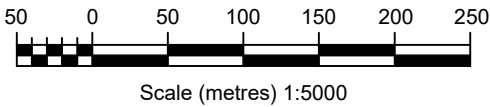


LEGEND

SITE BOUNDARY

AERIAL IMAGE SOURCE: GOOGLE EARTH PRO 7.1.2
AERIAL IMAGE © SINCLAIR KNIGHT MERZ 2014

revision	no.	description			drawn	approved	date
	A	ORIGINAL ISSUE					

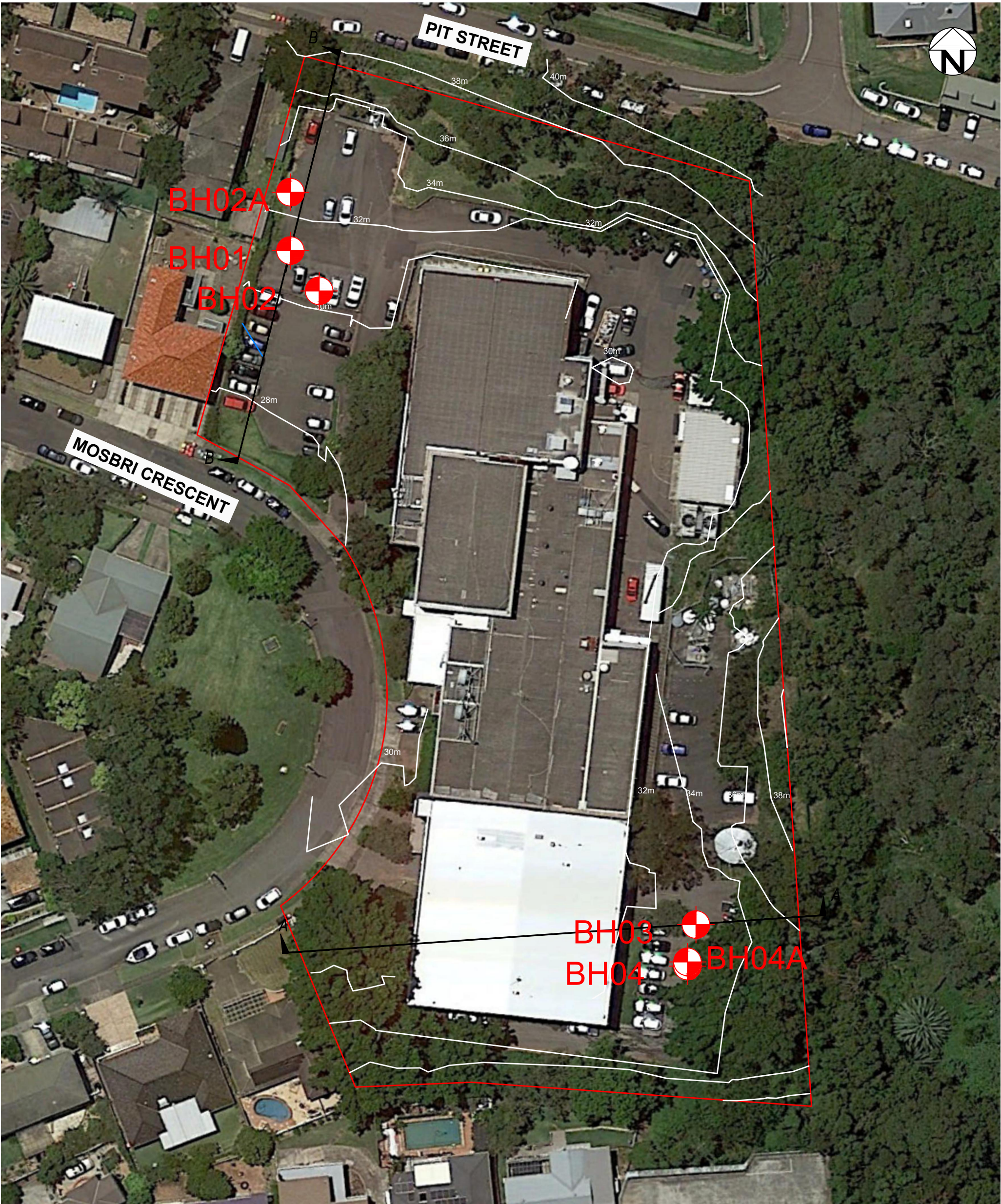


drawn	SJB
approved	PW
date	30/10/2018
scale	AS SHOWN
original size	A3

coffey

A TETRA TECH COMPANY

client: CRESCENT NEWCASTLE PTY LTD		
project: PROPOSED RESIDENTIAL DEVELOPMENT NBN SITE 11-17 MOSBRI CRESCENT THE HILL PRELIMINARY CONTAMINATION ASSESSMENT		
title: SITE LOCATION PLAN		
project no: 754-NTLGE220504	figure no: FIGURE 1	rev: A



revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE			

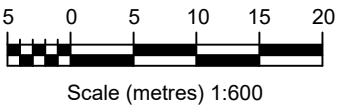
LEGEND



APPROXIMATE BOREHOLE LOCATION

SECTION LINE

AERIAL IMAGE SOURCE: GOOGLE EARTH PRO 7.1.2
AERIAL IMAGE ©: SINCLAIR KNIGHT MERZ 2014



drawn	SJB
approved	PW
date	30/10/2018
scale	AS SHOWN
original size	A3



client:	CRESCENT NEWCASTLE PTY LTD		
project:	PROPOSED RESIDENTIAL DEVELOPMENT NBN SITE 11-17 MOSBRI CRESCENT THE HILL PRELIMINARY CONTAMINATION ASSESSMENT		
title:	BOREHOLE LOCATION PLAN		
project no:	754-NTLGE220504	figure no:	FIGURE 2
		rev:	A

Appendix B – Tables

Notes:

- Not Analysed

P Present

A Absent

¹ NEPC (2013) National Environment Protection (Assessment of Site Contamination) Measure (NEPM 2013) - Table 1A(1): HIL-A (Residential)

² NERC (2013) National Environment Protection (Assessment of Site Contamination) Measure (NERM 2013) - Table 1A(1): HII-B (Residential)

³ NEPC (2013) National Environment Protection (Assessment of Site Contamination) Measure (NEM 2013) - Table 1A(1): Nil - C (Recreation)

⁴ NEPC (2013) National Environment Protection (Assessment of Site Contamination) Measure (NEPM 2013) - Table 1A(1): HIL-D (Commercial/Industrial)

								Field ID	BH01 0.5	BH01 1.0	BH02 0.1	BH02 0.5	BH03 0.4M	BH03 0.7-1.0M	BH04 0.5	BH04 1.0	BH04 3.0	
								Sample Date	03-Sep-18	03-Sep-18	10-Sep-18	10-Sep-18	17-Sep-18	17-Sep-18	12-Sep-18	12-Sep-18	12-Sep-18	
Method_Type	ChemName	Units	HSL	HSL-A/B ⁽¹⁾	HSL-A/B ⁽²⁾	HSL-D ⁽³⁾	HSL-D ⁽⁴⁾	HSL-Intrusive maintenance work ⁽⁵⁾										
Heavy Metal	Arsenic	mg/kg	2						12	8.6	6.1	10	3.4	7.6	4.8	4.7	7	
	Cadmium	mg/kg	0.4						<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	0.5	<0.4	<0.4	
	Chromium	mg/kg	5						13	14	16	12	6.3	20	13	39	5.3	
	Copper	mg/kg	1						16	18	13	16	9	9.8	11	14	6.1	
	Lead	mg/kg	1						57	66	23	29	8	23	56	83	24	
	Mercury	mg/kg	0.1						<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
	Nickel	mg/kg	5						51	55	27	33	15	45	31	45	15	
	Zinc	mg/kg	5						52	79	39	27	11	22	67	230	33	
	Mixture Content (dried @ 103°C)	%							16	18	8.1	19	18	18	11	9.3	13	
	4,4'-Dioxin	mg/kg	0.05						<0.05	-	-	<0.05	<0.05	<0.05	<0.05	-	-	
Organic	a-BHC	mg/kg	0.05					<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	<0.05	-	-	
	Aldrin + Dieldrin	mg/kg	0.05					<0.05	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	-	-	
	β-BHC	mg/kg	0.05					<0.05	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	-	-	
	Chlordane	mg/kg	0.1					<0.1	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	
	δ-BHC	mg/kg	0.05					<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	<0.05	-	-	
	DDT	mg/kg	0.05					<0.05	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	-	-	
	DDT+DDE+DDD	mg/kg	0.05					<0.05	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	-	-	
	Dieldrin	mg/kg	0.05					<0.05	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	-	-	
	Endosulfan I	mg/kg	0.05					<0.05	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	-	-	
	Endosulfan II	mg/kg	0.05					<0.05	-	-	<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	<0.05	-	-	
	Endrin	mg/kg	0.05					<0.05	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	-	-	
	Endrin isohydro	mg/kg	0.05					<0.05	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	-	-	
	Endrin isomer	mg/kg	0.05					<0.05	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	-	-	
	γ-BHC (Lindane)	mg/kg	0.05					<0.05	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	-	-	
	Heptachlor	mg/kg	0.05					<0.05	-	-	<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	<0.05	-	-	
	Heptachlorobenzene	mg/kg	0.05					<0.05	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	-	-	
	Methoxychlor	mg/kg	0.05					<0.05	-	-	<0.05	<0.2	<0.2	<0.2	<0.05	-	-	
	Toxaphene	mg/kg	1					<1	-	-	<1	<1	<1	<1	<1	-	-	
	Vic EPA RWQS 621 OCP (Total)*	MCU/KG	0.1					<0.1	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	
	Vic EPA RWQS 621 Other OCP (Total)*	MCU/KG	0.1					<0.1	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	
Organic	Naphthalene	mg/kg	0.5	1	9			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	
	1,2-NaphthylENE	mg/kg	10					<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	
	C1 - C9	mg/kg	10					<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	
	C10 - C40 (sum of total)	mg/kg	100					<100	<100	1520	<100	<100	<100	<100	<100	130	<100	
	C1 - C10 less BTEX (F1)	mg/kg	10	44	70	260	370	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	
	C10 - C18	mg/kg	10					<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	
	C18 - C34	mg/kg	100					<100	<100	1520	<100	<100	<100	<100	<100	130	<100	
	C34 - C40	mg/kg	100					<100	<100	1000	<100	<100	<100	<100	<100	<100	<100	
	C1 - C40	mg/kg	100					<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	
	C1 - C40	mg/kg	100					<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	
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	
	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	
	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	
	Benzo[a]anthracene	mg/kg	0.5					<0.5	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	1.3	1.1	<0.5	
	Benzo[a]pyrene	mg/kg	0.5					<0.5	0.9	<0.5	<0.5	<0.5	<0.5	<0.5	1.4	1.2	<0.5	
	Benzo[a]pyrene TEG (lower bound)*	MCU/KG	0.5					<0.5	1.2	<0.5	<0.5	<0.5	<0.5	<0.5	1.8	1.6	<0.5	
	Benzo[a]pyrene TEG (medium bound)*	MCU/KG	0.5					0.6	1.4	0.6	<0.5	<0.5	<0.5	<0.5	2.1	1.8	0.6	
	Benzo[a]pyrene TEG (upper bound)*	MCU/KG	0.5					1.2	1.7	1.2	1.2	1.2	1.2	2.1	2.1	1.2		
	Benzo[a]pyrene	mg/kg	0.5					<0.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.8	0.9	<0.5	
	Benzo[b]fluoranthene	mg/kg	0.5					<0.5	0.7	<0.5	<0.5	<0.5	<0.5	<0.5	1	0.9	<0.5	
	Chrysene	mg/kg	0.5					<0.5	0.9	<0.5	<0.5	<0.5	<0.5	<0.5	1.2	1	<0.5	
	Benzo[k]fluoranthene	mg/kg	0.5					<0.5	0.7	<0.5	<0.5	<0.5	<0.5	<0.5	1	0.9	<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	
	Fluoranthene	mg/kg	0.5					0.7	1.9	<0.5	<0.5	<0.5	<0.5	<0.5	3.1	2.8	<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	
	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	0.7	0.6	<0.5	
	Naphthalene	mg/kg	0.5	3	9			<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	0.7	<0.5	<0.5	<0.5	<0.5	<0.5	1.6	1.3	<0.5	
	Pyrene	mg/kg	0.5					0.6	1.5	<0.5	<0.5	<0.5	<0.5	<0.5	2.8	2.4	<0.5	
PCB	Total PCBs	mg/kg	0.5					3.3	8.9	<0.5	<0.5	<0.5	<0.5	<0.5	13.6	13.1	<0.5	
	Aroclor 1221	mg/kg	0.1					<0.1	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	
	Aroclor 1248	mg/kg	0.1					<0.1	-	-	<0.1	<0.5	<0.5	<0.5	<0.1	-	-	
	Aroclor 1242	mg/kg	0.1					<0.1	-	-	<0.1	<0.5	<0.5	<0.5	<0.1	-	-	
	Aroclor 1248	mg/kg	0.1					<0.1	-	-	<0.1	<0.5	<0.5	<0.5	<0.1	-	-	
	Aroclor 1254	mg/kg	0.1					<0.1	-	-	<0.1	<0.5	<0.5	<0.5	<0.1	-	-	
	Aroclor 1260	mg/kg	0.1					<0.1	-	-	<0.1	<0.5	<0.5	<0.5	<0.1	-	-	
	PCBs (sum of total)	mg/kg	0.1					<0.1	-	-	<0.1	<0.5	<0.5	<0.5	<0.1	-	-	
	C10 - C14	mg/kg	10					<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	
	C15 - C18	mg/kg	10					<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	
Volatile	C19 - C36	mg/kg	10					<10	<10	690	<10	<10	<10	<10	<10	70	<10	
	C37 - C38 (sum of total)	mg/kg	10					<10	<10	<10	<10	<10	<10	<10	<10	62	100	<10
	Benzene	mg/kg	0.1	0.5	0.5	3	3	77	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
	Ethylbenzene	mg/kg	0.1	57	220			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
	Toluene	mg/kg	0.1	160				<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
	Xylene (m & p)	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
	Xylene (o)	mg/kg	0.1					<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
	Xylene Total	mg/kg	0.1	60	29	230		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
	Result								<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
	Result								Exceeds adopted Health Screening Level (HSL-A, Low Density Residential)									
	Result								Exceeds adopted Health Screening Level (HSL-B, High Density Residential)									
Result								Exceeds adopted Health Screening Level (HSL-C, Commercial/Industrial)										
Result								Exceeds adopted Health Screening Level (HSL-D, Vapour Intrusion (HSL-D, Commercial/Industrial)										
Result								Exceeds adopted Health Screening Level (HSL-E, Vapour Intrusion (HSL-E, Commercial/Industrial)										
Result								Exceeds adopted Health Screening Level (HSL-F, Vapour Intrusion (HSL-F, Commercial/Industrial)										
Result								Exceeds adopted Health Screening Level (HSL-G, Vapour Intrusion (HSL-G, Commercial/Industrial)										
Result																		

Field Duplicates (SOIL)
 Filter: SDG in('28 Sep 2018','17 Sep 2018')

SDG Field ID Sample Date	17-Sep-18 BH02 0.5 10-09-18	17-Sep-18 QC3 10-09-18	RPD	17-Sep-18 BH02 0.5 10-09-18	Interlab_D QC4 10-09-18	RPD
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Method_Type	ChemName	Units	EQL						
PAH	Benzo(a)pyrene TEQ (half LOR)	mg/kg	0.5	0.6	0.6	0	0.6	0.6	0
	Benzo(a)pyrene TEQ (LOR)	mg/kg	0.5	1.2	1.2	0	1.2	1.2	0
	Benzo(a)pyrene TEQ (zero)	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
Organic	C6-C10 less BTEX (F1)	mg/kg	20 (Primary): 10	<20.0	<20.0	0	<20.0	<10.0	0
Volatile	Benzene	mg/kg	0.1 (Primary): 0.2	<0.1	<0.1	0	<0.1	<0.2	0
	Ethylbenzene	mg/kg	0.1 (Primary): 0.5	<0.1	<0.1	0	<0.1	<0.5	0
	Toluene	mg/kg	0.1 (Primary): 0.5	<0.1	<0.1	0	<0.1	<0.5	0
	Xylene (m & p)	mg/kg	0.2 (Primary): 0.5	<0.2	<0.2	0	<0.2	<0.5	0
	Xylene (o)	mg/kg	0.1 (Primary): 0.5	<0.1	<0.1	0	<0.1	<0.5	0
	Xylene Total	mg/kg	0.3 (Primary): 0.5	<0.3	<0.3	0	<0.3	<0.5	0
Inorganic	Moisture Content (dried @ 103°C)	%	1	19.0	19.0	0	19.0		
Heavy Metal	Arsenic	mg/kg	2 (Primary): 5 (In	10.0	8.6	15	10.0	10.0	0
	Cadmium	mg/kg	0.4 (Primary): 1 (	<0.4	<0.4	0	<0.4	<1.0	0
	Chromium	mg/kg	5 (Primary): 2 (In	12.0	13.0	8	12.0	13.0	8
	Copper	mg/kg	5	16.0	14.0	13	16.0	13.0	21
	Lead	mg/kg	5	29.0	22.0	27	29.0	18.0	47
	Mercury	mg/kg	0.1	<0.1	<0.1	0	<0.1	<0.1	0
	Nickel	mg/kg	5 (Primary): 2 (In	<5.0	<5.0	0	<5.0	2.0	0
	Zinc	mg/kg	5	27.0	25.0	8	27.0	23.0	16
OCP	4,4-DDE	mg/kg	0.05	<0.05	<0.05	0	<0.05	<0.05	0
	a-BHC	mg/kg	0.05	<0.05	<0.05	0	<0.05	<0.05	0
	Aldrin	mg/kg	0.05	<0.05	<0.05	0	<0.05	<0.05	0
	Aldrin + Dieldrin	mg/kg	0.05	<0.05	<0.05	0	<0.05	<0.05	0
	b-BHC	mg/kg	0.05	<0.05	<0.05	0	<0.05	<0.05	0
	Chlordane	mg/kg	0.1 (Primary): 0.0	<0.1	<0.1	0	<0.1	<0.05	0
	d-BHC	mg/kg	0.05	<0.05	<0.05	0	<0.05	<0.05	0
	DDD	mg/kg	0.05	<0.05	<0.05	0	<0.05	<0.05	0
	DDT	mg/kg	0.05 (Primary): 0.	<0.05	<0.05	0	<0.05	<0.2	0
	DDT+DDE+DDD	mg/kg	0.05	<0.05	<0.05	0	<0.05	<0.05	0
	Dieldrin	mg/kg	0.05	<0.05	<0.05	0	<0.05	<0.05	0
	Endosulfan I	mg/kg	0.05	<0.05	<0.05	0	<0.05	<0.05	0
	Endosulfan II	mg/kg	0.05	<0.05	<0.05	0	<0.05	<0.05	0
	Endosulfan sulphate	mg/kg	0.05	<0.05	<0.05	0	<0.05	<0.05	0
	Endrin	mg/kg	0.05	<0.05	<0.05	0	<0.05	<0.05	0
	Endrin aldehyde	mg/kg	0.05	<0.05	<0.05	0	<0.05	<0.05	0
	Endrin ketone	mg/kg	0.05	<0.05	<0.05	0	<0.05	<0.05	0
	g-BHC (Lindane)	mg/kg	0.05	<0.05	<0.05	0	<0.05	<0.05	0
	Heptachlor	mg/kg	0.05	<0.05	<0.05	0	<0.05	<0.05	0
	Heptachlor epoxide	mg/kg	0.05	<0.05	<0.05	0	<0.05	<0.05	0
	Hexachlorobenzene	mg/kg	0.05	<0.05	<0.05	0	<0.05	<0.05	0
	Methoxychlor	mg/kg	0.05 (Primary): 0.	<0.05	<0.05	0	<0.05	<0.2	0
	Toxaphene	mg/kg	1	<1.0	<1.0	0	<1.0		
	Vic EPA IWRG 621 OCP (Total)*	mg/kg	0.1	<0.1	<0.1	0	<0.1		
	Vic EPA IWRG 621 Other OCP (	mg/kg	0.1	<0.1	<0.1	0	<0.1		
Organic	Naphthalene	mg/kg	0.5 (Primary): 1 (	<0.5	<0.5	0	<0.5	<0.5	0
PAH	Acenaphthene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Acenaphthylene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Anthracene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Benzo(a)anthracene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Benzo(a)pyrene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Benzo(g,h,i)perylene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Benzo(k)fluoranthene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Chrysene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Benzo[b,j]fluoranthene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Dibenz(a,h)anthracene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Fluoranthene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Fluorene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Naphthalene	mg/kg	0.5 (Primary): 1 (	<0.5	<0.5	0	<0.5	<0.5	0
	Phenanthrene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Pyrene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
	Total PAHs	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0
Organic	F2-NAPHTHALENE	mg/kg	50	<50.0	<50.0	0	<50.0	<50.0	0
	C6 - C9	mg/kg	20 (Primary): 10	<20.0	<20.0	0	<20.0	<10.0	0
	C10 - C40 (Sum of total)	mg/kg	100 (Primary): 50	<100.0	<100.0	0	<100.0	<50.0	0
	C10-C16	mg/kg	50	<50.0	<50.0	0	<50.0	<50.0	0
	C16-C34	mg/kg	100	<100.0	<100.0	0	<100.0	<100.0	0
	C34-C40	mg/kg	100	<100.0	<100.0	0	<100.0	<100.0	0
	C6 - C10	mg/kg	20 (Primary): 10	<20.0	<20.0	0	<20.0	<10.0	0
TPH	C10 - C14	mg/kg	20 (Primary): 50	<20.0	<20.0	0	<20.0	<50.0	0
	C15 - C28	mg/kg	50 (Primary): 100	<50.0	<50.0	0	<50.0	<100.0	0
	C29 - C36	mg/kg	50 (Primary): 100	<50.0	<50.0	0	<50.0	<100.0	0
	C10 - C36 (Sum of total)	mg/kg	50	<50.0	<50.0	0	<50.0	<50.0	0

*RPDs have only been considered where a concentration is greater than 0 times the EQL.

**High RPDs are in bold (Acceptable RPDs for each EQL multiplier range are: 50 (0-10 x EQL); 30 (10-20 x EQL); 30 (> 20 x EQL))

***Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any methods in the row header relate to those used in the primary laboratory

Appendix C – Historical Title Search

ADVANCE LEGAL SEARCHERS PTY LTD

(ACN 147 943 842)
ABN 82 147 943 842

18/36 Osborne Road,
Manly NSW 2095

Telephone: +612 9977 6713
Mobile: 0412 169 809
Email: search@alsearchers.com.au

27th September 2018

COFFEY ENVIRONMENTS PTY LTD

19 Warabrook Boulevard,
WARABROOK NSW 2304

Attention: Sean Blackford

RE:

**11 – 17 Mosbri Crescent,
The Hill
PO WARA18-1033**

Current Search

Folio Identifier 1/204077 (title attached)
DP 204077 (plan attached)
Dated 26th September 2018
Registered Proprietor:
NBN LIMITED

Title Tree
Lot 1 DP 204077

Folio Identifier 1/204077

Certificate of Title Volume 14876 Folio 122

IVA 56532

Conveyance Book 2572 No. 435

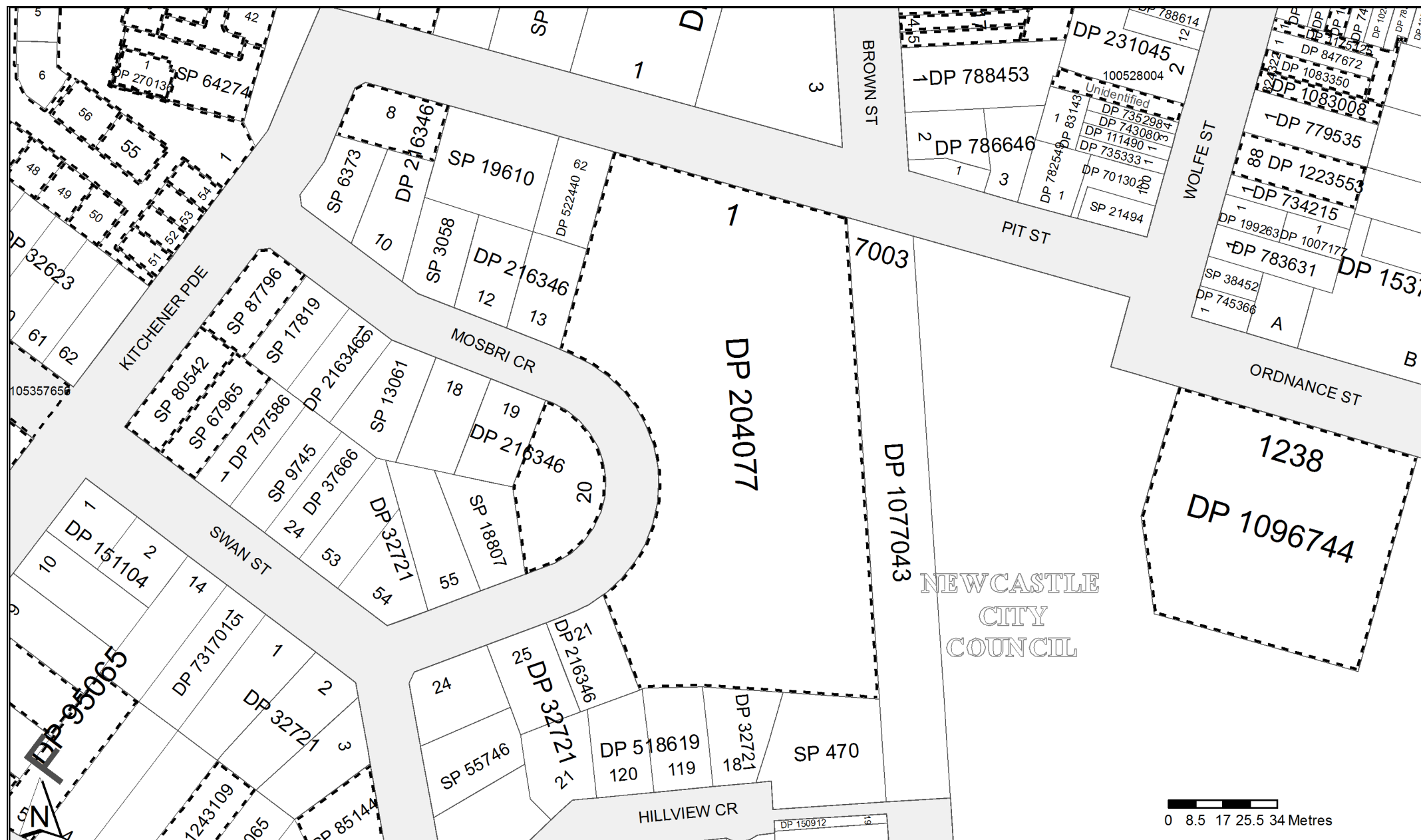
Conveyance Book 2461 No. 868

Conveyance Book 2206 No. 650

Summary of Proprietor(s)
Lot 1 DP 204077

Year	Proprietor(s)
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	(Lot 1 DP 204077)
1987 – todate	NBN Limited
<i>(1988 – todate)</i>	<i>(various leases shown on Historical Folio 1/204077)</i>
	(Lot 1 DP 204077 – CTVol 14876 Fol 122)
1982 – 1987	NBN Limited <i>(previously Newcastle Broadcasting and Television Corporation Limited)</i>
	(Part Lot 40 Section F Newcastle of the Australian Agricultural Company's subdivision and other land – Area 3 Acres 3 ½ Perches – Conv Book 2572 No. 435)
1961 – 1982	Newcastle Broadcasting and Television Corporation Limited
	(Part Lot 40 Section F of the Australian Agricultural Company's subdivision – Area 13 Acres 2 Roods 26 Perches – Conv Book 2461 No. 838)
1958 – 1961	Orrett Bros. Pty. Limited
	(Lot 40 Section F of the Australian Agricultural Company's subdivision and other land – Area 13 Acres 3 Roods 17 ¾ Perches – Conv Book 2206 No. 650)
1952 – 1958	Cecil Kay Orrett, master builder
	(Portion 268A Parish Newcastle – Crown Grant)
1847 – 1952	Australian Agricultural Company



	Status	Surv/Comp	Purpose
DP95065			
Lot(s): 5, 8 Section : F			
 DP1221821	REGISTERED	SURVEY	EASEMENT
Lot(s): 5 Section : F			
 CA87755 - LOT 5 SECTION F DP95065			
Lot(s): 8 Section : F			
 CA102286 - LOT 8 SECTION F DP95065			
DP151768			
Lot(s): 2			
 CA96805 - LOT 2 DP151768			
DP204077			
Lot(s): 1			
 DP994077	HISTORICAL	UNAVAILABLE	UNRESEARCHED
DP216346			
Lot(s): 8			
 CA91724 - LOT 8 DP216346			
Lot(s): 20			
 CA91997 - LOT 20 DP216346			
DP270136			
Lot(s): 35, 36, 42, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56			
 DP270136	HISTORICAL	SURVEY	COMMUNITY PLAN
Lot(s): 1			
 DP270136	UNNECESSARY	SURVEY	COMMUNITY SUBDIVISION PLAN
 DP270136	REGISTERED	SURVEY	COMMUNITY REPLACEMENT SHEET
 DP1203012	REGISTERED	COMPILATION	EASEMENT
 SP64274	REGISTERED	COMPILATION	STRATA PLAN
DP1081334			
Lot(s): 56			
 CA92233 - LOT 56 DP1081334			
DP1083008			
Lot(s): 324			
 CA93252 - LOTS 322 DP1083350 AND 324 DP1083008			
DP1083350			
Lot(s): 322			
 CA93252 - LOTS 322 DP1083350 AND 324 DP1083008			
DP1086561			
Lot(s): 62			
 DP95065	HISTORICAL	COMPILATION	UNRESEARCHED
DP1096744			
Lot(s): 1238			
 CA98895 - LOT 1238 DP1096744			
DP1141417			
Lot(s): 3, 4, 5			
 CA141322 - LOTS 1-5 DP1141417			
DP1175125			
Lot(s): 1, 2			
 CA150337 - LOTS 1-2 DP1175125			
DP1223553			
Lot(s): 88			
 DP1028200	HISTORICAL	COMPILATION	LIMITED FOLIO CREATION
DP1224986			
Lot(s): 910			
 DP1077536	HISTORICAL	COMPILATION	LIMITED FOLIO CREATION
 DP1203236	HISTORICAL	SURVEY	REDEFINITION
 CA90870 - LOTS 3090-3091 DP1077536			
DP1243109			
Lot(s): 100			
 DP95065	HISTORICAL	COMPILATION	UNRESEARCHED
 CA92446 - LOT 2 DP95065			

Caution: This information is provided as a searching aid only. Whilst every endeavour is made to ensure that current map, plan and titling information is accurately reflected, the Registrar General cannot guarantee the information provided. For **ALL** **ACTIVITY PRIOR TO SEPTEMBER 2002** you must refer to the RGs Charting and Reference Maps.

		Status	Surv/Comp	Purpose
SP64274				
	 DP270136	HISTORICAL	SURVEY	COMMUNITY SUBDIVISION PLAN
	 DP270136	HISTORICAL	SURVEY	COMMUNITY PLAN
SP67965				
	 DP37666	HISTORICAL	SURVEY	UNRESEARCHED
SP78976				
	 DP511613	HISTORICAL	SURVEY	SUBDIVISION
	 DP1112615	HISTORICAL	SURVEY	REDEFINITION
SP80542				
	 DP37666	HISTORICAL	SURVEY	UNRESEARCHED
	 DP1088308	HISTORICAL	SURVEY	REDEFINITION
SP85144				
	 DP32721	HISTORICAL	SURVEY	UNRESEARCHED
	 DP1159213	HISTORICAL	SURVEY	REDEFINITION
SP87796				
	 DP216346	HISTORICAL	SURVEY	SUBDIVISION
	 DP1181991	HISTORICAL	SURVEY	REDEFINITION
Road				
Polygon Id(s): 105357656				
	 EX-SUR 72/37 DP449035			
Polygon Id(s): 105182078, 105204783, 105357656, 105380592, 105409222, 105526511, 105545145				
	 DP1242664	REGISTERED	SURVEY	SURVEY INFORMATION ONLY
Unidentified				
Polygon Id(s): 100528004				
	 UNCONVERTIBLE OLD SYSTEM LAND SUBJECT TO A RIGHT OF WAY. FEE REMAINS IN CROWN GRANT SERIAL 264 PAGE 1939 AND SERIAL 264 PAGE 1948. TITLE CREATION WILL REQUIRE A DEPOSITED PLAN OF SURVEY AND A PRIMARY APPLICATION BASED UPON ADVERSE POSSESSION			

Caution: This information is provided as a searching aid only. Whilst every endeavour is made to ensure that current map, plan and titling information is accurately reflected, the Registrar General cannot guarantee the information provided. For **ALL** **ACTIVITY PRIOR TO SEPTEMBER 2002** you must refer to the RGs Charting and Reference Maps.

Plan	Surv/Comp	Purpose
DP32623	SURVEY	UNRESEARCHED
DP32721	SURVEY	UNRESEARCHED
DP37666	SURVEY	UNRESEARCHED
DP83143	SURVEY	UNRESEARCHED
DP95064	SURVEY	UNRESEARCHED
DP95065	COMPILATION	UNRESEARCHED
DP111490	COMPILATION	DEPARTMENTAL
DP112748	COMPILATION	DEPARTMENTAL
DP150789	SURVEY	UNRESEARCHED
DP150912	SURVEY	UNRESEARCHED
DP151104	COMPILATION	UNRESEARCHED
DP151768	COMPILATION	UNRESEARCHED
DP153708	SURVEY	UNRESEARCHED
DP195186	COMPILATION	DEPARTMENTAL
DP195410	COMPILATION	DEPARTMENTAL
DP199263	COMPILATION	DEPARTMENTAL
DP204077	SURVEY	SUBDIVISION
DP216346	SURVEY	SUBDIVISION
DP231045	SURVEY	SUBDIVISION
DP270136	SURVEY	COMMUNITY PLAN
DP270136	SURVEY	COMMUNITY REPLACEMENT SHEET
DP270136	SURVEY	COMMUNITY SUBDIVISION PLAN
DP270136	SURVEY	COMMUNITY CONSOLIDATION PLAN
DP518619	SURVEY	SUBDIVISION
DP522440	SURVEY	SUBDIVISION
DP701302	SURVEY	OLD SYSTEM CONVERSION
DP731701	COMPILATION	DEPARTMENTAL
DP734215	COMPILATION	DEPARTMENTAL
DP735298	COMPILATION	DEPARTMENTAL
DP735333	COMPILATION	DEPARTMENTAL
DP738647	COMPILATION	DEPARTMENTAL
DP743080	COMPILATION	DEPARTMENTAL
DP743818	COMPILATION	DEPARTMENTAL
DP745366	COMPILATION	DEPARTMENTAL
DP779535	COMPILATION	DEPARTMENTAL
DP782549	COMPILATION	DEPARTMENTAL
DP783311	COMPILATION	DEPARTMENTAL
DP783631	COMPILATION	DEPARTMENTAL
DP786055	SURVEY	SUBDIVISION
DP786646	SURVEY	SUBDIVISION
DP788453	SURVEY	CONSOLIDATION
DP788614	SURVEY	SUBDIVISION
DP794850	COMPILATION	DEPARTMENTAL
DP797586	COMPILATION	DEPARTMENTAL
DP847672	SURVEY	REDEFINITION
DP1007177	COMPILATION	LIMITED FOLIO CREATION
DP1028343	COMPILATION	LIMITED FOLIO CREATION
DP1039465	COMPILATION	LIMITED FOLIO CREATION
DP1077043	COMPILATION	DEPARTMENTAL
DP1081334	COMPILATION	LIMITED FOLIO CREATION
DP1083008	COMPILATION	LIMITED FOLIO CREATION
DP1083350	COMPILATION	LIMITED FOLIO CREATION
DP1086561	SURVEY	SUBDIVISION
DP1096744	COMPILATION	LIMITED FOLIO CREATION
DP1141417	COMPILATION	LIMITED FOLIO CREATION
DP1175125	COMPILATION	LIMITED FOLIO CREATION
DP1223553	SURVEY	DELIMITATION
DP1224986	COMPILATION	CONSOLIDATION
DP1243109	COMPILATION	REDEFINITION
SP470	COMPILATION	STRATA PLAN
SP3058	COMPILATION	STRATA PLAN
SP6373	COMPILATION	STRATA PLAN
SP9745	COMPILATION	STRATA PLAN
SP13061	COMPILATION	STRATA PLAN
SP15517	COMPILATION	STRATA PLAN

Caution: This information is provided as a searching aid only. Whilst every endeavour is made to ensure that current map, plan and titling information is accurately reflected, the Registrar General cannot guarantee the information provided. For **ALL** **ACTIVITY PRIOR TO SEPTEMBER 2002** you must refer to the RGs Charting and Reference Maps.

Plan	Surv/Comp	Purpose
SP17819	COMPILATION	STRATA PLAN
SP18807	COMPILATION	STRATA PLAN
SP19610	COMPILATION	STRATA PLAN
SP21494	COMPILATION	STRATA PLAN
SP38452	COMPILATION	STRATA PLAN
SP43206	COMPILATION	STRATA PLAN
SP44009	COMPILATION	STRATA PLAN
SP55746	COMPILATION	STRATA PLAN
SP64274	COMPILATION	STRATA PLAN
SP67965	COMPILATION	STRATA PLAN
SP78976	COMPILATION	STRATA PLAN
SP80542	COMPILATION	STRATA PLAN
SP85144	COMPILATION	STRATA PLAN
SP87796	COMPILATION	STRATA PLAN

Caution: This information is provided as a searching aid only. Whilst every endeavour is made to ensure that current map, plan and titling information is accurately reflected, the Registrar General cannot guarantee the information provided. For **ALL**

ACTIVITY PRIOR TO SEPTEMBER 2002 you must refer to the RGs Charting and Reference Maps.

CTD



REAL PROPERTY ACT, 1900



14876123

Vol. 14876 Fol. 122



16 9 1982

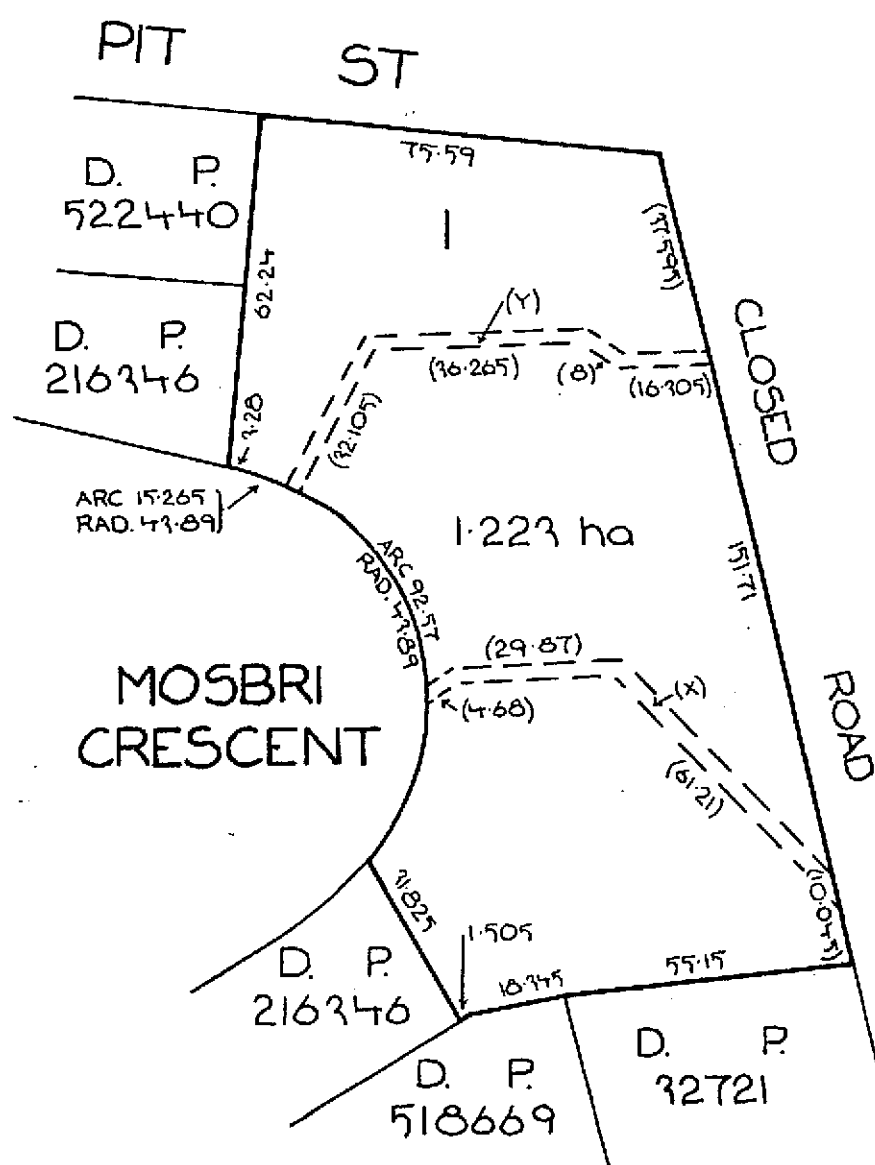
I certify that the person described in the First Schedule is the registered proprietor of the undermentioned estate in the land within described subject nevertheless to such exceptions encumbrances and interests as are shown in the Second Schedule.

Registrar General.



PLAN SHOWING LOCATION OF LAND

LENGTHS ARE IN METRES



(X) EASEMENT FOR DRAINAGE 2.44 WIDE BOOK 2574 NO 675.

(Y) EASEMENT TO
DRAIN WATER 2.44
WIDE BOOK 3199
NO 696

IVA 56532

ESTATE AND LAND REFERRED TO

Estate in Fee Simple in Lot 1 in Deposited Plan 204077 at Newcastle in the City of Newcastle Parish of Newcastle and County of Northumberland being part of Portion 268A granted to The Australian Agricultural Company on 20-11-1847. EXCEPTING THEREOUT all mines and minerals excepted by Deed Book 2206 No. 650.

FIRST SCHEDULE

NBN LIMITED.

SECOND SCHEDULE

1. Reservations and conditions, if any, contained in the Crown grant above referred to.
2. CAUTION. The land within described is held subject to any subsisting interests
(as defined in Section 28A Real Property Act, 1900). 16-9-1982

(as defined in Section 28A Real Property Act, 1900). 16-9-1982

3. Book 2574 No. 675 Easement for drainage affecting the part of the land above described shown so burdened in the plan hereon.

4. Book 3199 No. 696 Easement to drain water affecting the part of the land above described shown so burdened in the plan hereon.

5. Book 3399 No. 857 Mortgage to Commonwealth Trading Bank of Australia.

NOTE: ENTRIES RULED THROUGH AND AUTHENTICATED BY THE SEAL OF THE REGISTRAR GENERAL ARE CANCELLED

--	--	--

X148245X

NOTATIONS AND UNREGISTERED DEALINGS

--	--	--



X148245 CHARTERED BANK OF AUSTRALIA REGISTERED 4/11/98

SECOND SCHEDULE (continued)
PARTICULARS
Registrar General CANCELLATION

--	--

FIRST SCHEDULE (continued)
REGISTERED PROPRIETOR
Registrar General

Form 1

OFFICE USE ONLY

PLAN OF
part of lot 40 Sec.F, A.A.C^{os} subdivision

BK 2461 N^o 838

~~Mun./Shire/City~~ of Newcastle

Town or Locality Newcastle

Parish of Newcastle

County of Northumberland

Scale 100 feet to an inch

DP204077 s (E)

Registered:  18.6.1962
C.A.: 3516 of 5.6.61
Title System: Old System
Purpose: Subdivision
Ref. Map: Newcastle Sh. 2 1#
Last Plan:

CONVERSION TABLE ADDED IN
REGISTRAR GENERAL'S DEPARTMENT

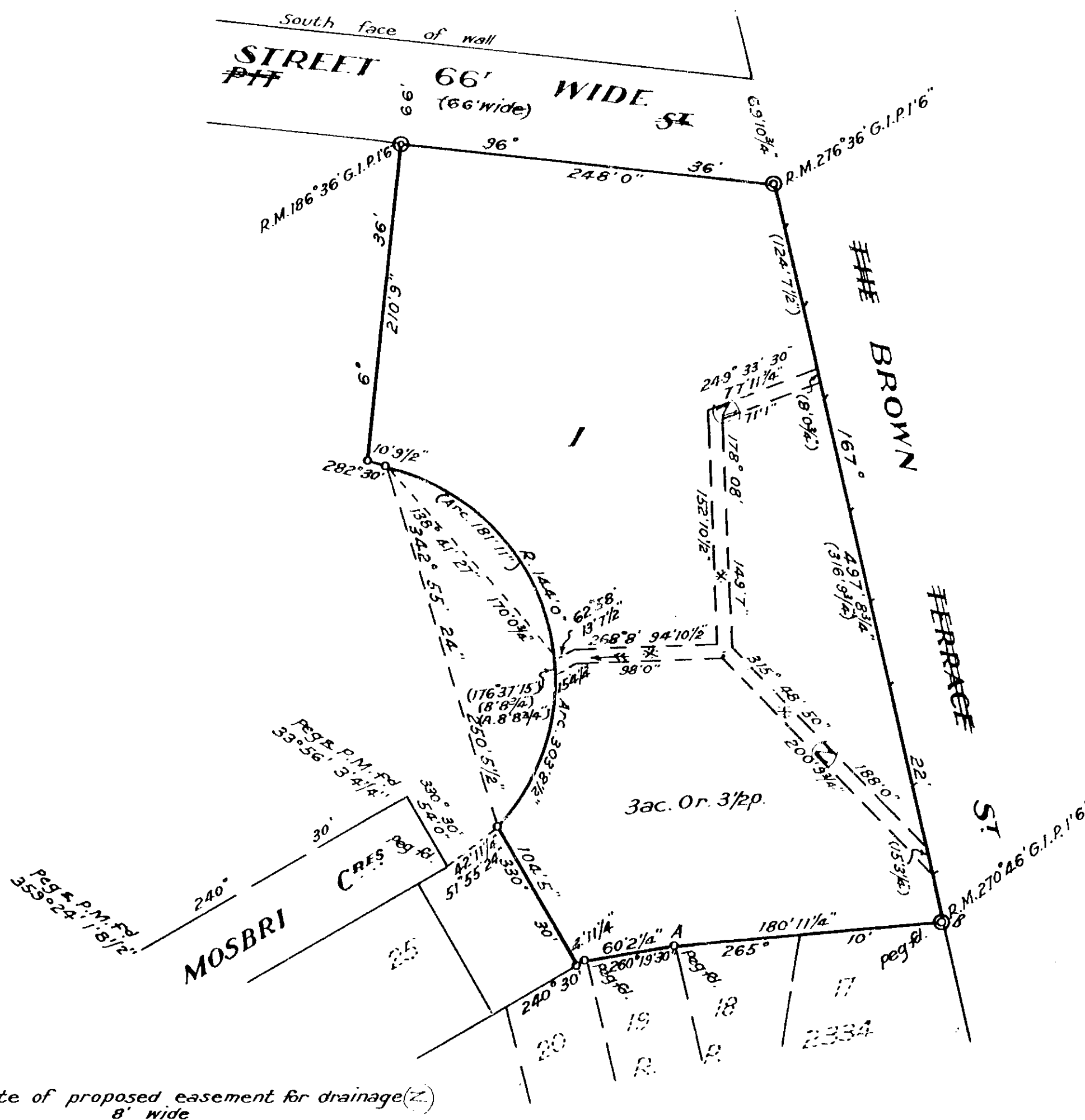
DP 204077

FEET	INCHES	METRES
------	--------	--------

1	6	0.457
1	7 1/2	0.495
1	8 1/2	0.521
3	4 1/4	1.022
4	11 1/4	1.505
8	-	2.439
8	0 3/4	2.457
8	8 3/4	2.661
10	9 1/2	3.289
13	7 1/2	4.153
15	3 1/4	4.655
15	4 1/4	4.680
24	7 1/2	7.506
42	11 1/4	13.087
54	-	16.459
60	2 1/4	18.345
66	-	20.117
69	10 3/4	21.304
71	1	21.666
77	11 1/4	23.755
77	11 3/4	23.768
94	10 1/2	28.918
98	-	29.870
104	5	31.826
124	7 1/2	37.986
144	-	43.891
149	7	45.593
152	10 1/2	46.596
170	0 3/4	51.835
180	11 1/4	55.150
181	11	55.448
188	-	57.302
200	9 3/4	61.208
210	9	64.237
248	-	75.590
250	5 1/2	76.340
303	8 1/2	92.570
316	9 3/4	96.564
497	8 3/4	151.708

AC	RU	P	HA
3	-	3 1/2	1.223

WARNING. Plan Drawing only to appear in this space.



M.M.

DP204077 s

WARNING. Plan Drawing only to appear in this space.

Signatures, Seals and Statements of Dedications and Easements.

It has been agreed to create easements for drainage 8' wide in favour of the Council of the City of Newcastle.

THE COUNCIL OF THE CITY OF NEWCASTLE
do hereby certify that the survey represented in this plan is accurate and has been made by me (1) by me (2) under my immediate supervision in accordance with the Survey Practice Regulations, 1933 and was completed on 6-1-1961.

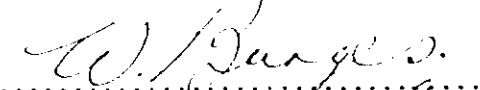
I, Reginald Frederick Bruyn

of Newcastle

a surveyor registered under the Surveyors Act, 1929, as amended, hereby certify that the survey represented in this plan is accurate and has been made (1) by me (2) under my immediate supervision in accordance with the Survey Practice Regulations, 1933 and was completed on 6-1-1961.

Signature: 
Surveyor registered under Surveyors Act, 1929 as amended.
Datum Line of Azimuth. A-B

Approved by Council. I hereby certify that the requirements of the Local Government Act, 1919 (other than the requirements for registration of plans), have been complied with by the applicant in relation to the proposed subdivision and/or new roads set out herein.

Subdivision No. 3516 Date 5-6-1961
Council Clerk: 

NEW SOUTH WALES LAND REGISTRY SERVICES - HISTORICAL SEARCH

SEARCH DATE

26/9/2018 1:18PM

FOLIO: 1/204077

First Title(s): SEE PRIOR TITLE(S)
Prior Title(s): VOL 14876 FOL 122

Recorded	Number	Type of Instrument	C.T. Issue
5/6/1987		TITLE AUTOMATION PROJECT	LOT RECORDED FOLIO NOT CREATED
27/11/1987		CONVERTED TO COMPUTER FOLIO	FOLIO CREATED CT NOT ISSUED
25/7/1988	X714862	MORTGAGE	EDITION 1
26/7/1996		AMENDMENT: LOCAL GOVT AREA	
13/6/1997	3005196	LEASE	EDITION 2
2/1/2007	AC837988	DISCHARGE OF MORTGAGE	
2/1/2007	AC837989	DISCHARGE OF MORTGAGE	EDITION 3
30/3/2007	AD24278	CAVEAT	
24/5/2007	AD135568	WITHDRAWAL OF CAVEAT	
18/10/2007	AD498142	MORTGAGE	EDITION 4
6/2/2013	AH536191	DISCHARGE OF MORTGAGE	EDITION 5

*** END OF SEARCH ***



NEW SOUTH WALES LAND REGISTRY SERVICES - TITLE SEARCH

FOLIO: 1/204077

SEARCH DATE	TIME	EDITION NO	DATE
26/9/2018	11:06 AM	5	6/2/2013

LAND

LOT 1 IN DEPOSITED PLAN 204077
AT NEWCASTLE
LOCAL GOVERNMENT AREA NEWCASTLE
PARISH OF NEWCASTLE COUNTY OF NORTHUMBERLAND
TITLE DIAGRAM DP204077

FIRST SCHEDULE

NBN LIMITED

SECOND SCHEDULE (4 NOTIFICATIONS)

- 1 RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)
- 2 BK 2574 NO 675 EASEMENT FOR DRAINAGE AFFECTING THE PART(S) SHOWN SO
BURDENED IN THE TITLE DIAGRAM
- 3 BK 3199 NO 696 EASEMENT TO DRAIN WATER AFFECTING THE PART(S) SHOWN
SO BURDENED IN THE TITLE DIAGRAM
- 4 BK 2206 NO 650 LAND EXCLUDES MINERALS

NOTATIONS

UNREGISTERED DEALINGS: NIL

*** END OF SEARCH ***

advlegs

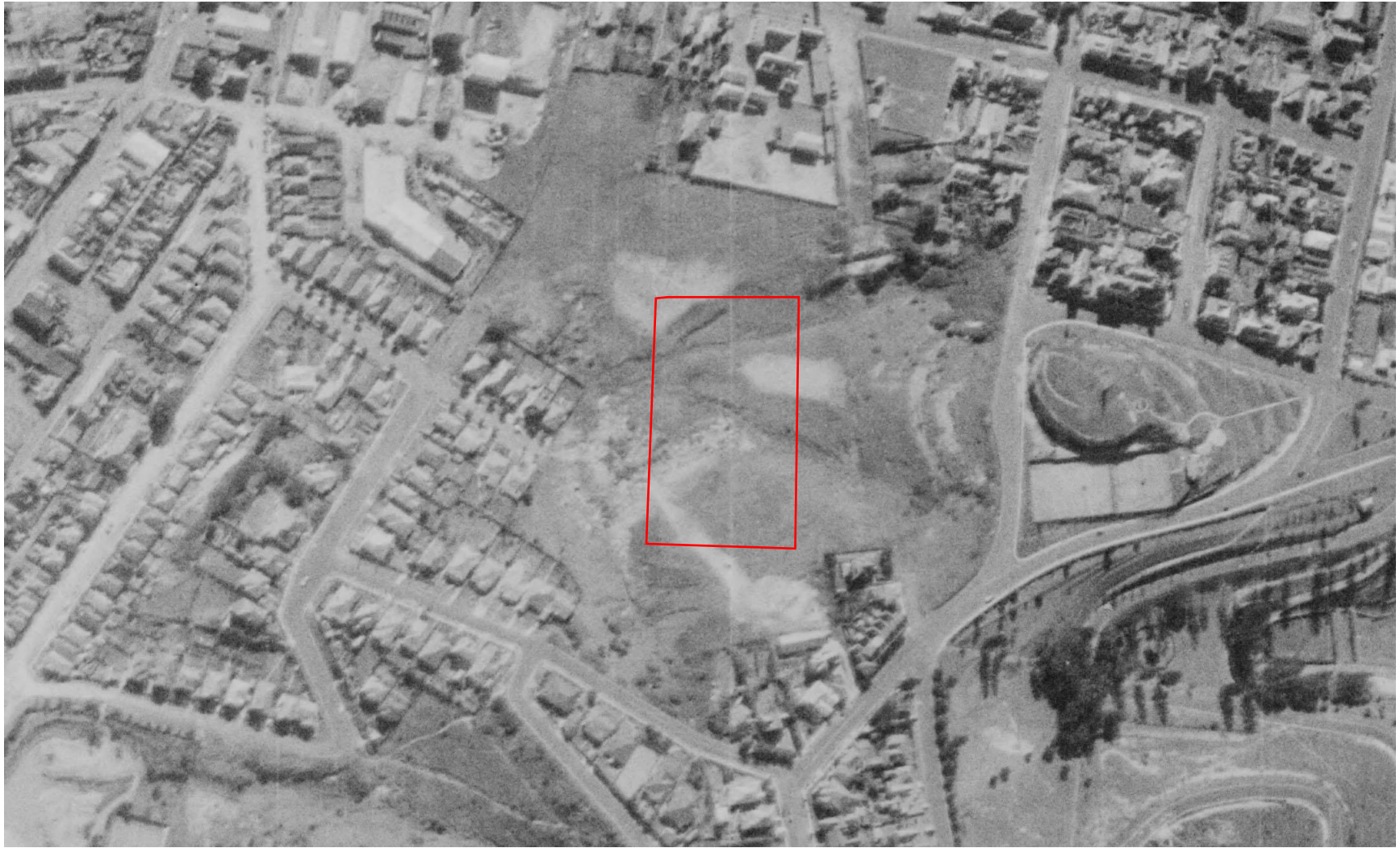
PRINTED ON 26/9/2018

Obtained from NSW LRS on 26 September 2018 11:06 AM AEST

* Any entries preceded by an asterisk do not appear on the current edition of the Certificate of Title. Warning: the information appearing under notations has not been formally recorded in the Register.

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Appendix D – Historical Aerial Photographs



Historical Aerial 1 - 1954 Showing the Future Location of the NBN Building



Historical Aerial 2 - 1966 Showing the Newcastle Broadcasting and Television Corporation Building



Historical Aerial 3 - 1976 Showing an Expanded Newcastle Broadcasting and Television Corporation Building



Historical Aerial 4 - 1987 Showing more Expansion on the NBN Limited Building



Historical Aerial 5 - 1993 Generally Unchanged Site Arrangement



Historical Aerial 6 - 2004 Showing a Generally Unchanged Site Arrangement

Appendix E – Site Photographs



Photo 1: Reception Area, NBN Television Building



Photo 2: Looking east across the site with communications infrastructure visible on the roof

drawn	PRW		client:	Stronach Property Pty Ltd.	
approved	PW		project:	Preliminary Contamination Assessment Proposed Multi-Building Residential Development 11-17 Mosbri Crescent, Cooks Hill	
date	10/29/2018		title:	SITE PHOTOGRAPHS	
scale	NTS		project no:	754-NTLGE220504-AB	photo no: 1&2
original size	A4				



Photo 3: Car parking on multiple terraced levels (western section of the Site)



Photo 4: Terracing of the landscape at the northern section of the Site.

drawn	PRW		client:	Stronach Property Pty Ltd.	
approved	PW		project:	Preliminary Contamination Assessment Proposed Multi-Building Residential Development 11-17 Mosbri Crescent, Cooks Hill	
date	10/29/2018		title:	SITE PHOTOGRAPHS	
scale	NTS		project no:	754-NTLGE220504-AB	photo no: 3&4
original size	A4				



Photo 5: Asphalt surface condition in car park



Photo 6: Asphalt surface condition along internal roadway

drawn	PRW		client:	Stronach Property Pty Ltd.	
approved	PW		project:	Preliminary Contamination Assessment Proposed Multi-Building Residential Development 11-17 Mosbri Crescent, Cooks Hill	
date	10/29/2018		title:	SITE PHOTOGRAPHS	
scale	NTS		project no:	754-NTLGE220504-AB	photo no: 5&6
original size	A4				



Photo 7: Cooling Tank on the eastern portion of the Site



Photo 8: Paint stored in shed on the eastern portion of the Site

drawn	PRW		client:	Stronach Property Pty Ltd.	
approved	PW		project:	Preliminary Contamination Assessment Proposed Multi-Building Residential Development 11- 17 Mosbri Crescent, Cooks Hill	
date	10/29/2018		title:	SITE PHOTOGRAPHS	
scale	NTS		project no:	754-NTLGE220504-AB	photo no: 7&8
original size	A4				



Photo 9: Scrap machinery on the eastern portion of the property



Photo 10: Satellite dish (disused) on the eastern portion of the property

drawn	PRW		client:	Stronach Property Pty Ltd.	
approved	PW		project:	Preliminary Contamination Assessment Proposed Multi-Building Residential Development 11-17 Mosbri Crescent, Cooks Hill	
date	10/29/2018		title:	SITE PHOTOGRAPHS	
scale	NTS		project no:	754-NTLGE220504-AB	photo no: 9&10
original size	A4				



Photo 11: Stand-by generator located in the eastern section of the Site



Photo 12: Historic image of progression of construction taking place into the cut in the hill. Photo Credit (Unknown) - Sourced Newcastle Lost Facebook Page (September 2018)

drawn	PRW		client:	Stronach Property Pty Ltd.	
approved	PW		project:	Preliminary Contamination Assessment Proposed Multi-Building Residential Development 11-17 Mosbri Crescent, Cooks Hill	
date	10/29/2018		title:	SITE PHOTOGRAPHS	
scale	NTS		project no:	754-NTLGE220504-AB	photo no: 11&12
original size	A4				

Appendix F – Section 10.7 Certificate



PLANNING CERTIFICATE

Section 10.7, Environmental Planning and Assessment Act 1979

To: Coffey Services Australia
19 Warabrook Boulevard
Warabrook NSW 2304

Certificate No: PL2018/04107
Fees: \$133.00
Receipt No(s): D000947040

Your Reference: NTLEN220504

Date of Issue: 28/08/2018

The Land: Lot 1 DP 204077
11-17 Mosbri Crescent The Hill NSW 2300

Advice provided on this Certificate:

Advice under section 10.7(2): see items 1 – 21
Additional advice under section 10.7(5): see Items 22 – 30

IMPORTANT: Please read this certificate carefully

This certificate contains important information about the land.

Please check for any item which could be inconsistent with the proposed use or development of the land. If there is anything you do not understand, phone Council's **Customer Enquiry Centre** on (02) 4974 2000, or come in and see us.

The information provided in this certificate relates only to the land described above. If you need information about adjoining or nearby land, or about the Council's development policies for the general area, contact Council's **Customer Enquiry Centre**.

All information provided is correct as at 28/08/2018. However, it's possible for changes to occur within a short time. We recommend that you only rely upon a very recent certificate.

Newcastle City Council

PO Box 489
NEWCASTLE 2300

Phone: (02) 4974 2000
Facsimile: (02) 4974 2222

Customer Enquiry Centre

Ground floor,
282 King Street
Newcastle NSW 2300

Office hours:

Mondays to Fridays 8.30 am to 5.00 pm

PART 1:

ADVICE PROVIDED UNDER SECTION 10.7(2)

ATTENTION: The explanatory notes appearing in italic print within Part 1 are provided to assist understanding, but do not form part of the advice provided under section 10.7(2). These notes shall be taken as being advice provided under section 10.7(5).

1. Names of relevant planning instruments and DCPs

The following environmental planning instruments, proposed environmental planning instruments and development control plans apply to the land, either in full or in part.

State Environmental Planning Policy No. 44 - Koala Habitat Protection

State Environmental Planning Policy No. 50 - Canal Estate Development

State Environmental Planning Policy No. 55 - Remediation of Land

State Environmental Planning Policy No. 62 - Sustainable Aquaculture

State Environmental Planning Policy No. 64 - Advertising and Signage

State Environmental Planning Policy No. 65 - Design Quality of Residential Flat Development

State Environmental Planning Policy (Housing For Seniors or People with a Disability) 2004

State Environmental Planning Policy (Building Sustainability Index:BASIX) 2004

State Environmental Planning Policy (State Significant Precincts) 2005

State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007

State Environmental Planning Policy (Temporary Structures) 2007

State Environmental Planning Policy (Infrastructure) 2007

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

State Environmental Planning Policy (Affordable Rental Housing) 2009

State Environmental Planning Policy (State and Regional Development) 2011

State Environmental Planning Policy (Coastal Management) 2018

Newcastle Local Environmental Plan 2012

Newcastle Development Control Plan 2012

2. Zoning and land use under relevant LEPs

Newcastle Local Environmental Plan 2012

Zoning: The Newcastle Local Environmental Plan 2012 identifies the land as being within the following zone(s):

Zone R3 Medium Density Residential

Note: Refer to www.newcastle.nsw.gov.au or www.legislation.nsw.gov.au web site for LEP instrument and zoning maps.

The following is an extract from the zoning provisions contained in Newcastle Local Environmental Plan 2012:

Zone R3 Medium Density Residential

- **Objectives of zone**

- To provide for the housing needs of the community within a medium density residential environment.
- To provide a variety of housing types within a medium density residential environment.
- To enable other land uses that provide facilities or services to meet the day to day needs of residents.
- To allow some diversity of activities and densities if:
 - (i) the scale and height of proposed buildings is compatible with the character of the locality, and
 - (ii) there will be no significant adverse impact on the amenity of any existing nearby development.
- To encourage increased population levels in locations that will support the commercial viability of centres provided that the associated new development:
 - (i) has regard to the desired future character of residential streets, and
 - (ii) does not significantly detract from the amenity of any existing nearby development.

- **Permitted without consent**

Environmental protection works; Home occupations

- **Permitted with consent**

Attached dwellings; Boarding houses; Car parks; Child care centres; Community facilities; Educational establishments; Emergency services facilities; Exhibition homes; Exhibition villages; Flood mitigation works; Group homes; Health services facilities; Home-based child care; Home businesses; Multi dwelling housing; Neighbourhood shops; Places of public worship; Recreation areas; Residential accommodation; Respite day care centres; Roads; Seniors housing; Tourist and visitor accommodation

- **Prohibited**

Any development not specified in, permitted without consent or permitted with consent

Minimum land dimensions for erection of a dwelling-house: The Newcastle Local Environmental Plan 2012 contains development standards relating to minimum land dimensions for the erection of a dwelling house. Refer to clause 4.1 Minimum subdivision lot size and Part 4 Principle development standards of the Newcastle LEP 2012 for provisions relating to minimum lot sizes for residential development.

Critical habitat: The Newcastle Local Environmental Plan 2012 does not identify the land as including or comprising critical habitat.

Heritage conservation area: The land is not within a heritage conservation area under the Newcastle Local Environmental Plan 2012.

Heritage items: There are no heritage items listed in the Newcastle Local Environmental Plan 2012 situated on the land.

3. Complying development

Note Other requirements: The advice below for all Complying Development Codes, is limited to identifying whether or not the **land**, the subject of the certificate, is land on which complying development may be carried out because of Clauses 1.17A(1)(c) to (e), (2), (3) & (4), 1.18 (1)(c3) and 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008 (the Codes SEPP).

To ascertain the extent to which the complying development may or may not be carried out on the land, maps are available on Council's web pages.

General Housing Code

Complying development under this Code may NOT be carried out on this land, as the land is affected by Specific land exemptions, being land that is excluded land identified by a policy adopted by Council as being a coastal hazard.

Rural Housing Code

Complying development under this Code may NOT be carried out on this land, as the land is affected by Specific land exemptions, being land that is excluded land identified by a policy adopted by Council as being a coastal hazard.

Housing Alterations Code

Complying development under the Housing Alterations Code MAY be carried out on this land.

General Development Code

Complying development under the General Development Code MAY be carried out on this land.

Commercial and Industrial Alterations Code

Complying development under the Commercial and Industrial Alterations Code MAY be carried out on this land.

Commercial and Industrial (New Buildings and Additions) Code

Complying development under this Code may NOT be carried out on this land, as the land is affected by Specific land exemptions, being land that is excluded land identified by a policy adopted by Council as being a coastal hazard.

Subdivision Code

Complying development under the Subdivision Code MAY be carried out on this land.

Demolition Code

Complying development under the Demolition Code MAY be carried out on this land.

Fire Safety Code

Complying development under the Fire Safety Code MAY be carried out on this land.

4B. Annual charges under Local Government Act 1993 for coastal protection services that relate to existing coastal protection works

The land IS NOT subject to an agreement for annual charges under section 496B of the Local Government Act 1993 for coastal protection services (within the meaning of section 553B of that Act).

5. Mine Subsidence Compensation Act 1961

The land IS within a proclaimed Mine Subsidence District under the Mine Subsidence Compensation Act 1961. The approval of the Mine Subsidence Board is required for all subdivision and building, except for certain minor structures. Surface development controls are in place to prevent damage from old, current or future mining. It is strongly recommended prospective purchasers consult with the Mine Subsidence Board regarding mine subsidence and any surface development guidelines. The Board can assist with information about mine subsidence and advise whether existing structures comply with the requirements of the Act.

NOTE: Plans of existing and abandoned mine workings are available for viewing at the Mine Subsidence Board's offices. For further clarification and details, contact the Mine Subsidence Board, 117 Bull Street, Newcastle West. Ph (02) 49084300.

6. Road widening or realignment

NOTE: The Roads and Maritime Services (RMS) may have proposals that are not referred to in this item. For advice about affectation by RMS proposals, contact the Roads and Maritime Services, Locked Mail Bag 30 Newcastle 2300. Ph: 131 782.

The land IS NOT AFFECTED by any road widening or road realignment under Division 2 of Part 3 of the Roads Act 1993.

The land IS NOT AFFECTED by any road widening or road realignment under an environmental planning instrument.

The land IS NOT AFFECTED by road widening or road realignment under a resolution of the Council.

7. Policies on hazard risk restrictions

Except as stated below, the land is not affected by a policy referred to in Item 7 of Schedule 4 of the Environmental Planning and Assessment Regulation 2000 that restricts the development of the land because of the likelihood of land slip, bushfire, tidal inundation, subsidence, acid sulphate soils or any other risk (other than flooding).

Potential acid sulfate soils: Works carried out on the land must be undertaken in accordance with Clause 6.1 Acid sulfate soils of the Newcastle Local Environmental Plan 2012.

Land Contamination: Council has adopted a policy of restricting development or imposing conditions on properties affected by Land Contamination. Refer to the Newcastle Development Control Plan 2012, which may be inspected or purchased at Council's Customer Enquiry Centre.

Bush fire: Under clause 5.11 Bush fire hazard reduction of the Newcastle LEP 2012, bush fire hazard reduction work authorised by the Rural Fires Act 1997 may be carried out on any land without development consent.

NOTE: The Rural Fires Act 1997 also makes provision relating to the carrying out of development on bush fire prone land.

The Newcastle Coastal Zone Management Plan: This land has been identified in the *Newcastle Coastal Zone Management Plan* (NCC 2016) as having a current exposure to coastal landslide risk. The *Newcastle Coastal Zone Management Plan* (NCC 2016) is based on the *Newcastle Coastal Zone Hazards Study* (BMT WBM) completed in 2014 and endorsed by Council in November 2016, and reflects information available at that time. The *Newcastle Coastal Zone Management Plan* (NCC 2016) is available on Council's website www.newcastle.nsw.gov.au, or you can contact council for more information.

NOTE: The absence of a policy to restrict development of the land because of the likelihood of a particular risk does not imply that the land is free from that risk. The Council considers the likelihood of natural and man-made risks when determining development applications under section 4.15 of the Environmental Planning and Assessment Act 1979. Detailed investigation carried out in conjunction with the preparation or assessment of a development application may result in the Council either refusing development consent or imposing conditions of consent on the basis of risks that are not identified above.

7A. Flood related development controls information

Council's current information indicates the property is not flood prone land as defined in the Floodplain Development Manual: the management of flood liable land, April 2005 published by the NSW Government.

8. Land reserved for acquisition

The land is not identified for acquisition by a public authority (as referred to in section 3.15 of the Act) by any environmental planning instrument or proposed environmental planning instrument applying to the land.

9. Contributions plans

The following contribution plan/s apply to the land.

Section 94A Development Contributions Plan 2009 - August 2017:

The Plan specifies section 94A contributions that may be imposed as a condition of development consent.

NOTE: Contributions plans are available on Council's website or may be inspected or purchased at Council's Customer Enquiry Centre.

9A. Biodiversity certified land

The land IS NOT biodiversity certified land under Part 8 of the Biodiversity Conservation Act 2016.

10. Biodiversity stewardship sites

The land IS NOT land (of which the Council is aware) under a biodiversity stewardship agreement under Part 5 of the Biodiversity Conservation Act 2016.

10A. Native vegetation clearing set asides

The land IS NOT land (of which the Council is aware) that contains a set aside area under section 60ZC of the Local Land Services Act 2013.

11. Bush fire prone land

The land, either in whole or in part IS bush fire prone land for the purposes of the Environmental Planning and Assessment Act 1979.

12. Property vegetation plans

Not applicable. The Native Vegetation Act 2003 does not apply to the Newcastle local government area.

13. Orders under Trees (Disputes Between Neighbours) Act 2006

Council HAS NOT been notified that an order has been made under the Trees (Disputes between Neighbours) Act 2006 to carry out work in relation to a tree on the land.

14. Directions under Part 3A

The land IS NOT AFFECTED by a direction by the Minister in force under section 75P (2) (c1) of the Act.

15. Site compatibility certificates and conditions for seniors housing

(a) The land IS NOT AFFECTED by a current site compatibility certificate (of which the Council is aware) issued under the State Environmental Planning Policy (Housing for Seniors and People with a Disability) 2004.

(b) The land IS NOT AFFECTED by any terms of kind referred to in clause 18(2) of the State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004, that have been imposed as a condition of consent to a development application granted after 11 October, 2007 in respect of the land.

16. Site compatibility certificates for infrastructure, schools or TAFE establishments

The land IS NOT AFFECTED by a valid site compatibility certificate (of which the Council is aware) issued under the State Environmental Planning Policy (Infrastructure) 2007.

17. Site compatibility certificates and conditions for affordable rental housing

The land IS NOT AFFECTED by a valid site compatibility certificate (of which the Council is aware) issued under the State Environmental Planning Policy (Affordable Rental Housing) 2009.

18. Paper subdivision information

The land IS NOT AFFECTED by any development plan that applies to the land or that is proposed to be subject to a consent ballot.

19. Site verification certificates

The land IS NOT AFFECTED by a current site verification certificate (of which the Council is aware) issued under the State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007.

20. Loose-fill asbestos insulation

The Council HAS NOT been notified that the land includes any residential premises (within the meaning of Division 1A of Part 8 of the Home Building Act 1989) that are listed on the register of loose-fill asbestos insulation, that is required to be maintained under that Division.

21. Affected building notices and building product rectification orders

The land IS NOT AFFECTED by any affected building notice of which the council is aware that is in force in respect of the land.

The land IS NOT AFFECTED by any building product rectification order that has not been fully complied with, of which the council is aware that is in force in respect of the land.

The land IS NOT AFFECTED by an outstanding notice of intention to make a building product rectification order of which the council is aware.

An affected building notice has the same meaning as in Part 4 of the Building Products (Safety) Act 2017. Building product rectification order has the same meaning as in the Building Products (Safety) Act 2017.

Note: *There are no matters prescribed by section 59(2) of the Contaminated Land Management Act 1997 to be disclosed, however if other contamination information is held by the Council this may be provided under a section 10.7(5) certificate.*

PART 2:

ADVICE PROVIDED UNDER SECTION 10.7(5)

ATTENTION: *Section 10.7(6) of the Act states that a Council shall not incur any liability in respect of advice provided in good faith pursuant to sub-section 10.7(5).*

22. Outstanding Notices and Orders issued by Council.

Council records indicate that this premise IS NOT AFFECTED by a current notice or order (excluding the notices or orders mentioned in the note below).

NOTE: *The Council has not inspected the premises immediately prior to the issue of this certificate. It is possible that the premises are affected by matters of which the Council is unaware.*

NOTE: *This Certificate does not include any advice regarding outstanding notices or orders issued under the Environmental Planning and Assessment Act 1979 or the Local Government Act 1993. To obtain advice regarding these matters, you should lodge an application for a Certificate as to Outstanding Notices and Orders (accompanied by the appropriate fee). For further information, please contact the Customer Enquiry Centre on (02) 4974 2000.*

23. Further consent requirements under the Newcastle Local Environmental Plan 2012.

The following provisions of the Newcastle Local Environmental Plan 2012 affect the carrying out of development on the land. These provisions are in addition to those required to be disclosed at Item 2 of this Certificate.

Refer to clause 3.1 Exempt Development of the Newcastle Local Environmental Plan 2012

Refer to clause 3.2 Complying Development of the Newcastle Local Environmental Plan 2012

Note: *The Newcastle Local Environmental 2012 may have additional provisions that affect the carry out of development. Refer to the Newcastle Local Environmental 2012 for the full affect it may have on the land or obtain profession advice for more information.*

24. Suspension of covenants.

Refer to 1.9A Suspension of covenants, agreements and instruments of the Newcastle Local Environmental Plan 2012.

25. Draft development control plans.

A draft development control plan DOES NOT APPLY to the land. The draft plans are exhibited pursuant to Part 3 of the Environmental Planning and Assessment Regulation 2000.

26. Heritage Act 1977.

The land IS NOT AFFECTED by a listing on the State Heritage Register or an Interim Heritage Order that is in force under the Heritage Act 1977.

NOTE: The above advice is provided to the extent that Council has been notified by the Heritage Council of NSW. For up-to-date details, contact the Office of Environment and Heritage, PO Box A290, South Sydney NSW 1232 Ph: (02) 9995 5000.

27. Listing by National Trust of Australia.

The land IS NOT AFFECTED by a listing of the National Trust of Australia (NSW).

NOTE: The above advice is provided to the extent that Council has been notified by the National Trust of Australia (NSW). For up-to-date details, contact the National Trust Ph 02 9258 0123.

28. Australian Heritage Database.

The land IS NOT AFFECTED by a listing on the Australian Heritage Database.

NOTE: The above advice is provided to the extent that Council has been notified by the Department of the Environment. For up-to-date details, contact the Department of the Environment, Heritage, King Edward Terrace, Parkes ACT 2600. Ph (02) 6274 1111.

29. Environment Protection & Biodiversity Conservation Act 1999 (Cth)

Under the (Commonwealth) Environment Protection and Biodiversity Conservation Act 1999, actions which have, may have or are likely to have, a significant impact on a matter of national environmental significance may be taken only with the approval of the Commonwealth Minister for the Environment.

Approval is also required for actions that have a significant effect on the environment of Commonwealth land. These actions may be on Commonwealth land or other land.

This approval is in addition to any approvals under the (NSW) Environmental Planning and Assessment Act 1979 or other NSW legislation.

Matters of national environmental significance are:

- declared World Heritage areas
- declared Ramsar wetlands
- listed threatened species and ecological communities
- listed migratory species
- nuclear actions
- the environment of Commonwealth marine areas.

Locations within the City of Newcastle that are a declared Ramsar wetland include Kooragang Nature Reserve and Shortland Wetlands. Listed threatened species and listed migratory species are known to occur within the City of Newcastle.

30. Other matters

The land is affected by the following:

Newcastle earthquake

Earthquakes occurred in the vicinity of Newcastle on 28th December 1989 and 6 August 1994. Buildings on the land may have suffered damage as a consequence of the earthquakes. Prospective purchasers are advised to make their own enquiries as to whether the property is affected by any damage.

Local Planning Strategy

The Local Planning Strategy is the principal land use strategy for Newcastle. It was adopted by the Council on 28 July 2015. The Strategy is taken into account when the Council assesses development applications and amendments to the Newcastle Local Environmental Plan 2012.

Note: Refer to Council's website to view the document. www.newcastle.nsw.gov.au

Lower Hunter Regional Strategy (2006 - 2031)

The Lower Hunter Regional Strategy has been prepared by the Department of Planning and Infrastructure. The contents of the strategy will be taken into account when Council assesses development applications and amendments to the Newcastle Local Environmental Plan 2012.

Note: Refer to Council's website to view the document. www.newcastle.nsw.gov.au

Newcastle City-Wide Floodplain Risk Management Study and Plan (2012)

The Newcastle City-wide Floodplain Risk Management Study and Plan addresses flood management for the City of Newcastle. The Study and Plan will be taken into account when Council assesses development applications and amendments to the Newcastle Local Environmental Plan 2012.

Note: Refer to Council's website to view the document. www.newcastle.nsw.gov.au

Stormwater drain

The Council's records indicate that a stormwater drain passes through the land. A registered easement to drain water has not been created for this drain.

Issued without alterations or additions, 28/08/18
Authorised by
JEREMY BATH
CHIEF EXECUTIVE OFFICER

Appendix G – Groundwater Bore Search

NSW Office of Water

Work Summary

GW202514

Licence: 20BL173249		Licence Status: ACTIVE	
		Authorised Purpose(s): MONITORING BORE	
		Intended Purpose(s): MONITORING BORE	
Work Type: Bore			
Work Status: Equipped			
Construct.Method: Auger - Solid Flight			
Owner Type: Local Govt			
Commenced Date:		Final Depth: 6.00 m	
Completion Date: 28/08/2012		Drilled Depth: 6.00 m	
Contractor Name: Soilcheck			
Driller: Andre Gisby			
Assistant Driller: Cameron Gill			
Property: N A 1 LAMAN STREET COOKS HILL		Standing Water Level:	
2300 NSW			
GWMA:		Salinity:	
GW Zone:		Yield:	

Site Details

Site Chosen By:			
		County	Parish
		Form A: NORTH	NORTH.44
		Licensed:	Cadastre
			14//1122031
Region: 20 - Hunter		CMA Map: 9232-2S	
River Basin: 210 - HUNTER RIVER		Grid Zone:	
Area/District:		Scale:	
Elevation: 0.00 m (A.H.D.)		Northing: 6355835.0	
Elevation Source: Unknown		Easting: 385268.0	
		Latitude: 32°55'47.0"S	
		Longitude: 151°46'22.2"E	
GS Map: -		MGA Zone: 0	
		Coordinate Source: GIS - Geographic Information System	

Construction

Negative depths indicate Above Ground Level; C-Cemented; SL-Slot Length; A-Aperture; GS-Grain Size; Q-Quantity; PL-Placement of Gravel Pack; PC-Pressure

Cemented; S-Sump; CE-Centralisers

Hole	Pipe	Component	Type	From (m)	To (m)	Outside Diameter (mm)	Inside Diameter (mm)	Interval	Details
1		Hole	Hole	0.00	6.00	100			Auger - Solid Flight
1		Annulus	Bentonite/Grout	0.00	1.00	100	50		PL:Pour ed/Shovelled
1		Annulus	Waterworn/Rounded	1.00	6.00	100	50		Graded, Q:0.013m3, PL:Pour ed/Shovelled
1	1	Casing	Pvc Class 18	0.00	6.00	50	46		Seated on Bottom, Screwed
1	1	Opening	Slots - Horizontal	1.80	6.00	50		1	Casing - Hand Sawn Slot, PVC Class 18, Screwed, SL: 45.0mm, A: 1.00mm

Water Bearing Zones

From (m)	To (m)	Thickness (m)	WBZ Type	S.W.L. (m)	D.D.L. (m)	Yield (L/s)	Hole Depth (m)	Duration (hr)	Salinity (mg/L)
----------	--------	---------------	----------	------------	------------	-------------	----------------	---------------	-----------------

Geologists Log Drillers Log

From (m)	To (m)	Thickness (m)	Drillers Description	Geological Material	Comments
0.00	0.80	0.80	Fill	Fill	
0.80	4.20	3.40	Silty Clay, alluvial	Silty Clay	
4.20	6.00	1.80	Sand, alluvial, trace of clay	Sand	

Remarks

28/08/2012: Form A Remarks:
Nat Carling, 22-Oct-2012; Coordinates based on location map provided with the Form-A.

*** End of GW202514 ***

Warning To Clients: This raw data has been supplied to the NSW Office of Water by drillers, licensees and other sources. The NOW does not verify the accuracy of this data. The data is presented for use by you at your own risk. You should consider verifying this data before relying on it. Professional hydrogeological advice should be sought in interpreting and using this data.

Appendix H – Contaminated Land Register Search

[Home](#) [Contaminated land](#) [Record of notices](#)

Search results

Your search for:LGA: Newcastle City Council

Matched 103 notices
relating to 21 sites,

[Search Again](#)
[Refine Search](#)

Suburb	Address	Site Name	Notices related to this site
HAMILTON	Clyde STREET	Hamilton Gasworks	3 current and 4 former
HAMILTON	116 Tudor STREET	Taxi Services	4 former
HAMILTON NORTH	56 Clyde STREET	Black and Decker	1 current
HAMILTON NORTH	54 Clyde STREET	ELMA	1 current and 1 former
HAMILTON NORTH	5 Chatham STREET	Shell Newcastle Terminal	2 current and 2 former
HEXHAM	Sparke STREET	Forgacs Site	1 current
HEXHAM	64 Old Maitland ROAD	Trojay Pty Ltd	1 current
KOORAGANG	Cormorant ROAD	BHP Kooragang	1 current and 1 former
KOORAGANG	15 Greenleaf ROAD	Orica Kooragang Island	4 current and 9 former
MARYVILLE	184-188 Hannell STREET	7-Eleven (former Mobil) Service Station	1 current
MAYFIELD	The Buffer Zone' extending directly adjacent to the Hunter River; near the Tourle Street Bridge STREET	BHP Steel River	3 current and 1 former
MAYFIELD		BHPB Supply site	3 current and 7 former
MAYFIELD	Industrial DRIVE	OneSteel (BHP)	5 current and 1 former
MAYFIELD WEST	East of Woodstock Street and Tourle STREET	Koppers Coal Tar	2 current and 1 former
NEWCASTLE	Bound by Hunter River, Selwyn Street & Industrial DRIVE	BHP Steelworks (Closure site)	9 current and 13 former
NEWCASTLE	26-28 Honeysuckle DRIVE	Reclaimed Land	1 former
SANDGATE	Maitland ROAD	North Limited Storage Handling facility	1 current and 7 former
SHORTLAND	1, 2 & 28 Astra STREET	Former Astra St landfill	3 current and 3 former
TARRO	Woodland CLOSE	Green Acres Farm	1 current
TIGHES HILL	110 Elizabeth STREET	Former Mobil Terminal	6 former

For business and industry ☐

For local government ☐

Contact us

Page 1 of 2

10 October 2018

- ☐ 131 555 (tel:131555)
- ☐ info@epa.nsw.gov.au (mailto:info@epa.nsw.gov.au)
- ☐ EPA Office Locations (<https://www.epa.nsw.gov.au/about-us/contact-us/locations>)

Accessibility (<https://www.epa.nsw.gov.au/about-us/contact-us/website-service-standards/help-index>)
Disclaimer (<https://www.epa.nsw.gov.au/about-us/contact-us/website-service-standards/disclaimer>)
Privacy (<https://www.epa.nsw.gov.au/about-us/contact-us/website-service-standards/privacy>)
Copyright (<https://www.epa.nsw.gov.au/about-us/contact-us/website-service-standards/copyright>)

Find us on ☐ ☐ ☐ <https://www.epa.nsw.gov.au>

[Home](#) [Contaminated land](#) [Record of notices](#)

Search results

Your search for:LGA: Newcastle City Council

Matched 103 notices
relating to 21 sites.

[Search Again](#)
[Refine Search](#)

Suburb	Address	Site Name	Notices related to this site
WICKHAM	156 Hannell STREET	Caltex Terminal	1 current

1 2

Page 2 of 2

10 October 2018

For business and industry ☐

For local government ☐

Contact us

- ☐ 131 555 (tel:131555)
- ☐ info@epa.nsw.gov.au (mailto:info@epa.nsw.gov.au)
- ☐ EPA Office Locations (<https://www.epa.nsw.gov.au/about-us/contact-us/locations>)

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Find us on    <https://www.epa.nsw.gov.au>

Appendix I – Borehole Logs

PDF 0 9 06 LIBRARY.GLB rev:AS Log COF BOREHOLE: NON CORED 754-NTLGE220504.GPJ <DrawingFile>> 30/10/2018 11:42

Engineering Log - Borehole

client: **Crescent Newcastle Pty Ltd**

principal:

project: ***Proposed Multi Building Residential Development***

location: **11 - 13 Mosbri Crescent, Cooks Hill, NSW**Borehole ID. **BH02**

sheet: 1 of 1

project no. **754-NTLGE220504**

date started: **10 Sep 2018**

date completed: **10 Sep 2018**

logged by: **MJ**

checked by: **RB**

position: E: 385,624.50; N: 6,355,677.60 (MGA94)

surface elevation: 30.94 m (AHD)

angle from horizontal: 90°

drill model: Comacchio 450P. Track mounted

drilling fluid:

hole diameter : 100 mm

drilling information						material substance							
method & support	1 penetration	2 water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations	
AD/T	Not Observed		E				CL	FILL: BITUMEN: Black, fine to coarse subangular gravel.	M >Wp	St VSt		FILL- WEARING COURSE	
			E		FILL: Sandy GRAVEL: fine to coarse grained, brown, with some cobbles 63mm to 80mm.			FILL- PAVEMENT					
			E		FILL: Sandy CLAY: low to medium plasticity, dark grey, grey and brown, fine to medium sand, some surrounded sized gravel.			FILL					
			SPT 3, 3, 8 N*=11	1.0	FILL: CLAY: medium plasticity, grey and pale grey, with orange.								
			E			SC	CLAYEY SAND: fine to coarse grained, pale brown and pale grey.	M		RESIDUAL SOIL			
			-29	2.0									
			SPT 6, 8, 9 N*=17	28	3.0		CL	Sandy CLAY: medium plasticity, grey, fine to medium grained sand. CLAY: medium plasticity, orange mottled pale grey.	~Wp	H			
							-27	4.0			<Wp		
			SPT 15/10mm HB N*=R					Borehole BH02 terminated at 4.01 m Safety reasons					
				-26	5.0								
				-25	6.0								
				-24	7.0								
				-23									
method AD auger drilling* AS auger screwing* HA hand auger W washbore RR rock roller/tricone			support M mud N nil C casing			samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remoulded (kPa) R refusal HB hammer bouncing			classification symbol & soil description based on Unified Classification System			consistency / relative density 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	
penetration no resistance ranging to refusal			water 10-Oct-12 water level on date shown water inflow water outflow			moisture D dry M moist W wet Wp plastic limit WL liquid limit							

Engineering Log - Borehole

client: **Crescent Newcastle Pty Ltd**

principal:

project: **Proposed Multi Building Residential Development**

location: **11 - 13 Mosbri Crescent, Cooks Hill, NSW**

Borehole ID. **BH02A**

sheet: 1 of 13

project no. **754-NTLGE220504**

date started: **20 Sep 2018**

date completed: **21 Sep 2018**

logged by: **MJ**

checked by: **RB**

position: E: 385,619.90; N: 6,355,693.60 (MGA94) surface elevation: 32.40 m (AHD) angle from horizontal: 90°
drill model: Comacchio 450P, Track mounted drilling fluid: non / water hole diameter : 96 mm

drilling information				material substance						
method & support	penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description	moisture condition	consistency / relative density
AD	1		E	32.40	0.0			FILL: BITUMEN PAVEMENT: black, 50mm.	M	
	2		E		1.0			FILL: Gravelly SAND: fine to coarse grained, brown and pale grey, with angular to sub-angular gravel.		
	3				2.0			SANDSTONE.		
					3.0					
					4.0					
					5.0					
					6.0					
					7.0					
					8.0					
					9.0					
					10.0					
					11.0					
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					93.0					
					94.0					
					95.0					
					96.0					
					97.0					
					98.0					
					99.0					
					100.0					

method AD auger drilling* AS auger screwing* HA hand auger W washbore RR rock roller/tricone * bit shown by suffix e.g. AD/T B blank bit T TC bit V V bit	support M mud C casing penetration  water 10-Oct-12 water level on date shown water inflow water outflow	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remoulded (kPa) R refusal HB hammer bouncing	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet Wp plastic limit Wl liquid limit	consistency / relative density 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
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client: **Crescent Newcastle Pty Ltd**

principal:

project: ***Proposed Multi Building Residential Development***

location: **11 - 13 Mosbri Crescent, Cooks Hill, NSW**

Borehole ID. ***BH02A***

sheet: 2 of 13

project no. **754-NTLGE220504**

date started: **20 Sep 2018**

date completed: **21 Sep 2018**

logged by: **MJ**

checked by: **RB**

position: E: 385,619.90; N: 6,355,693.60 (MGA94)

surface elevation: 32.40 m (AHD)

angle from horizontal: 90°

drill model: Comacchio 450P, Track mounted

drilling fluid: non / water

hole diameter : 96 mm

drilling information					material substance									
method & support	1 penetration	2	3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations
RR N				Not Observed		-24				SANDSTONE. (continued)				MODERATELY WEATHERED TO SLIGHTLY WEATHERED

Engineering Log - Borehole

client: **Crescent Newcastle Pty Ltd**

principal:

project: **Proposed Multi Building Residential Development**

location: **11 - 13 Mosbri Crescent, Cooks Hill, NSW**

Borehole ID: **BH02A**

sheet: 3 of 13

project no. **754-NTLGE220504**

date started: **20 Sep 2018**

date completed: **21 Sep 2018**

logged by: **MJ**

checked by: **RB**

position: E: 385,619.90; N: 6,355,693.60 (MGA94)

surface elevation: 32.40 m (AHD)

angle from horizontal: 90°

drill model: Comacchio 450P, Track mounted

drilling fluid: non / water

hole diameter : 96 mm

drilling information					material substance									
method & support	1 penetration	2 penetration	3 penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa)	structure and additional observations
RR 														

Engineering Log - Borehole

client: **Crescent Newcastle Pty Ltd**

principal:

project: **Proposed Multi Building Residential Development**

location: **11 - 13 Mosbri Crescent, Cooks Hill, NSW**

Borehole ID: **BH02A**

sheet: 4 of 13

project no: **754-NTLGE220504**

date started: **20 Sep 2018**

date completed: **21 Sep 2018**

logged by: **MJ**

checked by: **RB**

position: E: 385,619.90; N: 6,355,693.60 (MGA94) surface elevation: 32.40 m (AHD) angle from horizontal: 90°
drill model: Comacchio 450P, Track mounted drilling fluid: non / water hole diameter : 96 mm

drilling information					material substance							
method & support	penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa)	structure and additional observations
RR N	1 2 3							SANDSTONE. (continued)			100 200 300 400	MODERATELY WEATHERED TO SLIGHTLY WEATHERED
				8								
					25.0							
				7								
					26.0							
				6				COAL.				
					27.0							
				5								
					28.0			SILTSTONE.				
				4								
					29.0			COAL.				
				3				SILTSTONE.				
					30.0			COAL.				
			2				SANDSTONE.					
				31.0								
				1								

method AD auger drilling* AS auger screwing* HA hand auger W washbore RR rock roller/tricone * bit shown by suffix e.g. AD/T B blank bit T TC bit V V bit	support M mud C casing N nil penetration water 	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remoulded (kPa) R refusal HB hammer bouncing	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet Wp plastic limit Wl liquid limit	consistency / relative density 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
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Engineering Log - Borehole

client: **Crescent Newcastle Pty Ltd**

principal:

project: **Proposed Multi Building Residential Development**

location: **11 - 13 Mosbri Crescent, Cooks Hill, NSW**

Borehole ID: **BH02A**

sheet: 5 of 13

project no. **754-NTLGE220504**

date started: **20 Sep 2018**

date completed: **21 Sep 2018**

logged by: **MJ**

checked by: **RB**

position: E: 385,619.90; N: 6,355,693.60 (MGA94) surface elevation: 32.40 m (AHD) angle from horizontal: 90°
drill model: Comacchio 450P, Track mounted drilling fluid: non / water hole diameter : 96 mm

drilling information						material substance								
method & support	penetration			water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa)	structure and additional observations
	1	2	3							SANDSTONE. <i>(continued)</i>			100	FRESH
						0					200			
						33.0					300			
						-1					400			
						34.0								
						-2								
						35.0								
						-3								
						36.0								
						-4								
						37.0								
						-5								
						38.0								
						-6								
						39.0								
						-7								

method AD auger drilling* AS auger screwing* HA hand auger W washbore RR rock roller/tricone * bit shown by suffix e.g. AD/T B blank bit T TC bit V V bit	support M mud N nil C casing penetration  no resistance ranging to refusal water 10-Oct-12 water level on date shown water inflow water outflow	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remoulded (kPa) R refusal HB hammer bouncing	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet Wp plastic limit Wl liquid limit	consistency / relative density 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
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Engineering Log - Borehole

client: **Crescent Newcastle Pty Ltd**

principal:

project: **Proposed Multi Building Residential Development**

location: **11 - 13 Mosbri Crescent, Cooks Hill, NSW**

Borehole ID. **BH02A**

sheet: 6 of 13

project no. **754-NTLGE220504**

date started: **20 Sep 2018**

date completed: **21 Sep 2018**

logged by: **MJ**

checked by: **RB**

position: E: 385,619.90; N: 6,355,693.60 (MGA94)

surface elevation: 32.40 m (AHD)

angle from horizontal: 90°

drill model: Comacchio 450P, Track mounted

drilling fluid: non / water

hole diameter : 96 mm

drilling information					material substance									
method & support	1 penetration	2 penetration	3 penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa)	structure and additional observations
RR <														

Engineering Log - Borehole

client: **Crescent Newcastle Pty Ltd**

principal:

project: **Proposed Multi Building Residential Development**

location: **11 - 13 Mosbri Crescent, Cooks Hill, NSW**

Borehole ID. **BH02A**

sheet: 7 of 13

project no. **754-NTLGE220504**

date started: **20 Sep 2018**

date completed: **21 Sep 2018**

logged by: **MJ**

checked by: **RB**

position: E: 385,619.90; N: 6,355,693.60 (MGA94) surface elevation: 32.40 m (AHD) angle from horizontal: 90°
drill model: Comacchio 450P, Track mounted drilling fluid: non / water hole diameter : 96 mm

drilling information						material substance								
method & support	penetration			water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa)	structure and additional observations
	1	2	3										100 200 300 400	
RR										SANDSTONE: grey. (continued)				FRESH
N						-16								
						49.0								
						-17								
						50.0								
						-18								
						51.0								
						-19								
						52.0								
						-20								
						53.0								
						-21								
						54.0								
						-22								
						55.0								
						-23								
										COAL: black.				

method AD auger drilling* AS auger screwing* HA hand auger W washbore RR rock roller/tricone * bit shown by suffix e.g. AD/T B blank bit T TC bit V V bit	support M mud N nil C casing penetration  no resistance ranging to refusal water 10-Oct-12 water level on date shown water inflow water outflow	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remoulded (kPa) R refusal HB hammer bouncing	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet Wp plastic limit Wl liquid limit	consistency / relative density 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
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Engineering Log - Borehole

client: **Crescent Newcastle Pty Ltd**

principal:

project: **Proposed Multi Building Residential Development**

location: **11 - 13 Mosbri Crescent, Cooks Hill, NSW**

Borehole ID: **BH02A**

sheet: 8 of 13

project no. **754-NTLGE220504**

date started: **20 Sep 2018**

date completed: **21 Sep 2018**

logged by: **MJ**

checked by: **RB**

position: E: 385,619.90; N: 6,355,693.60 (MGA94) surface elevation: 32.40 m (AHD) angle from horizontal: 90°
drill model: Comacchio 450P, Track mounted drilling fluid: non / water hole diameter : 96 mm

drilling information					material substance									
method & support	penetration			water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description	moisture condition	consistency / relative density	hand penetrometer (kPa)	structure and additional observations
	1	2	3											
RR				Not Observed		-24				SANDSTONE				FRESH
N						57.0								
						-25								
						58.0								
						-26								
						59.0								
						-27								
						60.0								
						-28								
						61.0								
						-29								
						62.0								
					-30									
					63.0									
					-31									

method AD auger drilling* AS auger screwing* HA hand auger W washbore RR rock roller/tricone * bit shown by suffix e.g. AD/T B blank bit T TC bit V V bit	support M mud C casing penetration 	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remoulded (kPa) R refusal HB hammer bouncing	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet Wp plastic limit Wl liquid limit	consistency / relative density 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
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Engineering Log - Borehole

client: **Crescent Newcastle Pty Ltd**

principal:

project: **Proposed Multi Building Residential Development**

location: **11 - 13 Mosbri Crescent, Cooks Hill, NSW**

Borehole ID: **BH02A**

sheet: 9 of 13

project no. **754-NTLGE220504**

date started: **20 Sep 2018**

date completed: **21 Sep 2018**

logged by: **MJ**

checked by: **RB**

position: E: 385,619.90; N: 6,355,693.60 (MGA94) surface elevation: 32.40 m (AHD) angle from horizontal: 90°
drill model: Comacchio 450P, Track mounted drilling fluid: non / water hole diameter : 96 mm

drilling information					material substance									
method & support	penetration			water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa)	structure and additional observations
	1	2	3							SANDSTONE. <i>(continued)</i>			100	FRESH
											200			
											300			
											400			

method AD auger drilling* AS auger screwing* HA hand auger W washbore RR rock roller/tricone * bit shown by suffix e.g. AD/T B blank bit T TC bit V V bit	support M mud N nil C casing penetration  no resistance ranging to refusal water 10-Oct-12 water level on date shown water inflow water outflow	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remoulded (kPa) R refusal HB hammer bouncing	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet Wp plastic limit Wl liquid limit	consistency / relative density 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
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Engineering Log - Borehole

client: **Crescent Newcastle Pty Ltd**

principal:

project: **Proposed Multi Building Residential Development**

location: **11 - 13 Mosbri Crescent, Cooks Hill, NSW**

Borehole ID: **BH02A**

sheet: 11 of 13

project no. **754-NTLGE220504**

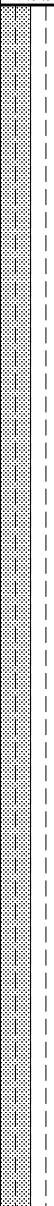
date started: **20 Sep 2018**

date completed: **21 Sep 2018**

logged by: **MJ**

checked by: **RB**

position: E: 385,619.90; N: 6,355,693.60 (MGA94) surface elevation: 32.40 m (AHD) angle from horizontal: 90°
drill model: Comacchio 450P, Track mounted drilling fluid: non / water hole diameter : 96 mm

drilling information					material substance									
method & support	penetration			water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa)	structure and additional observations
	1	2	3											
RR N		Not Observed			-48		SANDSTONE. <i>(continued)</i>						FRESH	
					81.0									
					-49									
					82.0									
					-50									
					83.0									
					-51									
					84.0									
					-52									
					85.0									
					-53									
					86.0									
					-54									
					87.0									
					-55									

method AD auger drilling* AS auger screwing* HA hand auger W washbore RR rock roller/tricone * bit shown by suffix e.g. B blank bit T TC bit V V bit	support M mud N nil C casing penetration  no resistance ranging to refusal water 10-Oct-12 water level on date shown water inflow water outflow	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remoulded (kPa) R refusal HB hammer bouncing	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet Wp plastic limit Wl liquid limit	consistency / relative density 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
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Engineering Log - Borehole

client: **Crescent Newcastle Pty Ltd**

principal:

project: **Proposed Multi Building Residential Development**

location: **11 - 13 Mosbri Crescent, Cooks Hill, NSW**

Borehole ID: **BH02A**

sheet: 12 of 13

project no. **754-NTLGE220504**

date started: **20 Sep 2018**

date completed: **21 Sep 2018**

logged by: **MJ**

checked by: **RB**

position: E: 385,619.90; N: 6,355,693.60 (MGA94) surface elevation: 32.40 m (AHD) angle from horizontal: 90°
drill model: Comacchio 450P, Track mounted drilling fluid: non / water hole diameter : 96 mm

drilling information					material substance							
method & support	penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description	moisture condition	consistency / relative density	hand penetrometer (kPa)	structure and additional observations
	1 2 3							SANDSTONE. <i>(continued)</i>			100 200 300 400	FRESH
				-56								
				89.0								
				-57								
				90.0								
				-58								
				91.0								
				-59								
				92.0								
				-60								
				93.0								
				-61								
				94.0								
				-62								
				95.0				COAL: black.				
				-63								

method AD auger drilling* AS auger screwing* HA hand auger W washbore RR rock roller/tricone * bit shown by suffix e.g. AD/T B blank bit T TC bit V V bit	support M mud C casing N nil penetration  no resistance ranging to refusal water 10-Oct-12 water level on date shown water inflow water outflow	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remoulded (kPa) R refusal HB hammer bouncing	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet Wp plastic limit Wl liquid limit	consistency / relative density 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
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client: **Crescent Newcastle Pty Ltd**

principal:

project: ***Proposed Multi Building Residential Development***

location: **11 - 13 Mosbri Crescent, Cooks Hill, NSW**

Borehole ID. ***BH02A***

sheet: 13 of 13

project no. **754-NTLGE220504**

date started: **20 Sep 2018**

date completed: **21 Sep 2018**

logged by: **MJ**

checked by: **RB**

position: E: 385,619.90; N: 6,355,693.60 (MGA94)

surface elevation: 32.40 m (AHD)

angle from horizontal: 90°

drill model: Comacchio 450P, Track mounted

drilling fluid: non / water

hole diameter : 96 mm

drilling information					material substance									
method & support	1 penetration	2 penetration	3 penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations
RR N				Not Observed		-64				COAL: black. (continued)				FRESH
						-65								
						-66								
						-67								
						-68								
						-69								
						-70								
						-71								
						-72								
						-73								
* B T V				Not Observed		-74				Borehole BH02A terminated at 102.0 m Target depth				
						-75								
						-76								
						-77								
						-78								
						-79								
						-80								
						-81								
						-82								
						-83								
* B T V				Not Observed		-84				Borehole BH02A terminated at 102.0 m Target depth				
						-85								
						-86								
						-87								
						-88								
						-89								
						-90								
						-91								
						-92								
						-93								
* B T V				Not Observed		-94				Borehole BH02A terminated at 102.0 m Target depth				
						-95								
						-96								
						-97								
						-98								
						-99								
						-100								
						-101								
						-102								
						-103								
* B T V				Not Observed		-104				Borehole BH02A terminated at 102.0 m Target depth				
						-105								
						-106								
						-107								
						-108								
						-109								
						-110								
						-111								
						-112								
						-113								
* B T V				Not Observed		-114				Borehole BH02A terminated at 102.0 m Target depth				
						-115								
						-116								
						-117								
						-118								
						-119								
						-120								
						-121								
						-122								
						-123								
* B T V				Not Observed		-124				Borehole BH02A terminated at 102.0 m Target depth				
						-125								
						-126								
						-127								
						-128								
						-129								
						-130								
						-131								
						-132								
						-133								
* B T V				Not Observed		-134				Borehole BH02A terminated at 102.0 m Target depth				
						-135								
						-136								
						-137								
						-138								
						-139								
						-140								
						-141								
						-142								
						-143								
* B T V				Not Observed		-144				Borehole BH02A terminated at 102.0 m Target depth				
						-145								
						-146								
						-147								
						-148								
						-149								
						-150								
						-151								
						-152								
						-153								
* B T V				Not Observed		-154				Borehole BH02A terminated at 102.0 m Target depth				
						-155								
						-156								
						-157								
						-158								
						-159								
						-160								
						-161								
						-162								
						-163								
* B T V				Not Observed		-164				Borehole BH02A terminated at 102.0 m Target depth				
						-165								
						-166								
						-167								
						-168								
						-169								
						-170								
						-171								
						-172								
						-173								
* B T V				Not Observed		-174				Borehole BH02A terminated at 102.0 m Target depth				
						-175								
						-176								
						-177								
						-178								
						-179								
						-180								
						-181								
						-182								
						-183								
* B T V				Not Observed		-184				Borehole BH02A terminated at 102.0 m Target depth				
						-185								
						-186								
						-187								
						-188								
						-189								
						-190								
						-191								
						-192								
						-193								
* B T V				Not Observed		-194				Borehole BH02A terminated at 102.0 m Target depth				
						-195								
						-196								
						-197								
						-198								
						-199								
						-200								
						-201								
						-202								
						-203								
* B T V				Not Observed		-204				Borehole BH02A terminated at 102.0 m Target depth				
						-205								
						-206								
						-207								
						-208								
						-209								
						-210								
						-211								
						-212								
						-213								
* B T V				Not Observed		-214				Borehole BH02A terminated at 102.0 m Target depth				
						-215								
						-216								
						-217								
						-218								
						-219								
						-220								
						-221								
						-222								
						-223								
* B T V				Not Observed		-224				Borehole BH02A terminated at 102.0 m Target depth				
						-225								
						-226								
						-227								
						-228								
						-229								
						-230								
						-231								
						-232								
						-233								
* B T V				Not Observed		-234				Borehole BH02A terminated at 102.0 m Target depth				
						-235								
						-236								
						-237								
						-238								
						-239								
						-240								
						-241								
						-242								
						-243								
* B T V				Not Observed		-244				Borehole BH02A terminated at 102.0 m Target depth				
						-245								
						-246								
						-247								
						-248								
						-249								
						-250								
						-251								
						-252								
						-253								
* B T V				Not Observed		-254				Borehole BH02A terminated at 102.0 m Target depth				
						-255								
						-256								
						-257								
						-258								
						-259								
						-260								
						-261								
						-262								
						-263								
* B T V				Not Observed		-264				Borehole BH02A terminated at 102.0 m Target depth				
						-265								
						-266								
						-267								
						-268								
						-269								
						-270								
						-271								
						-272								
						-273								
* B T V				Not Observed		-274				Borehole BH02A terminated at 102.0 m Target depth				
						-275								
						-276								
						-277								
						-278								
						-279								
						-280								
						-281								
						-282								
						-283								
* B T V				Not Observed		-284				Borehole BH02A terminated at 102.0 m Target depth				
						-285								
						-286								
						-287								
						-288								
						-289								
						-290								
						-291								
						-292								
						-293								
* B T V				Not Observed		-294				Borehole BH02A terminated at 102.0 m Target depth				
						-295								
						-296								
						-297								
						-298								
						-299								
						-300								
						-301								
						-302								
						-303								
* B T V														

Engineering Log - Borehole

client: **Crescent Newcastle Pty Ltd**

principal:

project: **Proposed Multi Building Residential Development**

location: **11 - 13 Mosbri Crescent, Cooks Hill, NSW**

Borehole ID: **BH03**

sheet: 1 of 14

project no: **754-NTLGE220504**

date started: **17 Sep 2018**

date completed: **20 Sep 2018**

logged by: **MJ**

checked by: **RB**

position: E: 385,685.80; N: 6,355,574.40 (MGA94) surface elevation: 32.75 m (AHD) angle from horizontal: 90°
drill model: Comacchio 450P, Track mounted drilling fluid: non / water hole diameter : 96 mm

drilling information					material substance							
method & support	penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations
AD	1		E				GP	FILL: BITUMEN: black, 50mm.	M			FILL- WEARING COURSE
	2		E		CI		FILL: Sandy GRAVEL: fine to coarse grained, grey, angular to sub-angular, fine grained sand. Sandy CLAY: medium plasticity, mottled red and brown.	>Wp	St - VSt		FILL- PAVEMENT	
	3											RESIDUAL SOIL
			SPT 5, 7, 10 N=17	-32			CI	CLAY: medium plasticity, pale grey and red mottled orange.	>Wp			
			B									
				-31								
			SPT 21, 30/90mm N=R				CL	Sandy CLAY: low plasticity, orange mottled pale brown, fine grained sand.	<Wp	VSt - H		EXTREMELY WEATHERED ROCK
				-30								
				-30	3.0							
								Borehole BH03 continued as cored hole				
				-29	4.0							
				-28	5.0							
				-27	6.0							
				-26	7.0							
				-25								

method AD auger drilling* AS auger screwing* HA hand auger W washbore RR rock roller/tricone * bit shown by suffix e.g. AD/T B blank bit T TC bit V V bit	support M mud C casing N nil penetration water 10-Oct-12 water level on date shown water inflow water outflow	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remoulded (kPa) R refusal HB hammer bouncing	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet Wp plastic limit WL liquid limit	consistency / relative density 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
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Engineering Log - Borehole

client: **Crescent Newcastle Pty Ltd**

principal:

project: **Proposed Multi Building Residential Development**

location: **11 - 13 Mosbri Crescent, Cooks Hill, NSW**

Borehole ID. **BH04**

sheet: 1 of 13

project no. **754-NTLGE220504**

date started: **12 Sep 2018**

date completed: **14 Sep 2018**

logged by: **MJ**

checked by: **RB**

position: E: 385,684.5; N: 6,355,567.6 (MGA94) surface elevation: 32.8 m (AHD) angle from horizontal: 90°
drill model: Comacchio 450P, Track mounted drilling fluid: non / water hole diameter : 96 mm

drilling information					material substance							
method & support	penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description	moisture condition	consistency / relative density	hand penetrometer (kPa)	structure and additional observations
AD	1		E				GW	FILL: BITUMEN PAVEMENT: black, 20mm.			100	FILL - WEARING COURSE
	2		E				SW	FILL: Sandy GRAVEL: fine to coarse grained, sub-angular to angular, grey, with fine grained sand.	M	F - St	200	FILL - PAVEMENT
	3		E				CL	FILL: CLAYEY SAND: fine to coarse grained, brown and red.	<Wp		300	FILL - UNCONTROLLED
			E		1.0		CL	FILL: Sandy CLAY: low plasticity, brown, dark brown, pale grey, fine to coarse grained sand, with fine grained angular to sub-angular gravel.			400	
			SPT 5, 5, 5 N=10				CL	FILL: Sandy CLAY: low plasticity, dark brown, mottled orange, fine grained sand, with fine grained sub-angular to sub-rounded gravel and glass pieces.		St - H		
			E		2.0							
			SPT 3, 4, 5 N=9				CL-CI	Sandy CLAY: low to medium plasticity, dark brown and dark grey, fine to coarse grained sand.	~Wp			RESIDUAL SOIL
					3.0		CL-CI	CLAY: low to medium plasticity, mottled orange and brown, with fine rounded to sub-rounded gravel.				
			B									
					29							
N					4.0		CL-CI	Sandy CLAY: low to medium plasticity, dark grey, with medium to course grained sand, with fine angular to sub-angular gravel.	>Wp			EXTREMELY WEATHERED MATERIAL
							CL-CI	Gravelly CLAY: fine to medium grained, low to medium plasticity, pale grey and grey, with rounded to sub-rounded gravel, trace of fine to coarse grained sand.				HIGHLY WEATHERED BECOMING MODERATELY WEATHERED MATERIAL
			SPT 7, 25/30mm N=R					SANDSTONE: fine grained, pale grey and orange.				
					5.0			SANDSTONE.				
					27							
					6.0							
					26							
					7.0							
					25							
RR												

method AD auger drilling* AS auger screwing* HA hand auger W washbore RR rock roller/tricone * bit shown by suffix e.g. AD/T B blank bit T TC bit V V bit	support M mud C casing N nil penetration water 10-Oct-12 water level on date shown water inflow water outflow	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remoulded (kPa) R refusal HB hammer bouncing	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet Wp plastic limit WL liquid limit	consistency / relative density 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
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Engineering Log - Borehole

client: **Crescent Newcastle Pty Ltd**

principal:

project: **Proposed Multi Building Residential Development**

location: **11 - 13 Mosbri Crescent, Cooks Hill, NSW**

Borehole ID. **BH04**

sheet: 2 of 13

project no. **754-NTLGE220504**

date started: **12 Sep 2018**

date completed: **14 Sep 2018**

logged by: **MJ**

checked by: **RB**

position: E: 385,684.5; N: 6,355,567.6 (MGA94) surface elevation: 32.8 m (AHD) angle from horizontal: 90°
drill model: Comacchio 450P, Track mounted drilling fluid: non / water hole diameter : 96 mm

drilling information						material substance								
method & support	penetration			water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa)	structure and additional observations
	1	2	3											
RR	N									SANDSTONE. <i>(continued)</i>				MODERATELY WEATHERED TO SLIGHTLY WEATHERED

method AD auger drilling* AS auger screwing* HA hand auger W washbore RR rock roller/tricone * bit shown by suffix e.g. AD/T B blank bit T TC bit V V bit	support M mud N nil C casing penetration  no resistance ranging to refusal water  10-Oct-12 water level on date shown water inflow water outflow	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remoulded (kPa) R refusal HB hammer bouncing	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet Wp plastic limit Wl liquid limit	consistency / relative density 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
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Engineering Log - Borehole

client: **Crescent Newcastle Pty Ltd**

principal:

project: **Proposed Multi Building Residential Development**

location: **11 - 13 Mosbri Crescent, Cooks Hill, NSW**

Borehole ID: **BH04**

sheet: 3 of 13

project no. **754-NTLGE220504**

date started: **12 Sep 2018**

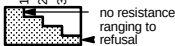
date completed: **14 Sep 2018**

logged by: **MJ**

checked by: **RB**

position: E: 385,684.5; N: 6,355,567.6 (MGA94) surface elevation: 32.8 m (AHD) angle from horizontal: 90°
drill model: Comacchio 450P, Track mounted drilling fluid: non / water hole diameter : 96 mm

drilling information					material substance									
method & support	penetration			water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa)	structure and additional observations
RR	N	1	2	3						SANDSTONE. (continued)				MODERATELY WEATHERED TO SLIGHTLY WEATHERED
				</										

method AD auger drilling* AS auger screwing* HA hand auger W washbore RR rock roller/tricone	support M mud N nil C casing	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remoulded (kPa) R refusal HB hammer bouncing	classification symbol & soil description based on Unified Classification System	consistency / relative density 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
* bit shown by suffix e.g. AD/T B blank bit T TC bit V V bit	penetration  no resistance ranging to refusal water 10-Oct-12 water level on date shown water inflow water outflow		moisture D dry M moist W wet Wp plastic limit Wl liquid limit	

Engineering Log - Borehole

client: **Crescent Newcastle Pty Ltd**

principal:

project: **Proposed Multi Building Residential Development**

location: **11 - 13 Mosbri Crescent, Cooks Hill, NSW**

Borehole ID: **BH04**

sheet: 4 of 13

project no. **754-NTLGE220504**

date started: **12 Sep 2018**

date completed: **14 Sep 2018**

logged by: **MJ**

checked by: **RB**

position: E: 385,684.5; N: 6,355,567.6 (MGA94)

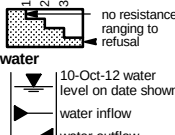
surface elevation: 32.8 m (AHD)

angle from horizontal: 90°

drill model: Comacchio 450P, Track mounted

drilling fluid: non / water

hole diameter : 96 mm

drilling information					material substance																	
method & support	1 penetration	2 penetration	3 penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa)	structure and additional observations								
RR N										SANDSTONE. (continued)				FRESH								
						8	25.0															
						7	26.0															
						6	27.0															
						5	28.0			TUFF. COAL: black, with some sand.												
						4	29.0			SILTSTONE.												
						3	30.0															
						2	31.0															
						1				SANDSTONE.												
method AD auger drilling* AS auger screwing* HA hand auger W washbore RR rock roller/tricone * bit shown by suffix e.g. AD/T B blank bit T TC bit V V hit					support M mud N nil C casing penetration  water 10-Oct-12 water level on date shown water inflow water outflow					samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remoulded (kPa) R refusal HB hammer bouncing					classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet Wp plastic limit Wl liquid limit				consistency / relative density 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			

Engineering Log - Borehole

client: **Crescent Newcastle Pty Ltd**

principal:

project: **Proposed Multi Building Residential Development**

location: **11 - 13 Mosbri Crescent, Cooks Hill, NSW**

Borehole ID. **BH04**

sheet: 5 of 13

project no. **754-NTLGE220504**

date started: **12 Sep 2018**

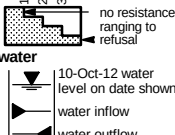
date completed: **14 Sep 2018**

logged by: **MJ**

checked by: **RB**

position: E: 385,684.5; N: 6,355,567.6 (MGA94) surface elevation: 32.8 m (AHD) angle from horizontal: 90°
drill model: Comacchio 450P, Track mounted drilling fluid: non / water hole diameter : 96 mm

drilling information					material substance									
method & support	1 penetration	2 penetration	3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations
RR	N									SANDSTONE. (continued)				FRESH
						0	33.0							
						-1	34.0							
						-2	35.0							
						-3	36.0							
						-4	37.0							
						-5	38.0							
						-6	39.0							
						-7								

method AD auger drilling* AS auger screwing* HA hand auger W washbore RR rock roller/tricone * bit shown by suffix e.g. AD/T B blank bit T TC bit V V bit	support M mud N nil C casing penetration 	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remoulded (kPa) R refusal HB hammer bouncing	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet Wp plastic limit Wl liquid limit	consistency / relative density 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
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Engineering Log - Borehole

client: **Crescent Newcastle Pty Ltd**

principal:

project: **Proposed Multi Building Residential Development**

location: **11 - 13 Mosbri Crescent, Cooks Hill, NSW**

Borehole ID. **BH04**

sheet: 6 of 13

project no. **754-NTLGE220504**

date started: **12 Sep 2018**

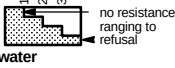
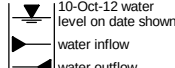
date completed: **14 Sep 2018**

logged by: **MJ**

checked by: **RB**

position: E: 385,684.5; N: 6,355,567.6 (MGA94) surface elevation: 32.8 m (AHD) angle from horizontal: 90°
drill model: Comacchio 450P, Track mounted drilling fluid: non / water hole diameter : 96 mm

drilling information					material substance												
method & support	penetration			water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa)				structure and additional observations
	1	2	3										100	200	300	400	
RR										SANDSTONE. (continued)						FRESH	

method AD auger drilling* AS auger screwing* HA hand auger W washbore RR rock roller/tricone * bit shown by suffix e.g. AD/T B blank bit T TC bit V V bit	support M mud N nil C casing penetration  water 	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remoulded (kPa) R refusal HB hammer bouncing	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet Wp plastic limit Wl liquid limit	consistency / relative density 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
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Engineering Log - Borehole

client: **Crescent Newcastle Pty Ltd**

principal:

project: **Proposed Multi Building Residential Development**

location: **11 - 13 Mosbri Crescent, Cooks Hill, NSW**

Borehole ID. **BH04**

sheet: 7 of 13

project no. **754-NTLGE220504**

date started: **12 Sep 2018**

date completed: **14 Sep 2018**

logged by: **MJ**

checked by: **RB**

position: E: 385,684.5; N: 6,355,567.6 (MGA94) surface elevation: 32.8 m (AHD) angle from horizontal: 90°
drill model: Comacchio 450P, Track mounted drilling fluid: non / water hole diameter : 96 mm

drilling information					material substance							
method & support	penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description	moisture condition	consistency / relative density	hand penetrometer (kPa)	structure and additional observations
								SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components			100 200 300 400	
RR	1				49.0			SANDSTONE. (continued)				FRESH
	2											
	3											
</												

method AD auger drilling* AS auger screwing* HA hand auger W washbore RR rock roller/tricone	support M mud C casing N nil	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remoulded (kPa) R refusal HB hammer bouncing	classification symbol & soil description based on Unified Classification System	consistency / relative density 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
* bit shown by suffix e.g. AD/T B blank bit T TC bit V V bit	penetration water 		moisture D dry M moist W wet Wp plastic limit Wl liquid limit	

Engineering Log - Borehole

client: **Crescent Newcastle Pty Ltd**

principal:

project: ***Proposed Multi Building Residential Development***

location: **11 - 13 Mosbri Crescent, Cooks Hill, NSW**

Borehole ID. **BH04**

sheet: 8 of 13

project no. **754-NTLGE220504**

date started: **12 Sep 2018**

date completed: **14 Sep 2018**

logged by: **MJ**

checked by: **RB**

position: E: 385,684.5; N: 6,355,567.6 (MGA94)

surface elevation: 32.8 m (AHD)

angle from horizontal: 90°

drill model: Comacchio 450P, Track mounted

drilling fluid: non / water

hole diameter : 96 mm

drilling information						material substance								
method & support		penetration		water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa)	structure and additional observations
RR	N					-24	57.0			SANDSTONE. (continued)			100 200 300 400	FRESH
										SILTSTONE.				
										SANDSTONE.				
						-25	58.0							
						-26	59.0							
						-27	60.0							
						-28	61.0							
						-29	62.0							
						-30	63.0							
						-31								

method AD auger drilling* AS auger screwing* HA hand auger W washbore RR rock roller/tricone	support M mud N nil C casing penetration  no resistance ranging to refusal water  10-Oct-12 water level on date shown  water inflow  water outflow	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remoulded (kPa) R refusal HB hammer bouncing	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet Wp plastic limit Wl liquid limit	consistency / relative density 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
--	---	--	--	--

* bit shown by suffix e.g. AD/T B blank bit T TC bit V V hit

Engineering Log - Borehole

client: **Crescent Newcastle Pty Ltd**

principal:

project: **Proposed Multi Building Residential Development**

location: **11 - 13 Mosbri Crescent, Cooks Hill, NSW**

Borehole ID. **BH04**

sheet: 9 of 13

project no. **754-NTLGE220504**

date started: **12 Sep 2018**

date completed: **14 Sep 2018**

logged by: **MJ**

checked by: **RB**

position: E: 385,684.5; N: 6,355,567.6 (MGA94) surface elevation: 32.8 m (AHD) angle from horizontal: 90°
drill model: Comacchio 450P, Track mounted drilling fluid: non / water hole diameter : 96 mm

drilling information					material substance									
method & support	1 penetration	2 penetration	3	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa) 100 200 300 400	structure and additional observations
RR										SANDSTONE. (continued)				FRESH

method AD auger drilling* AS auger screwing* HA hand auger W washbore RR rock roller/tricone * bit shown by suffix e.g. AD/T B blank bit T TC bit V V bit	support M mud N nil C casing penetration  no resistance ranging to refusal water 10-Oct-12 water level on date shown water inflow water outflow	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remoulded (kPa) R refusal HB hammer bouncing	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet Wp plastic limit Wl liquid limit	consistency / relative density 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
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CDF 0 9 06_LIBRARY.GLB rev:AS Log COF BOREHOLE: NON CORED 754-NTLGE220504.GPJ <DrawingFile>> 30/10/2018 11:42

Engineering Log - Borehole

client: **Crescent Newcastle Pty Ltd**

principal:

project: **Proposed Multi Building Residential Development**

location: **11 - 13 Mosbri Crescent, Cooks Hill, NSW**

Borehole ID: **BH04**

sheet: 11 of 13

project no. **754-NTLGE220504**

date started: **12 Sep 2018**

date completed: **14 Sep 2018**

logged by: **MJ**

checked by: **RB**

position: E: 385,684.5; N: 6,355,567.6 (MGA94) surface elevation: 32.8 m (AHD) angle from horizontal: 90°
drill model: Comacchio 450P, Track mounted drilling fluid: non / water hole diameter : 96 mm

drilling information						material substance																
method & support	penetration			water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa)	structure and additional observations								
RR	N	1								SANDSTONE. <i>(continued)</i>				FRESH								
		2																				
		3																				

method AD auger drilling* AS auger screwing* HA hand auger W washbore RR rock roller/tricone * bit shown by suffix e.g. AD/T B blank bit T TC bit V V bit	support M mud N nil C casing penetration  no resistance ranging to refusal water 10-Oct-12 water level on date shown water inflow water outflow	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remoulded (kPa) R refusal HB hammer bouncing	classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet Wp plastic limit Wl liquid limit	consistency / relative density 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
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Engineering Log - Borehole

client: **Crescent Newcastle Pty Ltd**

principal:

project: **Proposed Multi Building Residential Development**

location: **11 - 13 Mosbri Crescent, Cooks Hill, NSW**

Borehole ID: **BH04**

sheet: 12 of 13

project no. **754-NTLGE220504**

date started: **12 Sep 2018**

date completed: **14 Sep 2018**

logged by: **MJ**

checked by: **RB**

position: E: 385,684.5; N: 6,355,567.6 (MGA94) surface elevation: 32.8 m (AHD) angle from horizontal: 90°
drill model: Comacchio 450P, Track mounted drilling fluid: non / water hole diameter : 96 mm

drilling information					material substance				
method & support	penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description	structure and additional observations
	1 2 3							SANDSTONE. (continued)	FRESH
				-56	89.0			SANDSTONE.	
				-57	90.0				
				-58	91.0				
				-59	92.0			NO CORE: 1.65m (92.10-93.75 m) Tool drop.	
				-60	93.0				
				-61	94.0			CAVE IN: SILTSTONE AND COAL	
				-62	95.0				
				-63					

method AD auger drilling* AS auger screwing* HA hand auger W washbore RR rock roller/tricone	support M mud C casing N nil	samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remoulded (kPa) R refusal HB hammer bouncing	classification symbol & soil description based on Unified Classification System	consistency / relative density 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
* bit shown by suffix e.g. AD/T B blank bit T TC bit V V bit	penetration 		moisture D dry M moist W wet Wp plastic limit Wl liquid limit	

Engineering Log - Borehole

client: **Crescent Newcastle Pty Ltd**

principal:

project: ***Proposed Multi Building Residential Development***

location: **11 - 13 Mosbri Crescent, Cooks Hill, NSW**

Borehole ID. **BH04**

sheet: 13 of 13

project no. **754-NTLGE220504**

date started: **12 Sep 2018**

date completed: **14 Sep 2018**

logged by: **MJ**

checked by: **RB**

position: E: 385,684.5; N: 6,355,567.6 (MGA94)

surface elevation: 32.8 m (AHD)

angle from horizontal: 90°

drill model: Comacchio 450P, Track mounted

drilling fluid: non / water

hole diameter : 96 mm

drilling information						material substance						
method & support	penetration	water	samples & field tests	RL (m)	depth (m)	graphic log	classification symbol	material description SOIL TYPE: plasticity or particle characteristic, colour, secondary and minor components	moisture condition	consistency / relative density	hand penetrometer (kPa)	structure and additional observations
	1 2 3							CAVE IN: SILTSTONE AND COAL (<i>continued</i>)			100 200 300 400	FRESH
				-64								
				97.0								
				-65								
				98.0								
				-66				SANDSTONE.				
				99.0								
				-67								
				100.0								
				-68								
				101.0				Borehole BH04 terminated at 101.60 m Target depth				
				-69								
				102.0								
				-70								
				103.0								
				-71								
method AD auger drilling* AS auger screwing* HA hand auger W washbore RR rock roller/tricone * bit shown by suffix e.g. AD/T B blank bit T TC bit V V hit			support M mud N nil C casing penetration no resistance ranging to refusal 10-Oct-12 water level on date shown water inflow water outflow			samples & field tests B bulk disturbed sample D disturbed sample E environmental sample SS split spoon sample U## undisturbed sample ##mm diameter HP hand penetrometer (kPa) N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone VS vane shear; peak/remoulded (kPa) R refusal HB hammer bouncing			classification symbol & soil description based on Unified Classification System moisture D dry M moist W wet Wp plastic limit WL liquid limit		consistency / relative density 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	

position: Not Specified		surface elevation: 32.80 m (AHD)		angle from horizontal: 90°																					
drill model: Comacchio 450P, Track mounted		drilling fluid:		hole diameter : 300 mm																					
drilling information				material substance																					
method & support		penetration		water		samples & field tests		RL (m)		depth (m)		graphic log		classification symbol		material description		moisture condition		consistency / relative density		hand penetrometer (kPa)		structure and additional observations	
AD/T N		1 2 3		Not Observed		E E E		32		1.0		X				FILL: BITUMEN: black, fine to coarse gravel. FILL: Sandy GRAVEL: medium to coarse grained, grey, fine to coarse sized sand. FILL: Gravelly SAND: fine to coarse grained, brown, some pieces of fine to coarse subangular gravel, some pieces of brick, terracotta, steel, concrete and cobbles of sandstone and other crushed rock. 0.3 m: Steel bar FILL: CONCRETE BOULDER: 110mm thick. FILL: Gravelly SAND: fine to coarse grained, brown, some pieces of fine to coarse subangular gravel, some pieces of brick, terracotta, steel, concrete and cobbles of sandstone and other crushed rock. Borehole BH04A terminated at 1.0 m Refusal						100 200 300 400		FILL- WEARING COURSE FILL- PAVEMENT FILL - UNCONTROLLED	

Appendix J – Analytical Laboratory Results

Reference No. _____

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

Page 1 of 1

		Consigning Office: <u>WATERLOO</u> Report Results to: <u>MERRICK JONES</u> Invoices to: _____		Mobile: <u>04222 88221</u> Email: <u>merrick.jones@coffey.com</u>		
Project No: <u>754-NL66-220501</u> Project Name: <u>NIAU DEVELOPMENT</u> Sampler's Name: <u>MERRICK JONES</u> Special Instructions: _____		Task No: <u>FIELDWORK</u> Laboratory: _____ Project Manager: <u>STEVEN BAKER</u>		Phone: _____ Email: _____		
Lab No.	Sample ID	Sample Date	Time	Matrix (Soil...etc)	Container Type & Preservative*	T-A-T (specify)
	B3401 0.5	3/9/18	AM	S	T	S DAY
	B3401 1.0	3/9/18				
	B3402 0.1	10/9/18				
	B3402 0.5	10/9/18				
	B3404 0.5	12/9/18				
	B3404 1.0	12/9/18				
	B3401 3.0	12/9/18				
	B3401 1.5	3/9/18				
1	QC3					
	QC4 (ALS)					

NOTES
 Environmental Division
 Melbourne
 Work Order Reference
EM1814966


 Telephone : + 61-3-8549 9800

Please transfer QCU
 to ALS (B7, B13)
 only

RELINQUISHED BY

Name: MERRICK JONES Date: 14/9/18
 Coffey Environments Time: _____
 Name: Leigh Fy Date: 18/9/18
 Company: Eurolab Time: 8:00am

RECEIVED BY

Name: SOE Date: 14/9/18
 Company: _____ Time: 2:30PM
 Name: Merrick Date: 18/9
 Company: pu Time: 10:00

Sample Receipt Advice: (Lab Use Only)

☐ All Samples Received in Good Condition

☐ All Documentation is in Proper Order

☐ Samples Received Properly Chilled
Lab. Ref/Batch No.

* Container Type & Preservation Codes: P - Plastic, G - Glass Bottle, J - Glass Jar, V - Vial, Z - Ziplock bag, N - Nitric Acid Preserved, C - Hydrochloric Acid Preserved, S - Sulphuric Acid Preserved, I - Ice, ST - Sodium Thiosulfate, NP - No Preservative

Coffey Environments

Version: 5

Issued Date: 12/07/2015

CERTIFICATE OF ANALYSIS

Work Order : **EM1814966**
Client : **COFFEY ENVIRONMENTS PTY LTD**
Contact : MR SIMON BAKER
Address : 19 WARABROOK BOULEVARD
 WARABROOK NSW, AUSTRALIA 2304
Telephone : ----
Project : 754-MELGE220504
Order number :
C-O-C number : ----
Sampler : MERRICK JONES
Site :
Quote number : EN/222
No. of samples received : 1
No. of samples analysed : 1

Page : 1 of 7
Laboratory : Environmental Division Melbourne
Contact : Graeme Jablonskas
Address : 4 Westall Rd Springvale VIC Australia 3171
Telephone : +61-3-8549 9609
Date Samples Received : 18-Sep-2018 10:00
Date Analysis Commenced : 19-Sep-2018
Issue Date : 24-Sep-2018 12:33



Accreditation No. 825
 Accredited for compliance with
 ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Dilani Fernando	Senior Inorganic Chemist	Melbourne Inorganics, Springvale, VIC
Nancy Wang	2IC Organic Chemist	Melbourne Organics, Springvale, VIC



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.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

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.

~ = Indicates an estimated value.

- 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), Dibenzo(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 0.6mg/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	QC4	----	----	----	----
Client sampling date / time					[12-Sep-2018]	----	----	----	----
Compound	CAS Number	LOR	Unit		EM1814966-001	-----	-----	-----	-----
				Result	----	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		20.1	----	----	----	----
EG005T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		10	----	----	----	----
Cadmium	7440-43-9	1	mg/kg		<1	----	----	----	----
Chromium	7440-47-3	2	mg/kg		13	----	----	----	----
Copper	7440-50-8	5	mg/kg		13	----	----	----	----
Lead	7439-92-1	5	mg/kg		18	----	----	----	----
Nickel	7440-02-0	2	mg/kg		2	----	----	----	----
Zinc	7440-66-6	5	mg/kg		23	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	----	----	----	----
EP066: Polychlorinated Biphenyls (PCB)									
Total Polychlorinated biphenyls	----	0.1	mg/kg		<0.1	----	----	----	----
EP068A: Organochlorine Pesticides (OC)									
alpha-BHC	319-84-6	0.05	mg/kg		<0.05	----	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg		<0.05	----	----	----	----
beta-BHC	319-85-7	0.05	mg/kg		<0.05	----	----	----	----
gamma-BHC	58-89-9	0.05	mg/kg		<0.05	----	----	----	----
delta-BHC	319-86-8	0.05	mg/kg		<0.05	----	----	----	----
Heptachlor	76-44-8	0.05	mg/kg		<0.05	----	----	----	----
Aldrin	309-00-2	0.05	mg/kg		<0.05	----	----	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg		<0.05	----	----	----	----
^ Total Chlordane (sum)	----	0.05	mg/kg		<0.05	----	----	----	----
trans-Chlordane	5103-74-2	0.05	mg/kg		<0.05	----	----	----	----
alpha-Endosulfan	959-98-8	0.05	mg/kg		<0.05	----	----	----	----
cis-Chlordane	5103-71-9	0.05	mg/kg		<0.05	----	----	----	----
Dieldrin	60-57-1	0.05	mg/kg		<0.05	----	----	----	----
4,4'-DDE	72-55-9	0.05	mg/kg		<0.05	----	----	----	----
Endrin	72-20-8	0.05	mg/kg		<0.05	----	----	----	----
beta-Endosulfan	33213-65-9	0.05	mg/kg		<0.05	----	----	----	----
^ Endosulfan (sum)	115-29-7	0.05	mg/kg		<0.05	----	----	----	----
4,4'-DDD	72-54-8	0.05	mg/kg		<0.05	----	----	----	----
Endrin aldehyde	7421-93-4	0.05	mg/kg		<0.05	----	----	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg		<0.05	----	----	----	----

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	QC4	----	----	----	----
Client sampling date / time				[12-Sep-2018]	----	----	----	----	
Compound	CAS Number	LOR	Unit	EM1814966-001	-----	-----	-----	-----	
				Result	----	----	----	----	
EP068A: Organochlorine Pesticides (OC) - Continued									
4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	----	----	----	----	
Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	----	----	----	----	
Methoxychlor	72-43-5	0.2	mg/kg	<0.2	----	----	----	----	
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg	<0.05	----	----	----	----	
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg	<0.05	----	----	----	----	
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									



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	QC4	----	----	----	----
Client sampling date / time					[12-Sep-2018]	----	----	----	----
Compound	CAS Number	LOR	Unit		EM1814966-001	-----	-----	-----	-----
				Result	----	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	----	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	----	----	----	----
>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	----	0.5	mg/kg		<0.5	----	----	----	----
Naphthalene	91-20-3	1	mg/kg		<1	----	----	----	----
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		87.8	----	----	----	----
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		99.2	----	----	----	----
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		99.0	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		95.6	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%		106	----	----	----	----
2,4,6-Tribromophenol	118-79-6	0.5	%		64.2	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		123	----	----	----	----
Anthracene-d10	1719-06-8	0.5	%		114	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%		122	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	0.2	%		71.6	----	----	----	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	QC4	----	----	----	----
				Client sampling date / time	[12-Sep-2018]	----	----	----	----
Compound	CAS Number	LOR	Unit		EM1814966-001	-----	-----	-----	-----
				Result	----	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates - Continued									
Toluene-D8	2037-26-5	0.2	%		64.9	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.2	%		74.6	----	----	----	----



Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP066S: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	36	140
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	38	128
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	33	139
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	54	125
2-Chlorophenol-D4	93951-73-6	65	123
2,4,6-Tribromophenol	118-79-6	34	122
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	61	125
Anthracene-d10	1719-06-8	62	130
4-Terphenyl-d14	1718-51-0	67	133
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	51	125
Toluene-D8	2037-26-5	55	125
4-Bromofluorobenzene	460-00-4	56	124

QUALITY CONTROL REPORT

Work Order	: EM1814966	Page	: 1 of 9
Client	: COFFEY ENVIRONMENTS PTY LTD	Laboratory	: Environmental Division Melbourne
Contact	: MR SIMON BAKER	Contact	: Graeme Jablonskas
Address	: 19 WARABROOK BOULEVARD WARABROOK NSW, AUSTRALIA 2304	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +61-3-8549 9609
Project	: 754-MELGE220504	Date Samples Received	: 18-Sep-2018
Order number	:	Date Analysis Commenced	: 19-Sep-2018
C-O-C number	: ----	Issue Date	: 24-Sep-2018
Sampler	: MERRICK JONES		
Site	:		
Quote number	: EN/222		
No. of samples received	: 1		
No. of samples analysed	: 1		



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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

Signatories

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

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Dilani Fernando	Senior Inorganic Chemist	Melbourne Inorganics, Springvale, VIC
Nancy Wang	2IC Organic Chemist	Melbourne Organics, Springvale, VIC



General Comments

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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**

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 (Dried @ 105-110°C) (QC Lot: 1938815)									
EM1814921-001	Anonymous	EA055: Moisture Content	----	0.1	%	12.0	11.2	6.87	0% - 50%
EM1814998-007	Anonymous	EA055: Moisture Content	----	0.1	%	7.2	7.2	0.00	No Limit
EG005T: Total Metals by ICP-AES (QC Lot: 1939063)									
EM1814939-001	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	3	4	0.00	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	<2	<2	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	13	33	89.7	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	13	11	19.2	No Limit
EM1814948-001	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	22	25	11.5	0% - 50%
		EG005T: Nickel	7440-02-0	2	mg/kg	5	4	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	15	23	41.6	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	27	29	7.07	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	38	41	7.76	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	22	24	8.74	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 1939064)									
EM1814939-001	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	0.9	160	No Limit
EM1814948-001	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EP066: Polychlorinated Biphenyls (PCB) (QC Lot: 1939176)									
EM1814939-013	Anonymous	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EP068A: Organochlorine Pesticides (OC) (QC Lot: 1939175)									
EM1815026-005	Anonymous	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	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 (%)
EP068A: Organochlorine Pesticides (OC) (QC Lot: 1939175) - continued									
EM1815026-005	Anonymous	EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4,4'-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
EM1814939-013	Anonymous	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4,4'-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4,4'-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4,4'-DDT	50-29-3	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: <i>Compound</i>	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP068A: Organochlorine Pesticides (OC) (QC Lot: 1939175) - continued									
EM1814939-013	Anonymous	EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 1939173)									
EM1815026-005	Anonymous	EP075(SIM): Naphthalene	91-20-3	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): Acenaphthene	83-32-9	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): Phenanthrene	85-01-8	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): Fluoranthene	206-44-0	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): Benz(a)anthracene	56-55-3	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): Benzo(b+j)fluoranthene	205-99-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
			205-82-3						
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	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): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenzo(a.h)anthracene	53-70-3	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
		EM1814939-013	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5
EP075(SIM): Acenaphthylene	208-96-8			0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM): Acenaphthene	83-32-9			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): Phenanthrene	85-01-8			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): Fluoranthene	206-44-0			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): Benz(a)anthracene	56-55-3			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): Benzo(b+j)fluoranthene	205-99-2			0.5	mg/kg	<0.5	<0.5	0.00	No Limit
	205-82-3								
EP075(SIM): Benzo(k)fluoranthene	207-08-9			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): Indeno(1.2.3.cd)pyrene	193-39-5			0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM): Dibenzo(a.h)anthracene	53-70-3			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
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1938554)									
EM1814939-001	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EM1814951-001	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1939174)									

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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 (%)
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1939174) - continued									
EM1815026-005	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
		EP071: C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	0.00	No Limit
EM1814939-013	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
		EP071: C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1938554)									
EM1814939-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EM1814951-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1939174)									
EM1815026-005	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
		EP071: >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	0.00	No Limit
EM1814939-013	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
		EP071: >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	0.00	No Limit
EP080: BTEXN (QC Lot: 1938554)									
EM1814939-001	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	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	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EM1814951-001	Anonymous	EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
		EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	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	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	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		

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.

Method Blank (MB) Report

Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result		LCS	Low	High
EG005T: Total Metals by ICP-AES (QCLot: 1939063)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	94.8	78	107
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	86.5	76	108
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	93.2	78	110
EG005T: Copper	7440-50-8	5	mg/kg	<5	32 mg/kg	88.0	78	108
EG005T: Lead	7439-92-1	5	mg/kg	<5	40 mg/kg	91.6	78	106
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55 mg/kg	94.7	80	109
EG005T: Zinc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	93.6	79	110
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1939064)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	88.7	77	104
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 1939176)								
EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	1 mg/kg	79.7	63	115
EP068A: Organochlorine Pesticides (OC) (QCLot: 1939175)								
EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.5 mg/kg	98.7	65	120
EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	0.5 mg/kg	96.8	68	121
EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	0.5 mg/kg	98.9	70	121
EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	0.5 mg/kg	98.0	64	119
EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	98.6	56	121
EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.5 mg/kg	91.9	63	114
EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	0.5 mg/kg	103	64	121
EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.5 mg/kg	102	68	120
EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	0.5 mg/kg	100	72	124
EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	0.5 mg/kg	99.2	69	125
EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	0.5 mg/kg	103	71	123
EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	0.5 mg/kg	107	59	123
EP068: 4,4`-DDE	72-55-9	0.05	mg/kg	<0.05	0.5 mg/kg	103	70	123
EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	0.5 mg/kg	102	64	119
EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	0.5 mg/kg	103	69	124
EP068: 4,4`-DDD	72-54-8	0.05	mg/kg	<0.05	0.5 mg/kg	103	66	128
EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	0.5 mg/kg	104	62	121
EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.5 mg/kg	95.8	57	124
EP068: 4,4`-DDT	50-29-3	0.2	mg/kg	<0.2	0.5 mg/kg	91.8	60	124
EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	0.5 mg/kg	98.2	73	120
EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	0.5 mg/kg	90.2	61	121
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1939173)								



Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%) Low High	
Method: Compound	CAS Number	LOR	Unit	Result				
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1939173) - continued								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	3 mg/kg	101	75	131
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	3 mg/kg	93.1	70	132
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	3 mg/kg	105	80	128
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	3 mg/kg	98.3	70	128
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	3 mg/kg	106	80	128
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	3 mg/kg	110	72	126
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	3 mg/kg	110	70	128
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	3 mg/kg	117	80	125
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	3 mg/kg	108	70	130
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	3 mg/kg	108	80	126
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	3 mg/kg	88.3	71	124
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	3 mg/kg	96.4	75	125
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	3 mg/kg	83.6	70	125
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	3 mg/kg	87.4	71	128
EP075(SIM): Dibenz(a,h)anthracene	53-70-3	0.5	mg/kg	<0.5	3 mg/kg	94.8	72	126
EP075(SIM): Benzo(g,h,i)perylene	191-24-2	0.5	mg/kg	<0.5	3 mg/kg	96.6	68	127
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1938554)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	36 mg/kg	87.0	70	127
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1939174)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	806 mg/kg	95.4	80	120
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	3006 mg/kg	101	84	115
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	1584 mg/kg	91.6	80	112
EP071: C10 - C36 Fraction (sum)	----	50	mg/kg	<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1938554)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	45 mg/kg	87.4	68	125
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1939174)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	1160 mg/kg	94.9	83	117
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	3978 mg/kg	97.4	82	114
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	313 mg/kg	88.2	73	115
EP071: >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	----	----	----	----
EP080: BTEXN (QCLot: 1938554)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	2 mg/kg	83.5	74	124
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	2 mg/kg	85.6	77	125
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	2 mg/kg	88.6	73	125
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	4 mg/kg	92.8	77	128
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	2 mg/kg	90.6	81	128

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Sub-Matrix: SOIL				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result			Low	High
EP080: BTEXN (QCLot: 1938554) - continued								
EP080: Naphthalene	91-20-3	1	mg/kg	<1	0.5 mg/kg	90.9	66	130

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				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG005T: Total Metals by ICP-AES (QCLot: 1939063)							
EM1814939-002	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	100	78	124
		EG005T: Cadmium	7440-43-9	50 mg/kg	94.1	84	116
		EG005T: Chromium	7440-47-3	50 mg/kg	92.2	79	121
		EG005T: Copper	7440-50-8	50 mg/kg	95.1	82	124
		EG005T: Lead	7439-92-1	50 mg/kg	104	76	124
		EG005T: Nickel	7440-02-0	50 mg/kg	94.0	78	120
		EG005T: Zinc	7440-66-6	50 mg/kg	104	74	128
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1939064)							
EM1814939-002	Anonymous	EG035T: Mercury	7439-97-6	5 mg/kg	97.5	76	116
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 1939176)							
EM1814939-032	Anonymous	EP066: Total Polychlorinated biphenyls	----	1 mg/kg	78.6	44	144
EP068A: Organochlorine Pesticides (OC) (QCLot: 1939175)							
EM1814939-013	Anonymous	EP068: gamma-BHC	58-89-9	0.5 mg/kg	90.6	22	139
		EP068: Heptachlor	76-44-8	0.5 mg/kg	87.0	18	130
		EP068: Aldrin	309-00-2	0.5 mg/kg	92.5	23	136
		EP068: Dieldrin	60-57-1	0.5 mg/kg	94.2	42	136
		EP068: Endrin	72-20-8	0.5 mg/kg	99.8	23	146
		EP068: 4,4`-DDT	50-29-3	0.5 mg/kg	43.6	20	133
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1939173)							
EM1814939-007	Anonymous	EP075(SIM): Acenaphthene	83-32-9	3 mg/kg	92.5	67	117
		EP075(SIM): Pyrene	129-00-0	3 mg/kg	128	52	148
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1938554)							
EM1814939-007	Anonymous	EP080: C6 - C9 Fraction	----	28 mg/kg	44.7	42	131
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1939174)							
EM1814939-007	Anonymous	EP071: C10 - C14 Fraction	----	806 mg/kg	92.1	53	123
		EP071: C15 - C28 Fraction	----	3006 mg/kg	99.3	70	124
		EP071: C29 - C36 Fraction	----	1584 mg/kg	90.6	64	118

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 Project : 754-MELGE220504



Sub-Matrix: **SOIL**

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
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1938554)							
EM1814939-007	Anonymous	EP080: C6 - C10 Fraction	C6_C10	33 mg/kg	45.7	39	129
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1939174)							
EM1814939-007	Anonymous	EP071: >C10 - C16 Fraction	----	1160 mg/kg	92.7	65	123
		EP071: >C16 - C34 Fraction	----	3978 mg/kg	96.2	67	121
		EP071: >C34 - C40 Fraction	----	313 mg/kg	87.5	44	126
EP080: BTEXN (QCLot: 1938554)							
EM1814939-007	Anonymous	EP080: Benzene	71-43-2	2 mg/kg	54.0	50	136
		EP080: Toluene	108-88-3	2 mg/kg	57.3	56	139

Sample Receipt Advice

Company name: **Coffey Environments P/L N'castle**
Contact name: **Merrick Jones**
Project name: **NBN - 120**
Project ID: **7-H1-NTLGE220504**
COC number: **Not provided**
Turn around time: **5 Day**
Date/Time received: **Sep 28, 2018 8:10 AM**
Eurofins | mgt reference: **620058**

Sample information

- ☒ A detailed list of analytes logged into our LIMS, is included in the attached summary table.
- ☒ 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.
- ☐ Split sample sent to requested external lab.
- ☐ 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:

Andrew Black on Phone : (+61) 2 9900 8490 or by e.mail: AndrewBlack@eurofins.com

Results will be delivered electronically via e.mail to Merrick Jones - Merrick.Jones@coffey.com.

Company Name: Coffey Environments P/L N'castle
Address: Lot 101, 19 Warabrook Boulevard
Warabrook
NSW 2304

Project Name: NBN - 120
Project ID: 7-H1-NTLGE220504

Order No.:
Report #: 620058
Phone: 02 4016 2300
Fax: 02 4016 2380

Received: Sep 28, 2018 8:10 AM
Due: Oct 8, 2018
Priority: 5 Day
Contact Name: Merrick Jones

Eurofins | mgt Analytical Services Manager : Andrew Black

Sample Detail						Asbestos - AS4964	Eurofins mgt Suite B13	Moisture Set	Eurofins mgt Suite B7
Melbourne Laboratory - NATA Site # 1254 & 14271									
Sydney Laboratory - NATA Site # 18217						X	X	X	X
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
External Laboratory									
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID				
1	BH03 0.4M	Sep 17, 2018		Soil	S18-Se37046	X	X	X	X
2	BH03 0.7-1.0M	Sep 17, 2018		Soil	S18-Se37047	X	X	X	X
Test Counts						2	2	2	2

Certificate of Analysis



NATA Accredited
Accreditation Number 1261
Site Number 18217

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

Coffey Environments Pty Ltd Newcastle
Lot 101, 19 Warabrook Boulevard
Warabrook
NSW 2304

Attention: Merrick Jones
Report 620058-AID
Project Name NBN - 120
Project ID 7-H1-NTLGE220504
Received Date Sep 28, 2018
Date Reported Oct 08, 2018

Methodology:

Asbestos Fibre
Identification

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.

NOTE: Positive Trace Analysis results indicate the sample contains detectable respirable fibres.

Unknown Mineral
Fibres

Mineral fibres of unknown type, as determined by PLM with DS, may require another analytical technique, such as Electron Microscopy, to confirm unequivocal identity.

NOTE: While Actinolite, Anthophyllite and Tremolite asbestos may be detected by PLM with DS, due to variability in the optical properties of these materials, AS4964 requires that these are reported as UMF unless confirmed by an independent technique.

Subsampling Soil
Samples

The whole sample submitted is first dried and then passed through a 10mm sieve followed by a 2mm sieve. All fibrous matter 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) is employed.

NOTE: 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 for identification by PLM and DS. Where required, interfering matrices may be removed by disintegration using a range of heat, chemical or physical treatments, possibly in combination. The resultant material is then further examined in accordance with AS 4964 - 2004.

NOTE: Even after disintegration it may be difficult to detect the presence of asbestos in some asbestos-containing bulk materials using PLM and DS. This is due to the low grade or small length or diameter of the asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials. Vinyl/asbestos floor tiles, some asbestos-containing sealants and mastics, asbestos-containing epoxy resins and some ore samples are examples of these types of material, which are difficult to analyse.

Limit of Reporting

The performance limitation of the AS4964 method for inhomogeneous samples is around 0.1 g/kg (0.01% (w/w)). Where no asbestos is found by PLM and DS, including Trace Analysis where required, this is considered to be at the nominal reporting limit of 0.01 % (w / w). The examination of large sample sizes (500 mL is recommended) may improve the likelihood of identifying ACM in the > 2mm fraction. The NEPM screening level of 0.001 % (w / w) asbestos in soil for FA (friable asbestos) and AF (asbestos fines) then applies where they are able to be quantified by gravimetric procedures. This quantitative screening is not generally applicable to FF (free fibres) and results of Trace Analysis are referred.

NOTE: NATA News March 2014, p.7, states in relation to AS4964: "This is a qualitative method with a nominal reporting limit of 0.01%" and that currently in Australia "there is no validated method available for the quantification of asbestos". Accordingly, NATA Accreditation does not cover the performance of this service (indicated with an asterisk). This report is consistent with the analytical procedures and reporting recommendations in the National Environment Protection (Assessment of Site Contamination) Measure, 2013 (as amended) and the Western Australia Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia, 2009, including supporting document Recommended Procedures for Laboratory Analysis of Asbestos in Soil, June 2011.

Project Name NBN - 120
Project ID 7-H1-NTLGE220504
Date Sampled Sep 17, 2018
Report 620058-AID

Client Sample ID	Eurofins mgt Sample No.	Date Sampled	Sample Description	Result
BH03 0.4M	18-Se37046	Sep 17, 2018	Approximate Sample 65g Sample consisted of: Tan fine-grained clayey soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No respirable fibres detected.
BH03 0.7-1.0M	18-Se37047	Sep 17, 2018	Approximate Sample 63g Sample consisted of: Beige fine-grained clayey soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No respirable fibres detected.

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	Sep 28, 2018	Indefinite

Company Name: Coffey Environments P/L N'castle
Address: Lot 101, 19 Warabrook Boulevard
Warabrook
NSW 2304

Project Name: NBN - 120
Project ID: 7-H1-NTLGE220504

Order No.:
Report #: 620058
Phone: 02 4016 2300
Fax: 02 4016 2380

Received: Sep 28, 2018 8:10 AM
Due: Oct 8, 2018
Priority: 5 Day
Contact Name: Merrick Jones

Eurofins | mgt Analytical Services Manager : Andrew Black

Sample Detail						Asbestos - AS4964	Eurofins mgt Suite B13	Moisture Set	Eurofins mgt Suite B7
Melbourne Laboratory - NATA Site # 1254 & 14271									
Sydney Laboratory - NATA Site # 18217						X	X	X	X
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
External Laboratory									
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID				
1	BH03 0.4M	Sep 17, 2018		Soil	S18-Se37046	X	X	X	X
2	BH03 0.7-1.0M	Sep 17, 2018		Soil	S18-Se37047	X	X	X	X
Test Counts						2	2	2	2

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 (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.

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 ratios).

Comments

The samples received were not collected in an approved asbestos bag and was therefore sub-sampled from the 250mL glass jar. 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

Asbestos Counter/Identifier:

Karthik Surisetty Senior Analyst-Asbestos (NSW)

Authorised by:

Sayeed Abu 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

Measurement uncertainty of test data is available on request or please [click here](#).

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Certificate of Analysis



NATA Accredited
 Accreditation Number 1261
 Site Number 1254

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

Coffey Environments Pty Ltd Newcastle
Lot 101, 19 Warabrook Boulevard
Warabrook
NSW 2304

Attention: Simon Baker
Report 618016-AID
Project Name NBN DEVELOPMENT
Project ID 754-MLGE220504
Received Date Sep 17, 2018
Date Reported Sep 24, 2018

Methodology:

Asbestos Fibre
 Identification

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.

NOTE: Positive Trace Analysis results indicate the sample contains detectable respirable fibres.

Unknown Mineral
 Fibres

Mineral fibres of unknown type, as determined by PLM with DS, may require another analytical technique, such as Electron Microscopy, to confirm unequivocal identity.

NOTE: While Actinolite, Anthophyllite and Tremolite asbestos may be detected by PLM with DS, due to variability in the optical properties of these materials, AS4964 requires that these are reported as UMF unless confirmed by an independent technique.

Subsampling Soil
 Samples

The whole sample submitted is first dried and then passed through a 10mm sieve followed by a 2mm sieve. All fibrous matter 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) is employed.

NOTE: 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 for identification by PLM and DS. Where required, interfering matrices may be removed by disintegration using a range of heat, chemical or physical treatments, possibly in combination. The resultant material is then further examined in accordance with AS 4964 - 2004.

NOTE: Even after disintegration it may be difficult to detect the presence of asbestos in some asbestos-containing bulk materials using PLM and DS. This is due to the low grade or small length or diameter of the asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials. Vinyl/asbestos floor tiles, some asbestos-containing sealants and mastics, asbestos-containing epoxy resins and some ore samples are examples of these types of material, which are difficult to analyse.

Limit of Reporting

The performance limitation of the AS4964 method for inhomogeneous samples is around 0.1 g/kg (0.01% (w/w)). Where no asbestos is found by PLM and DS, including Trace Analysis where required, this is considered to be at the nominal reporting limit of 0.01 % (w / w). The examination of large sample sizes (500 mL is recommended) may improve the likelihood of identifying ACM in the > 2mm fraction. The NEPM screening level of 0.001 % (w / w) asbestos in soil for FA (friable asbestos) and AF (asbestos fines) then applies where they are able to be quantified by gravimetric procedures. This quantitative screening is not generally applicable to FF (free fibres) and results of Trace Analysis are referred.

NOTE: NATA News March 2014, p.7, states in relation to AS4964: "This is a qualitative method with a nominal reporting limit of 0.01%" and that currently in Australia "there is no validated method available for the quantification of asbestos". Accordingly, NATA Accreditation does not cover the performance of this service (indicated with an asterisk). This report is consistent with the analytical procedures and reporting recommendations in the National Environment Protection (Assessment of Site Contamination) Measure, 2013 (as amended) and the Western Australia Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia, 2009, including supporting document Recommended Procedures for Laboratory Analysis of Asbestos in Soil, June 2011.

Project Name NBN DEVELOPMENT
Project ID 754-MLGE220504
Date Sampled Sep 03, 2018 to Sep 12, 2018
Report 618016-AID

Client Sample ID	Eurofins mgt Sample No.	Date Sampled	Sample Description	Result
BH02 0.5	18-Se21256	Sep 10, 2018	Approximate Sample 429g Sample consisted of: Brown coarse-grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No respirable fibres detected.
BH04 0.5	18-Se21257	Sep 12, 2018	Approximate Sample 474g Sample consisted of: Brown coarse-grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No respirable fibres detected.
BH01 1.5	18-Se21260	Sep 03, 2018	Approximate Sample 303g Sample consisted of: Light brown coarse-grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No respirable fibres detected.
QC3	18-Se21261	Sep 03, 2018	Approximate Sample 70g Sample consisted of: Brown coarse-grained soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No respirable fibres detected.

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	Sep 17, 2018	Indefinite

Company Name: Coffey Environments P/L N'castle
Address: Lot 101, 19 Warabrook Boulevard
Warabrook
NSW 2304

Project Name: NBN DEVELOPMENT
Project ID: 754-MLGE220504

Order No.:
Report #: 618016
Phone: 02 4016 2300
Fax: 02 4016 2380

Received: Sep 17, 2018 8:09 AM
Due: Sep 24, 2018
Priority: 5 Day
Contact Name: Simon Baker

Eurofins | mgt Analytical Services Manager : Andrew Black

Sample Detail						Asbestos - AS4964	Eurofins mgt Suite B13	Moisture Set	Eurofins mgt Suite B7
Melbourne Laboratory - NATA Site # 1254 & 14271							X	X	X
Sydney Laboratory - NATA Site # 18217						X			
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
External Laboratory									
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID				
1	BH01 0.5	Sep 03, 2018		Soil	M18-Se21253		X	X	X
2	BH01 1.0	Sep 03, 2018		Soil	M18-Se21254			X	X
3	BH02 0.1	Sep 10, 2018		Soil	M18-Se21255			X	X
4	BH02 0.5	Sep 10, 2018		Soil	M18-Se21256	X	X	X	X
5	BH04 0.5	Sep 12, 2018		Soil	M18-Se21257	X	X	X	X
6	BH04 1.0	Sep 12, 2018		Soil	M18-Se21258			X	X
7	BH04 3.0	Sep 12, 2018		Soil	M18-Se21259			X	X
8	BH01 1.5	Sep 03, 2018		Soil	M18-Se21260	X			
9	QC3	Sep 03, 2018		Soil	M18-Se21261	X	X	X	X

Company Name: Coffey Environments P/L N'castle
Address: Lot 101, 19 Warabrook Boulevard
Warabrook
NSW 2304

Project Name: NBN DEVELOPMENT
Project ID: 754-MLGE220504

Order No.:
Report #: 618016
Phone: 02 4016 2300
Fax: 02 4016 2380

Received: Sep 17, 2018 8:09 AM
Due: Sep 24, 2018
Priority: 5 Day
Contact Name: Simon Baker

Eurofins | mgt Analytical Services Manager : Andrew Black

Sample Detail	Asbestos - AS4964	Eurofins mgt Suite B13	Moisture Set	Eurofins mgt Suite B7
		X	X	X
		X		
Melbourne Laboratory - NATA Site # 1254 & 14271		X	X	X
Sydney Laboratory - NATA Site # 18217	X			
Brisbane Laboratory - NATA Site # 20794				
Perth Laboratory - NATA Site # 23736				
Test Counts	4	4	8	8

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 (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.

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 ratios).

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
N/A	Not applicable

Asbestos Counter/Identifier:

Sayeed Abu Senior Analyst-Asbestos (NSW)

Authorised by:

Laxman Dias 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

Measurement uncertainty of test data is available on request or please [click here](#).

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Certificate of Analysis

Coffey Environments Pty Ltd Newcastle
 Lot 101, 19 Warabrook Boulevard
 Warabrook
 NSW 2304



NATA Accredited
 Accreditation Number 1261
 Site Number 1254

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

Attention: Simon Baker

Report 618016-S
 Project name NBN DEVELOPMENT
 Project ID 754-MLGE220504
 Received Date Sep 17, 2018

Client Sample ID			BH01 0.5 Soil M18-Se21253 Sep 03, 2018	BH01 1.0 Soil M18-Se21254 Sep 03, 2018	BH02 0.1 Soil M18-Se21255 Sep 10, 2018	BH02 0.5 Soil M18-Se21256 Sep 10, 2018
Sample Matrix						
Eurofins mgt Sample No.						
Date Sampled						
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	< 50	78	< 50
TRH C29-C36	50	mg/kg	< 50	< 50	690	< 50
TRH C10-36 (Total)	50	mg/kg	< 50	< 50	768	< 50
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	94	87	92	89
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene ^{N02}	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1) ^{N04}	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2) ^{N01}	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100	520	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	1000	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 100	< 100	1520	< 100
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	1.2	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	1.4	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.7	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	0.6	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	0.9	< 0.5	< 0.5
Benzo(b&j)fluoranthene ^{N07}	0.5	mg/kg	< 0.5	0.7	< 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	0.7	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	0.9	< 0.5	< 0.5

Client Sample ID			BH01 0.5 Soil M18-Se21253 Sep 03, 2018	BH01 1.0 Soil M18-Se21254 Sep 03, 2018	BH02 0.1 Soil M18-Se21255 Sep 10, 2018	BH02 0.5 Soil M18-Se21256 Sep 10, 2018
Sample Matrix						
Eurofins mgt Sample No.						
Date Sampled						
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Dibenz(a,h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	0.7	1.9	< 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	0.7	< 0.5	< 0.5
Pyrene	0.5	mg/kg	0.6	1.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	1.3	8.9	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	99	101	101	99
p-Terphenyl-d14 (surr.)	1	%	107	100	102	113
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
α-BHC	0.05	mg/kg	< 0.05	-	-	< 0.05
Aldrin	0.05	mg/kg	< 0.05	-	-	< 0.05
β-BHC	0.05	mg/kg	< 0.05	-	-	< 0.05
δ-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
γ-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	0.05	mg/kg	< 0.05	-	-	< 0.05
Toxaphene	1	mg/kg	< 1	-	-	< 1
Aldrin and Dieldrin (Total)*	0.05	mg/kg	< 0.05	-	-	< 0.05
DDT + DDE + DDD (Total)*	0.05	mg/kg	< 0.05	-	-	< 0.05
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	< 0.1	-	-	< 0.1
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	< 0.1	-	-	< 0.1
Dibutylchloroendate (surr.)	1	%	75	-	-	143
Tetrachloro-m-xylene (surr.)	1	%	127	-	-	128
Polychlorinated Biphenyls						
Aroclor-1016	0.1	mg/kg	< 0.1	-	-	< 0.1
Aroclor-1221	0.1	mg/kg	< 0.1	-	-	< 0.1
Aroclor-1232	0.1	mg/kg	< 0.1	-	-	< 0.1
Aroclor-1242	0.1	mg/kg	< 0.1	-	-	< 0.1
Aroclor-1248	0.1	mg/kg	< 0.1	-	-	< 0.1
Aroclor-1254	0.1	mg/kg	< 0.1	-	-	< 0.1
Aroclor-1260	0.1	mg/kg	< 0.1	-	-	< 0.1
Total PCB*	0.1	mg/kg	< 0.1	-	-	< 0.1
Dibutylchloroendate (surr.)	1	%	75	-	-	143
Tetrachloro-m-xylene (surr.)	1	%	127	-	-	128

Client Sample ID			BH01 0.5 Soil	BH01 1.0 Soil	BH02 0.1 Soil	BH02 0.5 Soil
Sample Matrix			M18-Se21253	M18-Se21254	M18-Se21255	M18-Se21256
Eurofins mgt Sample No.			Sep 03, 2018	Sep 03, 2018	Sep 10, 2018	Sep 10, 2018
Date Sampled						
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	2	mg/kg	12	8.6	6.1	10.0
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	13	14	16	12
Copper	5	mg/kg	16	18	13	16
Lead	5	mg/kg	57	66	23	29
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	< 5	< 5	5.1	< 5
Zinc	5	mg/kg	52	79	59	27
% Moisture	1	%	16	18	8.1	19

Client Sample ID			BH04 0.5 Soil	BH04 1.0 Soil	BH04 3.0 Soil	QC3 Soil
Sample Matrix			M18-Se21257	M18-Se21258	M18-Se21259	M18-Se21261
Eurofins mgt Sample No.			Sep 12, 2018	Sep 12, 2018	Sep 12, 2018	Sep 03, 2018
Date Sampled						
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	62	90	< 50	< 50
TRH C29-C36	50	mg/kg	< 50	70	< 50	< 50
TRH C10-36 (Total)	50	mg/kg	62	160	< 50	< 50
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	98	97	105	83
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene ^{N02}	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1) ^{N04}	20	mg/kg	< 20	< 20	< 20	< 20
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C10-C16 less Naphthalene (F2) ^{N01}	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	130	< 100	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 100	130	< 100	< 100
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	1.8	1.6	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	2.1	1.8	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	2.3	2.1	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	1.3	1.1	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	1.4	1.2	< 0.5	< 0.5

Client Sample ID			BH04 0.5 Soil M18-Se21257 Sep 12, 2018	BH04 1.0 Soil M18-Se21258 Sep 12, 2018	BH04 3.0 Soil M18-Se21259 Sep 12, 2018	QC3 Soil M18-Se21261 Sep 03, 2018
Sample Matrix						
Eurofins mgt Sample No.						
Date Sampled						
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Benzo(b&j)fluoranthene ^{N07}	0.5	mg/kg	1.0	0.9	< 0.5	< 0.5
Benzo(g,h,i)perylene	0.5	mg/kg	0.8	0.9	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	1.0	0.9	< 0.5	< 0.5
Chrysene	0.5	mg/kg	1.2	1.0	< 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	3.3	2.8	< 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	0.7	0.6	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	1.6	1.3	< 0.5	< 0.5
Pyrene	0.5	mg/kg	2.8	2.4	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	15.6	13.1	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	93	84	92	88
p-Terphenyl-d14 (surr.)	1	%	91	87	99	96
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
α-BHC	0.05	mg/kg	< 0.05	-	-	< 0.05
Aldrin	0.05	mg/kg	< 0.05	-	-	< 0.05
β-BHC	0.05	mg/kg	< 0.05	-	-	< 0.05
δ-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
γ-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	0.05	mg/kg	< 0.05	-	-	< 0.05
Toxaphene	1	mg/kg	< 1	-	-	< 1
Aldrin and Dieldrin (Total)*	0.05	mg/kg	< 0.05	-	-	< 0.05
DDT + DDE + DDD (Total)*	0.05	mg/kg	< 0.05	-	-	< 0.05
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	< 0.1	-	-	< 0.1
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	< 0.1	-	-	< 0.1
Dibutylchloroendate (surr.)	1	%	106	-	-	97
Tetrachloro-m-xylene (surr.)	1	%	88	-	-	90
Polychlorinated Biphenyls						
Aroclor-1016	0.1	mg/kg	< 0.1	-	-	< 0.1
Aroclor-1221	0.1	mg/kg	< 0.1	-	-	< 0.1
Aroclor-1232	0.1	mg/kg	< 0.1	-	-	< 0.1
Aroclor-1242	0.1	mg/kg	< 0.1	-	-	< 0.1
Aroclor-1248	0.1	mg/kg	< 0.1	-	-	< 0.1
Aroclor-1254	0.1	mg/kg	< 0.1	-	-	< 0.1

Client Sample ID			BH04 0.5	BH04 1.0	BH04 3.0	QC3
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins mgt Sample No.			M18-Se21257	M18-Se21258	M18-Se21259	M18-Se21261
Date Sampled			Sep 12, 2018	Sep 12, 2018	Sep 12, 2018	Sep 03, 2018
Test/Reference	LOR	Unit				
Polychlorinated Biphenyls						
Aroclor-1260	0.1	mg/kg	< 0.1	-	-	< 0.1
Total PCB*	0.1	mg/kg	< 0.1	-	-	< 0.1
Dibutylchlorendate (surr.)	1	%	106	-	-	97
Tetrachloro-m-xylene (surr.)	1	%	88	-	-	90
Heavy Metals						
Arsenic	2	mg/kg	4.8	4.7	2.0	8.6
Cadmium	0.4	mg/kg	< 0.4	0.5	< 0.4	< 0.4
Chromium	5	mg/kg	13	39	5.3	13
Copper	5	mg/kg	11	14	6.1	14
Lead	5	mg/kg	56	83	24	22
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	< 5	< 5	< 5	< 5
Zinc	5	mg/kg	67	230	33	25
% Moisture	1	%	11	9.3	13	19

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
Eurofins mgt Suite B7			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C36	Melbourne	Sep 18, 2018	14 Day
BTEX - Method: TRH C6-C40 - LTM-ORG-2010	Melbourne	Sep 18, 2018	14 Day
Total Recoverable Hydrocarbons - 2013 NEPM Fractions - Method: TRH C6-C40 - LTM-ORG-2010	Melbourne	Sep 18, 2018	14 Day
Total Recoverable Hydrocarbons - 2013 NEPM Fractions - Method: TRH C6-C40 - LTM-ORG-2010	Melbourne	Sep 18, 2018	14 Day
Polycyclic Aromatic Hydrocarbons - Method: LTM-ORG-2130 PAH and Phenols in Soil and Water	Melbourne	Sep 18, 2018	14 Day
Metals M8 - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Melbourne	Sep 18, 2018	28 Days
Eurofins mgt Suite B13			
Organochlorine Pesticides - Method: LTM-ORG-2220 OCP & PCB in Soil and Water	Melbourne	Sep 18, 2018	14 Day
Polychlorinated Biphenyls - Method: LTM-ORG-2220 OCP & PCB in Soil and Water	Melbourne	Sep 18, 2018	28 Days
% Moisture - Method: LTM-GEN-7080 Moisture	Melbourne	Sep 17, 2018	14 Day

Company Name: Coffey Environments P/L N'castle
Address: Lot 101, 19 Warabrook Boulevard
Warabrook
NSW 2304

Project Name: NBN DEVELOPMENT
Project ID: 754-MLGE220504

Order No.:
Report #: 618016
Phone: 02 4016 2300
Fax: 02 4016 2380

Received: Sep 17, 2018 8:09 AM
Due: Sep 24, 2018
Priority: 5 Day
Contact Name: Simon Baker

Eurofins | mgt Analytical Services Manager : Andrew Black

Sample Detail						Asbestos - AS4964	Eurofins mgt Suite B13	Moisture Set	Eurofins mgt Suite B7
Melbourne Laboratory - NATA Site # 1254 & 14271							X	X	X
Sydney Laboratory - NATA Site # 18217						X			
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
External Laboratory									
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID				
1	BH01 0.5	Sep 03, 2018		Soil	M18-Se21253		X	X	X
2	BH01 1.0	Sep 03, 2018		Soil	M18-Se21254			X	X
3	BH02 0.1	Sep 10, 2018		Soil	M18-Se21255			X	X
4	BH02 0.5	Sep 10, 2018		Soil	M18-Se21256	X	X	X	X
5	BH04 0.5	Sep 12, 2018		Soil	M18-Se21257	X	X	X	X
6	BH04 1.0	Sep 12, 2018		Soil	M18-Se21258			X	X
7	BH04 3.0	Sep 12, 2018		Soil	M18-Se21259			X	X
8	BH01 1.5	Sep 03, 2018		Soil	M18-Se21260	X		X	
9	QC3	Sep 03, 2018		Soil	M18-Se21261	X	X	X	X

Company Name: Coffey Environments P/L N'castle
Address: Lot 101, 19 Warabrook Boulevard
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Sample Detail	Asbestos - AS4964	Eurofins mgt Suite B13	Moisture Set	Eurofins mgt Suite B7
		X	X	X
		X		
Melbourne Laboratory - NATA Site # 1254 & 14271		X	X	X
Sydney Laboratory - NATA Site # 18217	X			
Brisbane Laboratory - NATA Site # 20794				
Perth Laboratory - NATA Site # 23736				
Test Counts	4	4	9	8

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. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. 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 SRA.

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.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

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

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

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

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and 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.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	Quality Systems Manual ver 5.1 US Department of Defense
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 & PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.1 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

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							
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							
Naphthalene	mg/kg	< 0.5			0.5	Pass	
TRH C6-C10	mg/kg	< 20			20	Pass	
TRH >C10-C16	mg/kg	< 50			50	Pass	
TRH >C16-C34	mg/kg	< 100			100	Pass	
TRH >C34-C40	mg/kg	< 100			100	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
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	
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	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
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	< 0.05			0.05	Pass	
Toxaphene	mg/kg	< 1			1	Pass	
Method Blank							
Polychlorinated Biphenyls							
Aroclor-1016	mg/kg	< 0.1			0.1	Pass	
Aroclor-1221	mg/kg	< 0.1			0.1	Pass	
Aroclor-1232	mg/kg	< 0.1			0.1	Pass	
Aroclor-1242	mg/kg	< 0.1			0.1	Pass	
Aroclor-1248	mg/kg	< 0.1			0.1	Pass	
Aroclor-1254	mg/kg	< 0.1			0.1	Pass	
Aroclor-1260	mg/kg	< 0.1			0.1	Pass	
Total PCB*	mg/kg	< 0.1			0.1	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	< 0.1			0.1	Pass	
Nickel	mg/kg	< 5			5	Pass	
Zinc	mg/kg	< 5			5	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	83			70-130	Pass	
TRH C10-C14	%	79			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	83			70-130	Pass	
Toluene	%	94			70-130	Pass	
Ethylbenzene	%	108			70-130	Pass	
m&p-Xylenes	%	108			70-130	Pass	
Xylenes - Total	%	109			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	107			70-130	Pass	
TRH C6-C10	%	80			70-130	Pass	
TRH >C10-C16	%	73			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	99			70-130	Pass	
Acenaphthylene	%	107			70-130	Pass	
Anthracene	%	111			70-130	Pass	
Benz(a)anthracene	%	94			70-130	Pass	
Benzo(a)pyrene	%	113			70-130	Pass	
Benzo(b&j)fluoranthene	%	109			70-130	Pass	

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Benzo(g,h,i)perylene			%	85			70-130	Pass	
Benzo(k)fluoranthene			%	111			70-130	Pass	
Chrysene			%	124			70-130	Pass	
Dibenz(a,h)anthracene			%	79			70-130	Pass	
Fluoranthene			%	121			70-130	Pass	
Fluorene			%	106			70-130	Pass	
Indeno(1,2,3-cd)pyrene			%	85			70-130	Pass	
Naphthalene			%	104			70-130	Pass	
Phenanthrene			%	94			70-130	Pass	
Pyrene			%	111			70-130	Pass	
LCS - % Recovery									
Organochlorine Pesticides									
4,4'-DDD			%	121			70-130	Pass	
4,4'-DDE			%	121			70-130	Pass	
4,4'-DDT			%	104			70-130	Pass	
a-BHC			%	112			70-130	Pass	
Aldrin			%	123			70-130	Pass	
b-BHC			%	109			70-130	Pass	
d-BHC			%	110			70-130	Pass	
Dieldrin			%	120			70-130	Pass	
Endosulfan I			%	119			70-130	Pass	
Endosulfan II			%	112			70-130	Pass	
Endosulfan sulphate			%	121			70-130	Pass	
Endrin			%	103			70-130	Pass	
Endrin aldehyde			%	127			70-130	Pass	
Endrin ketone			%	128			70-130	Pass	
g-BHC (Lindane)			%	112			70-130	Pass	
Heptachlor			%	108			70-130	Pass	
Heptachlor epoxide			%	116			70-130	Pass	
Hexachlorobenzene			%	108			70-130	Pass	
Methoxychlor			%	100			70-130	Pass	
LCS - % Recovery									
Polychlorinated Biphenyls									
Aroclor-1260			%	126			70-130	Pass	
LCS - % Recovery									
Heavy Metals									
Arsenic			%	110			80-120	Pass	
Cadmium			%	106			80-120	Pass	
Chromium			%	120			80-120	Pass	
Copper			%	117			80-120	Pass	
Lead			%	115			80-120	Pass	
Mercury			%	114			75-125	Pass	
Nickel			%	116			80-120	Pass	
Zinc			%	112			80-120	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	M18-Se25700	NCP	%	88			70-130	Pass	
Acenaphthylene	M18-Se25700	NCP	%	90			70-130	Pass	
Anthracene	M18-Se25700	NCP	%	103			70-130	Pass	
Benz(a)anthracene	M18-Se25700	NCP	%	89			70-130	Pass	
Benzo(a)pyrene	M18-Se25700	NCP	%	102			70-130	Pass	
Benzo(b&j)fluoranthene	M18-Se25700	NCP	%	82			70-130	Pass	
Benzo(g,h,i)perylene	M18-Se25700	NCP	%	88			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Benzo(k)fluoranthene	M18-Se25700	NCP	%	106			70-130	Pass	
Chrysene	M18-Se25700	NCP	%	129			70-130	Pass	
Dibenz(a,h)anthracene	M18-Se25700	NCP	%	81			70-130	Pass	
Fluoranthene	M18-Se25700	NCP	%	119			70-130	Pass	
Fluorene	M18-Se25700	NCP	%	92			70-130	Pass	
Indeno(1.2.3-cd)pyrene	M18-Se25700	NCP	%	88			70-130	Pass	
Naphthalene	M18-Se25700	NCP	%	90			70-130	Pass	
Phenanthrene	M18-Se25700	NCP	%	74			70-130	Pass	
Pyrene	M18-Se25700	NCP	%	107			70-130	Pass	
Spike - % Recovery									
Organochlorine Pesticides				Result 1					
4.4'-DDD	M18-Se19501	NCP	%	94			70-130	Pass	
4.4'-DDE	M18-Se19501	NCP	%	107			70-130	Pass	
4.4'-DDT	S18-Se17865	NCP	%	104			70-130	Pass	
a-BHC	M18-Se19501	NCP	%	102			70-130	Pass	
Aldrin	M18-Se19501	NCP	%	110			70-130	Pass	
b-BHC	M18-Se19501	NCP	%	99			70-130	Pass	
d-BHC	M18-Se19501	NCP	%	100			70-130	Pass	
Dieldrin	M18-Se19501	NCP	%	106			70-130	Pass	
Endosulfan I	M18-Se19501	NCP	%	107			70-130	Pass	
Endosulfan II	M18-Se19501	NCP	%	98			70-130	Pass	
Endosulfan sulphate	M18-Se19501	NCP	%	102			70-130	Pass	
Endrin	M18-Se19501	NCP	%	117			70-130	Pass	
Endrin aldehyde	M18-Se19501	NCP	%	100			70-130	Pass	
Endrin ketone	M18-Se19501	NCP	%	104			70-130	Pass	
g-BHC (Lindane)	M18-Se19501	NCP	%	103			70-130	Pass	
Heptachlor	M18-Se19501	NCP	%	113			70-130	Pass	
Heptachlor epoxide	M18-Se19501	NCP	%	104			70-130	Pass	
Hexachlorobenzene	M18-Se19501	NCP	%	98			70-130	Pass	
Methoxychlor	M18-Se19501	NCP	%	127			70-130	Pass	
Spike - % Recovery									
Polychlorinated Biphenyls				Result 1					
Aroclor-1260	S18-Se20467	NCP	%	101			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	M18-Se21256	CP	%	74			70-130	Pass	
TRH C10-C14	M18-Se21256	CP	%	80			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	M18-Se21256	CP	%	84			70-130	Pass	
Toluene	M18-Se21256	CP	%	83			70-130	Pass	
Ethylbenzene	M18-Se21256	CP	%	100			70-130	Pass	
m&p-Xylenes	M18-Se21256	CP	%	100			70-130	Pass	
o-Xylene	M18-Se21256	CP	%	103			70-130	Pass	
Xylenes - Total	M18-Se21256	CP	%	101			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	M18-Se21256	CP	%	91			70-130	Pass	
TRH C6-C10	M18-Se21256	CP	%	73			70-130	Pass	
TRH >C10-C16	M18-Se21256	CP	%	74			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	M18-Se21259	CP	%	108			75-125	Pass	
Cadmium	M18-Se21259	CP	%	103			75-125	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Chromium	M18-Se21259	CP	%	112			75-125	Pass	
Copper	M18-Se21259	CP	%	106			75-125	Pass	
Lead	M18-Se21259	CP	%	101			75-125	Pass	
Mercury	M18-Se21259	CP	%	111			70-130	Pass	
Nickel	M18-Se21259	CP	%	110			75-125	Pass	
Zinc	M18-Se21259	CP	%	81			75-125	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C10-C14	M18-Se20615	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	M18-Se20615	NCP	mg/kg	810	720	11	30%	Pass	
TRH C29-C36	M18-Se20615	NCP	mg/kg	400	340	15	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
TRH >C10-C16	M18-Se20615	NCP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C16-C34	M18-Se20615	NCP	mg/kg	980		12	30%	Pass	
TRH >C34-C40	M18-Se20615	NCP	mg/kg	230		24	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	M18-Se25698	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	M18-Se25698	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	M18-Se25698	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	M18-Se25698	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	M18-Se25698	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	M18-Se25698	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g,h,i)perylene	M18-Se25698	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	M18-Se25698	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	M18-Se25698	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a,h)anthracene	M18-Se25698	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	M18-Se25698	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	M18-Se25698	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1,2,3-cd)pyrene	M18-Se25698	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	M18-Se25698	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	M18-Se25698	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	M18-Se25698	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Organochlorine Pesticides				Result 1	Result 2	RPD			
Chlordanes - Total	M18-Se19941	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
4,4'-DDD	M18-Se19941	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4,4'-DDE	M18-Se19941	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4,4'-DDT	M18-Se19941	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
a-BHC	M18-Se19941	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Aldrin	M18-Se19941	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
b-BHC	M18-Se19941	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
d-BHC	M18-Se19941	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Dieldrin	M18-Se19941	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan I	M18-Se19941	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan II	M18-Se19941	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan sulphate	M18-Se19941	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin	M18-Se19941	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin aldehyde	M18-Se19941	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin ketone	M18-Se19941	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
g-BHC (Lindane)	M18-Se19941	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor	M18-Se19941	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	

Duplicate								
Organochlorine Pesticides				Result 1	Result 2	RPD		
Heptachlor epoxide	M18-Se19941	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Hexachlorobenzene	M18-Se19941	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Methoxychlor	M18-Se19941	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass
Toxaphene	M18-Se19941	NCP	mg/kg	< 1	< 1	<1	30%	Pass
Duplicate								
Polychlorinated Biphenyls				Result 1	Result 2	RPD		
Aroclor-1016	M18-Se19941	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Aroclor-1221	M18-Se19941	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Aroclor-1232	M18-Se19941	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Aroclor-1242	M18-Se19941	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Aroclor-1248	M18-Se19941	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Aroclor-1254	M18-Se19941	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Aroclor-1260	M18-Se19941	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Total PCB*	M18-Se19941	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Duplicate								
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD		
TRH C6-C9	M18-Se21255	CP	mg/kg	< 20	< 20	<1	30%	Pass
Duplicate								
BTEX				Result 1	Result 2	RPD		
Benzene	M18-Se21255	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Toluene	M18-Se21255	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Ethylbenzene	M18-Se21255	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
m&p-Xylenes	M18-Se21255	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
o-Xylene	M18-Se21255	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Xylenes - Total	M18-Se21255	CP	mg/kg	< 0.3	< 0.3	<1	30%	Pass
Duplicate								
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD		
Naphthalene	M18-Se21255	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
TRH C6-C10	M18-Se21255	CP	mg/kg	< 20	< 20	<1	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
% Moisture	M18-Se21255	CP	%	8.1	8.1	<1	30%	Pass
Duplicate								
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD		
TRH C6-C9	M18-Se21257	CP	mg/kg	< 20	< 20	<1	30%	Pass
Duplicate								
BTEX				Result 1	Result 2	RPD		
Benzene	M18-Se21257	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Toluene	M18-Se21257	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Ethylbenzene	M18-Se21257	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
m&p-Xylenes	M18-Se21257	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass
o-Xylene	M18-Se21257	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Xylenes - Total	M18-Se21257	CP	mg/kg	< 0.3	< 0.3	<1	30%	Pass
Duplicate								
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD		
Naphthalene	M18-Se21257	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
TRH C6-C10	M18-Se21257	CP	mg/kg	< 20	< 20	<1	30%	Pass
Duplicate								
Heavy Metals				Result 1	Result 2	RPD		
Arsenic	M18-Se21259	CP	mg/kg	2.0	< 2	1.0	30%	Pass
Cadmium	M18-Se21259	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass
Chromium	M18-Se21259	CP	mg/kg	5.3	5.3	1.0	30%	Pass
Copper	M18-Se21259	CP	mg/kg	6.1	6.1	<1	30%	Pass
Lead	M18-Se21259	CP	mg/kg	24	24	<1	30%	Pass

Duplicate								
Heavy Metals				Result 1	Result 2	RPD		
Mercury	M18-Se21259	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Nickel	M18-Se21259	CP	mg/kg	< 5	< 5	<1	30%	Pass
Zinc	M18-Se21259	CP	mg/kg	33	33	1.0	30%	Pass

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

Authorised By

Andrew Black	Analytical Services Manager
Chris Bennett	Senior Analyst-Metal (VIC)
Harry Bacalis	Senior Analyst-Volatile (VIC)
Joseph Edouard	Senior Analyst-Organic (VIC)
Nibha Vaidya	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

Measurement uncertainty of test data is available on request or please [click here](#).

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Certificate of Analysis

Coffey Environments Pty Ltd Newcastle
 Lot 101, 19 Warabrook Boulevard
 Warabrook
 NSW 2304



NATA Accredited
 Accreditation Number 1261
 Site Number 18217

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

Attention: Merrick Jones

Report 620058-S
 Project name NBN - 120
 Project ID 7-H1-NTLGE220504
 Received Date Sep 28, 2018

Client Sample ID			BH03 0.4M	BH03 0.7-1.0M
Sample Matrix			Soil	Soil
Eurofins mgt Sample No.			S18-Se37046	S18-Se37047
Date Sampled			Sep 17, 2018	Sep 17, 2018
Test/Reference	LOR	Unit		
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	%	83	83
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	50	mg/kg	< 50	< 50
TRH >C10-C16 less Naphthalene (F2) ^{N01}	50	mg/kg	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 100	< 100
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

Client Sample ID			BH03 0.4M	BH03 0.7-1.0M
Sample Matrix			Soil	Soil
Eurofins mgt Sample No.			S18-Se37046	S18-Se37047
Date Sampled			Sep 17, 2018	Sep 17, 2018
Test/Reference	LOR	Unit		
Polycyclic Aromatic Hydrocarbons				
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	%	112	124
p-Terphenyl-d14 (surr.)	1	%	113	143
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
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
Aldrin and Dieldrin (Total)*	0.05	mg/kg	< 0.05	< 0.05
DDT + DDE + DDD (Total)*	0.05	mg/kg	< 0.05	< 0.05
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	< 0.1	< 0.1
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	< 0.1	< 0.1
Dibutylchloroendate (surr.)	1	%	97	127
Tetrachloro-m-xylene (surr.)	1	%	99	139
Polychlorinated Biphenyls				
Aroclor-1016	0.5	mg/kg	< 0.5	< 0.5
Aroclor-1221	0.1	mg/kg	< 0.1	< 0.1
Aroclor-1232	0.5	mg/kg	< 0.5	< 0.5
Aroclor-1242	0.5	mg/kg	< 0.5	< 0.5
Aroclor-1248	0.5	mg/kg	< 0.5	< 0.5
Aroclor-1254	0.5	mg/kg	< 0.5	< 0.5
Aroclor-1260	0.5	mg/kg	< 0.5	< 0.5
Total PCB*	0.5	mg/kg	< 0.5	< 0.5
Dibutylchloroendate (surr.)	1	%	97	127
Tetrachloro-m-xylene (surr.)	1	%	99	139

Client Sample ID			BH03 0.4M	BH03 0.7-1.0M
Sample Matrix			Soil	Soil
Eurofins mgt Sample No.			S18-Se37046	S18-Se37047
Date Sampled			Sep 17, 2018	Sep 17, 2018
Test/Reference	LOR	Unit		
Heavy Metals				
Arsenic	2	mg/kg	3.4	7.6
Cadmium	0.4	mg/kg	< 0.4	< 0.4
Chromium	5	mg/kg	6.3	20
Copper	5	mg/kg	6.0	9.8
Lead	5	mg/kg	8.0	23
Mercury	0.1	mg/kg	< 0.1	< 0.1
Nickel	5	mg/kg	< 5	< 5
Zinc	5	mg/kg	11	22
% Moisture	1	%	18	18

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
Total Recoverable Hydrocarbons - 1999 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Sydney	Sep 28, 2018	14 Day
BTEX - Method: LTM-ORG-2150 VOCs in Soils Liquid and other Aqueous Matrices	Sydney	Sep 28, 2018	14 Day
Total Recoverable Hydrocarbons - 2013 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Sydney	Sep 28, 2018	14 Day
Total Recoverable Hydrocarbons - 2013 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Sydney	Sep 28, 2018	14 Day
Polycyclic Aromatic Hydrocarbons - Method: LTM-ORG-2130 PAH and Phenols in Soil and Water	Sydney	Sep 28, 2018	14 Days
Metals M8 - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Sydney	Sep 28, 2018	28 Day
Organochlorine Pesticides - Method: LTM-ORG-2220 OCP & PCB in Soil and Water	Sydney	Sep 28, 2018	14 Day
Polychlorinated Biphenyls - Method: LTM-ORG-2220 OCP & PCB in Soil and Water	Sydney	Sep 28, 2018	28 Days
% Moisture - Method: LTM-GEN-7080 Moisture	Sydney	Sep 28, 2018	14 Day

Company Name: Coffey Environments P/L N'castle
Address: Lot 101, 19 Warabrook Boulevard
Warabrook
NSW 2304
Project Name: NBN - 120
Project ID: 7-H1-NTLGE220504

Order No.:
Report #: 620058
Phone: 02 4016 2300
Fax: 02 4016 2380

Received: Sep 28, 2018 8:10 AM
Due: Oct 8, 2018
Priority: 5 Day
Contact Name: Merrick Jones

Eurofins | mgt Analytical Services Manager : Andrew Black

Sample Detail						Asbestos - AS4964	Eurofins mgt Suite B13	Moisture Set	Eurofins mgt Suite B7
Melbourne Laboratory - NATA Site # 1254 & 14271									
Sydney Laboratory - NATA Site # 18217						X	X	X	X
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
External Laboratory									
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID				
1	BH03 0.4M	Sep 17, 2018		Soil	S18-Se37046	X	X	X	X
2	BH03 0.7-1.0M	Sep 17, 2018		Soil	S18-Se37047	X	X	X	X
Test Counts						2	2	2	2

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. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. 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 SRA.

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.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

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

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

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

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and 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.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	Quality Systems Manual ver 5.1 US Department of Defense
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 & PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.1 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

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	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	S18-Se37090	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C10-C14	S18-Se37091	NCP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	S18-Se37091	NCP	mg/kg	120	110	6.0	30%	Pass	
TRH C29-C36	S18-Se37091	NCP	mg/kg	59	74	22	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	B18-Se36396	NCP	mg/kg	0.8	0.8	8.0	30%	Pass	
Acenaphthylene	B18-Se36396	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	B18-Se36396	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	B18-Se36396	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	B18-Se36396	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	B18-Se36396	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g,h,i)perylene	B18-Se36396	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	B18-Se36396	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	B18-Se36396	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a,h)anthracene	B18-Se36396	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	B18-Se36396	NCP	mg/kg	< 2	< 2	<1	30%	Pass	
Fluorene	B18-Se36396	NCP	mg/kg	1.2	0.8	<1	30%	Pass	
Indeno(1,2,3-cd)pyrene	B18-Se36396	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	B18-Se36396	NCP	mg/kg	4.9	4.8	2.0	30%	Pass	
Phenanthrene	B18-Se36396	NCP	mg/kg	2.5	2.1	14	30%	Pass	
Pyrene	B18-Se36396	NCP	mg/kg	< 2	< 2	<1	30%	Pass	
Duplicate									
Organochlorine Pesticides				Result 1	Result 2	RPD			
Chlordanes - Total	S18-Se36955	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
4,4'-DDD	S18-Se36955	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4,4'-DDE	S18-Se36955	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4,4'-DDT	S18-Se36955	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
a-BHC	S18-Se36955	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Aldrin	S18-Se36955	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
b-BHC	S18-Se36955	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
d-BHC	S18-Se36955	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Dieldrin	S18-Se36955	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan I	S18-Se36955	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan II	S18-Se36955	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan sulphate	S18-Se36955	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin	S18-Se36955	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin aldehyde	S18-Se36955	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin ketone	S18-Se36955	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
g-BHC (Lindane)	S18-Se36955	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor	S18-Se36955	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor epoxide	S18-Se36955	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Hexachlorobenzene	S18-Se36955	NCP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Methoxychlor	S18-Se36955	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Toxaphene	S18-Se36955	NCP	mg/kg	< 1	< 1	<1	30%	Pass	

Duplicate								
Polychlorinated Biphenyls				Result 1	Result 2	RPD		
Aroclor-1016	S18-Se36955	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Aroclor-1221	S18-Se36955	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass
Aroclor-1232	S18-Se36955	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Aroclor-1242	S18-Se36955	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Aroclor-1248	S18-Se36955	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass
Duplicate								
Heavy Metals				Result 1	Result 2	RPD		
Arsenic	S18-Se37282	NCP	mg/kg	**	**	<1	30%	Pass
Cadmium	S18-Se37282	NCP	mg/kg	**	**	<1	30%	Pass
Chromium	S18-Se37282	NCP	mg/kg	**	**	10	30%	Pass
Copper	S18-Se36243	NCP	mg/kg	**	**	18	30%	Pass
Lead	S18-Se37282	NCP	mg/kg	**	**	3.0	30%	Pass
Nickel	S18-Se36243	NCP	mg/kg	**	**	17	30%	Pass
Zinc	S18-Se37282	NCP	mg/kg	**	**	7.0	30%	Pass
Duplicate								
				Result 1	Result 2	RPD		
% Moisture	S18-Se37046	CP	%	18	18	<1	30%	Pass

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

Authorised By

Andrew Black	Analytical Services Manager
Nibha Vaidya	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

Measurement uncertainty of test data is available on request or please [click here](#).

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CHAIN-OF-CUSTODY AND ANALYSIS REQUEST



A TETRA TECH COMPANY

Consigning Office: Waterbury

04222 88221

Report Results to: Merrick JonesMobile: 04222 88221Email: merrick.jones

Invoices to:

Phone:

Email:

@coffey.com

Project No: 744-NLGE 220504Task No: FIELDWORKProject Name: NBN Development

Laboratory:

Sampler's Name: Merrick JonesProject Manager: Simon Baker

Special Instructions:

Analysis Request Section

Lab No.	Sample ID	Sample Date	Time	Matrix (Soil... etc)	Container Type & Preservative*	T-A-T (specify)
---------	-----------	-------------	------	----------------------	--------------------------------	-----------------

NOTES

13401	0.5	3/9/18	AM	S	T	5 DAY
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13401	1.0	3/9/18				
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13402	0.1	10/9/18				
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13402	0.5	10/9/18				
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13404	0.5	12/9/18				
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13404	1.0	12/9/18				
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13404	3.0	12/9/18				
-------	-----	---------	--	--	--	--

13401	1.5	3/9/18				
-------	-----	--------	--	--	--	--

QC3						
-----	--	--	--	--	--	--

QC4 (ALS)						
-----------	--	--	--	--	--	--

Rece transfer QCU to ALS (B7, B13) only

RELINQUISHED BY

RECEIVED BY

Name: Merrick Jones Date: 14/9/18Name: BOE

Coffey Environments Time:

Company:

Name: Date:

→

Company: Time:

Company:

Date:

Time:

→

→

* Container Type & Preservation Codes: P - Plastic, G - Glass Bottle, J - Glass Jar, V - Vial, Z - Ziplock bag, N - Nitric Acid Preserved, C - Hydrochloric Acid Preserved, S - Sulphuric Acid Preserved, I - Ice, ST - Sodium Thiosulfate, NP - No Preservative

Tax Invoice

Coffey Environments P/L N'castle
Lot 101, 19 Warabrook Boulevard
Warabrook
NSW 2304

Purchase Order #: Not provided
Invoice #: 475470
Date: Sep 24, 2018
Report #: 618016
Project Name: NBN DEVELOPMENT
Project ID: 754-MLGE220504
Contact: Simon Baker

Description	Quantity	Price	Total	Notes
Solid Samples				
Asbestos - AS4964	4	\$19.90	\$79.60	
Eurofins mgt Suite B13	4	\$27.80	\$111.20	
Eurofins mgt Suite B7	8	\$62.20	\$497.60	
Split sample couriered to external lab	1	\$45.00	\$45.00	

	Nett Total	\$733.40
	GST	\$73.34
	Total Inc GST	\$806.74

This invoice is subject to Eurofins General Terms of Sales. Copies available on request or at <http://environment.eurofins.com.au>

Please detach and return with payment to:

Postal:
Eurofins | mgt
PO Box 276
Oakleigh
Victoria, 3166

Please EFT Payments to:

Eurofins mgt
BSB 063-498
Acct No: 10057019
e.mail Remittances:
EnviroRemittances@eurofins.com

Invoice Number : 475470
Amount Inc GST : \$806.74

TERMS STRICTLY 30 DAYS

Company Name: Coffey Environments P/L N'castle
Address: Lot 101, 19 Warabrook Boulevard
Warabrook
NSW 2304

Project Name: NBN DEVELOPMENT
Project ID: 754-MLGE220504

Order No.:
Report #: 618016
Phone: 02 4016 2300
Fax: 02 4016 2380

Received: Sep 17, 2018 8:09 AM
Due: Sep 24, 2018
Priority: 5 Day
Contact Name: Simon Baker

Eurofins | mgt Analytical Services Manager : Andrew Black

Sample Detail						Asbestos - AS4964	Eurofins mgt Suite B13	Moisture Set	Eurofins mgt Suite B7
Melbourne Laboratory - NATA Site # 1254 & 14271							X	X	X
Sydney Laboratory - NATA Site # 18217						X			
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
External Laboratory									
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID				
1	BH01 0.5	Sep 03, 2018		Soil	M18-Se21253		X	X	X
2	BH01 1.0	Sep 03, 2018		Soil	M18-Se21254			X	X
3	BH02 0.1	Sep 10, 2018		Soil	M18-Se21255			X	X
4	BH02 0.5	Sep 10, 2018		Soil	M18-Se21256	X	X	X	X
5	BH04 0.5	Sep 12, 2018		Soil	M18-Se21257	X	X	X	X
6	BH04 1.0	Sep 12, 2018		Soil	M18-Se21258			X	X
7	BH04 3.0	Sep 12, 2018		Soil	M18-Se21259			X	X
8	BH01 1.5	Sep 03, 2018		Soil	M18-Se21260	X		X	
9	QC3	Sep 03, 2018		Soil	M18-Se21261	X	X	X	X

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Address: Lot 101, 19 Warabrook Boulevard
Warabrook
NSW 2304

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		X	X	X
	X			
Melbourne Laboratory - NATA Site # 1254 & 14271		X	X	X
Sydney Laboratory - NATA Site # 18217	X			
Brisbane Laboratory - NATA Site # 20794				
Perth Laboratory - NATA Site # 23736				
Test Counts	4	4	9	8

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