ANNEXURE 9

Environmental Investigation Report

prepared by

Coffey Geotechnics

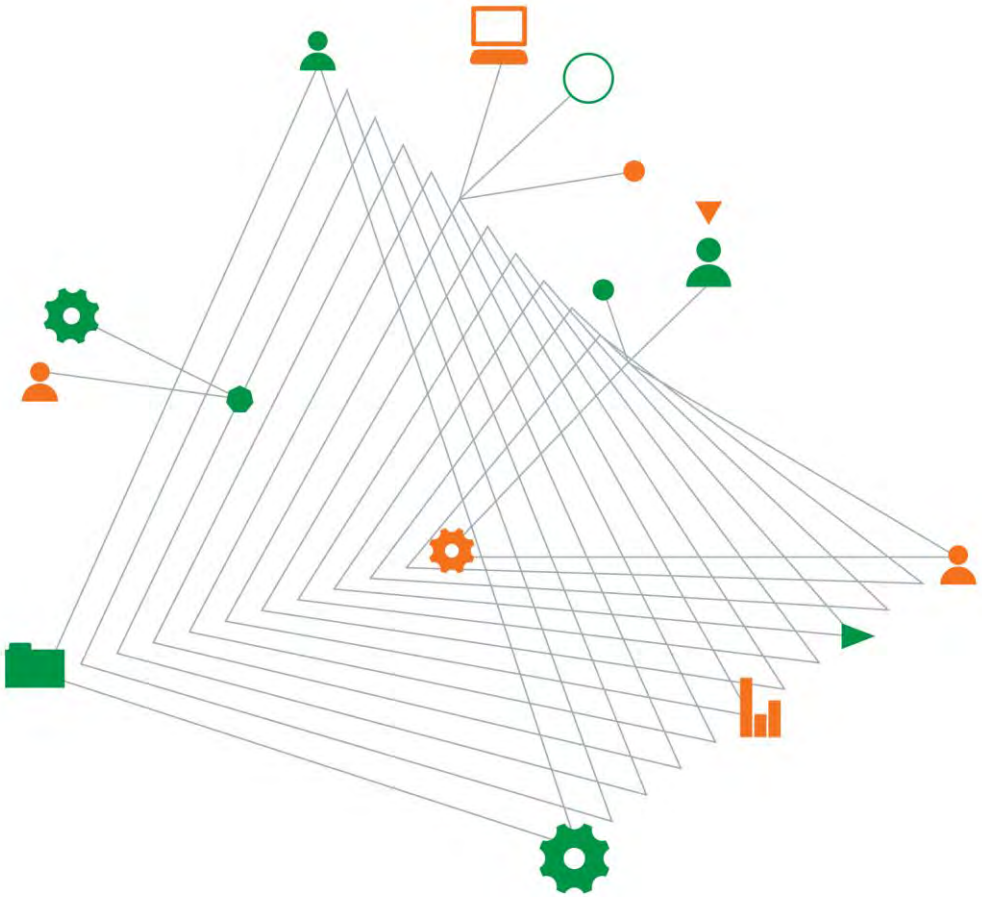
ANNEXURE 9

Manildra Group Pty Ltd

Proposed Starch Dryer Area - Environmental Investigation Report

Part of Lot 201 DP1062668
Bolong Road
BOMADERRY, NSW

20 October 2015



Experience comes to life when it is powered by expertise

This page has been left intentionally blank

Proposed Starch Dryer Area - Environmental Investigation Report

Prepared for
Manildra Group Pty Ltd

Prepared by
Coffey Environments Australia Pty Ltd
118 Auburn St
Wollongong NSW 2500 Australia
t: +61 2 4201 1430 f: +61 2 4201 1401
ABN: 65 140 765 902

Project Director	Manuel Fernandez Principal Environmental Engineer
Project Manager	Felicia Mellors Senior Environmental Scientist

20 October 2015

ENAUWOLL04242AA-R01

Quality information

Revision history

Revision	Description	Date	Author	Reviewer
Rev. 0	ENAUWOLLO04242AA-R01	20/10/2015	GH	MF

Distribution

Report Status	No. of copies	Format	Distributed to	Date
Final	1	PDF	Manildra Group Pty Ltd	20/10/2015

Executive summary

Background	Manildra Group Pty Ltd (Manildra) required an environmental investigation for a modification to an existing "project approval" for a proposed starch dryer to be constructed in an area of an existing warehouse at the Manildra site. Coffey had carried out an assessment of this general area in 2003.
Objective	The objective for the works were to: • Assess the likelihood for contamination to exist beneath the warehouse from past or present activities and to make recommendations on the need for further investigation and/or remediation should contamination be present. • Assess the likelihood for acid sulfate soils (ASS) to be present.
Scope of Work	The scope of works to achieve the above objectives was undertaken on the 21 September 2015 and comprised of the following • A site walkover and interview with relevant people with knowledge of site activities, to assess change in site activities since 2003 and whether the site conditions have materially changed the likelihood of contamination to exist in area within and immediately surrounding the warehouse; • Drilling of six boreholes (CBH503 to CBH508) using a hand auger to a maximum of 1 meters below ground surface (mbgs) or particle refusal; • Collection of three surface samples (SS1, SS2 and SS4); and • Submission of selected soil samples for chemical analysis.
Conclusions and recommendations	Based on the results of the site history and previous report, the main potential for site contamination was assessed to be associated with former workshop activities (mainly associated with mechanical maintenance and probable storage and use of oils, greases and degreasers). Intrusive assessment had difficulty penetrating into the subsurface with hand tools at most locations due to coarse/dense fill. However, due to the inferred top down mechanism of potential contamination, contamination (if present) would be expected to be found under the paved areas. Targeted sampling was carried out and no excdeedences of the adopted criteria were recorded. Some petroleum hydrocarbons were detected by the laboratory, but not at concentrations that would be unsuitable for ongoing industrial land use. Previous testing in 2003 near a former underground storage tank which was decommissioned more than 20 years prior did not record evidence to suggest widespread contamination. Should earthworks require encroachment to the tank, then the tank should be removed and the area validated. As the information on tank decommissioning was only anecdotal, appropriate care should be taken with any works near the tank and should follow relevant Australian Standards and codes of practice. Due to the history of workshop activities at the site and shallow investigations, an unexpected finds protocol should be adopted for civil works if significant soil disturbance is proposed. This will allow management of suspicious material if any is uncovered.

	We recommend that the pre-demolition hazardous materials survey be carried out of the building before demolition and that any subsequent demolition work is carried out appropriately and in accordance with relevant codes of practice to avoid the potential of cross contamination of hazardous materials (e.g. asbestos). Where cut to fill balances suggest a net soil excess or if there are geotechnically unsuitable soils, careful soil management is strongly recommended during civil work so that disposal costs can be minimised. For example separation of like fill materials and segregation of fill from natural soils. Acid sulfate soils could be encountered within alluvial soils underlying the fill materials. An acid sulfate soil management plan is recommended to manage these soils if construction activities require disturbance of these soils or any prolonged dewatering that could lower the groundwater table.

This sheet is intended to provide a summary only of the assessment of the site. It does not provide a definitive environmental or engineering analysis and is for an introduction only. It should be read in conjunction with the full report. Limitations and assumptions used to reach the conclusions of the executive summary are contained within the report and have not necessarily been included in this executive summary. This report must be read in conjunction with the attached 'Important information about Coffey Environmental Report' included in Appendix A.

Table of contents

Appendices

Appendix E Laboratory Reports and Chain of Custody Documentation

1. Introduction

Manildra Group Pty Ltd (Manildra) required an environmental investigation for a modification approval to an existing "project approval" for a proposed starch dryer to be constructed in an area of an existing warehouse at the Manildra Shoalhaven Starches Plant, Bolong Road, Bomaderry, NSW.

The site location is presented on Figures 1 and 2.

1.1. Background

Coffey understands that Manildra is proposing to construct one new starch dryer in an area currently occupied by a warehouse building on the south side of Bolong Road. Cowman Stoddart Pty Ltd (Cowman Stoddart) is assisting Manildra with the environmental planning and approvals and indicated that the current warehouse will be removed and that a hazardous building materials survey will be undertaken at that time.

Manildra requires contamination and Acid Sulfate Soil (ASS) information within the area for the proposed starch dryer. The results will be used to support their modification proposal to the Director General's Department.

The area of the proposed new dryer is presented in Figure 2.

1.2. Objectives

The objectives of the environmental investigation at the starch dryer area were to:

- Assess the likelihood for contamination to exist beneath the warehouse from past or present activities and to make recommendations on the need for further investigation and/or remediation should contamination be present.
- Assess the likelihood for ASS to be present.

1.3. Scope of works

To achieve the objectives of the environmental investigation at the starch dryer area, the following scope of work was undertaken:

- Review of previous information and reports;
- A site walkover and interview with relevant people with knowledge of site activities, to assess change in site activities since 2003 and whether the site conditions have materially changed the likelihood of contamination to exist in area within and immediately surrounding the warehouse;
- Drilling of six boreholes (CBH503 to CBH508) using a hand auger to a maximum of 1 meter below ground surface (mbgs) or particle refusal;
- Collection of three surface samples (SS1, SS2 and SS4);
- Screening each sample for the presence of volatile organic compounds (VOCs) using a photoionisation detector (PID);
- Logging of all soil returns using the unified soil classification system (USCS);
- Collection of quality assurance/quality control samples was undertaken in the form of one intra-laboratory duplicate) and one pair of trip spike and blank samples;

- Analysis of eight samples for total recoverable hydrocarbons (TRH), benzene, toluene, ethyl benzene, xylenes (BTEX), polycyclic aromatic hydrocarbons (PAHs), volatile halogenated hydrocarbons (VHCs). Analysis of nine samples for heavy metals and three samples for asbestos identification and one sample for potential acid sulfate soils (ASS); and
- The preparation of a report, summarising the fieldwork, results, and findings and conclusions relevant to the objectives of this environmental investigation.

2. Site conditions and surrounding environment

2.1. Summary of geoenvironmental site setting

The geoenvironmental setting of the site is summarised as follows:

- The investigation area is set within Manildra starches plant and is one of two light industrial warehouses within Lot 201 of DP 106268. The site locality is shown in Figure 1 and the area of the investigation (herein referred to as 'the site') is shown in Figure 2;
- Bolong Road is located to the north, workshops to the west and the Shoalhaven starches plant to the east and south;
- The site is located within the local government area of Shoalhaven, Parish of Bunberra and County of Camden;
- The site lies within a mainly commercial/industrial area and is zoned IN1 – general industrial viewed under the Shoalhaven City Council's Local Environmental Plan webmaps;
- Geological information obtained from 1:250,000 Wollongong Geological Series Sheet (S1 56-9, First Edition) prepared by the NSW Department of Mines (1952) indicates the site is likely to be underlain by Quaternary Alluvium, gravel, swamp deposit and sand dunes;
- The Kiama 1:100,000 soil landscape series sheet 90928, published by the Department of Conservation and Land Management in 1984 indicates that the site is located on a landscape of flat to gently undulating terrace surfaces of the Shoalhaven River. From site observations during a previous environmental investigation by Coffey in 2003 the site was noted to have a gentle slope of <1% to the south. The Berry 1:25,000 Topographic Map indicates that the site lies at an elevation less than 10m above Australian Height Datum (AHD);
- During a recent Geotechnical investigation for the proposed starch dryer, groundwater was encountered between 2.8mbgs to 3.5mbgs (Coffey, 2015); and
- The nearest potential receiving surface water body in relation to the site is the Abernethy's Creek to the east approximately 10m. It was noted that the Abernethy's Creek flows in a southerly direction into the Shoalhaven River, approximately 200m south of the investigation area (Coffey, 2003).

3. Previous reports

Two previous reports were made available for this site:

- Coffey Geosciences Pty Ltd, Preliminary Environmental Site Assessment, Part Lot 22 DP 1000265 (No. 24) Bolong, Road, Bomaderry (Ref: SC1537/7-AD, dated 10 June 2003)
- Coffey Geotechnics Pty Ltd, Geotechnical investigation, proposed dryer plant, Manildra, Bomaderry (Ref: GEOTWOLL03658AE-AA, dated 26 August 2015)

The Coffey (2003) report was a due diligence assessment prior to Manildra's purchase of a larger parcel of land which included the site of this investigation. The scope included a site history review and targeted sampling and analysis of site soils. The relevant site history indicated the following:

- Prior to 1948 the site was owned by private individuals and may have been vacant and used for farming or grazing purposes although this cannot be confirmed. In 1948 the site was purchased by a company named British Chemicals and Biologicals (formerly Benger-Genatosan). Aerial photographs indicate that a warehouse was constructed in the eastern portion of the site and was apparent by 1949. Anecdotal evidence suggests that this company constructed the warehouse but never actually ended up using it or the site. This warehouse was subsequently used by the local technical college and later by the army reserve for only a short period.
- The site was purchased in 1964 by Moorehouse Industries (the registered proprietor back in 2003). A second warehouse was built nearby but to the west of the investigation area at around this time and the site was used to build farm machinery up until about 1978. After 1978 the two light industrial warehouses were subdivided into smaller sections and leased to various companies which have used the warehouses and the site for things such as mechanical repairs and manufacturing of tractors and front end loaders. .
- The warehouse was occupied by "R.M.S Fabrication" and a mechanical repairs workshop and was used for the manufacture of tractors and front end loaders. The workshops appeared to contain metal manufacturing equipment and operations such as welding and spray painting were observed in this warehouse. Observations made inside the warehouse indicated that it had a concrete floor which appeared to be in fair to good condition with only minor cracking observed at the time.
- An underground storage tank was installed at a location adjacent to the central western boundary of the current site in the 1960s and used to store petrol for refuelling of vehicles. The tank apparently had a capacity of about 300 gallons. This tank was apparently abandoned in-situ about 30 years ago by filling with concrete. The site owner was not aware of the tank ever leaking.
- Based on the site history, the report identified relevant areas of environmental concern (AECs) and associated contaminants of concern. The AECs identified that are relevant to the current site are summarised below:
  - The whole site which may contain imported fill materials of unknown origin;
  - Exposed surfaces near the warehouses from potential weathering of lead based paints and fibro (potentially containing asbestos) roofing materials;
  - The light industrial warehouses from historical use for industrial activities comprising metal manufacturing and mechanical repairs.

Intrusive investigations were carried out to target some of the AECs, but excluded the workshop forming the majority of the current site due access constraints. Copies of the sample locations and laboratory results are included in Appendix C.

The results of this assessment identified some petroleum hydrocarbons in soil in areas where equipment was previously stored, but away from the current site. We note that guidelines used in 2003 are superseded. No evidence of petroleum hydrocarbon impact was noted at three borehole locations positioned near the UST which suggested the likelihood of widespread contamination from the UST is low. Relevant subsurface information from the previous reports is presented in Section 5.1.

3.1. Site interviews

Two interviews were carried out as part of the current environmental investigation to assess change in site activities since 2003 and whether the site conditions have materially changed the likelihood of contamination to exist in areas within and immediately surrounding the warehouse.

One interview was undertaken with Aaron Ticehurst. Aaron mentioned that forklifts were given oil changes in the forklift maintenance area and that waste oil and transmission oil was kept in two intermediate bulk containers (IBCs) within this area. No oil was kept in the motor store and that this area was formerly a steel warehouse (Shoalhaven Steel) and that no chemicals were stored in the electricians' workshop. Underground storage tanks or sumps were not known of and that the former mechanics workshop and belt store contained asbestos roofing. Degreasers, grease oil, engine fluids, coolant and possible fuels were once used in this area. Several 44 gallon drums outside contained food hydraulic oil.

The second interview was undertaken with Phil Beekhoven. Phil has been familiar with the site for the past 25 years. Phil said in the former workshop there was a mechanics pit (approximately 8-9 years ago) that was 0.65m deep. The pit was used for mechanics to work under cars for performing oil changes. There were no hoists, as the roof was too low. The waste oil (no other chemicals mentioned during interview) was kept outside in the north-west corner of the building and a former aboveground storage tank was located on the concrete platform in this location. Phil went onto say that other areas of the shed were rented out to others. Welding fabrication was carried out in the south-west and north-east corners of the shed and that a sheet metal workshop was carried out in the south-east part of the shed.

3.2. Site observations

Site observations were made at the time of the fieldwork (21 and 23 September 2015). The observations are summarised below. Relevant features are shown in Figure 2 and site photographs are presented in Appendix B.

- The site was mainly occupied by a single storey workshop building made of a mixture of brick and corrugated iron walls with corrugated asbestos cement roof (Photos 1 and 9);
- The areas adjacent to the workshop were predominantly asphalt paved;
- The workshop was partitioned into sections and currently used for:
  - Forklift maintenance (Photos 2 and 3)
  - Cardboard processing
  - Centrifuge maintenance
  - Electrical workshop
- The workshop had a concrete floor which appeared old, but generally in good condition. Typical patchy darker oil stains were noted in various parts of the workshop with an area of darker staining was in the central area;
- Waste oil IBCs were present in the forklift maintenance area and 44 gallon drums (Photos 2 and 3);
- Cardboard and empty IBC were stored in the cardboard processing area (Photo 4);
- General equipment and shelving was located in the centrifuge maintenance area (Photo 5);
- Other parts of the workshop had isolated shelving, general equipment storage or was partially vacant;

- An equipment bath/wash area was located on the south-western side of the workshop. This area was on concrete and asphalt paving (Photo 10);
- Evidence of a former mechanics pit was observed in the central western part of the workshop. This pit had a metal cover (Photo 6).
- Several 44 gallon drums were stored outside the workshop building near the north-western corner (Photo 7).
- The majority of the site was paved and there were no visible indicators of acid sulfate soils.

3.3. Methodology

Based on the results of the site history and previous report, the main potential for site contamination was assessed to be associated with former workshop activities (mainly associated with mechanical maintenance and probable storage and use of oils, greases and degreasers). The associated contaminants of concern for this activity are considered to be:

- Total recoverable hydrocarbons (TRH);
- Benzene, toluene, ethylbenzene, xylene (BTEX);
- Polycyclic aromatic hydrocarbons (PAH);
- Volatile halogenated compounds (VHC); and
- Heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc).

Previous testing of fill materials of this general area did not suggest the fill was impacted other than from probable site activities. The target depth for the assessment was set at 1m. If contamination was to be present it would be expected below the concrete from top down sources.

The site has an area of approximately 2,800m^2. Reference to the NSW EPA (1995) Sampling Design Guidelines recommends a minimum of about 8 sample locations, subject to the results of the site history. For this assessment we targeted the site with 9 sample locations (6 hand auger boreholes and 3 surface samples).

4. Fieldwork and laboratory analysis

The following field activities were undertaken at the site on 21 and 23 September 2015:

- Observing the surface area of the proposed project;
- Drilling of six hand auger bores (CBH503 to CBH508) to a maximum depth of 1 metre below ground surface (mbgs). Surface samples were collected with the hand auger or by hand;
- Paved areas were cored by a subcontract concrete corer;
- Sampling locations were advanced with the aid of a 100mm hand auger. The auger was washed by brush scrubbing with a phosphate free detergent, rinsed with potable water and distilled water between locations. An equipment rinsate (labelled WB1) was collected from the auger;
- Soil samples were generally collected from the surface, under concrete paving and then at regular intervals and logged in accordance with the Unified Soil Classification System (USCS). All soil samples were collected using a new pair of disposable nitrile gloves to prevent cross contamination. Soil samples were placed in clean laboratory-supplied acid washed glass jars, and stored on ice in a cooler while on-site and in transit to the analytical laboratories;

- Hand auger bores were reinstated to ground surface by backfilling with cuttings from the bore of origin and then with concrete;
- Selected soil samples were submitted from investigation locations for laboratory analysis for relevant COPCs;
- Quality control (QC) samples (duplicate, rinsate and trip spike/blank) were also collected and submitted for laboratory analysis of selected analytes. One duplicate sample (QC1) was collected of the primary sample CBH503/0.15-0.25m; and
- All primary and quality control soil samples were forwarded to Eurofins MGT Environmental Testing Australia Pty Ltd (Eurofins) who is National Association Testing Authority (NATA) accredited for all analyses requested. We note that soil samples from another project carried out for Manildra at another portion of the site were also included in this batch of samples. These are also included in the laboratory certificates but are to be disregarded for this report.

5. Ground Conditions Encountered

5.1. Sub surface Conditions

Ground conditions encountered varied across the investigation area, but can be generally be described as concrete of thicknesses between 0.1mbgs to 0.13mbgs and beneath, fill of yellow sands, or brown silty sand or brown to dark-brown low to medium plasticity silty/sandy clays with some fine gravel.

The sub-surface ground conditions encountered during the current environmental investigation have been found to be similar to those conditions described in the recent Geotechnical investigation undertaken for the proposed Dryer Plant.

Only hand auger location CBH503 beneath the centrifuge maintenance area reached the target depth of 1mbgs. All other hand auger locations beneath the investigation area had refusal at varying depth due to large gravels and cobbles. Locations CBH508 was not extended beyond 0.25mbgs due to time constraints.

The subsurface conditions recorded from the geotechnical investigation are reproduced below and are from two deeper boreholes drilled with a drilling rig.

Table 1 - Summary of subsurface conditions encountered in Boreholes CBH501 and CBH502.

Geotechnical unit	Description	Depth to top of unit below current ground level[(1)] (m)	Unit thickness[(1)] (m)	Consistency / Relative density	Comment
Fill	Asphalt	0.0	0.04	-	Only in CBH501
Fill	Silty CLAY: Low plasticity, dark brown, with some fine to medium grained sand, trace of fine to medium sub-angular or angular gravel	0.0 to 0.04	1.2 to 2.7	-	-
Alluvial Soils	Clayey SAND: Fine to coarse grained, grey, low plasticity clay	2.8	2.6	Very loose	Only in CBH501
Residual Soil	Silty CLAY / Sandy CLAY / CLAY: Low to high plasticity, orange/brown/mottled dark grey/black, fine to coarse grained sand	1.2 to 5.4	4.1 to 4.3	Firm to stiff	-
Extremely Weathered Material	CLAY: Medium to high plasticity, pale grey/mottled pale red/brown, with some fine to coarse grained black sand, trace of gravel sized ironstone fragments	5.5 to 9.5	1.7 to 2.5	Firm to stiff	-
Highly Weathered to Slightly Weathered Sandstone	SANDSTONE: Fine to coarse grained, yellow/brown/pale grey/orange/dark grey, low to high strength with some inter-bedded clayey material	8.0 to 11.2	-	-	Some extremely weathered seams (Refer to logs for the details)

Notes: The depths and thicknesses of the various units are based on a limited number of boreholes and may not represent the maximum or minimum values across the site or all materials beneath the site.

Copies of the logs and figure from the Coffey 2015 report are also included in Appendix D.

6. Tier 1 Screening assessment

6.1. Analytical laboratories

All primary and intra-laboratory duplicate soil samples were sent to Eurofins | mgt Environmental Testing Australia Pty Ltd (MGT). MGT is National Association of Testing Authorities (NATA) registered for all the analysis requested.

6.2. Assessment Criteria

The soil analytical results have been screened against the criteria sourced from:

- NEPC (1999) National Environment Protection (Assessment of Site Contamination) Amendment Measure (No. 1) 2013 (NEPM); and
- CRC CARE (2011) Cooperative Research Centre for Contamination Assessment and Remediation of the Environment, Technical Report Series, no. 10.

The NEPC (1999) National Environment Protection (Assessment of Site Contamination) Amendment Measure (No. 1) (NEPM, 2013) presents assessment guidelines for different land uses (e.g. industrial / commercial, residential, recreational, etc.) as well as ecological considerations (EILs). Based on information provided by Manildra, the assessment criteria adopted to assess the soils for the existing and proposed land use is - industrial.

To assess the soil for potential risks associated with dermal contact with petroleum hydrocarbons, the CRC CARE (2011) direct contact HSLs has been adopted.

Therefore, the following assessment criteria will be adopted for soil assessment purposes:

- NEPM (2013) Health investigation level (HIL) D for commercial/industrial land use;
- NEPM (2013) Health screening level (HSL) D commercial/industrial land use based on sand lithology;
- NEPM (2013) Health screening level (HSL) D commercial/industrial land use based on clay lithology;
- CRC CARE (2011) Soil Direct Contact, HSL-D Commercial/Industrial;
- CRC CARE (2011) Soil Intrusive Maintenance Worker, HSL-D Commercial/Industrial; and
- NEPM (2013) Management limits (coarse soil, residential, parkland and open space).

HSLs are for application against potential vapour intrusion issues with petroleum hydrocarbons. For asbestos we have adopted a conservative screening criteria of no asbestos detected. The site is heavily industrialised and intended to be used for a commercial industrial food dryer plant, therefore the environmental investigation and/or screening levels are not considered relevant for the current investigation.

6.3. Analytical Results

Soil analytical results, including quality control (QC) data and comparisons to the screening assessment criteria are presented in Table 1. Laboratory certificates of analysis and chain of custody (COC) documentation with analysis requests are provided in Appendix C.

6.4. Quality assessment

Coffey has reviewed the outcomes and findings of both the field and laboratory QC component of the soil sampling conducted in the area of investigation (Tables 1 and 2).

The calculated relative percentage differences (RPDs) between results were acceptable for all primary and replicate intra-laboratory (duplicate) samples, with the exception of lead. The elevated RPDs are not considered to affect the integrity of the result as the elevated RPD associated with metals are considered due to the particulate nature of metals in the soil.

Coffey considers that the field and laboratory QC results are acceptable for the purposes of this investigation.

6.5. Comparison of results to assessment criteria

Results of the investigation reported all requested analytes below the adopted criteria.

7. Acid sulfate soils

7.1. General

Coastal acid sulfate soils are commonly found in low lying coastal floodplains, estuaries, rivers and creeks. They are naturally occurring sediments rich in iron sulfides that form sulfuric acid when exposed to oxygen. Acid sulfate soils include potential acid sulfate soils (PASS) and actual acid sulfate soils (AASS).

Potential acid sulfate (PASS) soils are soils which contain iron sulfides or sulfidic material. In their undisturbed state, PASS may exhibit a pH of 4 or greater, and may be slightly alkaline. When exposed to air, the sulfides in PASS oxidise and can release significant quantities of acid. Following oxidation, the pH of these soils may fall considerably below pH 3.5.

Actual acid sulfate soils (AASS) are highly acidic soils resulting from the oxidation of iron sulfides or sulfidic material present in the soil profile. AASS are formed through the disturbance of PASS, which may be a result of either natural disturbances (e.g. regional fall in groundwater levels that exposes PASS to oxygen) or human disturbances (e.g. excavating PASS). AASS are typically characterised by pale yellow mottles, coating of soils with jarosite and pH of 4 or less.

7.2. Acid sulfate soil risk

Reference to the Burrier / Berry 1:25,000 Acid Sulfate Soil Risk Map (1997) edition 2, prepared by the DLWC, indicates that the site is located on an area described as an alluvial plain which is between 2m-4m above AHD. According to the map, the site is located in an area of “low probability” of occurrence of acid sulfate soil material within the soil profile. If present, acid sulfate soil materials would be expected to occur at depths between 1m and 3m below the ground surface. Acid sulfate soil materials (if present) are said to be widespread or sporadic within the soil profile and may be buried by alluvium or wind-blown sediment.

The subsurface conditions encountered in this and the previous geotechnical assessment were reviewed (See Section 5).

The borehole closest to Abernathy's drain (CBH501) encountered soils logged as alluvial soil from about 2.8m (clayey SAND, grey). Soils of similar description have been found to be acid sulfate soil in other parts of the Shoalhaven Starches plant.

Other soils (upper fill layers) and deeper residual soil and rock and not likely to be acid sulfate soil based on their appearance and geological origin.

7.3. Laboratory analysis

One soil sample (CBH503/0.85-0.95) was selected for laboratory analysis using the chromium reducible sulfur method. This sample was selected as it was from the borehole where the deepest penetration was achieved and it was also closest to Abernathy's Drain. The sample comprised natural alluvial material described as Silty CLAY: low plasticity, brown to dark brown, stiff.

7.4. Acid sulfate soil assessment criteria

In order to assess the significance of the ASS potential, the laboratory results were compared to action criteria in the Acid Sulfate Soil Management Advisory Committee 1998 (ASSMAC) Acid Sulfate Soil Manual[1]. The ASSMAC action criteria trigger the need to prepare a management plan and obtain development consent. The action criteria are based on oxidisable sulfur concentrations for three differing soil textures. The ASS Manual provides different action levels depending on the amount of ASS that is to be disturbed (i.e. < 1000 tonnes and >1000 tonnes). The volume of ASS to be disturbed is unknown, therefore criteria applying to disturbance of >1000 tonnes has been conservatively adopted. The action criteria provided in the ASS manual are summarised in Table 2 below.

Table 2: ASSMAC (1998) Acid Sulfate Soil ACTION Criteria*

Soil Texture Category	Approximate Clay Content (%)	Action Criteria*			
		Sulfur Trail Percent Oxidisable Sulfur (SCR) (%)		Acid Trail TAA (mol H+/tonne)	
Coarse	<5%	0.03	0.03	18	18
Medium	5% to 40%	0.06	0.03	36	18
Fine	>40%	0.1	0.03	62	18

A field pH below 4 can indicate that actual acid sulfate soils are present (i.e., soils in which oxidation of iron sulfides has already occurred and have produced acid). Generally a pH drop below 3.5 following oxidation with hydrogen peroxide indicates the probable presence of unoxidised sulfides in the samples, and for the purposes of the screening test, is taken as an indication of the probable presence of potential acid sulfate soils.

The results indicated the following:

[1] *Acid Sulfate Soil Management Advisory Committee (1998) Acid Sulfate Soil Manual*

- The pH of the soil was measured at 5.4 – not suggestive of actual acid sulfate soil conditions;
- Titratable actual acidity – 17mol H+/t (below the adopted criteria of 18 mol H+/t)
- Chromium reducible sulfur – 0.006% (below the adopted criteria of 0.03%)
- The net acidity – 0.03% (equal to the criteria of 0.03%).

The result is marginal. It generally suggests that there could be some acid sulfate potential based on the net acidity, but is not severe. Based on other assessments carried out by Coffey for Manildra along the flanks of the river, acid sulfate soils are likely to be present in estuarine material and intermittent in alluvial soils.

8. Conclusions and recommendations

Based on the results of the site history and previous report, the main potential for site contamination was assessed to be associated with former workshop activities (mainly associated with mechanical maintenance and probable storage and use of oils, greases and degreasers).

Intrusive assessment had difficulty penetrating into the subsurface with hand tools at most locations due to coarse/dense fill. However, due to the inferred top down mechanism of potential contamination, contamination (if present) would be expected to be found under the paved areas. Targeted sampling was carried out and no excdeedences of the adopted criteria were recorded. Some petroleum hydrocarbons were detected by the laboratory, but not at concentrations that would be unsuitable for ongoing industrial land use.

Previous testing in 2003 near a former underground storage tank which was decommissioned more than 20 years prior did not record evidence to suggest widespread contamination. Should earthworks require encroachment to the tank, then the tank should be removed and the area validated. As the information on tank decommissioning was only anecdotal, appropriate care should be taken with any works near the tank and should follow relevant Australian Standards and codes of practice.

Due to the history of workshop activities at the site and shallow investigations, an unexpected finds protocol should be adopted for civil works if significant soil disturbance is proposed. This will allow management of suspicious material if any is uncovered.

We recommend that the pre-demolition hazardous materials survey be carried out of the building before demolition and that any subsequent demolition work is carried out appropriately and in accordance with relevant codes of practice to avoid the potential of cross contamination of hazardous materials (e.g. asbestos).

Where cut to fill balances suggest a net soil excess or if there are geotechnically unsuitable soils, careful soil management is strongly recommended during civil work so that disposal costs can be minimised. For example separation of like fill materials and segregation of fill from natural soils.

Acid sulfate soils could be encountered within alluvial soils underlying the fill materials. An acid sulfate soil management plan is recommended to manage these soils if construction activities require disturbance of these soils or any prolonged dewatering that could lower the groundwater table.

This report must be read in conjunction with the attached ‘Important Information about your Coffey Environmental Report’ provided in Appendix A.

9. References

Coffey Geosciences Pty Ltd (2003) Manildra Group Preliminary Environmental Site Assessment, Part 22 DP 1000265 (No. 24), Bolong Road, Bomaderry, NSW. Ref: SC1537/7-AD, dated 10 June 2015.

Coffey Geotechnics Pty Ltd (2015) Manildra Group Pty Ltd Proposed Dryer Plant – Manildra, Bomaderry. Ref: GEOTWOLL03658AE-AA, dated 26 August 2015.

Friebel, E & Nadebaum, P 2011, Health screening levels for petroleum hydrocarbons in soil and groundwater. Summary, CRC CARE Technical Report no. 10, CRC for Contamination Assessment and Remediation of the Environment, Adelaide, Australia.

National Environment Protection Council (NEPC) (2013) National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No.1), NEPC.

Department of Land and Water Conservation (1997) Acid Sulfate Soil Risk Map – Burrier/Berry

Tables

Table 1
Soil Analytical Results
Starch Dryer Area Environmental Investigation

Field_ID					CBH503	QC1	RPD	CBH503	CBH504	CBH505	CBH506	CBH507	CBH508	SS1	SS2	SS4
Sample_Depth_Range					0.15-0.25			0.85-0.95	0.2-0.25	0.1-0.15	0.3-0.4	0.15-0.25	0.15-0.25	0.0-0.0.5	0.0-0.01	0.0-0.05
Sampled_Date					21/09/2015	21/09/2015	%	21/09/2015	22/09/2015	22/09/2015	22/09/2015	22/09/2015	22/09/2015	22/09/2015	22/09/2015	22/09/2015
Matrix_Type					SOIL	SOIL		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Comments					Normal	Duplicate of CBH503/0.15-0.25	RPD Between CBH503/0.15-0.25 and QC1	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
Method_Type	ChemName	Units	LOR	HSL-D Commercial / Industrial Direct Contact (1)	HSL-D Commercial / Industrial Intrusive Maintenance Worker (2)	NEPM 2013 Commercial/Industrial D Soil HSL for Vapour Intrusion, Clay (3) 0 to <1m	NEPM 2013 Commercial/Industrial D Soil HSL for Vapour Intrusion, Sand (4) 0 to <1m	NEPM 2013 Management Limits (Commercial/industrial - coarse) (5)	NEPM 2013 HILs Commercial/ industrial D Soil (6)								
BTEX	Benzene	mg/kg	0.1	430	1100	4	3	NE	NE	<0.1	<0.1	NA	-	<0.1	<0.1	<0.1	<0.1	-	-	<0.1
	Ethylbenzene	mg/kg	0.1	27000	85000	NE	NE	NE	NE	<0.1	<0.1	NA	-	<0.1	<0.1	<0.1	<0.1	-	-	<0.1
	Toluene	mg/kg	0.1	99000	120000	NE	NE	NE	NE	<0.1	<0.1	NA	-	<0.1	<0.1	<0.1	<0.1	-	-	<0.1
	Xylene (m & p)	mg/kg	0.2	NE	NE	NE	NE	NE	NE	<0.2	<0.2	NA	-	<0.2	<0.2	<0.2	<0.2	-	-	<0.2
	Xylene (o)	mg/kg	0.1	NE	NE	NE	NE	NE	NE	<0.1	<0.1	NA	-	<0.1	<0.1	<0.1	<0.1	-	-	<0.1
	Xylene Total	mg/kg	0.3	81000	130000	NE	230	NE	NE	<0.3	<0.3	NA	-	<0.3	<0.3	<0.3	<0.3	-	-	<0.3
TPH (NEPM 1999)	C6 - C9	mg/kg	20	NE	NE	NE	NE	NE	NE	<20	<20	NA	-	<20	<20	<20	<20	-	-	<20
	C10 - C14	mg/kg	20	NE	NE	NE	NE	NE	NE	<20	<20	NA	-	<20	<20	<20	<20	-	-	52
	C15 - C28	mg/kg	50	NE	NE	NE	NE	NE	NE	<50	<50	NA	-	57	<50	<50	<50	-	-	950
	C29 - C36	mg/kg	50	NE	NE	NE	NE	NE	NE	<50	<50	NA	-	64	<50	<50	<50	-	-	720
	C10 - C36 (Sum of total)	mg/kg	50	NE	NE	NE	NE	NE	NE	<50	<50	NA	-	120	<50	<50	<50	-	-	1700
TRH (NEPM 2013)	Naphthalene	mg/kg	0.5	11000	29000	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	F2-NAPHTHALENE	mg/kg	50	NE	NE	NE	NE	NE	NE	<50	<50	NA	-	<50	<50	<50	<50	-	-	<50
	C6-C10 less BTEX (F1)	mg/kg	20	26000	82000	NE	260	NE	NE	<20	<20	NA	-	<20	<20	<20	<20	-	-	<20
	C6 - C10	mg/kg	20	NE	NE	NE	NE	700	NE	<20	<20	NA	-	<20	<20	<20	<20	-	-	<20
	C10-C16	mg/kg	50	20000	62000	NE	NE	1000	NE	<50	<50	NA	-	<50	<50	<50	<50	-	-	<50
	C16-C34	mg/kg	100	27000	85000	NE	NE	3500	NE	<100	<100	NA	-	120	<100	<100	<100	-	-	1500
	C34-C40	mg/kg	100	38000	120000	NE	NE	10,000	NE	<100	<100	NA	-	<100	<100	<100	<100	-	-	310
Heavy Metal	Arsenic	mg/kg	2	NE	NE	NE	NE	NE	3000	11	11	0	-	3.3	6.2	8.1	5	10	-	4.7	2.3
	Cadmium	mg/kg	0.4	NE	NE	NE	NE	NE	900	<0.4	<0.4	NA	-	<0.4	<0.4	0.8	<0.4	<0.4	-	<0.4	<0.4
	Chromium	mg/kg	5	NE	NE	NE	NE	NE	NE	20	20	0	-	7.4	22	42	20	19	-	440	44
	Copper	mg/kg	5	NE	NE	NE	NE	NE	240000	18	17	6	-	<5	39	38	<5	19	-	280	72
	Lead	mg/kg	5	NE	NE	NE	NE	NE	1500	24	17	**34**	-	<5	28	36	7.9	22	-	190	29
	Mercury	mg/kg	0.05	NE	NE	NE	NE	NE	730	<0.05	<0.05	NA	-	<0.05	<0.05	0.1	<0.05	<0.05	-	<0.05	<0.05
	Nickel	mg/kg	5	NE	NE	NE	NE	NE	6000	17	17	0	-	<5	26	<5	<5	15	-	160	22
	Zinc	mg/kg	5	NE	NE	NE	NE	NE	400000	90	83	8	-	19	110	260	10	85	-	510	330
PAH	Acenaphthene	mg/kg	0.5	NE	NE	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	Acenaphthylene	mg/kg	0.5	NE	NE	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	Anthracene	mg/kg	0.5	NE	NE	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	Benzo(a)anthracene	mg/kg	0.5	NE	NE	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	Benzo(a)pyrene	mg/kg	0.5	NE	NE	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	Benzo(a)pyrene TEQ (lower bound) *	MG/KG	0.5	NE	NE	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	Benzo(a)pyrene TEQ (medium bound) *	MG/KG	0.5	NE	NE	NE	NE	NE	40	0.6	0.6	0	-	0.6	0.6	0.6	0.6	0.6	-	-	0.6
	Benzo(a)pyrene TEQ (upper bound) *	MG/KG	0.5	NE	NE	NE	NE	NE	NE	1.2	1.2	0	-	1.2	1.2	1.2	1.2	1.2	-	-	1.2
	Benzo(g,h,i)perylene	mg/kg	0.5	NE	NE	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	Benzo(k)fluoranthene	mg/kg	0.5	NE	NE	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	Chrysene	mg/kg	0.5	NE	NE	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	Benzo[b+j]fluoranthene	mg/kg	0.5	NE	NE	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	Dibenz(a,h)anthracene	mg/kg	0.5	NE	NE	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	Fluoranthene	mg/kg	0.5	NE	NE	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	Fluorene	mg/kg	0.5	NE	NE	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	Indeno(1,2,3-c,d)pyrene	mg/kg	0.5	NE	NE	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	Naphthalene	mg/kg	0.5	11000	29000	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	Phenanthrene	mg/kg	0.5	NE	NE	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	Pyrene	mg/kg	0.5	NE	NE	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	Total PAHs	mg/kg	0.5	NE	NE	NE	NE	NE	4000	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5

Notes
ID = identification
BH = bore hole, QC = quality control
mbgs = metres below ground surface
LOR = limit of reporting
NE = not established
NA = not applicable
ND = non detect
"-" = analytes not requested for analysis
(a) Where results are derived from the summation of selected analytes, LOR can not be determined.

Result highlighted cells indicate result exceeds adopted criteria

Adopted Guidelines
1. **CRC CARE (2011)** Soil – Vapour intrusion, HSLs for Direct Contact
2. **CRC CARE (2011)** Soil – Vapour intrusion, HSLs for Intrusive Maintenance Workers
3. **NEPM (2013)** National Environment Protection (Assessment of Site Contamination) Measure (NEPM) – Health Screening Levels (HSLs) for Commercial/Industrial "D" for clay 0 to <1m
4. **NEPM (2013)** National Environment Protection (Assessment of Site Contamination) Measure (NEPM) – Health Investigation Levels (HILs) for Commercial/Industrial "D" for sand 0 to <1m
5. **NEPM (2013)** National Environment Protection (Assessment of Site Contamination) Measure (NEPM) – Management limits (Commercial/Industrial)
6. **NEPM (2013)** National Environment Protection (Assessment of Site Contamination) Measure (NEPM) – Health Investigation Levels (HILs) for Commercial/Industrial "D"

Table 1
Soil Analytical Results
Starch Dryer Area Environmental Investigation

Field_ID					CBH503	QC1	RPD	CBH503	CBH504	CBH505	CBH506	CBH507	CBH508	SS1	SS2	SS4
Sample_Depth_Range					0.15-0.25			0.85-0.95	0.2-0.25	0.1-0.15	0.3-0.4	0.15-0.25	0.15-0.25	0.0-0.0.5	0.0-0.01	0.0-0.05
Sampled_Date					21/09/2015	21/09/2015	%	21/09/2015	22/09/2015	22/09/2015	22/09/2015	22/09/2015	22/09/2015	22/09/2015	22/09/2015	22/09/2015
Matrix_Type					SOIL	SOIL		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Comments					Normal	Duplicate of CBH503/0.15-0.25	RPD Between CBH503/0.15-0.25 and QC1	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
Method_Type	ChemName	Units	LOR	HSL-D Commercial / Industrial Direct Contact (1)	HSL-D Commercial / Industrial Intrusive Maintenance Worker (2)	NEPM 2013 Commercial/Industrial D Soil HSL for Vapour Intrusion, Clay (3) 0 to <1m	NEPM 2013 Commercial/Industrial D Soil HSL for Vapour Intrusion, Sand (4) 0 to <1m	NEPM 2013 Management Limits (Commercial/industrial - coarse) (5)	NEPM 2013 HILs Commercial/ industrial D Soil (6)										
VOC	1,1,1,2-tetrachloroethane	mg/kg	0.5	NE	NE	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	1,1,1-trichloroethane	mg/kg	0.5	NE	NE	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	1,1,2,2-tetrachloroethane	mg/kg	0.5	NE	NE	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	1,1,2-trichloroethane	mg/kg	0.5	NE	NE	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	1,1-dichloroethane	mg/kg	0.5	NE	NE	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	1,1-dichloroethene	mg/kg	0.5	NE	NE	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	1,2,3-trichloropropane	mg/kg	0.5	NE	NE	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	1,2-dibromoethane	mg/kg	0.5	NE	NE	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	1,2-dichlorobenzene	mg/kg	0.5	NE	NE	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	1,2-dichloroethane	mg/kg	0.5	NE	NE	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	1,2-dichloropropane	mg/kg	0.5	NE	NE	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	1,3-dichlorobenzene	mg/kg	0.5	NE	NE	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	1,3-dichloropropane	mg/kg	0.5	NE	NE	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	1,4-dichlorobenzene	mg/kg	0.5	NE	NE	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	Bromodichloromethane	mg/kg	0.5	NE	NE	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	Bromoform	mg/kg	0.5	NE	NE	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	Bromomethane	mg/kg	0.5	NE	NE	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	Carbon tetrachloride	mg/kg	0.5	NE	NE	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	Chlorobenzene	mg/kg	0.5	NE	NE	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	Chlorodibromomethane	mg/kg	0.5	NE	NE	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	Chloroform	mg/kg	0.5	NE	NE	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	Chloromethane	mg/kg	0.5	NE	NE	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	cis-1,2-dichloroethene	mg/kg	0.5	NE	NE	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	cis-1,3-dichloropropene	mg/kg	0.5	NE	NE	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	Dibromomethane	mg/kg	0.5	NE	NE	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	Dichloromethane	mg/kg	0.5	NE	NE	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	Iodomethane	mg/kg	0.5	NE	NE	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	Trichloroethene	mg/kg	0.5	NE	NE	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	Tetrachloroethene	mg/kg	0.5	NE	NE	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	trans-1,2-dichloroethene	mg/kg	0.5	NE	NE	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	trans-1,3-dichloropropene	mg/kg	0.5	NE	NE	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	Trichlorofluoromethane	mg/kg	0.5	NE	NE	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
	Vinyl chloride	mg/kg	0.5	NE	NE	NE	NE	NE	NE	<0.5	<0.5	NA	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5
Asbestos	Presence/Absence	ND	0.01% w/w	NA	NA	NA	NA	NE	NA	-	-	NA	-	-	-	-	-	-	ND	ND	ND
Inorganic	Moisture Content (dried @ 103°C)	%	0.1	NE	NE	NE	NE	NE	NE	23	23	0	21	3.7	10	17	18	26	-	16	24
	pH (aqueous extract)	pH_Units	0.1	NE	NE	NE	NE	NE	NE	-	-	NA	-	-	-	-	-	-	-	-	-

Notes
ID = identification
BH = bore hole, QC = quality control
mbgs = metres below ground surface
LOR = limit of reporting
NE = not established
NA = not applicable
ND = non detect
"-" = analytes not requested for analysis
(a) Where results are derived from the summation of selected analytes, LOR can not be determined.

Result highlighted cells indicate result exceeds adopted criteria

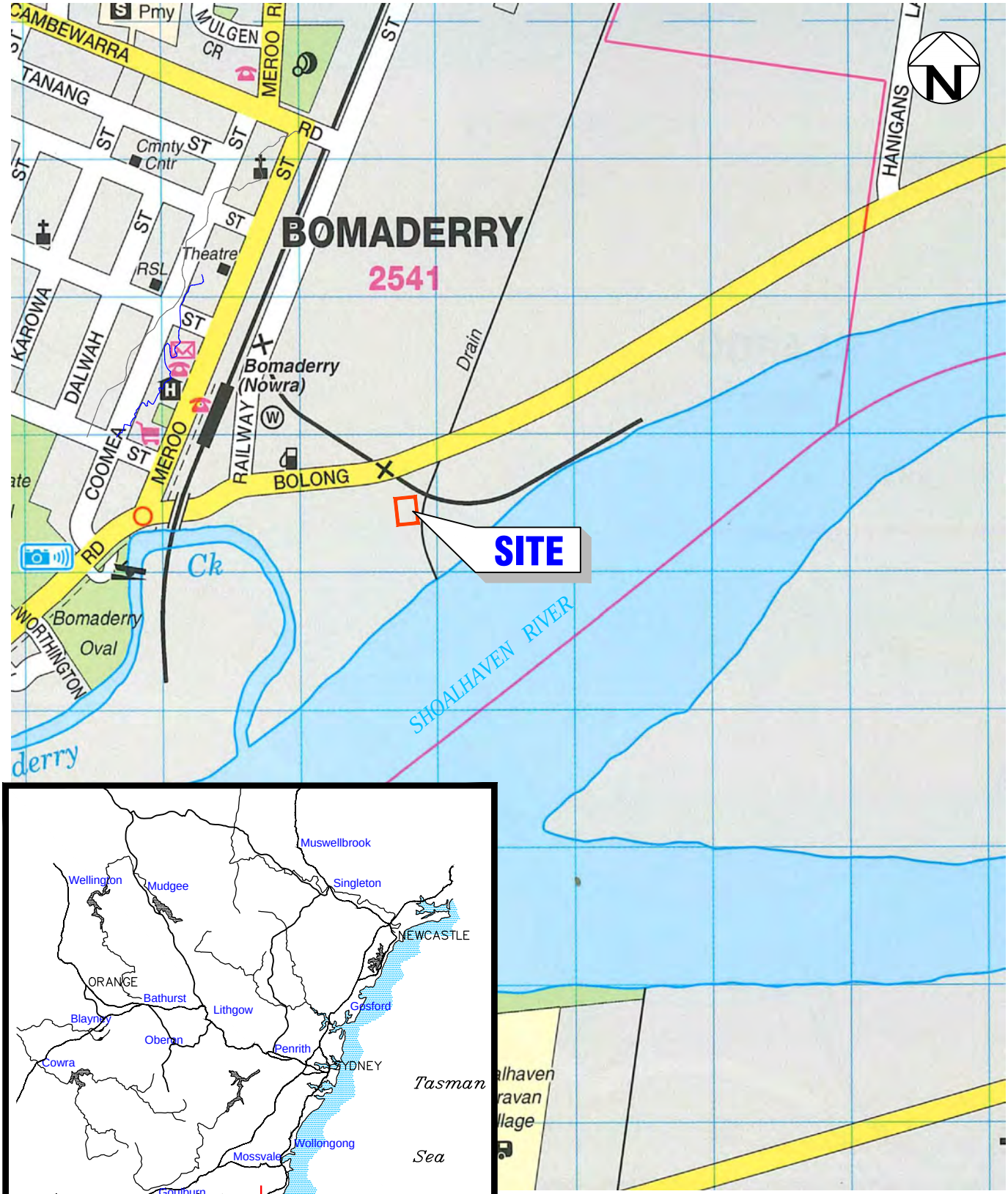
Adopted Guidelines
Adopted Guidelines
1. **CRC CARE (2011)** Soil – Vapour intrusion, HSLs for Direct Contact
2. **CRC CARE (2011)** Soil – Vapour intrusion, HSLs for Intrusive Maintenance Workers
3. **NEPM (2013)** National Environment Protection (Assessment of Site Contamination) Measure (NEPM) – Health Screening Levels (HSLs) for Commercial/Industrial "D" for clay 0 to <1m
4. **NEPM (2013)** National Environment Protection (Assessment of Site Contamination) Measure (NEPM) – Health Investigation Levels (HILs) for Commercial/Industrial "D" for sand 0 to <1m
5. **NEPM (2013)** National Environment Protection (Assessment of Site Contamination) Measure (NEPM) – Management limits (Commercial/Industrial)
6. **NEPM (2013)** National Environment Protection (Assessment of Site Contamination) Measure (NEPM) – Health Investigation Levels (HILs) for Commercial/Industrial "D"

Table 2
Quality Control Analytical Results
Starch Dryer Area Environmental Investigation

			Lab Report Number	473434	473434	473434
			Field ID	TRIP SPIKE	TRIP BLANK	RINSATE
			Sampled Date	22/09/2015	22/09/2015	22/09/2015
			Matrix	Water	Water	Water
Method_Type	**ChemName**	**Units**	**LOR**			
BTEX	Benzene	µg/l	1	-	<1	<1
	Ethylbenzene	µg/l	1	-	<1	<1
	Toluene	µg/l	1	-	<1	<1
	Xylene (m & p)	µg/l	2	-	<2	<2
	Xylene (o)	µg/l	1	-	<1	<1
	Xylene Total	µg/l	3	-	<3	<3
BTEX	Benzene	%	1	101	-	-
	Ethylbenzene	%	1	95	-	-
	Toluene	%	1	99	-	-
	Xylene (m & p)	%	2	91	-	-
	Xylene (o)	%	1	94	-	-
	Xylene Total	%	3	92	-	-
TPH (NEPM 1999)	C6 - C9	µg/l	20	-	<20	<20
	C10 - C14	µg/l	50	-	-	<50
	C15 - C28	µg/l	100	-	-	<100
	C29 - C36	µg/l	100	-	-	<100
	C10 - C36 (Sum of total)	µg/l	100	-	-	<100
TRH (NEPM 2013)	Naphthalene	µg/l	20	-	<20	<20
	F2-NAPHTHALENE	mg/l	0.05	-	-	<0.05
	C6-C10 less BTEX (F1)	mg/l	0.02	-	<0.02	<0.02
	C6 - C10	mg/l	0.02	-	<0.02	<0.02
	C10-C16	mg/l	0.05	-	-	<0.05
	C16-C34	mg/l	0.1	-	-	0.1
	C34-C40	mg/l	0.1	-	-	<0.1
Heavy Metal	Arsenic (Filtered)	mg/l	0.001	-	-	<0.001
	Cadmium (Filtered)	mg/l	0.0001	-	-	<0.0001
	Chromium (Filtered)	mg/l	0.001	-	-	<0.001
	Copper (Filtered)	mg/l	0.001	-	-	<0.001
	Lead (Filtered)	mg/l	0.001	-	-	<0.001
	Mercury (Filtered)	mg/l	0.0001	-	-	<0.0001
	Nickel (Filtered)	mg/l	0.001	-	-	<0.001
	Zinc (Filtered)	mg/l	0.005	-	-	<0.005
PAH	Acenaphthene	µg/l	1	-	-	<1
	Acenaphthylene	µg/l	1	-	-	<1
	Anthracene	µg/l	1	-	-	<1
	Benzo(a)anthracene	µg/l	1	-	-	<1
	Benzo(a)pyrene	µg/l	1	-	-	<1
	Benzo(g,h,i)perylene	µg/l	1	-	-	<1
	Benzo(k)fluoranthene	µg/l	1	-	-	<1
	Chrysene	µg/l	1	-	-	<1
	Benzo[b+j]fluoranthene	mg/l	0.001	-	-	<0.001
	Dibenz(a,h)anthracene	µg/l	1	-	-	<1
	Fluoranthene	µg/l	1	-	-	<1
	Fluorene	µg/l	1	-	-	<1
	Indeno(1,2,3-c,d)pyrene	µg/l	1	-	-	<1
	Naphthalene	µg/l	1	-	-	<1
	Phenanthrene	µg/l	1	-	-	<1
	Pyrene	µg/l	1	-	-	<1
	Total PAHs	µg/l	1	-	-	<1

Notes
ID = identification
LOR = limit of reporting
"-" = analytes not requested for analysis

Figures



SOURCE: UBD WOLLONGONG STREET DIRECTORY
NEW SOUTH WALES, EDITION 19, MAP: 88

SCALE 1:10000 (A3)

0 0.1 0.2 0.3 0.4 0.5 KILOMETRES

drawn	MV
approved	GH
date	16/10/15
scale	AS SHOWN
original size	A4

coffey

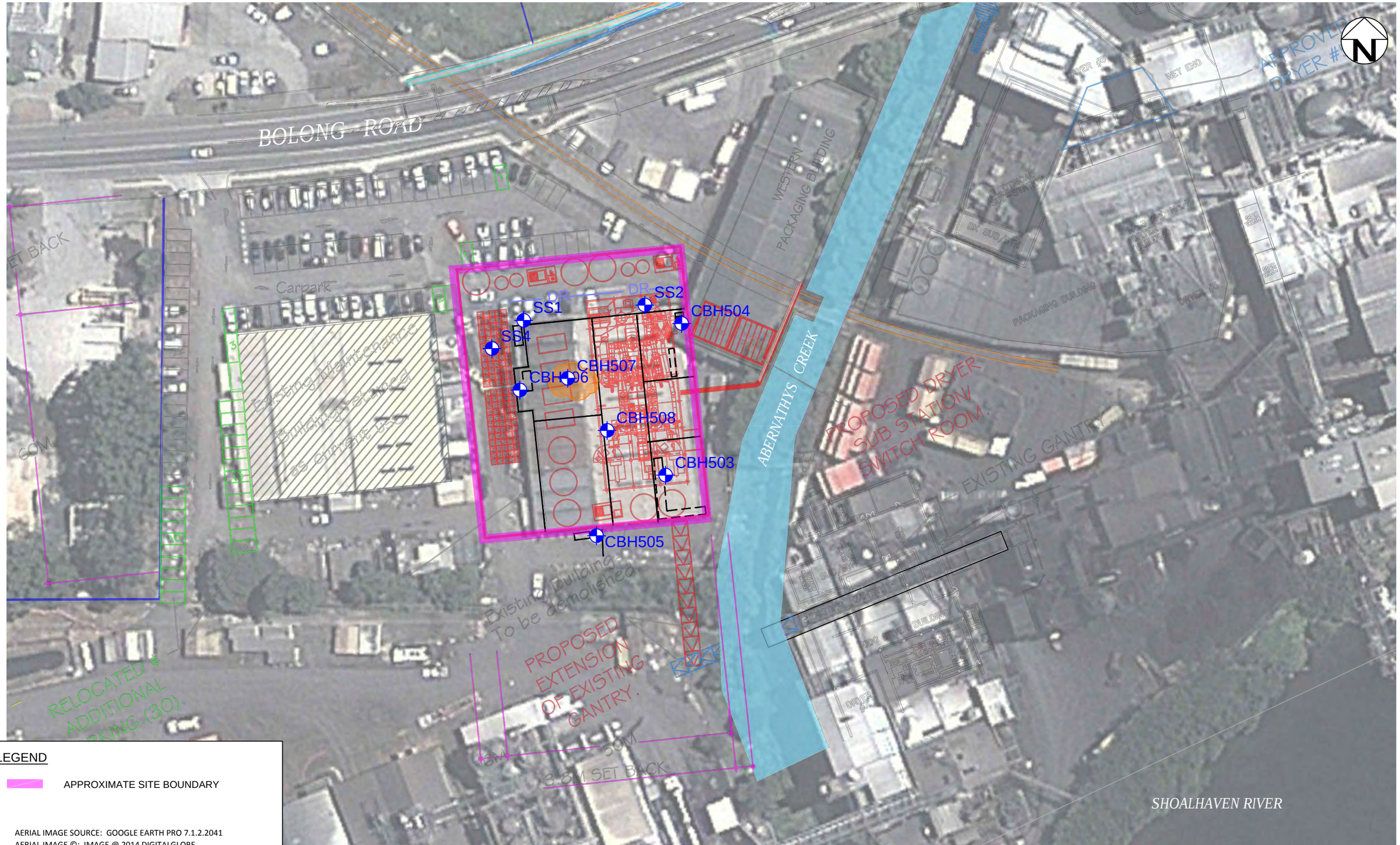
client: MANILDRA GROUP PTY LTD

project: STARCH DRYER AREA ENVIRONMENTAL INVESTIGATION REPORT
PART LOT 22 DP 1000265 (NO. 24)
BOLONG ROAD, BOMADERRY, NSW

title: SITE LOCATION PLAN

project no: ENAUWOLL04242AA-R01 | figure no: FIGURE 1 | rev: A

PLOT DATE: 16/10/2015 3:55:05 PM DWG FILE: F:\ENV\PROJECTS\OTHER OFFICES\ENAUWOLL\ENAUWOLL04242AA\ENAUWOLL04242AA-R01-D01.DWG



LEGEND

APPROXIMATE SITE BOUNDARY

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

revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE			

NOTE:
ALL LOCATIONS ARE APPROXIMATE
DIMENSIONS IN METRES.

0 8 16 24 32 40
SCALE 1:800 (A3) METRES

drawn	MV
approved	GH
date	16/10/15
scale	AS SHOWN
original size	A3

coffey

client: MANILDRA GROUP PTY LTD

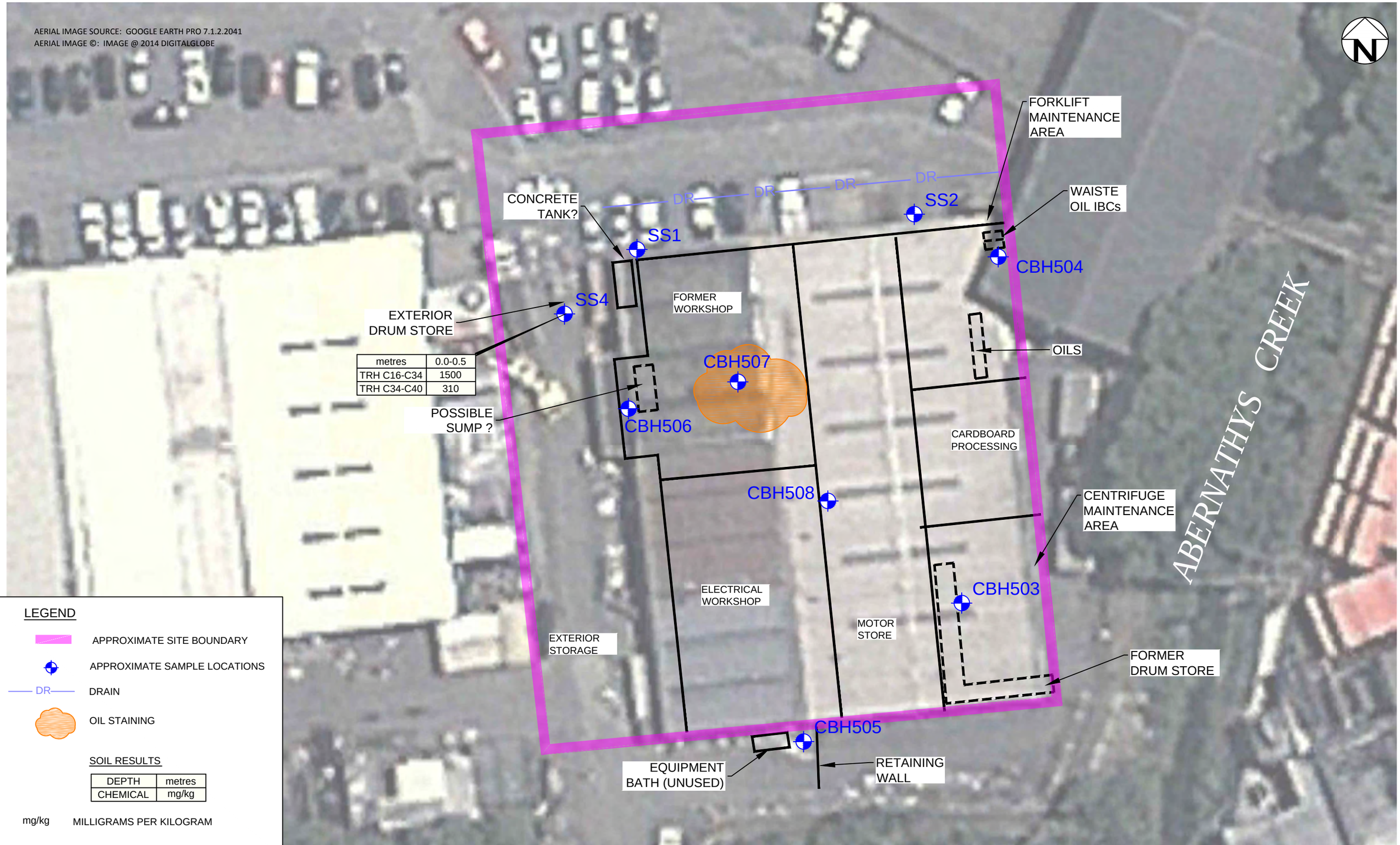
project: STARCH DRYER AREA ENVIRONMENTAL INVESTIGATION REPORT
PART LOT 22 DP 1000265 (NO. 24)
BOLONG ROAD, BOMADERRY, NSW

title: PROPOSED DEVELOPMENT

project no: ENAUWOLL04242AA-R01 | figure no: FIGURE 2 | rev: A

PLOT DATE: 19/10/2015 5:19:20 PM DWG FILE: F:\ENV\PROJECTS\OTHER OFFICES\ENAUWOLL\ENAUWOLL04242AA\ENAUWOLL04242AA-R01-D01.DWG

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



metres	0.0-0.5
TRH C16-C34	1500
TRH C34-C40	310

LEGEND

- APPROXIMATE SITE BOUNDARY
- APPROXIMATE SAMPLE LOCATIONS
- DR — DRAIN
- OIL STAINING

SOIL RESULTS

DEPTH	metres
CHEMICAL	mg/kg

mg/kg MILLIGRAMS PER KILOGRAM

revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE			

NOTE:
ALL LOCATIONS ARE APPROXIMATE
DIMENSIONS IN METRES.

0 3.5 7 10.5 14 17.5
SCALE 1:350 (A3) METRES

drawn	MV
approved	GH
date	16/10/15
scale	AS SHOWN
original size	A3

coffey

client: MANILDRA GROUP PTY LTD

project: STARCH DRYER AREA ENVIRONMENTAL INVESTIGATION REPORT
PART LOT 22 DP 1000265 (NO. 24)
BOLONG ROAD, BOMADERRY, NSW

title: SAMPLE LOCATION PLAN (21 SEPTEMBER 2015)

project no: ENAUWOLL04242AA-R01 | figure no: FIGURE 3 | rev: A

PLOT DATE: 19/10/2015 5:22:03 PM DWG FILE: F:\ENV\PROJECTS\OTHER OFFICES\ENAUWOLL\ENAUWOLL04242AA\ENAUWOLL04242AA-R01-D01.DWG

Appendix A - Important Information about your Coffey Environments Report

Important information about your Coffey Environmental Report

1. 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.

2. 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 posed 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).

3. Limitations of the Report

The work was conducted, and the report has been prepared, in response to an agreed purpose and scope, within time and budgetary constraints, and in reliance on certain data and information made available to Coffey. The analyses, evaluations, opinions and conclusions presented in this report are based on that purpose and scope, requirements, data or information, and they could change if such requirements or data are inaccurate or incomplete.

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

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

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

4. 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.

5. 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.

6. 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.

7. 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.

8. 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.

9. 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 B - Site Photographs

Photograph 1: Northern part of workshop (drums stored in north-eastern corner) (21 September 2015).

Photograph 2: Forklift maintenance area with waste oil IBCs (21 September 2015).

Photograph 3: Forklift maintenance area with drums IBCs (21 September 2015).

Photograph 4: Cardboard processing area (21 September 2015).

Photograph 5: Centrifuge maintenance area (21 September 2015).

Photograph 6: Possible mechanics pit (21 September 2015).

Photograph 7: Drum store in the north-western corner of the site (21 September 2015).

Photograph 8: Looking at the former workshop area (north western part of workshop building) (21 September 2015).

Photograph 9: Looking at the possible asbestos D6 roofing of the current building (21 September 2015).

Photograph 10: Looking at the equipment bath on the southern end of the Electrician Workshop area (21 September 2015).

Appendix C - Copy of information from Coffey 2003 report

N

Copy of Figure 2 from Coffey Geosciences (2003)

Approximate boundary of proposed starch dryer

BOLONG ROAD

21
DP 1000265

2

DP 548659

A

PRIVATE

UP 371386

RAILWAY

5.1
Grassed Area

27.5
Grassed Area
Tractor Storage Area

201
1.08ha

32.7

Shipping Container

Manufactured Piping
Storage Area

SS1 X

CTP5

SS2 X

Tractor Storage Area

Grassed Area

CTP4

SS7 X

Sump

AST

CTP3

Metal Piping
Shipping Container

Cleary Brothers
Batching Plant

Storage Compound

LIGHT
INDUSTRIAL
WAREHOUSES

Scrap Storage

SS3 X

Compressor

Approximate Location
of UST

CBH1

CBH2

CBH3

SS5 X

Chemical Storage Drums

Scrap Metal
Recycling

CTP1

Wash Bay

Shed

AST

Fence

Gate

CTP2

SS6 X

Oil Drum
Storage Area

Tractor Storage Area

Concrete Loading Platform

Industrial Waste Bin

Wooden Pallet Storage Area

CTP6

LIGHT
INDUSTRIAL
WAREHOUSES

Industrial Waste Bins

SS4 X

18.2

10.3

29.3

5.6

ABERNETHY'S CREEK

LEGEND

- Approximate Location of Test Pits
- Approximate Location of Boreholes
- X Approximate Location of Surface Samples
- Investigation Area

REF: PROPOSED INDUSTRIAL SUBDIVISION TITLED "SKETCH PLAN OF PROPOSED INDUSTRIAL SUBDIVISION" (22938), CREATED BY ALLEN, PRICE & ASSOCIATES – LAND & DEVELOPMENT CONSULTANTS, MARCH 2003.

Coffey Geosciences Pty Ltd ACN 056 335 516 | Geotechnical | **Resources** | Environmental | **Technical** | Project Management

0 12 24 36

Scale (metres)
1 : 600 (Approx)

Revision	Description	Drawn	Approved	Date

Drawn	CCH
Checked	
Date	10/6/03

MANILDRA GROUP
PRELIMINARY ENVIRONMENTAL SITE ASSESSMENT
24 BOLONG ROAD, BOMADERRY, NSW
APPROXIMATE SAMPLING LOCATIONS

Drawing no: FIGURE 2

Job no: SC1537/7-AD

TABLE 3:

SUMMARY OF LABORATORY RESULTS FOR SOIL SAMPLES

Heavy Metals, TPH, BTEX, PAH, OCP, PCB, VHC and Asbestos

(All results in mg/kg)

Sample ID		CTP1	CTP2	CTP2	CTP3	CTP4	CTP6	CBH3	CBH3	SS1	SS2	SS3	SS4	SS6	SS7
Material		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date of Sampling		19-May-2003	19-May-2003	19-May-2003	19-May-2003	19-May-2003	19-May-2003	19-May-2003	19-May-2003	19-May-2003	19-May-2003	19-May-2003	19-May-2003	19-May-2003	19-May-2003
Depth (m)		0.0-0.1	0.0-0.1	0.2-0.3	0.0-0.1	0.0-0.1	0.0-0.1	0.5-0.95	2.5-2.95	0.0-0.05	0.0-0.05	0.0-0.05	0.0-0.05	0.0-0.05	0.0-0.05
	THRESHOLD CONCENTRATION														
HEAVY METALS															
Arsenic	500 [1]	10	10	1	-	4	8	-	-	9	7	6	28	9	5
Cadmium	100 [1]	<1	<1	<1	-	<1	<1	-	-	<1	<1	2	2	<1	<1
Chromium	600,000 [1]	24	26	6	-	18	135	-	-	86	86	30	2270	28	18
Chromium (VI)	500	-	-	-	-	-	-	-	-	-	-	-	<1	-	-
Copper	5000 [1]	36	203	21	-	18	117	-	-	91	56	43	1710	83	119
Lead	600 [1]	22	109	22	-	37	269	18	16	89	59	137	850	109	31
Mercury	75 [1]	<0.1	<0.1	<0.1	-	<0.1	<0.1	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	3000 [1]	23	20	5	-	3	41	-	-	51	52	12	1680	20	7
Zinc	35000 [1]	92	437	61	-	60	936	-	-	476	184	1770	<1	482	143
TOTAL PETROLEUM HYDROCARBONS															
C6 - C9 Fraction	65 [2]	<2	<2	<2	<2	-	<2	<2	<2	<2	<2	-	4	<2	-
C10 - C14 Fraction		<50	<50	<50	<500	-	<50	<50	<50	<50	<50	-	<50	<1000	-
C15 - C28 Fraction		<100	861	152	10000	-	<100	<100	<100	<100	133	-	169	24300	-
C29 - C36 Fraction		<100	830	161	2220	-	121	<100	<100	156	384	-	<100	20100	-
Total C10-C36	1000 [2]	ND	**1691**	313	**12220**	-	121	ND	ND	156	517	-	169	**44400**	-
BTEX															
Benzene	1 [2]	<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	-
Toluene	130 [2]	<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	-
Chlorobenzene		<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	-
Ethylbenzene	50 [2]	<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.2	-	0.2	<0.2	-
meta- & para-Xylene		<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.2	-	0.9	<0.2	-
ortho-Xylene		<0.2	<0.2	<0.2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.2	-	0.9	<0.2	-
Total Xylene	25 [2]	ND	ND	ND	ND	-	ND	ND	ND	ND	ND	-	1.8	ND	-
POLYCYCLIC AROMATIC HYDROCARBONS															
Benzo(a)pyrene	5 [1]	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5	<0.5	-	<0.5	<0.5	-
Total PAHs	100 [1]	ND	ND	ND	ND	ND	ND	-	-	ND	ND	-	ND	ND	-
ORGANOCHLORINE PESTICIDES															
Dieldrin	50 [1a]	<0.05	-	-	-	-	-	-	-	<0.05	-	-	-	<0.05	-
Other OCP		ND	-	-	-	-	-	-	-	ND	-	-	-	ND	-
TOTAL PCB		<0.1	-	-	-	-	-	-	-	<0.1	-	-	-	<0.5	-
VHC		-	ND	-	-	-	-	-	-	-	-	-	-	-	-
ASBESTOS		-	-	-	-	-	-	-	-	-	-	ND	ND	-	-

NOTES:

Bold Concentration exceeds the respective threshold concentration

[1] Based on NSW EPA (1998), Guidelines for the NSW Site Auditor Scheme (Commercial/Industrial)

[1a] Aldrin + Dieldrin

[2] Based on NSW EPA (1994), Guidelines for Assessing Service Station Sites

ND Not Detected

- Not Analysed

See original laboratory reports for detection limits

Soil Description

Explanation Sheet (1 of 2)

Coffey

DEFINITION:

In engineering terms soil includes every type of uncemented or partially cemented inorganic or organic material found in the ground. In practice, if the material can be remoulded or disintegrated by hand in its field condition or in water it is described as a soil.

Other materials are described using rock description terms.

CLASSIFICATION SYMBOL & SOIL NAME

Soils are described in accordance with the Unified Soil Classification (UCS) as shown in the table on Sheet 2.

PARTICLE SIZE DESCRIPTIVE TERMS

NAME	SUBDIVISION	SIZE
Boulders		>200 mm
Cobbles		63 mm to 200 mm
Gravel	coarse	20 mm to 63 mm
	medium	6 mm to 20 mm
	fine	2.36 mm to 6 mm
Sand	coarse	600 µm to 2.36 mm
	medium	200 µm to 600µm
	fine	75 µm to 200 µm

MOISTURE CONDITION

Dry Looks and feels dry. Cohesive and cemented soils are hard, friable or powdery. Uncemented granular soils run freely through hands.

Moist Soil feels cool and darkened in colour. Cohesive soils can be moulded. Granular soils tend to cohere.

Wet As for moist but with free water forming on hands when handled.

CONSISTENCY OF COHESIVE SOILS

TERM	UNDRAINED STRENGTH s_u (kPa)	FIELD GUIDE
Very Soft	<12	A finger can be pushed well into the soil with little effort.
Soft	12 – 25	A finger can be pushed into the soil to about 25mm depth.
Firm	25 – 50	The soil can be indented about 5mm with the thumb, but not penetrated.
Stiff	50 – 100	The surface of the soil can be indented with the thumb, but not penetrated.
Very Stiff	100 – 200	The surface of the soil can be marked, but not indented with thumb pressure.
Hard	>200	The surface of the soil can be marked only with the thumbnail.
Friable	–	Crumbles or powders when scraped by thumbnail.

DENSITY OF GRANULAR SOILS

TERM	DENSITY INDEX (%)
Very loose	Less than 15
Loose	15 – 35
Medium Dense	35 – 65
Dense	65 — 85
Very Dense	Greater than 85

MINOR COMPONENTS

TERM	ASSESSMENT GUIDE	PROPORTION OF MINOR COMPONENT IN:
Trace of	Presence just detectable by feel or eye, but soil properties little or no different to general properties of primary component.	Coarse grained soils: < 5% Fine grained soils: <15%
With some	Presence easily detected by feel or eye, soil properties little different to general properties of primary component.	Coarse grained soils: 5 – 12% Fine grained soils: 15 – 30%

SOIL STRUCTURE

ZONING		CEMENTING	
Layers	Continuous across exposure or sample.	Weakly cemented	Easily broken up by hand in air or water.
Lenses	Discontinuous layers of lenticular shape.	Moderately cemented	Effort is required to break up the soil by hand in air or water.
Pockets	Irregular inclusions of different material.		

GEOLOGICAL ORIGIN

WEATHERED IN PLACE SOILS

Extremely weathered material — Structure and fabric of parent rock visible.

Residual soil — Structure and fabric of parent rock not visible.

TRANSPORTED SOILS

Aeolian soil — Deposited by wind.

Alluvial soil — Deposited by streams and rivers.

Colluvial soil — Deposited on slopes (transported downslope by gravity).

Fill — Man made deposit. Fill may be significantly more variable between tested locations than naturally occurring soils.

Lacustrine soil — Deposited by lakes.

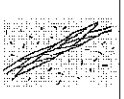
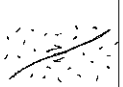
Marine soil — Deposited in ocean basins, bays, beaches and estuaries.

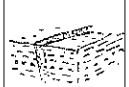
SOIL CLASSIFICATION INCLUDING IDENTIFICATION AND DESCRIPTION

FIELD IDENTIFICATION PROCEDURES (Excluding particles larger than 60 mm and basing fractions on estimated mass)						USC	PRIMARY NAME
COARSE GRAINED SOILS More than 50% of material less than 63 mm is larger than 0.075 mm	(About the smallest particle visible to the naked eye)	GRAVELS More than half of coarse fraction is larger than 2.0 mm	CLEAN GRAVELS (Little or no fines)	Wide range in grain size and substantial amounts of all intermediate particle sizes.		GW	GRAVEL
				Predominantly one size or a range of sizes with more intermediate sizes missing.		GP	GRAVEL
			GRAVELS WITH FINES (Appreciable amount of fines)	Non-plastic fines (for identification procedures see ML below)		GM	SILTY GRAVEL
				Plastic fines (for identification procedures see CL below)		GC	CLAYEY GRAVEL
		SANDS More than half of coarse fraction is smaller than 2.0 mm	CLEAN SANDS (Little or no fines)	Wide range in grain sizes and substantial amounts of all intermediate sizes missing		SW	SAND
				Predominantly one size or a range of sizes with some intermediate sizes missing.		SP	SAND
			SANDS WITH FINES (Appreciable amount of fines)	Non-plastic fines (for identification procedures see ML below).		SM	SILTY SAND
				Plastic fines (for identification procedures see CL below).		SC	CLAYEY SAND
FINE GRAINED SOILS More than 50% of material less than 63 mm is smaller than 0.075 mm	(A 0.075 mm particle is about the smallest particle visible to the naked eye)		IDENTIFICATION PROCEDURES ON FRACTIONS <0.2 mm.				
			DRY STRENGTH	DILATANCY	TOUGHNESS		
		SILTS & CLAYS Liquid limit less than 50	None to Low	Quick to slow	None	ML	SILT
			Medium to High	None	Medium	CL	CLAY
			Low to medium	Slow to very slow	Low	OL	ORGANIC SILT
		SILTS & CLAYS Liquid limit greater than 50	Low to medium	Slow to very slow	Low to medium	MH	SILT
			High	None	High	CH	CLAY
			Medium to high	None	Low to medium	OH	ORGANIC CLAY
HIGHLY ORGANIC SOILS		Readily identified by colour, odour, spongy feel and frequently by fibrous texture.				Pt	PEAT

• Low plasticity – Liquid Limit W_L less than 35%. • Medium plasticity – W_L between 35% and 50%.

COMMON DEFECTS IN SOIL

TERM	DEFINITION	DIAGRAM
PARTING	A surface or crack across which the soil has little or no tensile strength. Parallel or sub parallel to layering (eg bedding). May be open or closed.	
JOINT	A surface or crack across which the soil has little or no tensile strength but which is not parallel or sub parallel to layering. May be open or closed. The term 'fissure' may be used for irregular joints <0.2m in length.	
SHEARED ZONE	Zone in clayey soil with roughly parallel near planar, curved or undulating boundaries containing closely spaced, smooth or slickensided, curved intersecting joints which divide the mass into lenticular or wedge shaped blocks.	
SHEARED SURFACE	A near planar curved or undulating, smooth, polished or slickensided surface in clayey soil. The polished or slickensided surface indicates that movement (in many cases very little) has occurred along the defect.	

TERM	DEFINITION	DIAGRAM
SOFTENED ZONE	A zone in clayey soil, usually adjacent to a defect in which the soil has a higher moisture content than elsewhere.	
TUBE	Tubular cavity. May occur singly or as one of a large number of separate or inter-connected tubes. Walls often coated with clay or strengthened by denser packing of grains. May contain organic matter	
TUBE CAST	Roughly cylindrical elongated body of soil different from the soil mass in which it occurs. In some cases the soil which makes up the tube cast is cemented.	
INFILLED SEAM	Sheet or wall like body of soil substance or mass with roughly planar to irregular near parallel boundaries which cuts through a soil mass. Formed by infilling of open joints.	

Rock Description

Explanation Sheet (1 of 2)

The descriptive terms used by Coffey are given below. They are broadly consistent with Australian Standard AS1726-1993.

DEFINITIONS: Rock substance, defect and mass are defined as follows:

Rock Substance	In engineering terms rock substance is any naturally occurring aggregate of minerals and organic material which cannot be disintegrated or remoulded by hand in air or water. Other material is described using soil descriptive terms. Effectively homogonous material, may be isotropic or anisotropic.
Defect	Discontinuity or break in the continuity of a substance or substances.
Mass	Any body of material which is not effectively homogeneous. It can consist of two or more substances without defects, or one or more substances with one or more defects.

SUBSTANCE DESCRIPTIVE TERMS:

ROCK NAME	Simple rock names are used rather than precise geological classification.
PARTICLE SIZE	Grain size terms for sandstone are:
Coarse grained	Mainly 0.6mm to 2mm
Medium grained	Mainly 0.2mm to 0.6mm
Fine grained	Mainly 0.06mm (just visible) to 0.2mm
FABRIC	Terms for layering or penetrative fabric (eg. bedding, cleavage etc.) are:
Massive	No layering or penetrative fabric.
Indistinct	Layering or fabric just visible. Little effect on properties.
Distinct	Layering or fabric is easily visible. Rock breaks more easily parallel to layering or fabric.

CLASSIFICATION OF WEATHERING PRODUCTS

Term	Abbreviation	Definition
Residual Soil	RS	Soil derived from the weathering of rock; the mass structure and substance fabric are no longer evident; there is a large change in volume but the soil has not been significantly transported.
Extremely Weathered Material	XW	Material is weathered to such an extent that it has soil properties, ie, it either disintegrates or can be remoulded in water. Original rock fabric still visible.
Highly Weathered Rock	HW	Rock strength is changed by weathering. The whole of the rock substance is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable. Some minerals are decomposed to clay minerals. Porosity may be increased by leaching or may be decreased due to the deposition of minerals in pores.
Moderately Weathered Rock	MW	The whole of the rock substance is discoloured, usually by iron staining or bleaching, to the extent that the colour of the fresh rock is no longer recognisable.
Slightly Weathered Rock	SW	Rock substance affected by weathering to the extent that partial staining or partial discolouration of the rock substance (usually by limonite) has taken place. The colour and texture of the fresh rock is recognisable; strength properties are essentially those of the fresh rock substance.
Fresh Rock	FR	Rock substance unaffected by weathering.

Notes on Weathering:

1. *AS1726 suggests the term "Distinctly Weathered" (DW) to cover the range of substance weathering conditions between XW and SW. For projects where it is not practical to delineate between HW and MW or it is judged that there is no advantage in making such a distinction, DW may be used with the definition given in AS1726.*
2. *Where physical and chemical changes were caused by hot gasses and liquids associated with igneous rocks, the term "altered" may be substituted for "weathering" to give the abbreviations XA, HA, MA, SA and DA.*

ROCK SUBSTANCE STRENGTH TERMS

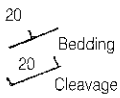
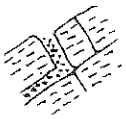
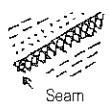
Term	Abbrev-iation	Point Load Index, I_S50 (MPa)	Field Guide
Very Low	**VL**	Less than 0.1	Material crumbles under firm blows with sharp end of pick; can be peeled with a knife; pieces up to 30mm thick can be broken by finger pressure.
Low	**L**	0.1 to 0.3	Easily scored with a knife; indentations 1mm to 3mm show with firm blows of a pick point; has a dull sound under hammer. Pieces of core 150mm long by 50mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling.
Medium	**M**	0.3 to 1.0	Readily scored with a knife; a piece of core 150mm long by 50mm diameter can be broken by hand with difficulty.
High	**H**	1 to 3	A piece of core 150mm long by 50mm can not be broken by hand but can be broken by a pick with a single firm blow; rock rings under hammer.
Very High	**VH**	3 to 10	Hand specimen breaks after more than one blow of a pick; rock rings under hammer.
Extremely High	**EH**	More than 10	Specimen requires many blows with geological pick to break; rock rings under hammer.

Notes on Rock Substance Strength:

1. *In anisotropic rocks the field guide to strength applies to the strength perpendicular to the anisotropy. High strength anisotropic rocks may break readily parallel to the planar anisotropy.*
2. *The term "extremely low" is not used as a rock substance strength term. While the term is used in AS1726-1993, the field guide therein makes it clear that materials in that strength range are soils in engineering terms.*
3. *The unconfined compressive strength for isotropic rocks (and anisotropic rocks which fail across the planar anisotropy) is typically 10 to 25 times the point load index (Is50). The ratio may vary for different rock types. Lower strength rocks often have lower ratios than higher strength rocks.*

Coffey

COMMON DEFECTS IN ROCK MASSES

Term	Definition	Diagram	Map Symbol	Graphic Log (Note 1)
Parting	A surface or crack across which the rock has little or no tensile strength. Parallel or sub parallel to layering (eg bedding) or a planar anisotropy in the rock substance (eg,cleavage). May be open or closed.			 (Note 2)
Joint	A surface or crack across which the rock has little or no tensile strength but which is not parallel or sub parallel to layering or planar anisotropy in the rock substance. May be open or closed.			 (Note 2)
Sheared Zone (Note 3)	Zone of rock substance with roughly parallel near planar, curved or undulating boundaries cut by closely spaced joints, sheared surfaces or other defects. Some of the defects are usually curved and intersect to divide the mass into lenticular or wedge shaped blocks.			
Sheared Surface (Note 3)	A near planar, curved or undulating surface which is usually smooth, polished or slickensided.			
Crushed Seam (Note 3)	Seam with roughly parallel almost planar boundaries, composed of disoriented, usually angular fragments of the host rock substance which may be more weathered than the host rock. The seam has soil properties.			
Infilled Seam	Seam of soil substance usually with distinct roughly parallel boundaries formed by the migration of soil into an open cavity or joint. Infilled seams less than 1mm thick may be described as veneer or coating on joint surface.			
Extremely Weathered Seam	Seam of soil substance, often with gradational boundaries. Formed by weathering of the rock substance in place.			

Notes on Defects:

1. Usually borehole logs show the true dip of defects and face sketches and sections the apparent dip.
2. Partings and joints are not usually shown on the graphic log unless considered significant.
3. Sheared zones, sheared surfaces and crushed seams are faults in geological terms.

DEFECT SHAPE TERMS

Planar	The defect does not vary in orientation
Curved	The defect has a gradual change in orientation
Undulating	The defect has a wavy surface
Stepped	The defect has one or more well defined steps
Irregular	The defect has many sharp changes of orientation

Note: *The assessment of defect shape is partly influenced by the scale of the observation.*

ROUGHNESS TERMS

Slickensided	Grooved or striated surface, usually polished
Polished	Shiny smooth surface
Smooth	Smooth to touch. Few or no surface irregularities
Rough	Many small surface irregularities (amplitude generally less than 1mm). Feels like fine to coarse sand paper.
Very Rough	Many large surface irregularities (amplitude generally more than 1mm). Feels like, or coarser than very coarse sand paper.

COATING TERMS

Clean	No visible coating
Stained	No visible coating but surfaces are discoloured
Veneer	A visible coating of soil or mineral, too thin to measure; may be patchy
Coating	A visible coating up to 1mm thick. Thicker soil material is usually described using appropriate defect terms (eg, infilled seam). Thicker rock strength material is usually described as a vein.

BLOCK SHAPE TERMS

Blocky	Approximately equidimensional
Tabular	Thickness much less than length or width
Columnar	Height much greater than cross section

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **CBH1**

Sheet 1 of 1

Engineering Log - Borehole

Office Job No.: **SC1537/7**

Client: **MANILDRA GROUP**

Date started: **19.5.2003**

Principal:

Date completed: **19.5.2003**

Project: **PRELIMINARY ENVIRONMENTAL SITE ASSESSMENT**

Logged by: **CCH**

Borehole Location: **24 BOLONG ROAD, BOMADERRY, NSW**

Checked by:

drill model and mounting: GEMCO 210B TRAILER | Easting: | slope: -90° | R.L. Surface: NOT MEASURED

hole diameter: 100 mm | Northing | bearing: | datum:

drilling information							material substance					
method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
ADV		N				0.0			ASPHALT	D	MD		ASPHALT
									FILL: Silty Clayey SAND: fine to medium grained, red/brown, clay is low plasticity. Some fine grained gravel subangular to angular	M	MD		FILL: No Hydrocarbon odour
				E		0.5			Silty CLAY: medium plasticity, dark brown/grey	<Wp	F/S		ALLUVIUM: No Hydrocarbon odour
						1.0			Becoming high plasticity from ~0.8m				
				SPT 2,2,4 N*=6		1.5			Becomng dark brown/grey, orange mottles from ~ 1.3m				
									Silty CLAY: high plasticity, pale brown/grey	>Wp	S		
				SPT 2,4,5 N*=9		2.0							Very faint natural organic odour from 2.0-2.3m
			▶			2.5			Trace of ironstone gravel fine grained subrounded @ 2.4m	W			
									Becoming dark brown/grey with orange mottles from ~2.0m, thin band of silty sand @ 2.45m then returning into silty clay high plasticity pale grey/orange mottles	>Wp			
						3.0			Borehole CBH1 terminated at 3m				
						3.5							
						4.0							
						4.5							
						5.0							

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	dietube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support

M mud N nil
C casing

penetration 1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown
water inflow
water outflow

notes, samples, tests

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

classification symbols and soil description
based on unified classification system

moisture

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

consistency/density index

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

BOREHOLE SC1537-7.GINT.GPJ COFFEY.GDT 10.06.03

Form GEO 5.3 Issue 3 Rev.2

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **CBH2**

Sheet 1 of 1

Office Job No.: **SC1537/7**

Engineering Log - Borehole

Client: ***MANILDRA GROUP***

Date started: ***19.5.2003***

Principal:

Date completed: ***19.5.2003***

Project: ***PRELIMINARY ENVIRONMENTAL SITE ASSESSMENT***

Logged by: ***CCH***

Borehole Location: ***24 BOLONG ROAD, BOMADERRY, NSW***

Checked by: MF

drill model and mounting: GEMCO 210B TRAILER | Easting: | slope: -90° | R.L. Surface: NOT MEASURED

hole diameter: 100 mm | Northing | bearing: | datum:

drilling information							material substance						
method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetrometer kPa 100 200 300 400	structure and additional observations
ADV		N		E					ASPHALT				ASPHALT
									FILL: Silty Clayey SAND: fine to medium grained, red/brown. Clay is low plasticity some fine grained gravel subangular to angular	M	MD		FILL: No Hydrocarbon odour
				E		0.5			FILL: Sand fine to coarse grained, brown	M	MD		
									Possible V Bit Refusal @ 0.65m on possible UST Borehole CBH2 terminated at 0.65m				
						1.0							
						1.5							
						2.0							
						2.5							
						3.0							
						3.5							
						4.0							
						4.5							
						5.0							

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support

M mud N nil

C casing

penetration

1 2 3 4 — no resistance ranging to refusal

water

10/1/98 water level on date shown

water inflow

water outflow

notes, samples, tests

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

classification symbols and soil description

based on unified classification system

moisture

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

consistency/density index

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

BOREHOLE SC1537-7GINT.GPJ COFFEY.GDT 10.06.03

Form GEO 5.3 Issue 3 Rev.2

Coffey Geosciences Pty Ltd ACN 056 335 516

Borehole No. **CBH3**

Sheet 1 of 1

Engineering Log - Borehole

Office Job No.: **SC1537/7**

Client: **MANILDRA GROUP**

Date started: **19.5.2003**

Principal:

Date completed: **19.5.2003**

Project: **PRELIMINARY ENVIRONMENTAL SITE ASSESSMENT**

Logged by: **CCH**

Borehole Location: **24 BOLONG ROAD, BOMADERRY, NSW**

Checked by:

drill model and mounting: GEMCO 210B TRAILER | Easting: | slope: -90° | R.L. Surface: NOT MEASURED

hole diameter: 100 mm | Northing | bearing: | datum:

drilling information							material substance						
method	penetration 1 2 3	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency/ density index	pocket penetro-meter kPa 100 200 300 400	structure and additional observations
ADV		N				0.0			ASPHALT				ASPHALT
									FILL: Silty CLAY: Sand fine to medium grained, red/brown. Clay low plasticity. Some gravel fine grained subangular to angular	M	MD		FILL
						0.5			Silty CLAY: medium plasticity, dark brown/grey	<Wp	S/F		ALLUVIUM Very Faint Hydrocarbon odour 0.5-0.95m
				SPT 2,2,3 N*=5		1.0							
						1.5			Becoming dark brown/grey and orange mottles from ~ 1.3m Silty CLAY: high plasticity, dark grey/orange mottles	>Wp	F/St		No Hydrocarbon odour from1.3m
				SPT 2,4,3 N*=7		2.0			Silty Sand fine grained - appears to be a seepage zone. Trace Clay				
						2.5			Becoming Silty Clay high plasticity brown, orange and grey mottles				
			4:30pm	SPT 2,5,6 N*=11		3.0			Becoming Silty Sandy Clay medium plasticity, grey/orange mottles sand fine grained @ 2.90m				
						3.5							
						4.0			Silty Clayey SAND: fine to coarse grained, grey/orange mottles	W	S		
						4.5			Silty Clayey SAND: fine to coarse grained, brown/orange mottles	W	S		
						5.0			Borehole CBH3 terminated at 4.5m				

method

AS	auger screwing*
AD	auger drilling*
RR	roller/tricone
W	washbore
CT	cable tool
HA	hand auger
DT	diatube
B	blank bit
V	V bit
T	TC bit

*bit shown by suffix e.g. ADT

support: M mud, C casing, N nil

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

water: 10/1/98 water level on date shown; water inflow; water outflow

notes, samples, tests

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

classification symbols and soil description based on unified classification system

moisture

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

consistency/density index

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

BOREHOLE SC1537-7GINT.GPJ COFFEY.GDT 10.06.03

Form GEO 6.3 Issue 3 Rev.2

This page has been left intentionally blank

Appendix D – Copies of figure and logs from Coffey 2015 report

revision	description	drawn	approved	date

drawn	KK
approved	JPT
date	20/08/2015
scale	N.T. S.
original size	A3

coffey

client: Manildra Group Pty Ltd

project: GEOTECHNICAL INVESTIGATION
PROPOSED DRYER PLANT
MANILDRA, BOMADERRY, NSW

title: PLAN WITH LOCATION OF PROPOSED DRYER PLANT AND APPROXIMATE LOCATION OF BOREHOLES

project no:GEOTWOLL03658AE-AA | figure no: 1

coffey

Soil Description Explanation Sheet (1 of 2)

DEFINITION:

In engineering terms soil includes every type of uncemented or partially cemented inorganic or organic material found in the ground. In practice, if the material can be remoulded or disintegrated by hand in its field condition or in water it is described as a soil. Other materials are described using rock description terms.

CLASSIFICATION SYMBOL & SOIL NAME

Soils are described in accordance with the Unified Soil Classification (UCS) as shown in the table on Sheet 2.

PARTICLE SIZE DESCRIPTIVE TERMS

NAME	SUBDIVISION	SIZE
Boulders		>200 mm
Cobbles		63 mm to 200 mm
Gravel	coarse	20 mm to 63 mm
	medium	6 mm to 20 mm
	fine	2.36 mm to 6 mm
Sand	coarse	600 μm to 2.36 mm
	medium	200 μm to 600 μm
	fine	75 μm to 200 μm

MOISTURE CONDITION

Dry Looks and feels dry. Cohesive and cemented soils are hard, friable or powdery. Uncemented granular soils run freely through hands.

Moist Soil feels cool and darkened in colour. Cohesive soils can be moulded. Granular soils tend to cohere.

Wet As for moist but with free water forming on hands when handled.

CONSISTENCY OF COHESIVE SOILS

TERM	UNDRAINED STRENGTH s_u (kPa)	FIELD GUIDE
Very Soft	<12	A finger can be pushed well into the soil with little effort.
Soft	12 - 25	A finger can be pushed into the soil to about 25mm depth.
Firm	25 - 50	The soil can be indented about 5mm with the thumb, but not penetrated.
Stiff	50 - 100	The surface of the soil can be indented with the thumb, but not penetrated.
Very Stiff	100 - 200	The surface of the soil can be marked, but not indented with thumb pressure.
Hard	>200	The surface of the soil can be marked only with the thumbnail.
Friable	–	Crumbles or powders when scraped by thumbnail.

DENSITY OF GRANULAR SOILS

TERM	DENSITY INDEX (%)
Very loose	Less than 15
Loose	15 - 35
Medium Dense	35 - 65
Dense	65 - 85
Very Dense	Greater than 85

MINOR COMPONENTS

TERM	ASSESSMENT GUIDE	PROPORTION OF MINOR COMPONENT IN:
Trace of	Presence just detectable by feel or eye, but soil properties little or no different to general properties of primary component.	Coarse grained soils: <5% Fine grained soils: <15%
With some	Presence easily detected by feel or eye, soil properties little different to general properties of primary component.	Coarse grained soils: 5 - 12% Fine grained soils: 15 - 30%

SOIL STRUCTURE

ZONING		CEMENTING	
Layers	Continuous across exposure or sample.	Weakly cemented	Easily broken up by hand in air or water.
Lenses	Discontinuous layers of lenticular shape.	Moderately cemented	Effort is required to break up the soil by hand in air or water.
Pockets	Irregular inclusions of different material.		

GEOLOGICAL ORIGIN

WEATHERED IN PLACE SOILS

Extremely weathered material	Structure and fabric of parent rock visible.
Residual soil	Structure and fabric of parent rock not visible.

TRANSPORTED SOILS

Aeolian soil	Deposited by wind.
Alluvial soil	Deposited by streams and rivers.
Colluvial soil	Deposited on slopes (transported downslope by gravity).
Fill	Man made deposit. Fill may be significantly more variable between tested locations than naturally occurring soils.
Lacustrine soil	Deposited by lakes.
Marine soil	Deposited in ocean basins, bays, beaches and estuaries.

coffey

Soil Description Explanation Sheet (2 of 2)

SOIL CLASSIFICATION INCLUDING IDENTIFICATION AND DESCRIPTION

FIELD IDENTIFICATION PROCEDURES (Excluding particles larger than 60 mm and basing fractions on estimated mass)							USC	PRIMARY NAME
COARSE GRAINED SOILS More than 50% of materials less than 63 mm is larger than 0.075 mm	(A 0.075 mm particle is about the smallest particle visible to the naked eye)	GRAVELS More than half of coarse fraction is larger than 2.36 mm	CLEAN GRAVELS (Little or no fines)	Wide range in grain size and substantial amounts of all intermediate particle sizes.			GW	GRAVEL
				Predominantly one size or a range of sizes with more intermediate sizes missing.			GP	GRAVEL
			GRAVELS WITH FINES (Appreciable amount of fines)	Non-plastic fines (for identification procedures see ML below)			GM	SILTY GRAVEL
				Plastic fines (for identification procedures see CL below)			GC	CLAYEY GRAVEL
		SANDS More than half of coarse fraction is smaller than 2.36 mm	CLEAN SANDS (Little or no fines)	Wide range in grain sizes and substantial amounts of all intermediate sizes			SW	SAND
				Predominantly one size or a range of sizes with some intermediate sizes missing.			SP	SAND
			SANDS WITH FINES (Appreciable amount of fines)	Non-plastic fines (for identification procedures see ML below).			SM	SILTY SAND
				Plastic fines (for identification procedures see CL below).			SC	CLAYEY SAND
FINE GRAINED SOILS More than 50% of material less than 63 mm is smaller than 0.075 mm			IDENTIFICATION PROCEDURES ON FRACTIONS <0.2 mm.					
		SILTS & CLAYS Liquid limit less than 50	**DRY STRENGTH**	**DILATANCY**	**TOUGHNESS**			
			None to Low	Quick to slow	None		ML	SILT
			Medium to High	None	Medium		CL	CLAY
			Low to medium	Slow to very slow	Low		OL	ORGANIC SILT
		SILTS & CLAYS Liquid limit greater than 50	Low to medium	Slow to very slow	Low to medium		MH	SILT
			High	None	High		CH	CLAY
			Medium to High	None	Low to medium		OH	ORGANIC CLAY
HIGHLY ORGANIC SOILS			Readily identified by colour, odour, spongy feel and frequently by fibrous texture.				Pt	PEAT

• Low plasticity – Liquid Limit w_L less than 35%. • Medium plasticity – w_L between 35% and 50%. • High plasticity – w_L greater than 50%.

COMMON DEFECTS IN SOIL

TERM	DEFINITION	DIAGRAM
PARTING	A surface or crack across which the soil has little or no tensile strength. Parallel or sub parallel to layering (eg bedding). May be open or closed.	
JOINT	A surface or crack across which the soil has little or no tensile strength but which is not parallel or sub parallel to layering. May be open or closed. The term 'fissure' may be used for irregular joints <0.2 m in length.	
SHEARED ZONE	Zone in clayey soil with roughly parallel near planar, curved or undulating boundaries containing closely spaced, smooth or slickensided, curved intersecting joints which divide the mass into lenticular or wedge shaped blocks.	
SHEARED SURFACE	A near planar curved or undulating, smooth, polished or slickensided surface in clayey soil. The polished or slickensided surface indicates that movement (in many cases very little) has occurred along the defect.	

TERM	DEFINITION	DIAGRAM
SOFTENED ZONE	A zone in clayey soil, usually adjacent to a defect in which the soil has a higher moisture content than elsewhere.	
TUBE	Tubular cavity. May occur singly or as one of a large number of separate or inter-connected tubes. Walls often coated with clay or strengthened by denser packing of grains. May contain organic matter	
TUBE CAST	Roughly cylindrical elongated body of soil different from the soil mass in which it occurs. In some cases the soil which makes up the tube cast is cemented.	
INFILLED SEAM	Sheet or wall like body of soil substance or mass with roughly planar to irregular near parallel boundaries which cuts through a soil mass. Formed by infilling of open joints.	

coffey

Rock Description Explanation Sheet (1 of 2)

The descriptive terms used by Coffey are given below. They are broadly consistent with Australian Standard AS1726-1993.

DEFINITIONS: Rock substance, defect and mass are defined as follows:

Rock Substance	In engineering terms rock substance is any naturally occurring aggregate of minerals and organic material which cannot be disintegrated or remoulded by hand in air or water. Other material is described using soil descriptive terms. Effectively homogenous material, may be isotropic or anisotropic.
Defect	Discontinuity or break in the continuity of a substance or substances.
Mass	Any body of material which is not effectively homogeneous. It can consist of two or more substances without defects, or one or more substances with one or more defects.

SUBSTANCE DESCRIPTIVE TERMS:

ROCK NAME	Simple rock names are used rather than precise geological classification.
PARTICLE SIZE	Grain size terms for sandstone are:
Coarse grained	Mainly 0.6mm to 2mm
Medium grained	Mainly 0.2mm to 0.6mm
Fine grained	Mainly 0.06mm (just visible) to 0.2mm
FABRIC	Terms for layering of penetrative fabric (eg. bedding, cleavage etc.) are:
Massive	No layering or penetrative fabric.
Indistinct	Layering or fabric just visible. Little effect on properties.
Distinct	Layering or fabric is easily visible. Rock breaks more easily parallel to layering of fabric.

CLASSIFICATION OF WEATHERING PRODUCTS

Term	Abbreviation	Definition
Residual Soil	**RS**	Soil derived from the weathering of rock; the mass structure and substance fabric are no longer evident; there is a large change in volume but the soil has not been significantly transported.
Extremely Weathered Material	**XW**	Material is weathered to such an extent that it has soil properties, ie, it either disintegrates or can be remoulded in water. Original rock fabric still visible.
Highly Weathered Rock	**HW**	Rock strength is changed by weathering. The whole of the rock substance is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable. Some minerals are decomposed to clay minerals. Porosity may be increased by leaching or may be decreased due to the deposition of minerals in pores.
Moderately Weathered Rock	**MW**	The whole of the rock substance is discoloured, usually by iron staining or bleaching , to the extent that the colour of the fresh rock is no longer recognisable.
Slightly Weathered Rock	**SW**	Rock substance affected by weathering to the extent that partial staining or partial discolouration of the rock substance (usually by limonite) has taken place. The colour and texture of the fresh rock is recognisable; strength properties are essentially those of the fresh rock substance.
Fresh Rock	**FR**	Rock substance unaffected by weathering.

Notes on Weathering:

1. AS1726 suggests the term "Distinctly Weathered" (DW) to cover the range of substance weathering conditions between XW and SW. For projects where it is not practical to delineate between HW and MW or it is judged that there is no advantage in making such a distinction. DW may be used with the definition given in AS1726.
2. Where physical and chemical changes were caused by hot gasses and liquids associated with igneous rocks, the term "altered" may be substituted for "weathering" to give the abbreviations XA, HA, MA, SA and DA.

ROCK SUBSTANCE STRENGTH TERMS

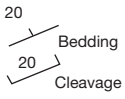
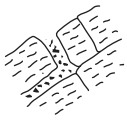
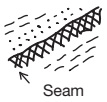
Term	Abbrev-iation	Point Load Index, $I_{s(50)}$ (MPa)	Field Guide
Very Low	**VL**	Less than 0.1	Material crumbles under firm blows with sharp end of pick; can be peeled with a knife; pieces up to 30mm thick can be broken by finger pressure.
Low	**L**	0.1 to 0.3	Easily scored with a knife; indentations 1mm to 3mm show with firm bows of a pick point; has a dull sound under hammer. Pieces of core 150mm long by 50mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling.
Medium	**M**	0.3 to 1.0	Readily scored with a knife; a piece of core 150mm long by 50mm diameter can be broken by hand with difficulty.
High	**H**	1 to 3	A piece of core 150mm long by 50mm can not be broken by hand but can be broken by a pick with a single firm blow; rock rings under hammer.
Very High	**VH**	3 to 10	Hand specimen breaks after more than one blow of a pick; rock rings under hammer.
Extremely High	**EH**	More than 10	Specimen requires many blows with geological pick to break; rock rings under hammer.

Notes on Rock Substance Strength:

1. In anisotropic rocks the field guide to strength applies to the strength perpendicular to the anisotropy. High strength anisotropic rocks may break readily parallel to the planar anisotropy.
2. The term "extremely low" is not used as a rock substance strength term. While the term is used in AS1726-1993, the field guide therein makes it clear that materials in that strength range are soils in engineering terms.
3. The unconfined compressive strength for isotropic rocks (and anisotropic rocks which fall across the planar anisotropy) is typically 10 to 25 times the point load index $I_{s(50)}$. The ratio may vary for different rock types. Lower strength rocks often have lower ratios than higher strength rocks.

coffey

Rock Description Explanation Sheet (2 of 2)

COMMON DEFECTS IN ROCK MASSES Term	Definition	Diagram	Map Symbol	Graphic Log (Note 1)
Parting	A surface or crack across which the rock has little or no tensile strength. Parallel or sub parallel to layering (eg bedding) or a planar anisotropy in the rock substance (eg, cleavage). May be open or closed.			
Joint	A surface or crack across which the rock has little or no tensile strength. but which is not parallel or sub parallel to layering or planar anisotropy in the rock substance. May be open or closed.			
Sheared Zone (Note 3)	Zone of rock substance with roughly parallel near planar, curved or undulating boundaries cut by closely spaced joints, sheared surfaces or other defects. Some of the defects are usually curved and intersect to divide the mass into lenticular or wedge shaped blocks.			
Sheared Surface (Note 3)	A near planar, curved or undulating surface which is usually smooth, polished or slickensided.			
Crushed Seam (Note 3)	Seam with roughly parallel almost planar boundaries, composed of disoriented, usually angular fragments of the host rock substance which may be more weathered than the host rock. The seam has soil properties.			
Infilled Seam	Seam of soil substance usually with distinct roughly parallel boundaries formed by the migration of soil into an open cavity or joint, infilled seams less than 1mm thick may be described as veneer or coating on joint surface.			
Extremely Weathered Seam	Seam of soil substance, often with gradational boundaries. Formad by weathering of the rock substance in place.			

DEFECT SHAPE TERMS	
Planar	The defect does not vary in orientation
Curved	The defect has a gradual change in orientation
Undulating	The defect has a wavy surface
Stepped	The defect has one or more well defined steps
Irregular	The defect has many sharp changes of orientation

Note: The assessment of defect shape is partly influenced by the scale of the observation.

ROUGHNESS TERMS	
Slickensided	Grooved or striated surface, usually polished
Polished	Shiny smooth surface
Smooth	Smooth to touch. Few or no surface irregularities
Rough	Many small surface irregularities (amplitude generally less than 1mm). Feels like fine to coarse sand paper.
Very Rough	Many large surface irregularities (amplitude generally more than 1mm). Feels like, or coarser than very coarse sand paper.

COATING TERMS	
Clean	No visible coating
Stained	No visible coating but surfaces are discoloured
Veneer	A visible coating of soil or mineral, too thin to measure; may be patchy
Coating	A visible coating up to 1mm thick. Thicker soil material is usually described using appropriate defect terms (eg, infilled seam). Thicker rock strength material is usually described as a vein.

BLOCK SHAPE TERMS	
Blocky	Approximately equidimensional
Tabular	Thickness much less than length or width
Columnar	Height much greate than cross section

Notes on Defects:

1. Usually borehole logs show the true dip of defects and face sketches and sections the apparent dip.
2. Partings and joints are not usually shown on the graphic log unless considered significant.
3. Sheared zones, sheared surfaces and crushed seams are faults in geological terms.

72710 / 07-06

coffey

Engineering Log - Borehole

Borehole ID.	***CBH501***
sheet:	1 of 3
project no.	***GEOTWOLL03658AE***
client:	***Manildra Group***
date started:	***17 Aug 2015***
principal:	
date completed:	***18 Aug 2015***
project:	***Geotechnical Investigation - Proposed Starch Dryer Plant***
logged by:	***JE***
location:	***Bolong Road, Bomaderry NSW***
checked by:	***KK***

position: E: 281816; N: 6140298 (Datum Not Specified) surface elevation: Not Specified angle from horizontal: 90°

drill model: Hydrapower Scout, Truck mounted casing diameter : 150 mm

drilling information | **material substance**

method & support	penetration 1 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
AD/T, CASING								**ASPHALT**	M			**ASPHALT**
			SPT 2, 3, 3 N*=6		1.0			**Silty CLAY**: low plasticity, dark brown, with some fine to medium grained sand, trace of fine to medium grained sub-angular to angular gravel.	M - W			**FILL**
			SPT 2, 2, 2 N*=4		2.0		CI-CH	**Silty CLAY**: medium to high plasticity, brown and grey mottled orange, red and black.	M			
		▶			3.0		SC	**Clayey SAND**: fine to coarse grained, grey, low plasticity clay.	W	VL		**ALLUVIAL**
W			SPT 0, 0, 0 N*=0		4.0							
			SPT 1, 5, 6 N*=11		5.0		CI-CH	**CLAY**: medium to high plasticity, orange brown mottled grey, with some fine to coarse grained black sand, trace of gravel sized ironstone fragments.	M - W	F - St		**RESIDUAL**
					6.0			pale grey mottled pale red/brown	M			
					7.0							
					8.0					VSt - H		
			SPT 7, 16, 23 N*=39									

CDF_0_9_04BB.GLB Log COF BOREHOLE: NON CORED GW03658AE_DATABASE.GPJ <<DrawingFile>> 24/08/2015 14:42

method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore

* 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
1 2 3 — 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

coffey

Engineering Log - Borehole

Borehole ID.	***CBH501***
sheet:	2 of 3
project no.	***GEOTWOLL03658AE***
client: ***Manildra Group***	date started: ***17 Aug 2015***
principal:	date completed: ***18 Aug 2015***
project: ***Geotechnical Investigation - Proposed Starch Dryer Plant***	logged by: ***JE***
location: ***Bolong Road, Bomaderry NSW***	checked by: ***KK***

position: E: 281816; N: 6140298 (Datum Not Specified) surface elevation: Not Specified angle from horizontal: 90°

drill model: Hydrapower Scout, Truck mounted casing diameter : 150 mm

drilling information						material substance						
method & support	penetration 1 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
W							CI-CH	**CLAY**: medium to high plasticity, orange brown mottled grey, with some fine to coarse grained black sand, trace of gravel sized ironstone fragments. *(continued)*	M	VSt - H		**RESIDUAL**
					10.0		CH	**Silty CLAY**: high plasticity, pale grey, trace of fine grained sand.	M			**EXTREMELY WEATEHRED MATERIAL**
					11.0			Borehole CBH501 continued as cored hole				
					12.0							
					13.0							
					14.0							
					15.0							
					16.0							
					17.0							

CDF_0_9_04BB.GLB Log COF BOREHOLE: NON CORED GW03658AE_DATABASE.GPJ <<DrawingFile>> 24/08/2015 14:42

method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore

* 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
1 2 3 — 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/remouded (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

coffey

Engineering Log - Cored Borehole

Borehole ID.	***CBH501***
sheet:	3 of 3
project no.	***GEOTWOLL03658AE***
client: ***Manildra Group***	date started: ***17 Aug 2015***
principal:	date completed: ***18 Aug 2015***
project: ***Geotechnical Investigation - Proposed Starch Dryer Plant***	logged by: ***JE***
location: ***Bolong Road, Bomaderry NSW***	checked by: ***KK***

position: E: 281816; N: 6140298 (Datum Not Specified) surface elevation: Not Specified angle from horizontal: 90°

drill model: Hydrapower Scout, Truck mounted drilling fluid: E casing diameter : 150 mm

drilling information				material substance						rock mass defects		
method & support	water	RL (m)	depth (m)	graphic log	material description **ROCK TYPE**: grain characterisics, colour, structure, minor components	weathering & alteration	estimated strength & Is50 (X = axial; O = diametral) VL L M H VH EH	samples, field tests & Is(50) (MPa) a = axial; d = diametral	core run & RQD	defect spacing (mm) 30 100 300 1000 3000	additional observations and defect descriptions (type, inclination, planarity, roughness, coating, thickness, other) particular	general
					start coring at 11.20m							
DB			12.0		**SANDSTONE**: fine to coarse grained, yellow brown, pale grey, red and orange, distinct bedding at 0-5°.	HW - MW		a=0.22 d=0.26			SS, 50 - 90°, CU, RO, CN - SN SM, 30 mm, Extremely Weathered Material, Sandy CLAY: low to medium plasticity, grey, fine to coarse grained sand SM, 140 mm, Extremely Weathered Material, Sandy CLAY: low to medium plasticity, grey, fine to coarse grained sand	Defects are:PT, 0 - 5°, PL, RO - VR, SN - VN, unless otherwise described
			13.0		**SANDSTONE**: fine to medium grained, dark grey mottled yellow, orange and brown.	HW - MW					PT, 0 - 5°, PL, RO - VR, VN PT, 0 - 5°, PL, RO - VR, VN	
					SANDSTONE: coarse grained, yellow brown mottled grey.	XW - HW		a=0.10 d=0.08			Crushed SANDSTONE	
			14.0		**SANDSTONE**: fine to coarse grained, yellow brown, pale grey, red and orange, distinct bedding at 0-5°.	HW - MW					JT, 80°, UN, RO, SN	
			15.0		**SANDSTONE**: fine to medium grained, dark grey mottled yellow brown.	MW		d=2.02 a=1.88 d=2.27 d=1.83 a=1.15 d=1.56				
			16.0					d=1.80 d=0.75			JT, 50 - 60°, PL, RO, CN - SN SM, 20 mm, Extremely Weathered Material, CLAY: medium to high plasticity, grey, with some fine sand	
			17.0		**SANDSTONE**: coarse grained, yellow brown mottled grey.	XW - HW						
					Borehole CBH501 terminated at 16.98 m							
			18.0									
			19.0									

CDF_0_9_04BB.GLB Log COF BOREHOLE: CORED GW03658AE_DATABASE.GPJ <<DrawingFile>> 24/08/2015 12:16

method & support
- AS auger screwing
- AD auger drilling
- CB claw or blade bit
- W washbore
- NMLC NMLC core (51.9 mm)
- NQ wireline core (47.6mm)
- HQ wireline core (63.5mm)
- PQ wireline core (85.0mm)
- SPT standard penetration test

water
- 10/10/12, water level on date shown
- water inflow
- complete drilling fluid loss
- partial drilling fluid loss
- 25uL water pressure test result (lugeons) for depth interval shown

graphic log / core recovery
- core recovered (graphic symbols indicate material)
- no core recovered

core run & RQD
- barrel withdrawn
- RQD = Rock Quality Designation (%)

weathering & alteration*
- RS residual soil
- XW extremely weathered
- HW highly weathered
- DW distinctly weathered
- MW moderately weathered
- SW slightly weathered
- FR fresh

*W replaced with A for alteration

strength
- VL very low
- L low
- M medium
- H high
- VH very high
- EH extremely high

defect type
- PT parting
- JT joint
- SZ shear zone
- SS shear surface
- CS crushed seam
- SM seam
- DB drilling break

roughness
- SL slickensided
- POL polished
- SO smooth
- RO rough
- VR very rough

planarity
- PL planar
- CU curved
- UN undulating
- ST stepped
- IR Irregular

coating
- CN clean
- SN stain
- VN veneer
- CO coating

PointID : CBH501 Depth Range: 11.20 - 14.20 m

drawn	**JE**
approved	**KK**
date	**21/08/2015**
scale	**N.T.S.**
original size	**A4**

coffey

client: Manildra Group

project: Geotechnical Investigation - Proposed Starch Dryer Plant
Bolong Road, Bomaderry NSW

title: **CORE PHOTOGRAPH**
CBH501

project no: GEOTWOLL03658AE | fig no: **FIGURE 1** | rev:

PointID : CBH501 Depth Range: 14.20 - 16.98 m

drawn	**JE**
approved	**KK**
date	**21/08/2015**
scale	**N.T.S.**
original size	**A4**

client: Manildra Group

project: Geotechnical Investigation - Proposed Starch Dryer Plant
Bolong Road, Bomaderry NSW

title: **CORE PHOTOGRAPH**
CBH501

project no: GEOTWOLL03658AE | fig no: **FIGURE 2** | rev:

coffey

Engineering Log - Borehole

Borehole ID.	***CBH502***
sheet:	1 of 2
project no.	***GEOTWOLL03658AE***
client:	***Manildra Group***
date started:	***17 Aug 2015***
principal:	
date completed:	***17 Aug 2015***
project:	***Geotechnical Investigation - Proposed Starch Dryer Plant***
logged by:	***JE***
location:	***Bolong Road, Bomaderry NSW***
checked by:	***KK***

position: E: 281790; N: 6140333 (Datum Not Specified) surface elevation: Not Specified angle from horizontal: 90°

drill model: Hydrapower Scout, Truck mounted casing diameter : 150 mm

drilling information | **material substance**

method & support	penetration 1 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
AD/V CASING					0.0			**Silty CLAY**: low plasticity, dark brown, trace of fine grained sand, fine to coarse grained sub-angular to angular gravel.	D - M			**FILL**
			SPT 2, 4, 5 N*=9		1.0		CI-CH	**Silty CLAY**: medium to high plasticity, orange brown mottled dark grey.	M	F - St		**RESIDUAL**
			SPT 2, 4, 8 N*=12		2.0			orange brown mottled red and grey				
		▶			3.0							
			SPT 5, 8, 12 N*=20		4.0		CL-CI	**Sandy CLAY**: low to medium plasticity, red/orange brown mottled grey, brown and black, fine to coarse grained sand.	M - W			
W			SPT 11, 13, 17 N*=30		5.0		CI	**CLAY**: medium plasticity, pale grey mottled pale red brown, with some black fine to coarse grained sand, trace of gravel sized ironstone fragments.	W	St		**EXTREMELY WEATEHRED MATERIAL**
					6.0							
					7.0							
			SPT 20/10mm HB N*=R		8.0			Borehole CBH502 continued as cored hole				

CDF_0_9_04BB.GLB Log COF BOREHOLE: NON CORED GW03658AE_DATABASE.GPJ <<DrawingFile>> 24/08/2015 14:42

method
- AD auger drilling*
- AS auger screwing*
- HA hand auger
- W washbore

* 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
1 2 3 — 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/remouded (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

coffey

Engineering Log - Cored Borehole

Borehole ID.	**CBH502**
sheet:	2 of 2
project no.	**GEOTWOLL03658AE**
client:	**Manildra Group**
date started:	**17 Aug 2015**
principal:	
date completed:	**17 Aug 2015**
project:	**Geotechnical Investigation - Proposed Starch Dryer Plant**
logged by:	**JE**
location:	**Bolong Road, Bomaderry NSW**
checked by:	**KK**

position: E: 281790; N: 6140333 (Datum Not Specified) surface elevation: Not Specified angle from horizontal: 90°

drill model: Hydrapower Scout, Truck mounted drilling fluid: E casing diameter : 150 mm

drilling information				material substance					rock mass defects		
method & support	water	RL (m)	depth (m)	graphic log	material description **ROCK TYPE**: grain characterisics, colour, structure, minor components	weathering & alteration	estimated strength & Is50 (X = axial; O = diametral) VL L M H VH EH	samples, field tests & Is(50) (MPa) a = axial; d = diametral	core run & RQD	defect spacing (mm) 30 100 300 1000 3000	additional observations and defect descriptions (type, inclination, planarity, roughness, coating, thickness, other) particular / general
					start coring at 8.00m						Defects are:PT, 0 - 5°, PL, SO - RO, SN - VN, unless otherwise described
DB			8.0		**SANDSTONE**: fine to coarse grained, orange red and pale grey, distinct bedding.	XW - HW		d=0.00 a=0.42 d=0.16 d=0.08			PT, 0 - 5°, PL, RO - VR, SN - VN PT, 0 - 5°, PL, RO - VR, SN - VN PT, 0 - 5°, PL, RO - VR, SN - VN PT, 0 - 5°, PL, RO - VR, SN - VN PT, 0 - 5°, PL, RO - VR, SN - VN PT, 0 - 5°, PL, RO - VR, SN - VN SM, 40 mm, Extremely Weathered Material, CLAY: medium plasticity, pale grey, fine to coarse grained sand PT, 20 - 30°, PL, SO - RO, SN - VN SM, Extremely Weathered Material, Clayey SAND: fine to coarse grained, pale grey, low to medium plasticity fines JT, 50 - 60°, CU, RO - VR, SN SM, Extremely Weathered Material, CLAY: medium plasticity, pale grey JT, 50 - 60°, UN, RO, SN SM, Extremely Weathered Material, Sandy CLAY: medium plasticity, pale grey mottled dark grey, fine to medium grained sand
			9.0								
			10.0		**SANDSTONE**: fine to medium grained, dark grey.	XW - HW					
			11.0		**NO CORE:** 0.06 m	XW - HW					SM, Extremely Weathered Material, Sandy CLAY: medium plasticity, pale grey, fine to medium grained sand SM, Extremely Weathered Material, Sandy CLAY: medium plasticity, dark grey mottled red and yellow, fine to medium grained sand JT, 70 - 80°, UN, SO - RO, VN SM, Extremely Weathered Material, CLAY: medium plasticity, yellow brown mottled dark grey SM, Extremely Weathered Material, CLAY: medium plasticity, grey, with some fine to medium grained sand SM, Extremely Weathered Material, Sandy CLAY: medium plasticity, pale grey, fine to coarse grained sand SM, Extremely Weathered Material, Sandy CLAY: medium plasticity, pale grey, fine to coarse grained sand PT, 0 - 5°, UN, SO - RO, SN - VN SM, Extremely Weathered Material, Sandy CLAY: medium plasticity, pale grey and red, fine to coarse grained sand SM, Extremely Weathered Material, CLAY: low to medium plasticity, grey mottled yellow/brown and red PT, 0 - 5°, UN, SO - RO, SN - VN PT, 0 - 5°, UN, SO - RO, SN - VN PT, 0 - 5°, UN, SO - RO, SN - VN PT, 0 - 5°, UN, SO - RO, SN - VN PT, 10 - 20°, PL, SO - RO, SN - VN PT, 0 - 5°, UN, SO - RO, SN - VN PT, 0 - 5°, UN, SO - RO, SN - VN
					SANDSTONE: fine to medium grained, dark grey and yellow brown.	MW - SW		a=0.50 a=0.50 d=0.27 d=0.62 d=2.00 d=1.37 d=1.18 a=0.22 d=0.37			
			12.0								
			13.0								
			14.0		Borehole CBH502 terminated at 14.00 m						
			15.0								
			16.0								

CDF_0_9_04BB.GLB Log COF BOREHOLE: CORED GW03658AE_DATABASE.GPJ <<DrawingFile>> 24/08/2015 12:16

method & support
- AS auger screwing
- AD auger drilling
- CB claw or blade bit
- W washbore
- NMLC NMLC core (51.9 mm)
- NQ wireline core (47.6mm)
- HQ wireline core (63.5mm)
- PQ wireline core (85.0mm)
- SPT standard penetration test

water
- 10/10/12, water level on date shown
- water inflow
- complete drilling fluid loss
- partial drilling fluid loss
- 25uL water pressure test result (lugeons) for depth interval shown

graphic log / core recovery
- core recovered (graphic symbols indicate material)
- no core recovered

core run & RQD
- barrel withdrawn

RQD = Rock Quality Designation (%)

weathering & alteration*
- RS residual soil
- XW extremely weathered
- HW highly weathered
- DW distinctly weathered
- MW moderately weathered
- SW slightly weathered
- FR fresh

*W replaced with A for alteration

strength
- VL very low
- L low
- M medium
- H high
- VH very high
- EH extremely high

defect type
- PT parting
- JT joint
- SZ shear zone
- SS shear surface
- CS crushed seam
- SM seam
- DB drilling break

roughness
- SL slickensided
- POL polished
- SO smooth
- RO rough
- VR very rough

planarity
- PL planar
- CU curved
- UN undulating
- ST stepped
- IR Irregular

coating
- CN clean
- SN stain
- VN veneer
- CO coating

PointID : CBH502 Depth Range: 8.00 - 12.00 m

drawn	**JE**
approved	**KK**
date	**21/08/2015**
scale	**N.T.S.**
original size	**A4**

coffey

client: Manildra Group

project: Geotechnical Investigation - Proposed Starch Dryer Plant
Bolong Road, Bomaderry NSW

title: **CORE PHOTOGRAPH**
CBH502

project no: GEOTWOLL03658AE | fig no: **FIGURE 3** | rev:

PointID : CBH502 Depth Range: 12.00 - 14.00 m

drawn	**JE**
approved	**KK**
date	**21/08/2015**
scale	**N.T.S.**
original size	**A4**

coffey

client: Manildra Group

project: Geotechnical Investigation - Proposed Starch Dryer Plant
Bolong Road, Bomaderry NSW

title: **CORE PHOTOGRAPH**
CBH502

project no: GEOTWOLL03658AE | fig no: **FIGURE 4** | rev:

This page has been left intentionally blank

This page has been left intentionally blank

Appendix E Laboratory Reports and Chain of Custody Documentation

eurofins | mgt

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

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

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

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

Company Name: Coffey Environments Pty Ltd Wollongong
Address: 118 Auburn Street
Wollongong
NSW 2500

Project Name: ENAUWOLL04242AA

Order No.:
Report #: 473434
Phone: 02 4201 1400
Fax: 02 4201 1401

Received: Sep 23, 2015 2:45 PM
Due: Sep 30, 2015
Priority: 5 Day
Contact Name: Manuel Fernandez

Eurofins | mgt Client Manager: Charl Du Preez

Sample Detail					Asbestos - AS4964	Conductivity (1:5 aqueous extract at 25°C)	HOLD	pH (1:5 Aqueous extract)	Polycyclic Aromatic Hydrocarbons	Metals M8	Metals M8 filtered	BTEX	Foreign Material - Type III	Halogenated Volatile Organics	Chromium Suite	Moisture Set	Moisture Set	Total Recoverable Hydrocarbons	Eurofins | mgt Suite B4	BTEX and Volatile TRH
Laboratory where analysis is conducted																				
Melbourne Laboratory - NATA Site # 1254 & 14271																				
Sydney Laboratory - NATA Site # 18217					X	X	X	X	X	X	X	X	X	X		X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794															X	X	X			
External Laboratory																				
Sample ID	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**																
T1-1	Sep 21, 2015		Soil	S15-Se21862			X													
T1-2	Sep 21, 2015		Soil	S15-Se21863			X													
T1-3	Sep 21, 2015		Soil	S15-Se21864													X		X	
T1-4	Sep 21, 2015		Soil	S15-Se21865			X													
T1-5	Sep 21, 2015		Soil	S15-Se21866			X													
T2-1	Sep 21, 2015		Soil	S15-Se21867			X													
T2-2	Sep 21, 2015		Soil	S15-Se21868			X													
T2-3	Sep 21, 2015		Soil	S15-Se21869			X													
T2-4	Sep 21, 2015		Soil	S15-Se21870													X		X	
T2-5	Sep 21, 2015		Soil	S15-Se21871			X													

eurofins | mgt

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

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

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

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

Company Name: Coffey Environments Pty Ltd Wollongong
Address: 118 Auburn Street
Wollongong
NSW 2500

Project Name: ENAUWOLL04242AA

Order No.:
Report #: 473434
Phone: 02 4201 1400
Fax: 02 4201 1401

Received: Sep 23, 2015 2:45 PM
Due: Sep 30, 2015
Priority: 5 Day
Contact Name: Manuel Fernandez

Eurofins | mgt Client Manager: Charl Du Preez

Sample Detail					Asbestos - AS4964	Conductivity (1:5 aqueous extract at 25°C)	HOLD	pH (1:5 Aqueous extract)	Polycyclic Aromatic Hydrocarbons	Metals M8	Metals M8 filtered	BTEX	Foreign Material - Type III	Halogenated Volatile Organics	Chromium Suite	Moisture Set	Moisture Set	Total Recoverable Hydrocarbons	Eurofins | mgt Suite B4	BTEX and Volatile TRH
Laboratory where analysis is conducted																				
Melbourne Laboratory - NATA Site # 1254 & 14271																				
Sydney Laboratory - NATA Site # 18217					X	X	X	X	X	X	X	X	X	X		X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794															X	X	X			
External Laboratory																				
T3-1	Sep 21, 2015		Soil	S15-Se21872			X													
T3-2	Sep 21, 2015		Soil	S15-Se21873													X		X	
T3-3	Sep 21, 2015		Soil	S15-Se21874			X													
T3-4	Sep 21, 2015		Soil	S15-Se21875			X													
T3-5	Sep 21, 2015		Soil	S15-Se21876			X													
T3-6	Sep 21, 2015		Soil	S15-Se21877						X							X			
T4-1	Sep 21, 2015		Soil	S15-Se21878			X													
T4-2	Sep 21, 2015		Soil	S15-Se21879			X													
T4-3	Sep 21, 2015		Soil	S15-Se21880			X													
T4-4	Sep 21, 2015		Soil	S15-Se21881			X													
T4-5	Sep 21, 2015		Soil	S15-Se21882					X			X					X	X		

eurofins | mgt

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

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

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

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

Company Name: Coffey Environments Pty Ltd Wollongong
Address: 118 Auburn Street
Wollongong
NSW 2500

Project Name: ENAUWOLL04242AA

Order No.:
Report #: 473434
Phone: 02 4201 1400
Fax: 02 4201 1401

Received: Sep 23, 2015 2:45 PM
Due: Sep 30, 2015
Priority: 5 Day
Contact Name: Manuel Fernandez

Eurofins | mgt Client Manager: Charl Du Preez

Sample Detail					Asbestos - AS4964	Conductivity (1:5 aqueous extract at 25°C)	HOLD	pH (1:5 Aqueous extract)	Polycyclic Aromatic Hydrocarbons	Metals M8	Metals M8 filtered	BTEX	Foreign Material - Type III	Halogenated Volatile Organics	Chromium Suite	Moisture Set	Moisture Set	Total Recoverable Hydrocarbons	Eurofins | mgt Suite B4	BTEX and Volatile TRH
Laboratory where analysis is conducted																				
Melbourne Laboratory - NATA Site # 1254 & 14271																				
Sydney Laboratory - NATA Site # 18217					X	X	X	X	X	X	X	X	X	X		X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794															X	X	X			
External Laboratory																				
T-QC1	Sep 21, 2015		Soil	S15-Se21883			X													
T-QC2	Sep 21, 2015		Soil	S15-Se21884					X			X					X	X		
T-QC3	Sep 21, 2015		Soil	S15-Se21885			X													
T-QC4	Sep 21, 2015		Soil	S15-Se21886			X													
T-QC5	Sep 21, 2015		Soil	S15-Se21887			X													
TRENCH 1	Sep 21, 2015		Soil	S15-Se21888	X	X		X		X			X				X			
TRENCH 2	Sep 21, 2015		Soil	S15-Se21889	X	X		X		X			X				X			
TRENCH 3	Sep 21, 2015		Soil	S15-Se21890	X	X		X		X			X				X			
TRENCH 4	Sep 21, 2015		Soil	S15-Se21891	X	X		X		X			X				X			
TRENCH QC	Sep 21, 2015		Soil	S15-Se21892		X		X		X							X			
CBH503/0.15-0.25	Sep 21, 2015		Soil	S15-Se21893						X				X			X		X	

eurofins | mgt

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

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

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

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

Company Name: Coffey Environments Pty Ltd Wollongong
Address: 118 Auburn Street
Wollongong
NSW 2500

Project Name: ENAUWOLL04242AA

Order No.:
Report #: 473434
Phone: 02 4201 1400
Fax: 02 4201 1401

Received: Sep 23, 2015 2:45 PM
Due: Sep 30, 2015
Priority: 5 Day
Contact Name: Manuel Fernandez

Eurofins | mgt Client Manager: Charl Du Preez

Sample Detail					Asbestos - AS4964	Conductivity (1:5 aqueous extract at 25°C)	HOLD	pH (1:5 Aqueous extract)	Polycyclic Aromatic Hydrocarbons	Metals M8	Metals M8 filtered	BTEX	Foreign Material - Type III	Halogenated Volatile Organics	Chromium Suite	Moisture Set	Moisture Set	Total Recoverable Hydrocarbons	Eurofins | mgt Suite B4	BTEX and Volatile TRH
Laboratory where analysis is conducted																				
Melbourne Laboratory - NATA Site # 1254 & 14271																				
Sydney Laboratory - NATA Site # 18217					X	X	X	X	X	X	X	X	X	X		X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794															X	X	X			
External Laboratory																				
CBH503/0.85-0.95	Sep 21, 2015		Soil	S15-Se21894											X	X				
CBH504/0.2-0.25	Sep 22, 2015		Soil	S15-Se21895						X				X			X		X	
CBH505/0.1-0.15	Sep 22, 2015		Soil	S15-Se21896						X				X			X		X	
CBH506/0.1-0.25	Sep 22, 2015		Soil	S15-Se21897			X													
CBH506/0.3-0.4	Sep 22, 2015		Soil	S15-Se21898						X				X			X		X	
CBH507/0.15-0.25	Sep 22, 2015		Soil	S15-Se21899						X				X			X		X	
CBH508/0.15-0.25	Sep 22, 2015		Soil	S15-Se21900						X				X			X		X	

eurofins | mgt

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

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

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

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

Company Name: Coffey Environments Pty Ltd Wollongong
Address: 118 Auburn Street
Wollongong
NSW 2500

Project Name: ENAUWOLL04242AA

Order No.:
Report #: 473434
Phone: 02 4201 1400
Fax: 02 4201 1401

Received: Sep 23, 2015 2:45 PM
Due: Sep 30, 2015
Priority: 5 Day
Contact Name: Manuel Fernandez

Eurofins | mgt Client Manager: Charl Du Preez

Sample Detail					Asbestos - AS4964	Conductivity (1:5 aqueous extract at 25°C)	HOLD	pH (1:5 Aqueous extract)	Polycyclic Aromatic Hydrocarbons	Metals M8	Metals M8 filtered	BTEX	Foreign Material - Type III	Halogenated Volatile Organics	Chromium Suite	Moisture Set	Moisture Set	Total Recoverable Hydrocarbons	Eurofins | mgt Suite B4	BTEX and Volatile TRH
Laboratory where analysis is conducted																				
Melbourne Laboratory - NATA Site # 1254 & 14271																				
Sydney Laboratory - NATA Site # 18217					X	X	X	X	X	X	X	X	X	X		X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794															X	X	X			
External Laboratory																				
SS1/0.0-0.05	Sep 22, 2015		Soil	S15-Se21901	X															
SS2/0.0-0.01	Sep 22, 2015		Soil	S15-Se21902	X					X							X			
SS3/0.0-0.05	Sep 22, 2015		Soil	S15-Se21903			X													
SS4/0.0-0.05	Sep 22, 2015		Soil	S15-Se21904	X					X				X			X		X	
WB1	Sep 22, 2015		Water	S15-Se21905							X								X	
TRIP SPIKE	Sep 22, 2015		Water	S15-Se21906								X								
TRIP BLANK	Sep 22, 2015		Water	S15-Se21907																X
QC2	Sep 22, 2015		Soil	S15-Se21908			X													
QC1	Sep 21, 2015		Soil	S15-Se21909						X				X			X		X	
QC1A	Sep 21, 2015		Soil	S15-Se22074			X													

Certificate of Analysis

NATA Accredited
Accreditation Number 1261
Site Number 18217

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

Coffey Environments Pty Ltd Wollongong
118 Auburn Street
Wollongong
NSW 2500

Attention:	Manuel Fernandez
Report	473434-AID
Project Name	ENAUWOLL04242AA
Received Date	Sep 23, 2015
Date Reported	Sep 30, 2015

Methodology:

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

Project Name ENAUWOLL04242AA
Project ID
Date Sampled Sep 21, 2015 to Sep 22, 2015
Report 473434-AID

Client Sample ID	Eurofins | mgt Sample No.	Date Sampled	Sample Description	Result
TRENCH 1	15-Se21888	Sep 21, 2015	Approximate Sample 851g Sample consisted of: Brown coarse grain soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w.* Organic fibre detected. No respirable fibres detected.
TRENCH 2	15-Se21889	Sep 21, 2015	Approximate Sample 797g Sample consisted of: Brown grey coarse grain soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w.* Organic fibre detected. No respirable fibres detected.
TRENCH 3	15-Se21890	Sep 21, 2015	Approximate Sample 429g Sample consisted of: Brown grey coarse grain soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w.* Organic fibre detected. No respirable fibres detected.
TRENCH 4	15-Se21891	Sep 21, 2015	Approximate Sample 573g Sample consisted of: Brown grey coarse grain soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w.* Organic fibre detected. No respirable fibres detected.
SS1/0.0-0.05	15-Se21901	Sep 22, 2015	Approximate Sample 275g Sample consisted of: Grey coarse grain soil	No asbestos detected at the reporting limit of 0.01% w/w.* Organic fibre detected. No respirable fibres detected.
SS2/0.0-0.01	15-Se21902	Sep 22, 2015	Approximate Sample 80g Sample consisted of: Grey coarse grain soil	No asbestos detected at the reporting limit of 0.01% w/w.* Synthetic mineral fibre detected. Organic fibre detected. No respirable fibres detected.
SS4/0.0-0.05	15-Se21904	Sep 22, 2015	Approximate Sample 88g Sample consisted of: Grey coarse grain 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 29, 2015	Indefinite

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

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

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

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

Company Name: Coffey Environments Pty Ltd Wollongong
Address: 118 Auburn Street
Wollongong
NSW 2500

Project Name: ENAUWOLL04242AA

Order No.:
Report #: 473434
Phone: 02 4201 1400
Fax: 02 4201 1401

Received: Sep 23, 2015 2:45 PM
Due: Sep 30, 2015
Priority: 5 Day
Contact Name: Manuel Fernandez

Eurofins | mgt Client Manager: Charl Du Preez

Sample Detail					Asbestos - AS4964	Conductivity (1:5 aqueous extract at 25°C)	HOLD	pH (1:5 Aqueous extract)	Polycyclic Aromatic Hydrocarbons	Metals M8	Metals M8 filtered	BTEX	Foreign Material - Type III	Halogenated Volatile Organics	Chromium Suite	Moisture Set	Moisture Set	Total Recoverable Hydrocarbons	Eurofins | mgt Suite B4	BTEX and Volatile TRH
Laboratory where analysis is conducted																				
Melbourne Laboratory - NATA Site # 1254 & 14271																				
Sydney Laboratory - NATA Site # 18217					X	X	X	X	X	X	X	X	X	X		X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794															X	X	X			
External Laboratory																				
Sample ID	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**																
T1-1	Sep 21, 2015		Soil	S15-Se21862			X													
T1-2	Sep 21, 2015		Soil	S15-Se21863			X													
T1-3	Sep 21, 2015		Soil	S15-Se21864													X		X	
T1-4	Sep 21, 2015		Soil	S15-Se21865			X													
T1-5	Sep 21, 2015		Soil	S15-Se21866			X													
T2-1	Sep 21, 2015		Soil	S15-Se21867			X													
T2-2	Sep 21, 2015		Soil	S15-Se21868			X													
T2-3	Sep 21, 2015		Soil	S15-Se21869			X													
T2-4	Sep 21, 2015		Soil	S15-Se21870													X		X	
T2-5	Sep 21, 2015		Soil	S15-Se21871			X													

eurofins | mgt

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

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

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

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

Company Name: Coffey Environments Pty Ltd Wollongong
Address: 118 Auburn Street
Wollongong
NSW 2500

Project Name: ENAUWOLL04242AA

Order No.:
Report #: 473434
Phone: 02 4201 1400
Fax: 02 4201 1401

Received: Sep 23, 2015 2:45 PM
Due: Sep 30, 2015
Priority: 5 Day
Contact Name: Manuel Fernandez

Eurofins | mgt Client Manager: Charl Du Preez

Sample Detail					Asbestos - AS4964	Conductivity (1:5 aqueous extract at 25°C)	HOLD	pH (1:5 Aqueous extract)	Polycyclic Aromatic Hydrocarbons	Metals M8	Metals M8 filtered	BTEX	Foreign Material - Type III	Halogenated Volatile Organics	Chromium Suite	Moisture Set	Moisture Set	Total Recoverable Hydrocarbons	Eurofins | mgt Suite B4	BTEX and Volatile TRH
Laboratory where analysis is conducted																				
Melbourne Laboratory - NATA Site # 1254 & 14271																				
Sydney Laboratory - NATA Site # 18217					X	X	X	X	X	X	X	X	X	X		X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794															X	X	X			
External Laboratory																				
T3-1	Sep 21, 2015		Soil	S15-Se21872			X													
T3-2	Sep 21, 2015		Soil	S15-Se21873													X		X	
T3-3	Sep 21, 2015		Soil	S15-Se21874			X													
T3-4	Sep 21, 2015		Soil	S15-Se21875			X													
T3-5	Sep 21, 2015		Soil	S15-Se21876			X													
T3-6	Sep 21, 2015		Soil	S15-Se21877						X							X			
T4-1	Sep 21, 2015		Soil	S15-Se21878			X													
T4-2	Sep 21, 2015		Soil	S15-Se21879			X													
T4-3	Sep 21, 2015		Soil	S15-Se21880			X													
T4-4	Sep 21, 2015		Soil	S15-Se21881			X													
T4-5	Sep 21, 2015		Soil	S15-Se21882					X			X					X	X		

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

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

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

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

Company Name: Coffey Environments Pty Ltd Wollongong
Address: 118 Auburn Street
Wollongong
NSW 2500

Project Name: ENAUWOLL04242AA

Order No.:
Report #: 473434
Phone: 02 4201 1400
Fax: 02 4201 1401

Received: Sep 23, 2015 2:45 PM
Due: Sep 30, 2015
Priority: 5 Day
Contact Name: Manuel Fernandez

Eurofins | mgt Client Manager: Charl Du Preez

Sample Detail					Asbestos - AS4964	Conductivity (1:5 aqueous extract at 25°C)	HOLD	pH (1:5 Aqueous extract)	Polycyclic Aromatic Hydrocarbons	Metals M8	Metals M8 filtered	BTEX	Foreign Material - Type III	Halogenated Volatile Organics	Chromium Suite	Moisture Set	Moisture Set	Total Recoverable Hydrocarbons	Eurofins | mgt Suite B4	BTEX and Volatile TRH
Laboratory where analysis is conducted																				
Melbourne Laboratory - NATA Site # 1254 & 14271																				
Sydney Laboratory - NATA Site # 18217					X	X	X	X	X	X	X	X	X	X		X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794															X	X	X			
External Laboratory																				
T-QC1	Sep 21, 2015		Soil	S15-Se21883			X													
T-QC2	Sep 21, 2015		Soil	S15-Se21884					X			X					X	X		
T-QC3	Sep 21, 2015		Soil	S15-Se21885			X													
T-QC4	Sep 21, 2015		Soil	S15-Se21886			X													
T-QC5	Sep 21, 2015		Soil	S15-Se21887			X													
TRENCH 1	Sep 21, 2015		Soil	S15-Se21888	X	X		X		X			X				X			
TRENCH 2	Sep 21, 2015		Soil	S15-Se21889	X	X		X		X			X				X			
TRENCH 3	Sep 21, 2015		Soil	S15-Se21890	X	X		X		X			X				X			
TRENCH 4	Sep 21, 2015		Soil	S15-Se21891	X	X		X		X			X				X			
TRENCH QC	Sep 21, 2015		Soil	S15-Se21892		X		X		X							X			
CBH503/0.15-0.25	Sep 21, 2015		Soil	S15-Se21893						X				X			X		X	

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

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

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

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

Company Name: Coffey Environments Pty Ltd Wollongong
Address: 118 Auburn Street
Wollongong
NSW 2500

Project Name: ENAUWOLL04242AA

Order No.:
Report #: 473434
Phone: 02 4201 1400
Fax: 02 4201 1401

Received: Sep 23, 2015 2:45 PM
Due: Sep 30, 2015
Priority: 5 Day
Contact Name: Manuel Fernandez

Eurofins | mgt Client Manager: Charl Du Preez

Sample Detail					Asbestos - AS4964	Conductivity (1:5 aqueous extract at 25°C)	HOLD	pH (1:5 Aqueous extract)	Polycyclic Aromatic Hydrocarbons	Metals M8	Metals M8 filtered	BTEX	Foreign Material - Type III	Halogenated Volatile Organics	Chromium Suite	Moisture Set	Moisture Set	Total Recoverable Hydrocarbons	Eurofins | mgt Suite B4	BTEX and Volatile TRH
Laboratory where analysis is conducted																				
Melbourne Laboratory - NATA Site # 1254 & 14271																				
Sydney Laboratory - NATA Site # 18217					X	X	X	X	X	X	X	X	X	X		X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794															X	X	X			
External Laboratory																				
CBH503/0.85-0.95	Sep 21, 2015		Soil	S15-Se21894											X	X				
CBH504/0.2-0.25	Sep 22, 2015		Soil	S15-Se21895						X				X			X		X	
CBH505/0.1-0.15	Sep 22, 2015		Soil	S15-Se21896						X				X			X		X	
CBH506/0.1-0.25	Sep 22, 2015		Soil	S15-Se21897			X													
CBH506/0.3-0.4	Sep 22, 2015		Soil	S15-Se21898						X				X			X		X	
CBH507/0.15-0.25	Sep 22, 2015		Soil	S15-Se21899						X				X			X		X	
CBH508/0.15-0.25	Sep 22, 2015		Soil	S15-Se21900						X				X			X		X	

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

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

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

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

Company Name: Coffey Environments Pty Ltd Wollongong
Address: 118 Auburn Street
Wollongong
NSW 2500

Project Name: ENAUWOLL04242AA

Order No.:
Report #: 473434
Phone: 02 4201 1400
Fax: 02 4201 1401

Received: Sep 23, 2015 2:45 PM
Due: Sep 30, 2015
Priority: 5 Day
Contact Name: Manuel Fernandez

Eurofins | mgt Client Manager: Charl Du Preez

Sample Detail					Asbestos - AS4964	Conductivity (1:5 aqueous extract at 25°C)	HOLD	pH (1:5 Aqueous extract)	Polycyclic Aromatic Hydrocarbons	Metals M8	Metals M8 filtered	BTEX	Foreign Material - Type III	Halogenated Volatile Organics	Chromium Suite	Moisture Set	Moisture Set	Total Recoverable Hydrocarbons	Eurofins | mgt Suite B4	BTEX and Volatile TRH
Laboratory where analysis is conducted																				
Melbourne Laboratory - NATA Site # 1254 & 14271																				
Sydney Laboratory - NATA Site # 18217					X	X	X	X	X	X	X	X	X	X		X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794															X	X	X			
External Laboratory																				
SS1/0.0-0.05	Sep 22, 2015		Soil	S15-Se21901	X															
SS2/0.0-0.01	Sep 22, 2015		Soil	S15-Se21902	X					X							X			
SS3/0.0-0.05	Sep 22, 2015		Soil	S15-Se21903			X													
SS4/0.0-0.05	Sep 22, 2015		Soil	S15-Se21904	X					X				X			X		X	
WB1	Sep 22, 2015		Water	S15-Se21905							X								X	
TRIP SPIKE	Sep 22, 2015		Water	S15-Se21906								X								
TRIP BLANK	Sep 22, 2015		Water	S15-Se21907																X
QC2	Sep 22, 2015		Soil	S15-Se21908			X													
QC1	Sep 21, 2015		Soil	S15-Se21909						X				X			X		X	
QC1A	Sep 21, 2015		Soil	S15-Se22074			X													

Eurofins | mgt 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 Stardards 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 substatntial 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 Se21904: The sample received was 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-sample to be analysed accurately represented the sample received.

Sample Integrity

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

Qualifier Codes/Comments

Code	Description
N/A	Not applicable

Authorised by:

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

Uncertainty data is available on request

Certificate of Analysis

Coffey Environments Pty Ltd Wollongong
118 Auburn Street
Wollongong
NSW 2500

NATA Accredited
Accreditation Number 1261
Site Number 1254

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

Attention: **Manuel Fernandez**

Report **473434-S**
Project name ENAUWOLL04242AA
Received Date Sep 23, 2015

Client Sample ID			**T1-3**	**T2-4**	**T3-2**	**T3-6**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**S15-Se21864**	**S15-Se21870**	**S15-Se21873**	**S15-Se21877**
Date Sampled			**Sep 21, 2015**	**Sep 21, 2015**	**Sep 21, 2015**	**Sep 21, 2015**
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	-
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	-
TRH C15-C28	50	mg/kg	< 50	< 50	< 50	-
TRH C29-C36	50	mg/kg	< 50	< 50	< 50	-
TRH C10-36 (Total)	50	mg/kg	< 50	< 50	< 50	-
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	-
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	-
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	-
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	-
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	-
Xylenes - Total	0.3	mg/kg	< 0.3	< 0.3	< 0.3	-
4-Bromofluorobenzene (surr.)	1	%	70	73	85	-
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	-
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	-
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50	-
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6	-
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2	-
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-

Client Sample ID			T1-3	T2-4	T3-2	T3-6
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**S15-Se21864**	**S15-Se21870**	**S15-Se21873**	**S15-Se21877**
Date Sampled			**Sep 21, 2015**	**Sep 21, 2015**	**Sep 21, 2015**	**Sep 21, 2015**
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	< 0.5	-
2-Fluorobiphenyl (surr.)	1	%	112	116	117	-
p-Terphenyl-d14 (surr.)	1	%	120	111	129	-
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	-
TRH >C16-C34	100	mg/kg	< 100	< 100	< 100	-
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100	-
% Moisture	0.1	%	14	18	12	24
Heavy Metals						
Arsenic	2	mg/kg	-	-	-	4.2
Cadmium	0.4	mg/kg	-	-	-	< 0.4
Chromium	5	mg/kg	-	-	-	12
Copper	5	mg/kg	-	-	-	35
Lead	5	mg/kg	-	-	-	15
Mercury	0.05	mg/kg	-	-	-	< 0.05
Nickel	5	mg/kg	-	-	-	9.3
Zinc	5	mg/kg	-	-	-	56

Client Sample ID			T4-5	T-QC2	TRENCH 1	TRENCH 2
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**S15-Se21882**	**S15-Se21884**	**S15-Se21888**	**S15-Se21889**
Date Sampled			**Sep 21, 2015**	**Sep 21, 2015**	**Sep 21, 2015**	**Sep 21, 2015**
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	%	86	85	-	-
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	-	-
TRH C6-C10	20	mg/kg	< 20	< 20	-	-
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	-	-
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	-	-

Client Sample ID			T4-5	T-QC2	TRENCH 1	TRENCH 2
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**S15-Se21882**	**S15-Se21884**	**S15-Se21888**	**S15-Se21889**
Date Sampled			**Sep 21, 2015**	**Sep 21, 2015**	**Sep 21, 2015**	**Sep 21, 2015**
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	-	-
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	-	-
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	-	-
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	-	-
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	-	-
Anthracene	0.5	mg/kg	< 0.5	< 0.5	-	-
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	-	-
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	-	-
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	-	-
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	-	-
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	-	-
Chrysene	0.5	mg/kg	< 0.5	< 0.5	-	-
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	-	-
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	-	-
Fluorene	0.5	mg/kg	< 0.5	< 0.5	-	-
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	-	-
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	-	-
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	-	-
Pyrene	0.5	mg/kg	< 0.5	< 0.5	-	-
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	-	-
2-Fluorobiphenyl (surr.)	1	%	116	118	-	-
p-Terphenyl-d14 (surr.)	1	%	113	124	-	-
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	50	mg/kg	< 50	< 50	-	-
TRH >C16-C34	100	mg/kg	< 100	< 100	-	-
TRH >C34-C40	100	mg/kg	< 100	< 100	-	-
Conductivity (1:5 aqueous extract at 25°C)	5	uS/cm	-	-	330	440
pH (1:5 Aqueous extract)	0.1	pH Units	-	-	6.8	7.5
% Moisture	0.1	%	14	9.0	15	9.5
Heavy Metals						
Arsenic	2	mg/kg	-	-	12	6.7
Cadmium	0.4	mg/kg	-	-	< 0.4	< 0.4
Chromium	5	mg/kg	-	-	20	60
Copper	5	mg/kg	-	-	33	50
Lead	5	mg/kg	-	-	11	15
Mercury	0.05	mg/kg	-	-	< 0.05	< 0.05
Nickel	5	mg/kg	-	-	6.8	18
Zinc	5	mg/kg	-	-	35	81
Foreign Material - Type III						
Rubber*	0.05	%	-	-	0	0
Plastic*	0.05	%	-	-	0	0
Bitumen*	0.05	%	-	-	0	0
Paper*	0.05	%	-	-	0	0
Cloth*	0.05	%	-	-	0	0
Paint*	0.05	%	-	-	0	0
Wood and other vegetable matter*	0.05	%	-	-	0	0.050

Client Sample ID			TRENCH 3	TRENCH 4	TRENCH QC	CBH503/0.15-0.25
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins | mgt Sample No.			S15-Se21890	S15-Se21891	S15-Se21892	S15-Se21893
Date Sampled			Sep 21, 2015	Sep 21, 2015	Sep 21, 2015	Sep 21, 2015
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	-	-	-	< 20
TRH C10-C14	20	mg/kg	-	-	-	< 20
TRH C15-C28	50	mg/kg	-	-	-	< 50
TRH C29-C36	50	mg/kg	-	-	-	< 50
TRH C10-36 (Total)	50	mg/kg	-	-	-	< 50
BTEX						
Benzene	0.1	mg/kg	-	-	-	< 0.1
Toluene	0.1	mg/kg	-	-	-	< 0.1
Ethylbenzene	0.1	mg/kg	-	-	-	< 0.1
m&p-Xylenes	0.2	mg/kg	-	-	-	< 0.2
o-Xylene	0.1	mg/kg	-	-	-	< 0.1
Xylenes - Total	0.3	mg/kg	-	-	-	< 0.3
4-Bromofluorobenzene (surr.)	1	%	-	-	-	117
Halogenated Volatile Organics						
1.1-Dichloroethane	0.5	mg/kg	-	-	-	< 0.5
1.1-Dichloroethene	0.5	mg/kg	-	-	-	< 0.5
1.1.1-Trichloroethane	0.5	mg/kg	-	-	-	< 0.5
1.1.1.2-Tetrachloroethane	0.5	mg/kg	-	-	-	< 0.5
1.1.2-Trichloroethane	0.5	mg/kg	-	-	-	< 0.5
1.1.2.2-Tetrachloroethane	0.5	mg/kg	-	-	-	< 0.5
1.2-Dibromoethane	0.5	mg/kg	-	-	-	< 0.5
1.2-Dichlorobenzene	0.5	mg/kg	-	-	-	< 0.5
1.2-Dichloroethane	0.5	mg/kg	-	-	-	< 0.5
1.2-Dichloropropane	0.5	mg/kg	-	-	-	< 0.5
1.2.3-Trichloropropane	0.5	mg/kg	-	-	-	< 0.5
1.3-Dichlorobenzene	0.5	mg/kg	-	-	-	< 0.5
1.3-Dichloropropane	0.5	mg/kg	-	-	-	< 0.5
1.4-Dichlorobenzene	0.5	mg/kg	-	-	-	< 0.5
Bromodichloromethane	0.5	mg/kg	-	-	-	< 0.5
Bromoform	0.5	mg/kg	-	-	-	< 0.5
Bromomethane	0.5	mg/kg	-	-	-	< 0.5
Carbon Tetrachloride	0.5	mg/kg	-	-	-	< 0.5
Chlorobenzene	0.5	mg/kg	-	-	-	< 0.5
Chloroform	0.5	mg/kg	-	-	-	< 0.5
Chloromethane	0.5	mg/kg	-	-	-	< 0.5
cis-1.2-Dichloroethene	0.5	mg/kg	-	-	-	< 0.5
cis-1.3-Dichloropropene	0.5	mg/kg	-	-	-	< 0.5
Dibromochloromethane	0.5	mg/kg	-	-	-	< 0.5
Dibromomethane	0.5	mg/kg	-	-	-	< 0.5
Iodomethane	0.5	mg/kg	-	-	-	< 0.5
Methylene Chloride	0.5	mg/kg	-	-	-	< 0.5
Tetrachloroethene	0.5	mg/kg	-	-	-	< 0.5
trans-1.2-Dichloroethene	0.5	mg/kg	-	-	-	< 0.5
trans-1.3-Dichloropropene	0.5	mg/kg	-	-	-	< 0.5
Trichloroethene	0.5	mg/kg	-	-	-	< 0.5
Trichlorofluoromethane	0.5	mg/kg	-	-	-	< 0.5
Vinyl chloride	0.5	mg/kg	-	-	-	< 0.5
Fluorobenzene (surr.)	1	%	-	-	-	95

Client Sample ID			TRENCH 3	TRENCH 4	TRENCH QC	CBH503/0.15-0.25
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins | mgt Sample No.			S15-Se21890	S15-Se21891	S15-Se21892	S15-Se21893
Date Sampled			Sep 21, 2015	Sep 21, 2015	Sep 21, 2015	Sep 21, 2015
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	-	-	-	< 0.5
TRH C6-C10	20	mg/kg	-	-	-	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	-	-	-	< 20
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	-	-	-	< 50
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	-	-	-	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	-	-	-	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	-	-	-	1.2
Acenaphthene	0.5	mg/kg	-	-	-	< 0.5
Acenaphthylene	0.5	mg/kg	-	-	-	< 0.5
Anthracene	0.5	mg/kg	-	-	-	< 0.5
Benz(a)anthracene	0.5	mg/kg	-	-	-	< 0.5
Benzo(a)pyrene	0.5	mg/kg	-	-	-	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	-	-	-	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	-	-	-	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	-	-	-	< 0.5
Chrysene	0.5	mg/kg	-	-	-	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	-	-	-	< 0.5
Fluoranthene	0.5	mg/kg	-	-	-	< 0.5
Fluorene	0.5	mg/kg	-	-	-	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	-	-	-	< 0.5
Naphthalene	0.5	mg/kg	-	-	-	< 0.5
Phenanthrene	0.5	mg/kg	-	-	-	< 0.5
Pyrene	0.5	mg/kg	-	-	-	< 0.5
Total PAH*	0.5	mg/kg	-	-	-	< 0.5
2-Fluorobiphenyl (surr.)	1	%	-	-	-	115
p-Terphenyl-d14 (surr.)	1	%	-	-	-	116
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	50	mg/kg	-	-	-	< 50
TRH >C16-C34	100	mg/kg	-	-	-	< 100
TRH >C34-C40	100	mg/kg	-	-	-	< 100
Conductivity (1:5 aqueous extract at 25°C)	5	uS/cm	140	290	140	-
pH (1:5 Aqueous extract)	0.1	pH Units	8.1	8.1	8.3	-
% Moisture	0.1	%	13	13	13	23
Heavy Metals						
Arsenic	2	mg/kg	6.8	7.2	6.2	11
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	23	19	18	20
Copper	5	mg/kg	51	39	43	18
Lead	5	mg/kg	11	14	12	24
Mercury	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Nickel	5	mg/kg	12	12	14	17
Zinc	5	mg/kg	54	62	52	90

Client Sample ID			TRENCH 3	TRENCH 4	TRENCH QC	CBH503/0.15-0.25
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**S15-Se21890**	**S15-Se21891**	**S15-Se21892**	**S15-Se21893**
Date Sampled			**Sep 21, 2015**	**Sep 21, 2015**	**Sep 21, 2015**	**Sep 21, 2015**
Test/Reference	LOR	Unit				
Foreign Material - Type III						
Rubber*	0.05	%	0	0	-	-
Plastic*	0.05	%	0	0	-	-
Bitumen*	0.05	%	0	0	-	-
Paper*	0.05	%	0	0	-	-
Cloth*	0.05	%	0	0	-	-
Paint*	0.05	%	0	0	-	-
Wood and other vegetable matter*	0.05	%	0.25	0	-	-

Client Sample ID			CBH503/0.85-0.95	CBH504/0.2-0.25	CBH505/0.1-0.15	CBH506/0.3-0.4
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**S15-Se21894**	**S15-Se21895**	**S15-Se21896**	**S15-Se21898**
Date Sampled			**Sep 21, 2015**	**Sep 22, 2015**	**Sep 22, 2015**	**Sep 22, 2015**
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	-	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	-	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	-	57	< 50	< 50
TRH C29-C36	50	mg/kg	-	64	< 50	< 50
TRH C10-36 (Total)	50	mg/kg	-	120	< 50	< 50
BTEX						
Benzene	0.1	mg/kg	-	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	-	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	-	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	-	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	-	< 0.1	< 0.1	< 0.1
Xylenes - Total	0.3	mg/kg	-	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	-	117	118	116
Halogenated Volatile Organics						
1.1-Dichloroethane	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
1.1-Dichloroethene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
1.1.1-Trichloroethane	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
1.1.1.2-Tetrachloroethane	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
1.1.2-Trichloroethane	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
1.1.2.2-Tetrachloroethane	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
1.2-Dibromoethane	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
1.2-Dichlorobenzene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
1.2-Dichloroethane	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
1.2-Dichloropropane	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
1.2.3-Trichloropropane	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
1.3-Dichlorobenzene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
1.3-Dichloropropane	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
1.4-Dichlorobenzene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Bromodichloromethane	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Bromoform	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Bromomethane	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Carbon Tetrachloride	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Chlorobenzene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5

Client Sample ID			CBH503/0.85-0.95	CBH504/0.2-0.25	CBH505/0.1-0.15	CBH506/0.3-0.4
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**S15-Se21894**	**S15-Se21895**	**S15-Se21896**	**S15-Se21898**
Date Sampled			**Sep 21, 2015**	**Sep 22, 2015**	**Sep 22, 2015**	**Sep 22, 2015**
Test/Reference	LOR	Unit				
Halogenated Volatile Organics						
Chloroform	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Chloromethane	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
cis-1.2-Dichloroethene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
cis-1.3-Dichloropropene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Dibromochloromethane	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Dibromomethane	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Iodomethane	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Methylene Chloride	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Tetrachloroethene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
trans-1.2-Dichloroethene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
trans-1.3-Dichloropropene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Trichloroethene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Trichlorofluoromethane	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Vinyl chloride	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Fluorobenzene (surr.)	1	%	-	95	96	95
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
TRH C6-C10	20	mg/kg	-	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	-	< 20	< 20	< 20
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	-	< 50	< 50	< 50
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	-	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	-	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	-	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	-	118	120	125
p-Terphenyl-d14 (surr.)	1	%	-	129	125	140
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	50	mg/kg	-	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	-	120	< 100	< 100
TRH >C34-C40	100	mg/kg	-	< 100	< 100	< 100
% Moisture	0.1	%	21	3.7	10	17

Client Sample ID			CBH503/0.85-0.95	CBH504/0.2-0.25	CBH505/0.1-0.15	CBH506/0.3-0.4
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**S15-Se21894**	**S15-Se21895**	**S15-Se21896**	**S15-Se21898**
Date Sampled			**Sep 21, 2015**	**Sep 22, 2015**	**Sep 22, 2015**	**Sep 22, 2015**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	2	mg/kg	-	3.3	6.2	8.1
Cadmium	0.4	mg/kg	-	< 0.4	< 0.4	0.8
Chromium	5	mg/kg	-	7.4	22	42
Copper	5	mg/kg	-	< 5	39	38
Lead	5	mg/kg	-	< 5	28	36
Mercury	0.05	mg/kg	-	< 0.05	< 0.05	0.10
Nickel	5	mg/kg	-	< 5	26	< 5
Zinc	5	mg/kg	-	19	110	260
Chromium Suite						
pH-KCL	0.1	pH Units	5.4	-	-	-
Acid trail - Titratable Actual Acidity	2	mol H+/t	17	-	-	-
sulfidic - TAA equiv. S% pyrite	0.02	% pyrite S	0.03	-	-	-
Chromium Reducible Sulfur[S04]	0.005	% S	0.006	-	-	-
Chromium Reducible Sulfur -acidity units	3	mol H+/t	3.0	-	-	-
Sulfur - KCl Extractable	0.02	% S	n/a	-	-	-
HCl Extractable Sulfur	0.02	% S	n/a	-	-	-
Net Acid soluble sulfur	0.02	% S	n/a	-	-	-
Net Acid soluble sulfur - acidity units	10	mol H+/t	n/a	-	-	-
Net Acid soluble sulfur - equivalent S% pyrite[S02]	0.02	% S	n/a	-	-	-
Acid Neutralising Capacity (ANCbt)	0.01	%CaCO3	n/a	-	-	-
Acid Neutralising Capacity - acidity (ANCbt)	2	mol H+/t	n/a	-	-	-
Acid Neutralising Capacity - equivalent S% pyrite (s-ANCbt)[S03]	0.02	% S	n/a	-	-	-
ANC Fineness Factor		factor	1.5	-	-	-
Net Acidity (Sulfur Units)	0.02	% S	0.03	-	-	-
Net Acidity (Acidity Units)	10	mol H+/t	21	-	-	-
Liming Rate[S01]	1	kg CaCO3/t	2.0	-	-	-
Extraneous Material						
<2mm Fraction	0.005	g	n/a	-	-	-
>2mm Fraction	0.005	g	n/a	-	-	-
Analysed Material	0.1	%	100	-	-	-
Extraneous Material	0.1	%	< 0.1	-	-	-

Client Sample ID			CBH507/0.15-0.25	CBH508/0.15-0.25	SS2/0.0-0.01	SS4/0.0-0.05
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**S15-Se21899**	**S15-Se21900**	**S15-Se21902**	**S15-Se21904**
Date Sampled			**Sep 22, 2015**	**Sep 22, 2015**	**Sep 22, 2015**	**Sep 22, 2015**
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	-	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	-	52
TRH C15-C28	50	mg/kg	< 50	< 50	-	950
TRH C29-C36	50	mg/kg	< 50	< 50	-	720
TRH C10-36 (Total)	50	mg/kg	< 50	< 50	-	1700

Client Sample ID			CBH507/0.15-0.25	CBH508/0.15-0.25	SS2/0.0-0.01	SS4/0.0-0.05
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**S15-Se21899**	**S15-Se21900**	**S15-Se21902**	**S15-Se21904**
Date Sampled			**Sep 22, 2015**	**Sep 22, 2015**	**Sep 22, 2015**	**Sep 22, 2015**
Test/Reference	LOR	Unit				
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	-	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	-	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	-	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	-	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	-	< 0.1
Xylenes - Total	0.3	mg/kg	< 0.3	< 0.3	-	< 0.3
4-Bromofluorobenzene (surr.)	1	%	119	119	-	117
Halogenated Volatile Organics						
1.1-Dichloroethane	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
1.1-Dichloroethene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
1.1.1-Trichloroethane	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
1.1.1.2-Tetrachloroethane	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
1.1.2-Trichloroethane	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
1.1.2.2-Tetrachloroethane	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
1.2-Dibromoethane	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
1.2-Dichlorobenzene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
1.2-Dichloroethane	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
1.2-Dichloropropane	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
1.2.3-Trichloropropane	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
1.3-Dichlorobenzene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
1.3-Dichloropropane	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
1.4-Dichlorobenzene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Bromodichloromethane	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Bromoform	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Bromomethane	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Carbon Tetrachloride	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Chlorobenzene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Chloroform	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Chloromethane	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
cis-1.2-Dichloroethene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
cis-1.3-Dichloropropene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Dibromochloromethane	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Dibromomethane	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Iodomethane	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Methylene Chloride	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Tetrachloroethene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
trans-1.2-Dichloroethene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
trans-1.3-Dichloropropene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Trichloroethene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Trichlorofluoromethane	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Vinyl chloride	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Fluorobenzene (surr.)	1	%	99	101	-	102
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
TRH C6-C10	20	mg/kg	< 20	< 20	-	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	-	< 20
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	-	< 50

Client Sample ID			CBH507/0.15-0.25	CBH508/0.15-0.25	SS2/0.0-0.01	SS4/0.0-0.05
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins | mgt Sample No.			**S15-Se21899**	**S15-Se21900**	**S15-Se21902**	**S15-Se21904**
Date Sampled			**Sep 22, 2015**	**Sep 22, 2015**	**Sep 22, 2015**	**Sep 22, 2015**
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	-	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	-	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	-	< 0.5
2-Fluorobiphenyl (surr.)	1	%	114	117	-	113
p-Terphenyl-d14 (surr.)	1	%	117	114	-	129
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	50	mg/kg	< 50	< 50	-	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100	-	1500
TRH >C34-C40	100	mg/kg	< 100	< 100	-	310
% Moisture	0.1	%	18	26	16	24
Heavy Metals						
Arsenic	2	mg/kg	5.0	10	4.7	2.3
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	20	19	440	44
Copper	5	mg/kg	< 5	19	280	72
Lead	5	mg/kg	7.9	22	190	29
Mercury	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Nickel	5	mg/kg	< 5	15	160	22
Zinc	5	mg/kg	10.0	85	510	330

Client Sample ID			QC1
Sample Matrix			Soil
Eurofins | mgt Sample No.			S15-Se21909
Date Sampled			Sep 21, 2015
Test/Reference	LOR	Unit	
Total Recoverable Hydrocarbons - 1999 NEPM Fractions			
TRH C6-C9	20	mg/kg	< 20
TRH C10-C14	20	mg/kg	< 20
TRH C15-C28	50	mg/kg	< 50
TRH C29-C36	50	mg/kg	< 50
TRH C10-36 (Total)	50	mg/kg	< 50
BTEX			
Benzene	0.1	mg/kg	< 0.1
Toluene	0.1	mg/kg	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2
o-Xylene	0.1	mg/kg	< 0.1
Xylenes - Total	0.3	mg/kg	< 0.3
4-Bromofluorobenzene (surr.)	1	%	118
Halogenated Volatile Organics			
1.1-Dichloroethane	0.5	mg/kg	< 0.5
1.1-Dichloroethene	0.5	mg/kg	< 0.5
1.1.1-Trichloroethane	0.5	mg/kg	< 0.5
1.1.1.2-Tetrachloroethane	0.5	mg/kg	< 0.5
1.1.2-Trichloroethane	0.5	mg/kg	< 0.5
1.1.2.2-Tetrachloroethane	0.5	mg/kg	< 0.5
1.2-Dibromoethane	0.5	mg/kg	< 0.5
1.2-Dichlorobenzene	0.5	mg/kg	< 0.5
1.2-Dichloroethane	0.5	mg/kg	< 0.5
1.2-Dichloropropane	0.5	mg/kg	< 0.5
1.2.3-Trichloropropane	0.5	mg/kg	< 0.5
1.3-Dichlorobenzene	0.5	mg/kg	< 0.5
1.3-Dichloropropane	0.5	mg/kg	< 0.5
1.4-Dichlorobenzene	0.5	mg/kg	< 0.5
Bromodichloromethane	0.5	mg/kg	< 0.5
Bromoform	0.5	mg/kg	< 0.5
Bromomethane	0.5	mg/kg	< 0.5
Carbon Tetrachloride	0.5	mg/kg	< 0.5
Chlorobenzene	0.5	mg/kg	< 0.5
Chloroform	0.5	mg/kg	< 0.5
Chloromethane	0.5	mg/kg	< 0.5
cis-1.2-Dichloroethene	0.5	mg/kg	< 0.5
cis-1.3-Dichloropropene	0.5	mg/kg	< 0.5
Dibromochloromethane	0.5	mg/kg	< 0.5
Dibromomethane	0.5	mg/kg	< 0.5
Iodomethane	0.5	mg/kg	< 0.5
Methylene Chloride	0.5	mg/kg	< 0.5
Tetrachloroethene	0.5	mg/kg	< 0.5
trans-1.2-Dichloroethene	0.5	mg/kg	< 0.5
trans-1.3-Dichloropropene	0.5	mg/kg	< 0.5
Trichloroethene	0.5	mg/kg	< 0.5
Trichlorofluoromethane	0.5	mg/kg	< 0.5
Vinyl chloride	0.5	mg/kg	< 0.5
Fluorobenzene (surr.)	1	%	100

Client Sample ID			QC1
Sample Matrix			Soil
Eurofins | mgt Sample No.			S15-Se21909
Date Sampled			Sep 21, 2015
Test/Reference	LOR	Unit	
Total Recoverable Hydrocarbons - 2013 NEPM Fractions			
Naphthalene[N02]	0.5	mg/kg	< 0.5
TRH C6-C10	20	mg/kg	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50
Polycyclic Aromatic Hydrocarbons			
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2
Acenaphthene	0.5	mg/kg	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5
Anthracene	0.5	mg/kg	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5
Chrysene	0.5	mg/kg	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5
Fluorene	0.5	mg/kg	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5
Naphthalene	0.5	mg/kg	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5
Pyrene	0.5	mg/kg	< 0.5
Total PAH*	0.5	mg/kg	< 0.5
2-Fluorobiphenyl (surr.)	1	%	112
p-Terphenyl-d14 (surr.)	1	%	135
Total Recoverable Hydrocarbons - 2013 NEPM Fractions			
TRH >C10-C16	50	mg/kg	< 50
TRH >C16-C34	100	mg/kg	< 100
TRH >C34-C40	100	mg/kg	< 100
% Moisture	0.1	%	23
Heavy Metals			
Arsenic	2	mg/kg	11
Cadmium	0.4	mg/kg	< 0.4
Chromium	5	mg/kg	20
Copper	5	mg/kg	17
Lead	5	mg/kg	17
Mercury	0.05	mg/kg	< 0.05
Nickel	5	mg/kg	17
Zinc	5	mg/kg	83

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	Sydney	Sep 28, 2015	14 Day
- Method: TRH C6-C36 - LTM-ORG-2010			
BTEX	Sydney	Sep 28, 2015	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Sep 28, 2015	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Eurofins | mgt Suite B4			
Polycyclic Aromatic Hydrocarbons	Sydney	Sep 28, 2015	14 Day
- Method: E007 Polyaromatic Hydrocarbons (PAH)			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Sep 28, 2015	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Halogenated Volatile Organics	Sydney	Sep 28, 2015	7 Day
- Method: E016 Volatile Halogenated Compounds (VHC)			
Conductivity (1:5 aqueous extract at 25°C)	Sydney	Sep 28, 2015	7 Day
- Method: LTM-INO-4030			
pH (1:5 Aqueous extract)	Sydney	Sep 28, 2015	7 Day
- Method: LTM-GEN-7090 pH in soil by ISE			
Metals M8	Sydney	Sep 28, 2015	28 Day
- Method: LTM-MET-3040_R0 TOTAL AND DISSOLVED METALS AND MERCURY IN WATERS BY ICP-MS			
Foreign Material - Type III	Sydney	Sep 23, 2015	180 Day
- Method: RMS Method T276			
% Moisture	Sydney	Sep 23, 2015	14 Day
- Method: LTM-GEN-7080 Moisture			
Chromium Suite			
Chromium Suite	Brisbane	Sep 28, 2015	6 Week
- Method: LTM-GEN-7070			
Extraneous Material	Brisbane	Sep 28, 2015	6 Week
- Method: LTM-GEN-7050/7070			

Company Name: Coffey Environments Pty Ltd Wollongong
Address: 118 Auburn Street
Wollongong
NSW 2500

Project Name: ENAUWOLL04242AA

Order No.:
Report #: 473434
Phone: 02 4201 1400
Fax: 02 4201 1401

Received: Sep 23, 2015 2:45 PM
Due: Sep 30, 2015
Priority: 5 Day
Contact Name: Manuel Fernandez

Eurofins | mgt Client Manager: Charl Du Preez

Sample Detail					Asbestos - AS4964	Conductivity (1:5 aqueous extract at 25°C)	HOLD	pH (1:5 Aqueous extract)	Polycyclic Aromatic Hydrocarbons	Metals M8	Metals M8 filtered	BTEX	Foreign Material - Type III	Halogenated Volatile Organics	Chromium Suite	Moisture Set	Moisture Set	Total Recoverable Hydrocarbons	Eurofins | mgt Suite B4	BTEX and Volatile TRH
Laboratory where analysis is conducted																				
Melbourne Laboratory - NATA Site # 1254 & 14271																				
Sydney Laboratory - NATA Site # 18217					X	X	X	X	X	X	X	X	X	X		X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794															X	X	X			
External Laboratory																				
Sample ID	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**																
T1-1	Sep 21, 2015		Soil	S15-Se21862			X													
T1-2	Sep 21, 2015		Soil	S15-Se21863			X													
T1-3	Sep 21, 2015		Soil	S15-Se21864													X		X	
T1-4	Sep 21, 2015		Soil	S15-Se21865			X													
T1-5	Sep 21, 2015		Soil	S15-Se21866			X													
T2-1	Sep 21, 2015		Soil	S15-Se21867			X													
T2-2	Sep 21, 2015		Soil	S15-Se21868			X													
T2-3	Sep 21, 2015		Soil	S15-Se21869			X													
T2-4	Sep 21, 2015		Soil	S15-Se21870													X		X	
T2-5	Sep 21, 2015		Soil	S15-Se21871			X													

eurofins | mgt

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

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

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

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

Company Name: Coffey Environments Pty Ltd Wollongong
Address: 118 Auburn Street
Wollongong
NSW 2500

Project Name: ENAUWOLL04242AA

Order No.:
Report #: 473434
Phone: 02 4201 1400
Fax: 02 4201 1401

Received: Sep 23, 2015 2:45 PM
Due: Sep 30, 2015
Priority: 5 Day
Contact Name: Manuel Fernandez

Eurofins | mgt Client Manager: Charl Du Preez

Sample Detail					Asbestos - AS4964	Conductivity (1:5 aqueous extract at 25°C)	HOLD	pH (1:5 Aqueous extract)	Polycyclic Aromatic Hydrocarbons	Metals M8	Metals M8 filtered	BTEX	Foreign Material - Type III	Halogenated Volatile Organics	Chromium Suite	Moisture Set	Moisture Set	Total Recoverable Hydrocarbons	Eurofins | mgt Suite B4	BTEX and Volatile TRH
Laboratory where analysis is conducted																				
Melbourne Laboratory - NATA Site # 1254 & 14271																				
Sydney Laboratory - NATA Site # 18217					X	X	X	X	X	X	X	X	X	X		X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794															X	X	X			
External Laboratory																				
T3-1	Sep 21, 2015		Soil	S15-Se21872			X													
T3-2	Sep 21, 2015		Soil	S15-Se21873													X		X	
T3-3	Sep 21, 2015		Soil	S15-Se21874			X													
T3-4	Sep 21, 2015		Soil	S15-Se21875			X													
T3-5	Sep 21, 2015		Soil	S15-Se21876			X													
T3-6	Sep 21, 2015		Soil	S15-Se21877						X							X			
T4-1	Sep 21, 2015		Soil	S15-Se21878			X													
T4-2	Sep 21, 2015		Soil	S15-Se21879			X													
T4-3	Sep 21, 2015		Soil	S15-Se21880			X													
T4-4	Sep 21, 2015		Soil	S15-Se21881			X													
T4-5	Sep 21, 2015		Soil	S15-Se21882					X			X					X	X		

eurofins | mgt

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

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

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

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

Company Name: Coffey Environments Pty Ltd Wollongong
Address: 118 Auburn Street
Wollongong
NSW 2500

Project Name: ENAUWOLL04242AA

Order No.:
Report #: 473434
Phone: 02 4201 1400
Fax: 02 4201 1401

Received: Sep 23, 2015 2:45 PM
Due: Sep 30, 2015
Priority: 5 Day
Contact Name: Manuel Fernandez

Eurofins | mgt Client Manager: Charl Du Preez

Sample Detail					Asbestos - AS4964	Conductivity (1:5 aqueous extract at 25°C)	HOLD	pH (1:5 Aqueous extract)	Polycyclic Aromatic Hydrocarbons	Metals M8	Metals M8 filtered	BTEX	Foreign Material - Type III	Halogenated Volatile Organics	Chromium Suite	Moisture Set	Moisture Set	Total Recoverable Hydrocarbons	Eurofins | mgt Suite B4	BTEX and Volatile TRH
Laboratory where analysis is conducted																				
Melbourne Laboratory - NATA Site # 1254 & 14271																				
Sydney Laboratory - NATA Site # 18217					X	X	X	X	X	X	X	X	X	X		X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794															X	X	X			
External Laboratory																				
T-QC1	Sep 21, 2015		Soil	S15-Se21883			X													
T-QC2	Sep 21, 2015		Soil	S15-Se21884					X			X					X	X		
T-QC3	Sep 21, 2015		Soil	S15-Se21885			X													
T-QC4	Sep 21, 2015		Soil	S15-Se21886			X													
T-QC5	Sep 21, 2015		Soil	S15-Se21887			X													
TRENCH 1	Sep 21, 2015		Soil	S15-Se21888	X	X		X		X			X				X			
TRENCH 2	Sep 21, 2015		Soil	S15-Se21889	X	X		X		X			X				X			
TRENCH 3	Sep 21, 2015		Soil	S15-Se21890	X	X		X		X			X				X			
TRENCH 4	Sep 21, 2015		Soil	S15-Se21891	X	X		X		X			X				X			
TRENCH QC	Sep 21, 2015		Soil	S15-Se21892		X		X		X							X			
CBH503/0.15-0.25	Sep 21, 2015		Soil	S15-Se21893						X				X			X		X	

eurofins | mgt

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

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

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

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

Company Name: Coffey Environments Pty Ltd Wollongong
Address: 118 Auburn Street
Wollongong
NSW 2500

Project Name: ENAUWOLL04242AA

Order No.:
Report #: 473434
Phone: 02 4201 1400
Fax: 02 4201 1401

Received: Sep 23, 2015 2:45 PM
Due: Sep 30, 2015
Priority: 5 Day
Contact Name: Manuel Fernandez

Eurofins | mgt Client Manager: Charl Du Preez

Sample Detail					Asbestos - AS4964	Conductivity (1:5 aqueous extract at 25°C)	HOLD	pH (1:5 Aqueous extract)	Polycyclic Aromatic Hydrocarbons	Metals M8	Metals M8 filtered	BTEX	Foreign Material - Type III	Halogenated Volatile Organics	Chromium Suite	Moisture Set	Moisture Set	Total Recoverable Hydrocarbons	Eurofins | mgt Suite B4	BTEX and Volatile TRH
Laboratory where analysis is conducted																				
Melbourne Laboratory - NATA Site # 1254 & 14271																				
Sydney Laboratory - NATA Site # 18217					X	X	X	X	X	X	X	X	X	X		X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794															X	X	X			
External Laboratory																				
CBH503/0.85-0.95	Sep 21, 2015		Soil	S15-Se21894											X	X				
CBH504/0.2-0.25	Sep 22, 2015		Soil	S15-Se21895						X				X			X		X	
CBH505/0.1-0.15	Sep 22, 2015		Soil	S15-Se21896						X				X			X		X	
CBH506/0.1-0.25	Sep 22, 2015		Soil	S15-Se21897			X													
CBH506/0.3-0.4	Sep 22, 2015		Soil	S15-Se21898						X				X			X		X	
CBH507/0.15-0.25	Sep 22, 2015		Soil	S15-Se21899						X				X			X		X	
CBH508/0.15-0.25	Sep 22, 2015		Soil	S15-Se21900						X				X			X		X	

eurofins | mgt

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

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

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

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

Company Name: Coffey Environments Pty Ltd Wollongong
Address: 118 Auburn Street
Wollongong
NSW 2500

Project Name: ENAUWOLL04242AA

Order No.:
Report #: 473434
Phone: 02 4201 1400
Fax: 02 4201 1401

Received: Sep 23, 2015 2:45 PM
Due: Sep 30, 2015
Priority: 5 Day
Contact Name: Manuel Fernandez

Eurofins | mgt Client Manager: Charl Du Preez

Sample Detail					Asbestos - AS4964	Conductivity (1:5 aqueous extract at 25°C)	HOLD	pH (1:5 Aqueous extract)	Polycyclic Aromatic Hydrocarbons	Metals M8	Metals M8 filtered	BTEX	Foreign Material - Type III	Halogenated Volatile Organics	Chromium Suite	Moisture Set	Moisture Set	Total Recoverable Hydrocarbons	Eurofins | mgt Suite B4	BTEX and Volatile TRH
Laboratory where analysis is conducted																				
Melbourne Laboratory - NATA Site # 1254 & 14271																				
Sydney Laboratory - NATA Site # 18217					X	X	X	X	X	X	X	X	X	X		X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794															X	X	X			
External Laboratory																				
SS1/0.0-0.05	Sep 22, 2015		Soil	S15-Se21901	X															
SS2/0.0-0.01	Sep 22, 2015		Soil	S15-Se21902	X					X							X			
SS3/0.0-0.05	Sep 22, 2015		Soil	S15-Se21903			X													
SS4/0.0-0.05	Sep 22, 2015		Soil	S15-Se21904	X					X				X			X		X	
WB1	Sep 22, 2015		Water	S15-Se21905							X								X	
TRIP SPIKE	Sep 22, 2015		Water	S15-Se21906								X								
TRIP BLANK	Sep 22, 2015		Water	S15-Se21907																X
QC2	Sep 22, 2015		Soil	S15-Se21908			X													
QC1	Sep 21, 2015		Soil	S15-Se21909						X				X			X		X	
QC1A	Sep 21, 2015		Soil	S15-Se22074			X													

Eurofins | mgt Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

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

UNITS

mg/kg: milligrams per Kilogram

ug/l: micrograms per litre

ppb: Parts per billion

org/100ml: Organisms per 100 millilitres

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

mg/l: milligrams per litre

ppm: Parts per million

%: Percentage

NTU: Nephelometric Turbidity Units

TERMS

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery
CRM	Certified Reference Material - reported as percent recovery
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands. In the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
Batch Duplicate	A second piece of analysis from a sample outside of the clients batch of samples but run within the laboratory batch of analysis.
Batch SPIKE	Spike recovery reported on a sample from outside of the clients batch of samples but run within the laboratory batch of analysis.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
ASLP	Australian Standard Leaching Procedure (AS4439.3)
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within
TEQ	Toxic Equivalency Quotient

QC - ACCEPTANCE CRITERIA

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

Results <10 times the LOR : No Limit

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

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

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

QC DATA GENERAL COMMENTS

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxophene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxophene 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 Arochlor 1260 in Matrix Spikes and LCS's.
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 RPD's 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							
Halogenated Volatile Organics							
1.1-Dichloroethane	mg/kg	< 0.5			0.5	Pass	
1.1-Dichloroethene	mg/kg	< 0.5			0.5	Pass	
1.1.1-Trichloroethane	mg/kg	< 0.5			0.5	Pass	
1.1.1.2-Tetrachloroethane	mg/kg	< 0.5			0.5	Pass	
1.1.2-Trichloroethane	mg/kg	< 0.5			0.5	Pass	
1.1.2.2-Tetrachloroethane	mg/kg	< 0.5			0.5	Pass	
1.2-Dibromoethane	mg/kg	< 0.5			0.5	Pass	
1.2-Dichlorobenzene	mg/kg	< 0.5			0.5	Pass	
1.2-Dichloroethane	mg/kg	< 0.5			0.5	Pass	
1.2-Dichloropropane	mg/kg	< 0.5			0.5	Pass	
1.2.3-Trichloropropane	mg/kg	< 0.5			0.5	Pass	
1.3-Dichlorobenzene	mg/kg	< 0.5			0.5	Pass	
1.3-Dichloropropane	mg/kg	< 0.5			0.5	Pass	
1.4-Dichlorobenzene	mg/kg	< 0.5			0.5	Pass	
Bromodichloromethane	mg/kg	< 0.5			0.5	Pass	
Bromoform	mg/kg	< 0.5			0.5	Pass	
Bromomethane	mg/kg	< 0.5			0.5	Pass	
Carbon Tetrachloride	mg/kg	< 0.5			0.5	Pass	
Chlorobenzene	mg/kg	< 0.5			0.5	Pass	
Chloroform	mg/kg	< 0.5			0.5	Pass	
Chloromethane	mg/kg	< 0.5			0.5	Pass	
cis-1.2-Dichloroethene	mg/kg	< 0.5			0.5	Pass	
cis-1.3-Dichloropropene	mg/kg	< 0.5			0.5	Pass	
Dibromochloromethane	mg/kg	< 0.5			0.5	Pass	
Dibromomethane	mg/kg	< 0.5			0.5	Pass	
Iodomethane	mg/kg	< 0.5			0.5	Pass	
Methylene Chloride	mg/kg	< 0.5			0.5	Pass	
Tetrachloroethene	mg/kg	< 0.5			0.5	Pass	
trans-1.2-Dichloroethene	mg/kg	< 0.5			0.5	Pass	
trans-1.3-Dichloropropene	mg/kg	< 0.5			0.5	Pass	
Trichloroethene	mg/kg	< 0.5			0.5	Pass	
Trichlorofluoromethane	mg/kg	< 0.5			0.5	Pass	
Vinyl chloride	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/kg	< 0.5			0.5	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
TRH C6-C10	mg/kg	< 20			20	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/kg	< 0.5			0.5	Pass	
Acenaphthylene	mg/kg	< 0.5			0.5	Pass	
Anthracene	mg/kg	< 0.5			0.5	Pass	
Benz(a)anthracene	mg/kg	< 0.5			0.5	Pass	
Benzo(a)pyrene	mg/kg	< 0.5			0.5	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Benzo(g.h.i)perylene	mg/kg	< 0.5			0.5	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Chrysene	mg/kg	< 0.5			0.5	Pass	
Dibenz(a.h)anthracene	mg/kg	< 0.5			0.5	Pass	
Fluoranthene	mg/kg	< 0.5			0.5	Pass	
Fluorene	mg/kg	< 0.5			0.5	Pass	
Indeno(1.2.3-cd)pyrene	mg/kg	< 0.5			0.5	Pass	
Naphthalene	mg/kg	< 0.5			0.5	Pass	
Phenanthrene	mg/kg	< 0.5			0.5	Pass	
Pyrene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH >C10-C16	mg/kg	< 50			50	Pass	
TRH >C16-C34	mg/kg	< 100			100	Pass	
TRH >C34-C40	mg/kg	< 100			100	Pass	
Method Blank							
Conductivity (1:5 aqueous extract at 25°C)	uS/cm	< 5			5	Pass	
Method Blank							
Heavy Metals							
Arsenic	mg/kg	< 2			2	Pass	
Cadmium	mg/kg	< 0.4			0.4	Pass	
Chromium	mg/kg	< 5			5	Pass	
Copper	mg/kg	< 5			5	Pass	
Lead	mg/kg	< 5			5	Pass	
Mercury	mg/kg	< 0.05			0.05	Pass	
Nickel	mg/kg	< 5			5	Pass	
Zinc	mg/kg	< 5			5	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	94			70-130	Pass	
TRH C10-C14	%	87			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	127			70-130	Pass	
Toluene	%	128			70-130	Pass	
Ethylbenzene	%	115			70-130	Pass	
m&p-Xylenes	%	113			70-130	Pass	
o-Xylene	%	114			70-130	Pass	
Xylenes - Total	%	86			70-130	Pass	
LCS - % Recovery							
Halogenated Volatile Organics							
1.1-Dichloroethane	%	118			70-130	Pass	
1.1-Dichloroethene	%	106			70-130	Pass	
1.1.1-Trichloroethane	%	110			70-130	Pass	
1.1.1.2-Tetrachloroethane	%	100			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
1.1.2-Trichloroethane	%	113			70-130	Pass	
1.1.2.2-Tetrachloroethane	%	98			70-130	Pass	
1.2-Dibromoethane	%	116			70-130	Pass	
1.2-Dichlorobenzene	%	113			70-130	Pass	
1.2-Dichloroethane	%	108			70-130	Pass	
1.2-Dichloropropane	%	115			70-130	Pass	
1.2.3-Trichloropropane	%	113			70-130	Pass	
1.3-Dichlorobenzene	%	113			70-130	Pass	
1.3-Dichloropropane	%	115			70-130	Pass	
1.4-Dichlorobenzene	%	114			70-130	Pass	
Bromodichloromethane	%	111			70-130	Pass	
Bromoform	%	94			70-130	Pass	
Bromomethane	%	87			70-130	Pass	
Carbon Tetrachloride	%	101			70-130	Pass	
Chlorobenzene	%	102			70-130	Pass	
Chloroform	%	114			70-130	Pass	
Chloromethane	%	99			70-130	Pass	
cis-1.2-Dichloroethene	%	114			70-130	Pass	
cis-1.3-Dichloropropene	%	119			70-130	Pass	
Dibromochloromethane	%	109			70-130	Pass	
Dibromomethane	%	112			70-130	Pass	
Iodomethane	%	84			70-130	Pass	
Methylene Chloride	%	102			70-130	Pass	
Tetrachloroethene	%	111			70-130	Pass	
trans-1.2-Dichloroethene	%	115			70-130	Pass	
trans-1.3-Dichloropropene	%	119			70-130	Pass	
Trichloroethene	%	114			70-130	Pass	
Trichlorofluoromethane	%	75			70-130	Pass	
Vinyl chloride	%	89			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	129			70-130	Pass	
TRH C6-C10	%	97			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	95			70-130	Pass	
Acenaphthylene	%	93			70-130	Pass	
Anthracene	%	92			70-130	Pass	
Benz(a)anthracene	%	119			70-130	Pass	
Benzo(a)pyrene	%	76			70-130	Pass	
Benzo(b&j)fluoranthene	%	72			70-130	Pass	
Benzo(g.h.i)perylene	%	94			70-130	Pass	
Benzo(k)fluoranthene	%	92			70-130	Pass	
Chrysene	%	83			70-130	Pass	
Dibenz(a.h)anthracene	%	90			70-130	Pass	
Fluoranthene	%	99			70-130	Pass	
Fluorene	%	92			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	93			70-130	Pass	
Naphthalene	%	96			70-130	Pass	
Phenanthrene	%	84			70-130	Pass	
Pyrene	%	97			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH >C10-C16	%	85			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
LCS - % Recovery							
Heavy Metals							
Arsenic	%	85			70-130	Pass	
Cadmium	%	91			70-130	Pass	
Chromium	%	89			70-130	Pass	
Copper	%	76			70-130	Pass	
Lead	%	96			70-130	Pass	
Mercury	%	90			70-130	Pass	
Nickel	%	79			70-130	Pass	
Zinc	%	90			70-130	Pass	
LCS - % Recovery							
Chromium Suite							
Chromium Reducible Sulfur	%	103			70-130	Pass	
Acid Neutralising Capacity (ANCbt)	%	101			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S15-Se21877	CP	%	79			70-130	Pass	
Cadmium	S15-Se21877	CP	%	90			70-130	Pass	
Chromium	S15-Se21877	CP	%	78			70-130	Pass	
Copper	S15-Se21877	CP	%	92			70-130	Pass	
Lead	S15-Se21877	CP	%	78			70-130	Pass	
Mercury	S15-Se21877	CP	%	82			70-130	Pass	
Nickel	S15-Se21877	CP	%	92			70-130	Pass	
Zinc	S15-Se21877	CP	%	81			70-130	Pass	
Spike - % Recovery									
Halogenated Volatile Organics				Result 1					
1.1-Dichloroethane	S15-Se27286	NCP	%	98			70-130	Pass	
1.1-Dichloroethene	S15-Se27286	NCP	%	88			70-130	Pass	
1.1.1-Trichloroethane	S15-Se27286	NCP	%	92			70-130	Pass	
1.1.1.2-Tetrachloroethane	S15-Se27286	NCP	%	85			70-130	Pass	
1.1.2-Trichloroethane	S15-Se27286	NCP	%	93			70-130	Pass	
1.1.2.2-Tetrachloroethane	S15-Se27286	NCP	%	86			70-130	Pass	
1.2-Dibromoethane	S15-Se27286	NCP	%	92			70-130	Pass	
1.2-Dichlorobenzene	S15-Se27286	NCP	%	90			70-130	Pass	
1.2-Dichloroethane	S15-Se27286	NCP	%	88			70-130	Pass	
1.2-Dichloropropane	S15-Se27286	NCP	%	89			70-130	Pass	
1.2.3-Trichloropropane	S15-Se27286	NCP	%	90			70-130	Pass	
1.3-Dichlorobenzene	S15-Se27286	NCP	%	90			70-130	Pass	
1.3-Dichloropropane	S15-Se27286	NCP	%	92			70-130	Pass	
1.4-Dichlorobenzene	S15-Se27286	NCP	%	92			70-130	Pass	
Bromodichloromethane	S15-Se27286	NCP	%	87			70-130	Pass	
Bromoform	S15-Se27286	NCP	%	81			70-130	Pass	
Bromomethane	S15-Se27286	NCP	%	79			70-130	Pass	
Carbon Tetrachloride	S15-Se27286	NCP	%	82			70-130	Pass	
Chlorobenzene	S15-Se27286	NCP	%	85			70-130	Pass	
Chloroform	S15-Se27286	NCP	%	94			70-130	Pass	
Chloromethane	S15-Se27286	NCP	%	78			70-130	Pass	
cis-1.2-Dichloroethene	S15-Se27286	NCP	%	94			70-130	Pass	
cis-1.3-Dichloropropene	S15-Se27286	NCP	%	95			70-130	Pass	
Dibromochloromethane	S15-Se27286	NCP	%	86			70-130	Pass	
Dibromomethane	S15-Se27286	NCP	%	88			70-130	Pass	
Iodomethane	S15-Se27286	NCP	%	70			70-130	Pass	
Methylene Chloride	S15-Se27286	NCP	%	113			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Tetrachloroethene	S15-Se27286	NCP	%	90			70-130	Pass	
trans-1.2-Dichloroethene	S15-Se27286	NCP	%	94			70-130	Pass	
trans-1.3-Dichloropropene	S15-Se27286	NCP	%	95			70-130	Pass	
Trichloroethene	S15-Se27286	NCP	%	89			70-130	Pass	
Trichlorofluoromethane	S15-Se27286	NCP	%	71			70-130	Pass	
Vinyl chloride	S15-Se27286	NCP	%	75			70-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	S15-Se21893	CP	%	102			70-130	Pass	
Acenaphthylene	S15-Se21893	CP	%	99			70-130	Pass	
Anthracene	S15-Se21893	CP	%	94			70-130	Pass	
Benz(a)anthracene	S15-Se21893	CP	%	105			70-130	Pass	
Benzo(a)pyrene	S15-Se21893	CP	%	72			70-130	Pass	
Benzo(b&j)fluoranthene	S15-Se21893	CP	%	72			70-130	Pass	
Benzo(g.h.i)perylene	S15-Se21893	CP	%	97			70-130	Pass	
Benzo(k)fluoranthene	S15-Se21893	CP	%	81			70-130	Pass	
Chrysene	S15-Se21893	CP	%	79			70-130	Pass	
Dibenz(a.h)anthracene	S15-Se21893	CP	%	98			70-130	Pass	
Fluoranthene	S15-Se21893	CP	%	107			70-130	Pass	
Fluorene	S15-Se21893	CP	%	101			70-130	Pass	
Indeno(1.2.3-cd)pyrene	S15-Se21893	CP	%	98			70-130	Pass	
Naphthalene	S15-Se21893	CP	%	103			70-130	Pass	
Phenanthrene	S15-Se21893	CP	%	90			70-130	Pass	
Pyrene	S15-Se21893	CP	%	109			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	S15-Se21895	CP	%	88			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	S15-Se21895	CP	%	90			70-130	Pass	
Toluene	S15-Se21895	CP	%	72			70-130	Pass	
Ethylbenzene	S15-Se21895	CP	%	83			70-130	Pass	
m&p-Xylenes	S15-Se21895	CP	%	74			70-130	Pass	
o-Xylene	S15-Se21895	CP	%	78			70-130	Pass	
Xylenes - Total	S15-Se21895	CP	%	75			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	S15-Se21895	CP	%	99			70-130	Pass	
TRH C6-C10	S15-Se21895	CP	%	97			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C10-C14	S15-Se21898	CP	%	77			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
TRH >C10-C16	S15-Se21898	CP	%	77			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S15-Se21900	CP	%	80			70-130	Pass	
Cadmium	S15-Se21900	CP	%	88			70-130	Pass	
Chromium	S15-Se21900	CP	%	88			70-130	Pass	
Copper	S15-Se21900	CP	%	80			70-130	Pass	
Lead	S15-Se21900	CP	%	91			70-130	Pass	
Mercury	S15-Se21900	CP	%	82			70-130	Pass	
Nickel	S15-Se21900	CP	%	95			70-130	Pass	
Zinc	S15-Se21900	CP	%	90			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C10-C14	S15-Se21884	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	S15-Se21884	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C29-C36	S15-Se21884	CP	mg/kg	< 50	< 50	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
TRH >C10-C16	S15-Se21884	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C16-C34	S15-Se21884	CP	mg/kg	< 100	< 100	<1	30%	Pass	
TRH >C34-C40	S15-Se21884	CP	mg/kg	< 100	< 100	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (1:5 aqueous extract at 25°C)	S15-Se22956	NCP	uS/cm	540	550	1.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S15-Se21888	CP	mg/kg	12	7.6	47	30%	Fail	Q15
Cadmium	S15-Se21888	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	S15-Se21888	CP	mg/kg	20	22	6.0	30%	Pass	
Copper	S15-Se21888	CP	mg/kg	33	23	34	30%	Fail	Q15
Lead	S15-Se21888	CP	mg/kg	11	12	12	30%	Pass	
Mercury	S15-Se21888	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Nickel	S15-Se21888	CP	mg/kg	6.8	6.8	1.0	30%	Pass	
Zinc	S15-Se21888	CP	mg/kg	35	46	27	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
pH (1:5 Aqueous extract)	S15-Se21890	CP	pH Units	8.1	8.2	pass	30%	Pass	
% Moisture	S15-Se21890	CP	%	13	13	4.0	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	S15-Se21893	CP	mg/kg	< 20	< 20	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	S15-Se21893	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	S15-Se21893	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	S15-Se21893	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	S15-Se21893	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	S15-Se21893	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total	S15-Se21893	CP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Halogenated Volatile Organics				Result 1	Result 2	RPD			
1.1-Dichloroethane	S15-Se21893	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.1-Dichloroethene	S15-Se21893	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.1.1-Trichloroethane	S15-Se21893	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.1.1.2-Tetrachloroethane	S15-Se21893	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.1.2-Trichloroethane	S15-Se21893	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.1.2.2-Tetrachloroethane	S15-Se21893	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.2-Dibromoethane	S15-Se21893	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.2-Dichlorobenzene	S15-Se21893	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.2-Dichloroethane	S15-Se21893	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.2-Dichloropropane	S15-Se21893	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.2.3-Trichloropropane	S15-Se21893	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.3-Dichlorobenzene	S15-Se21893	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.3-Dichloropropane	S15-Se21893	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
1.4-Dichlorobenzene	S15-Se21893	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	

Duplicate									
Halogenated Volatile Organics				Result 1	Result 2	RPD			
Bromodichloromethane	S15-Se21893	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Bromoform	S15-Se21893	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Bromomethane	S15-Se21893	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Carbon Tetrachloride	S15-Se21893	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chlorobenzene	S15-Se21893	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chloroform	S15-Se21893	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chloromethane	S15-Se21893	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
cis-1.2-Dichloroethene	S15-Se21893	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
cis-1.3-Dichloropropene	S15-Se21893	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibromochloromethane	S15-Se21893	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibromomethane	S15-Se21893	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Iodomethane	S15-Se21893	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Methylene Chloride	S15-Se21893	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Tetrachloroethene	S15-Se21893	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
trans-1.2-Dichloroethene	S15-Se21893	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
trans-1.3-Dichloropropene	S15-Se21893	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Trichloroethene	S15-Se21893	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Trichlorofluoromethane	S15-Se21893	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Vinyl chloride	S15-Se21893	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	S15-Se21893	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
TRH C6-C10	S15-Se21893	CP	mg/kg	< 20	< 20	<1	30%	Pass	
Duplicate									
Chromium Suite				Result 1	Result 2	RPD			
pH-KCL	S15-Se21894	CP	pH Units	5.4	5.4	<1	30%	Pass	
Acid trail - Titratable Actual Acidity	S15-Se21894	CP	mol H+/t	17	17	1.0	30%	Pass	
sulfidic - TAA equiv. S% pyrite	S15-Se21894	CP	% pyrite S	0.03	0.03	1.0	30%	Pass	
Chromium Reducible Sulfur	S15-Se21894	CP	% S	0.006	0.005	4.0	30%	Pass	
Chromium Reducible Sulfur -acidity units	S15-Se21894	CP	mol H+/t	3.0	3.0	4.0	30%	Pass	
Sulfur - KCl Extractable	S15-Se21894	CP	% S	n/a	n/a	n/a	30%	Pass	
HCl Extractable Sulfur	S15-Se21894	CP	% S	n/a	n/a	n/a	30%	Pass	
Net Acid soluble sulfur	S15-Se21894	CP	% S	n/a	n/a	n/a	30%	Pass	
Net Acid soluble sulfur - acidity units	S15-Se21894	CP	mol H+/t	n/a	n/a	n/a	30%	Pass	
Net Acid soluble sulfur - equivalent S% pyrite	S15-Se21894	CP	% S	n/a	n/a	n/a	30%	Pass	
Acid Neutralising Capacity (ANCbt)	S15-Se21894	CP	%CaCO3	n/a	n/a	n/a	30%	Pass	
Acid Neutralising Capacity - equivalent S% pyrite (s-ANCbt)	S15-Se21894	CP	% S	n/a	n/a	n/a	30%	Pass	
ANC Fineness Factor	S15-Se21894	CP	factor	1.5	1.5	<1	30%	Pass	
Net Acidity (Sulfur Units)	S15-Se21894	CP	% S	0.03	0.03	n/a	30%	Pass	
Net Acidity (Acidity Units)	S15-Se21894	CP	mol H+/t	21	21	n/a	30%	Pass	
Liming Rate	S15-Se21894	CP	kg CaCO3/t	2.0	2.0	2.0	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	S15-Se21895	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	S15-Se21895	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	S15-Se21895	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	S15-Se21895	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	S15-Se21895	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	S15-Se21895	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	S15-Se21895	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	S15-Se21895	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	

Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Chrysene	S15-Se21895	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	S15-Se21895	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	S15-Se21895	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	S15-Se21895	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	S15-Se21895	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	S15-Se21895	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	S15-Se21895	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	S15-Se21895	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S15-Se21899	CP	mg/kg	5.0	5.2	4.0	30%	Pass	
Cadmium	S15-Se21899	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	S15-Se21899	CP	mg/kg	20	21	4.0	30%	Pass	
Copper	S15-Se21899	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Lead	S15-Se21899	CP	mg/kg	7.9	8.7	10	30%	Pass	
Mercury	S15-Se21899	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Nickel	S15-Se21899	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Zinc	S15-Se21899	CP	mg/kg	10.0	10.0	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S15-Se21904	CP	%	24	23	3.0	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
Q15	The RPD reported passes Eurofins | mgt's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.
S01	Liming rate is calculated and reported on a dry weight basis assuming use of fine agricultural lime (CaCO3) and using a safety factor of 1.5 to allow for non-homogeneous mixing and poor reactivity of lime. For conversion of Liming Rate from 'kg/t dry weight' to 'kg/m3 in-situ soil' multiply 'reported results' x 'wet bulk density of soil in t/m3'
S02	Retained Acidity is Reported when the pHKCl is less than pH 4.5
S03	Acid Neutralising Capacity is only required if the pHKCl if greater than or equal to pH 6.5
S04	Acid Sulfate Soil Samples have a 24 hour holding time unless frozen or dried within that period

Authorised By

Charl Du Preez	Analytical Services Manager
Bob Symons	Senior Analyst-Inorganic (NSW)
Bryan Wilson	Senior Analyst-Metal (QLD)
Ivan Taylor	Senior Analyst-Metal (NSW)
Nibha Vaidya	Senior Analyst-Asbestos (NSW)
Richard Corner	Senior Analyst-Inorganic (QLD)
Ryan Hamilton	Senior Analyst-Organic (NSW)
Ryan Hamilton	Senior Analyst-Volatile (NSW)

Glenn Jackson

National Operations Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

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

Uncertainty data is available on request

eurofins | mgt

Certificate of Analysis

Coffey Environments Pty Ltd Wollongong
118 Auburn Street
Wollongong
NSW 2500

NATA Accredited
Accreditation Number 1261
Site Number 1254

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

Attention: **Manuel Fernandez**

Report **473434-W**
Project name ENAUWOLL04242AA
Received Date Sep 23, 2015

Client Sample ID			**WB1**	**TRIP SPIKE**	**TRIP BLANK**
Sample Matrix			**Water**	**Water**	**Water**
Eurofins | mgt Sample No.			**S15-Se21905**	**S15-Se21906**	**S15-Se21907**
Date Sampled			**Sep 22, 2015**	**Sep 22, 2015**	**Sep 22, 2015**
Test/Reference	LOR	Unit			
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	-	-	< 0.02
Total Recoverable Hydrocarbons - 1999 NEPM Fractions					
TRH C6-C9	0.02	mg/L	< 0.02	-	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05	-	-
TRH C15-C28	0.1	mg/L	< 0.1	-	-
TRH C29-C36	0.1	mg/L	< 0.1	-	-
TRH C10-36 (Total)	0.1	mg/L	< 0.1	-	-
BTEX					
Benzene	0.001	mg/L	< 0.001	101%	< 0.001
Toluene	0.001	mg/L	< 0.001	99%	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001	95%	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002	91%	< 0.002
o-Xylene	0.001	mg/L	< 0.001	94%	< 0.001
Xylenes - Total	0.003	mg/L	< 0.003	92%	< 0.003
4-Bromofluorobenzene (surr.)	1	%	104	103	98
Total Recoverable Hydrocarbons - 2013 NEPM Fractions					
TRH C6-C10	0.02	mg/L	-	-	< 0.02
Volatile Organics					
Naphthalene[N02]	0.02	mg/L	-	-	< 0.02
Total Recoverable Hydrocarbons - 2013 NEPM Fractions					
Naphthalene[N02]	0.02	mg/L	< 0.02	-	-
TRH C6-C10	0.02	mg/L	< 0.02	-	-
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02	-	-
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	< 0.05	-	-
Polycyclic Aromatic Hydrocarbons					
Acenaphthene	0.001	mg/L	< 0.001	-	-
Acenaphthylene	0.001	mg/L	< 0.001	-	-
Anthracene	0.001	mg/L	< 0.001	-	-
Benz(a)anthracene	0.001	mg/L	< 0.001	-	-
Benzo(a)pyrene	0.001	mg/L	< 0.001	-	-
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001	-	-
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001	-	-
Benzo(k)fluoranthene	0.001	mg/L	< 0.001	-	-
Chrysene	0.001	mg/L	< 0.001	-	-
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001	-	-
Fluoranthene	0.001	mg/L	< 0.001	-	-

Client Sample ID			WB1	TRIP SPIKE	TRIP BLANK
Sample Matrix			**Water**	**Water**	**Water**
Eurofins | mgt Sample No.			**S15-Se21905**	**S15-Se21906**	**S15-Se21907**
Date Sampled			**Sep 22, 2015**	**Sep 22, 2015**	**Sep 22, 2015**
Test/Reference	LOR	Unit			
Polycyclic Aromatic Hydrocarbons					
Fluorene	0.001	mg/L	< 0.001	-	-
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001	-	-
Naphthalene	0.001	mg/L	< 0.001	-	-
Phenanthrene	0.001	mg/L	< 0.001	-	-
Pyrene	0.001	mg/L	< 0.001	-	-
Total PAH*	0.001	mg/L	< 0.001	-	-
2-Fluorobiphenyl (surr.)	1	%	80	-	-
p-Terphenyl-d14 (surr.)	1	%	116	-	-
Total Recoverable Hydrocarbons - 2013 NEPM Fractions					
TRH >C10-C16	0.05	mg/L	< 0.05	-	-
TRH >C16-C34	0.1	mg/L	0.1	-	-
TRH >C34-C40	0.1	mg/L	< 0.1	-	-
Heavy Metals					
Arsenic (filtered)	0.001	mg/L	< 0.001	-	-
Cadmium (filtered)	0.0001	mg/L	< 0.0001	-	-
Chromium (filtered)	0.001	mg/L	< 0.001	-	-
Copper (filtered)	0.001	mg/L	< 0.001	-	-
Lead (filtered)	0.001	mg/L	< 0.001	-	-
Mercury (filtered)	0.0001	mg/L	< 0.0001	-	-
Nickel (filtered)	0.001	mg/L	< 0.001	-	-
Zinc (filtered)	0.005	mg/L	< 0.005	-	-

Sample History

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

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

Description	Testing Site	Extracted	Holding Time
TRH C6-C10 less BTEX (F1)	Sydney	Sep 23, 2015	14 Day
- Method: LM-LTM-ORG-2010			
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Sydney	Sep 24, 2015	7 Day
- Method: TRH C6-C36 - LTM-ORG-2010			
BTEX	Sydney	Sep 23, 2015	14 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Sep 23, 2015	7 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Volatile Organics	Sydney	Sep 23, 2015	7 Day
- Method: E016 Volatile Organic Compounds (VOC)			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Sep 23, 2015	7 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Eurofins | mgt Suite B4			
Polycyclic Aromatic Hydrocarbons	Sydney	Sep 24, 2015	7 Day
- Method: E007 Polyaromatic Hydrocarbons (PAH)			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Sep 24, 2015	7 Day
- Method: TRH C6-C40 - LTM-ORG-2010			
Metals M8 filtered	Sydney	Sep 23, 2015	28 Day
- Method: LTM-MET-3040 Metals in Waters by ICP-MS			

eurofins | mgt

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

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

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

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

Company Name: Coffey Environments Pty Ltd Wollongong
Address: 118 Auburn Street
Wollongong
NSW 2500

Project Name: ENAUWOLL04242AA

Order No.:
Report #: 473434
Phone: 02 4201 1400
Fax: 02 4201 1401

Received: Sep 23, 2015 2:45 PM
Due: Sep 30, 2015
Priority: 5 Day
Contact Name: Manuel Fernandez

Eurofins | mgt Client Manager: Charl Du Preez

Sample Detail					Asbestos - AS4964	Conductivity (1:5 aqueous extract at 25°C)	HOLD	pH (1:5 Aqueous extract)	Polycyclic Aromatic Hydrocarbons	Metals M8	Metals M8 filtered	BTEX	Foreign Material - Type III	Halogenated Volatile Organics	Chromium Suite	Moisture Set	Moisture Set	Total Recoverable Hydrocarbons	Eurofins | mgt Suite B4	BTEX and Volatile TRH
Laboratory where analysis is conducted																				
Melbourne Laboratory - NATA Site # 1254 & 14271																				
Sydney Laboratory - NATA Site # 18217					X	X	X	X	X	X	X	X	X	X		X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794															X	X	X			
External Laboratory																				
Sample ID	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**																
T1-1	Sep 21, 2015		Soil	S15-Se21862			X													
T1-2	Sep 21, 2015		Soil	S15-Se21863			X													
T1-3	Sep 21, 2015		Soil	S15-Se21864													X		X	
T1-4	Sep 21, 2015		Soil	S15-Se21865			X													
T1-5	Sep 21, 2015		Soil	S15-Se21866			X													
T2-1	Sep 21, 2015		Soil	S15-Se21867			X													
T2-2	Sep 21, 2015		Soil	S15-Se21868			X													
T2-3	Sep 21, 2015		Soil	S15-Se21869			X													
T2-4	Sep 21, 2015		Soil	S15-Se21870													X		X	
T2-5	Sep 21, 2015		Soil	S15-Se21871			X													

eurofins | mgt

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

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

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

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

Company Name: Coffey Environments Pty Ltd Wollongong
Address: 118 Auburn Street
Wollongong
NSW 2500

Project Name: ENAUWOLL04242AA

Order No.:
Report #: 473434
Phone: 02 4201 1400
Fax: 02 4201 1401

Received: Sep 23, 2015 2:45 PM
Due: Sep 30, 2015
Priority: 5 Day
Contact Name: Manuel Fernandez

Eurofins | mgt Client Manager: Charl Du Preez

Sample Detail					Asbestos - AS4964	Conductivity (1:5 aqueous extract at 25°C)	HOLD	pH (1:5 Aqueous extract)	Polycyclic Aromatic Hydrocarbons	Metals M8	Metals M8 filtered	BTEX	Foreign Material - Type III	Halogenated Volatile Organics	Chromium Suite	Moisture Set	Moisture Set	Total Recoverable Hydrocarbons	Eurofins | mgt Suite B4	BTEX and Volatile TRH
Laboratory where analysis is conducted																				
Melbourne Laboratory - NATA Site # 1254 & 14271																				
Sydney Laboratory - NATA Site # 18217					X	X	X	X	X	X	X	X	X	X		X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794															X	X	X			
External Laboratory																				
T3-1	Sep 21, 2015		Soil	S15-Se21872			X													
T3-2	Sep 21, 2015		Soil	S15-Se21873													X		X	
T3-3	Sep 21, 2015		Soil	S15-Se21874			X													
T3-4	Sep 21, 2015		Soil	S15-Se21875			X													
T3-5	Sep 21, 2015		Soil	S15-Se21876			X													
T3-6	Sep 21, 2015		Soil	S15-Se21877						X							X			
T4-1	Sep 21, 2015		Soil	S15-Se21878			X													
T4-2	Sep 21, 2015		Soil	S15-Se21879			X													
T4-3	Sep 21, 2015		Soil	S15-Se21880			X													
T4-4	Sep 21, 2015		Soil	S15-Se21881			X													
T4-5	Sep 21, 2015		Soil	S15-Se21882					X			X					X	X		

eurofins | mgt

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

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

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

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

Company Name: Coffey Environments Pty Ltd Wollongong
Address: 118 Auburn Street
Wollongong
NSW 2500

Project Name: ENAUWOLL04242AA

Order No.:
Report #: 473434
Phone: 02 4201 1400
Fax: 02 4201 1401

Received: Sep 23, 2015 2:45 PM
Due: Sep 30, 2015
Priority: 5 Day
Contact Name: Manuel Fernandez

Eurofins | mgt Client Manager: Charl Du Preez

Sample Detail					Asbestos - AS4964	Conductivity (1:5 aqueous extract at 25°C)	HOLD	pH (1:5 Aqueous extract)	Polycyclic Aromatic Hydrocarbons	Metals M8	Metals M8 filtered	BTEX	Foreign Material - Type III	Halogenated Volatile Organics	Chromium Suite	Moisture Set	Moisture Set	Total Recoverable Hydrocarbons	Eurofins | mgt Suite B4	BTEX and Volatile TRH
Laboratory where analysis is conducted																				
Melbourne Laboratory - NATA Site # 1254 & 14271																				
Sydney Laboratory - NATA Site # 18217					X	X	X	X	X	X	X	X	X	X		X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794															X	X	X			
External Laboratory																				
T-QC1	Sep 21, 2015		Soil	S15-Se21883			X													
T-QC2	Sep 21, 2015		Soil	S15-Se21884					X			X					X	X		
T-QC3	Sep 21, 2015		Soil	S15-Se21885			X													
T-QC4	Sep 21, 2015		Soil	S15-Se21886			X													
T-QC5	Sep 21, 2015		Soil	S15-Se21887			X													
TRENCH 1	Sep 21, 2015		Soil	S15-Se21888	X	X		X		X			X				X			
TRENCH 2	Sep 21, 2015		Soil	S15-Se21889	X	X		X		X			X				X			
TRENCH 3	Sep 21, 2015		Soil	S15-Se21890	X	X		X		X			X				X			
TRENCH 4	Sep 21, 2015		Soil	S15-Se21891	X	X		X		X			X				X			
TRENCH QC	Sep 21, 2015		Soil	S15-Se21892		X		X		X							X			
CBH503/0.15-0.25	Sep 21, 2015		Soil	S15-Se21893						X				X			X		X	

eurofins | mgt

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

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

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

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

Company Name: Coffey Environments Pty Ltd Wollongong
Address: 118 Auburn Street
Wollongong
NSW 2500

Project Name: ENAUWOLL04242AA

Order No.:
Report #: 473434
Phone: 02 4201 1400
Fax: 02 4201 1401

Received: Sep 23, 2015 2:45 PM
Due: Sep 30, 2015
Priority: 5 Day
Contact Name: Manuel Fernandez

Eurofins | mgt Client Manager: Charl Du Preez

Sample Detail					Asbestos - AS4964	Conductivity (1:5 aqueous extract at 25°C)	HOLD	pH (1:5 Aqueous extract)	Polycyclic Aromatic Hydrocarbons	Metals M8	Metals M8 filtered	BTEX	Foreign Material - Type III	Halogenated Volatile Organics	Chromium Suite	Moisture Set	Moisture Set	Total Recoverable Hydrocarbons	Eurofins | mgt Suite B4	BTEX and Volatile TRH
Laboratory where analysis is conducted																				
Melbourne Laboratory - NATA Site # 1254 & 14271																				
Sydney Laboratory - NATA Site # 18217					X	X	X	X	X	X	X	X	X	X		X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794															X	X	X			
External Laboratory																				
CBH503/0.85-0.95	Sep 21, 2015		Soil	S15-Se21894											X	X				
CBH504/0.2-0.25	Sep 22, 2015		Soil	S15-Se21895						X				X			X		X	
CBH505/0.1-0.15	Sep 22, 2015		Soil	S15-Se21896						X				X			X		X	
CBH506/0.1-0.25	Sep 22, 2015		Soil	S15-Se21897			X													
CBH506/0.3-0.4	Sep 22, 2015		Soil	S15-Se21898						X				X			X		X	
CBH507/0.15-0.25	Sep 22, 2015		Soil	S15-Se21899						X				X			X		X	
CBH508/0.15-0.25	Sep 22, 2015		Soil	S15-Se21900						X				X			X		X	

eurofins | mgt

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

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

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

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

Company Name: Coffey Environments Pty Ltd Wollongong
Address: 118 Auburn Street
Wollongong
NSW 2500

Project Name: ENAUWOLL04242AA

Order No.:
Report #: 473434
Phone: 02 4201 1400
Fax: 02 4201 1401

Received: Sep 23, 2015 2:45 PM
Due: Sep 30, 2015
Priority: 5 Day
Contact Name: Manuel Fernandez

Eurofins | mgt Client Manager: Charl Du Preez

Sample Detail					Asbestos - AS4964	Conductivity (1:5 aqueous extract at 25°C)	HOLD	pH (1:5 Aqueous extract)	Polycyclic Aromatic Hydrocarbons	Metals M8	Metals M8 filtered	BTEX	Foreign Material - Type III	Halogenated Volatile Organics	Chromium Suite	Moisture Set	Moisture Set	Total Recoverable Hydrocarbons	Eurofins | mgt Suite B4	BTEX and Volatile TRH
Laboratory where analysis is conducted																				
Melbourne Laboratory - NATA Site # 1254 & 14271																				
Sydney Laboratory - NATA Site # 18217					X	X	X	X	X	X	X	X	X	X		X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794															X	X	X			
External Laboratory																				
SS1/0.0-0.05	Sep 22, 2015		Soil	S15-Se21901	X															
SS2/0.0-0.01	Sep 22, 2015		Soil	S15-Se21902	X					X							X			
SS3/0.0-0.05	Sep 22, 2015		Soil	S15-Se21903			X													
SS4/0.0-0.05	Sep 22, 2015		Soil	S15-Se21904	X					X				X			X		X	
WB1	Sep 22, 2015		Water	S15-Se21905							X								X	
TRIP SPIKE	Sep 22, 2015		Water	S15-Se21906								X								
TRIP BLANK	Sep 22, 2015		Water	S15-Se21907																X
QC2	Sep 22, 2015		Soil	S15-Se21908			X													
QC1	Sep 21, 2015		Soil	S15-Se21909						X				X			X		X	
QC1A	Sep 21, 2015		Soil	S15-Se22074			X													

Eurofins | mgt Internal Quality Control Review and Glossary

General

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

Holding Times

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

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

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

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

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

UNITS

mg/kg: milligrams per Kilogram

ug/l: micrograms per litre

ppb: Parts per billion

org/100ml: Organisms per 100 millilitres

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

mg/l: milligrams per litre

ppm: Parts per million

%: Percentage

NTU: Nephelometric Turbidity Units

TERMS

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery
CRM	Certified Reference Material - reported as percent recovery
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands. In the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
Batch Duplicate	A second piece of analysis from a sample outside of the clients batch of samples but run within the laboratory batch of analysis.
Batch SPIKE	Spike recovery reported on a sample from outside of the clients batch of samples but run within the laboratory batch of analysis.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
ASLP	Australian Standard Leaching Procedure (AS4439.3)
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within
TEQ	Toxic Equivalency Quotient

QC - ACCEPTANCE CRITERIA

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

Results <10 times the LOR : No Limit

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

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

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

QC DATA GENERAL COMMENTS

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxophene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxophene 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 Arochlor 1260 in Matrix Spikes and LCS's.
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 RPD's 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/L	< 0.02			0.02	Pass	
TRH C10-C14	mg/L	< 0.05			0.05	Pass	
TRH C15-C28	mg/L	< 0.1			0.1	Pass	
TRH C29-C36	mg/L	< 0.1			0.1	Pass	
Method Blank							
BTEX							
Benzene	mg/L	< 0.001			0.001	Pass	
Toluene	mg/L	< 0.001			0.001	Pass	
Ethylbenzene	mg/L	< 0.001			0.001	Pass	
m&p-Xylenes	mg/L	< 0.002			0.002	Pass	
o-Xylene	mg/L	< 0.001			0.001	Pass	
Xylenes - Total	mg/L	< 0.003			0.003	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH C6-C10	mg/L	< 0.02			0.02	Pass	
Method Blank							
Volatile Organics							
Naphthalene	mg/L	< 0.02			0.02	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/L	< 0.001			0.001	Pass	
Acenaphthylene	mg/L	< 0.001			0.001	Pass	
Anthracene	mg/L	< 0.001			0.001	Pass	
Benz(a)anthracene	mg/L	< 0.001			0.001	Pass	
Benzo(a)pyrene	mg/L	< 0.001			0.001	Pass	
Benzo(b&j)fluoranthene	mg/L	< 0.001			0.001	Pass	
Benzo(g.h.i)perylene	mg/L	< 0.001			0.001	Pass	
Benzo(k)fluoranthene	mg/L	< 0.001			0.001	Pass	
Chrysene	mg/L	< 0.001			0.001	Pass	
Dibenz(a.h)anthracene	mg/L	< 0.001			0.001	Pass	
Fluoranthene	mg/L	< 0.001			0.001	Pass	
Fluorene	mg/L	< 0.001			0.001	Pass	
Indeno(1.2.3-cd)pyrene	mg/L	< 0.001			0.001	Pass	
Phenanthrene	mg/L	< 0.001			0.001	Pass	
Pyrene	mg/L	< 0.001			0.001	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH >C10-C16	mg/L	< 0.05			0.05	Pass	
TRH >C16-C34	mg/L	< 0.1			0.1	Pass	
TRH >C34-C40	mg/L	< 0.1			0.1	Pass	
Method Blank							
Heavy Metals							
Arsenic (filtered)	mg/L	< 0.001			0.001	Pass	
Cadmium (filtered)	mg/L	< 0.0001			0.0001	Pass	
Chromium (filtered)	mg/L	< 0.001			0.001	Pass	
Copper (filtered)	mg/L	< 0.001			0.001	Pass	
Lead (filtered)	mg/L	< 0.001			0.001	Pass	
Mercury (filtered)	mg/L	< 0.0001			0.0001	Pass	
Nickel (filtered)	mg/L	< 0.001			0.001	Pass	
Zinc (filtered)	mg/L	< 0.005			0.005	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	109			70-130	Pass	
TRH C10-C14	%	118			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	98			70-130	Pass	
Toluene	%	100			70-130	Pass	
Ethylbenzene	%	101			70-130	Pass	
m&p-Xylenes	%	100			70-130	Pass	
o-Xylene	%	100			70-130	Pass	
Xylenes - Total	%	100			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH C6-C10	%	100			70-130	Pass	
LCS - % Recovery							
Volatile Organics							
Naphthalene	%	104			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	125			70-130	Pass	
Acenaphthylene	%	120			70-130	Pass	
Anthracene	%	111			70-130	Pass	
Benz(a)anthracene	%	127			70-130	Pass	
Benzo(a)pyrene	%	128			70-130	Pass	
Benzo(b&j)fluoranthene	%	124			70-130	Pass	
Benzo(g.h.i)perylene	%	111			70-130	Pass	
Benzo(k)fluoranthene	%	124			70-130	Pass	
Chrysene	%	120			70-130	Pass	
Dibenz(a.h)anthracene	%	109			70-130	Pass	
Fluoranthene	%	118			70-130	Pass	
Fluorene	%	124			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	113			70-130	Pass	
Naphthalene	%	119			70-130	Pass	
Phenanthrene	%	105			70-130	Pass	
Pyrene	%	125			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH >C10-C16	%	112			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic (filtered)	%	122			70-130	Pass	
Cadmium (filtered)	%	126			70-130	Pass	
Chromium (filtered)	%	115			70-130	Pass	
Copper (filtered)	%	115			70-130	Pass	
Lead (filtered)	%	124			70-130	Pass	
Mercury (filtered)	%	98			70-130	Pass	
Nickel (filtered)	%	120			70-130	Pass	
Zinc (filtered)	%	116			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	S15-Se20264	NCP	%	100			70-130	Pass	
TRH C10-C14	S15-Se19686	NCP	%	105			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	S15-Se20264	NCP	%	99			70-130	Pass	
Toluene	S15-Se20264	NCP	%	99			70-130	Pass	
Ethylbenzene	S15-Se20264	NCP	%	97			70-130	Pass	
m&p-Xylenes	S15-Se20264	NCP	%	94			70-130	Pass	
o-Xylene	S15-Se20264	NCP	%	95			70-130	Pass	
Xylenes - Total	S15-Se20264	NCP	%	94			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
TRH C6-C10	S15-Se20264	NCP	%	94			70-130	Pass	
Spike - % Recovery									
Volatile Organics				Result 1					
Naphthalene	S15-Se20264	NCP	%	103			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	S15-Se20264	NCP	%	103			70-130	Pass	
TRH C6-C10	S15-Se20264	NCP	%	94			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
TRH >C10-C16	S15-Se19686	NCP	%	100			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic (filtered)	S15-Se21591	NCP	%	114			70-130	Pass	
Cadmium (filtered)	S15-Se21591	NCP	%	120			70-130	Pass	
Chromium (filtered)	S15-Se21591	NCP	%	107			70-130	Pass	
Copper (filtered)	S15-Se21591	NCP	%	107			70-130	Pass	
Lead (filtered)	S15-Se21591	NCP	%	117			70-130	Pass	
Mercury (filtered)	S15-Se21591	NCP	%	98			70-130	Pass	
Nickel (filtered)	S15-Se21591	NCP	%	112			70-130	Pass	
Zinc (filtered)	S15-Se21591	NCP	%	108			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C10-C14	S15-Se19684	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH C15-C28	S15-Se19684	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH C29-C36	S15-Se19684	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	S15-Se23081	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Toluene	S15-Se23081	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Ethylbenzene	S15-Se23081	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
m&p-Xylenes	S15-Se23081	NCP	mg/L	< 0.002	< 0.002	<1	30%	Pass	
o-Xylene	S15-Se23081	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Duplicate									
Volatile Organics				Result 1	Result 2	RPD			
Naphthalene	S15-Se23081	NCP	mg/L	< 0.02	< 0.02	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	S15-Se23081	NCP	mg/L	< 0.02	**	<1	30%	Pass	

Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	S15-Se24969	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Acenaphthylene	S15-Se24969	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Anthracene	S15-Se24969	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benz(a)anthracene	S15-Se24969	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(a)pyrene	S15-Se24969	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(b&j)fluoranthene	S15-Se24969	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(g.h.i)perylene	S15-Se24969	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Benzo(k)fluoranthene	S15-Se24969	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Chrysene	S15-Se24969	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Dibenz(a.h)anthracene	S15-Se24969	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Fluoranthene	S15-Se24969	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Fluorene	S15-Se24969	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	S15-Se24969	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Naphthalene	S15-Se24969	NCP	mg/L	0.055	0.047	17	30%	Pass	
Phenanthrene	S15-Se24969	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Pyrene	S15-Se24969	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
TRH >C10-C16	S15-Se19684	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH >C16-C34	S15-Se19684	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH >C34-C40	S15-Se19684	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic (filtered)	S15-Se21590	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Cadmium (filtered)	S15-Se21590	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Chromium (filtered)	S15-Se21590	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper (filtered)	S15-Se21590	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Lead (filtered)	S15-Se21590	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Mercury (filtered)	S15-Se21590	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel (filtered)	S15-Se21590	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Zinc (filtered)	S15-Se21590	NCP	mg/L	< 0.005	< 0.005	<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

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

Glenn Jackson

National Operations Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

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

Uncertainty data is available on request

Chain of Custody

Laboratory Quotation / Order No:

Job No: 04242AA

Sheet 1 of

Dispatch to: (Address & Phone No.) Eurofins MGT, Unit 3F, 16 Mars Rd, WEST LANE COVE NSW 2066	Sampled by: A. Williams	Consigning Officer: A. Williams Date Dispatched: 23/9/15
Attention: Sample Receipt	Project Manager: (report results to) M. Fernandez	Courier Service: MEB Couries Consignment Note No: #

Relinquished by:	Date:	Time:	Received by:	Da
A. Williams	23/9/15	07:00	Ellen Wa E Floyd	23

Comments	Sample Matrix	Container Type and Preservative	Sample No.	Date Sampled	Analyses Required: PAHs	TPH/BTEX/PAH	MAHs = BTEX	Metals: M8	pH IEC	Foreign Materials	Asbestos	
	SOIL	Ice; 250mL jar	T1-1	21/9/15		✓						
			T1-2			✓						
			T1-3			✓						
			T1-4									
			T1-5									
			T2-1									
			T2-2									
			T2-3									
			T2-4			✓						
			T2-5									
			T3-1									
			T3-2			✓						
			T3-3									
			T3-4									
		Jar + Ziplock	T3-5									
		Jar + Ziplock	T3-6					✓			✓	

Special Laboratory Instructions:

Chain of Custody

Laboratory Quotation / Order No:

Job No: 04242AA

Dispatch to: (Address & Phone No.)	Sampled by: A. Williams	Consigning Officer: A Williams Date Dispatched: 23/9/15
Attention:	Project Manager: (report results to)	Courier Service: Consignment Note No: #473434

Relinquished by:	Date:	Time:	Received by:
	"	"	

Comments	Sample Matrix	Container Type and Preservative	Sample No.	Date Sampled	Analyses Required: PAHs	TPHs/BTEX/PAH	MAHs = BTEX	Metals: As &	pH/EC	Foreign Materials*	Asbestos ID**
	SOIL	Ice; 250mL jar	T4-1	23/9/15							
			T4-2								
			T4-3								
			T4-4								
			T4-5			/					
			T-QC1								
Please form composite samples for pH, EC, metals analysis as listed below:			T-QC2			/					
			T-QC3								
			T-QC4								
			T-QC5								
Composite T1-1 to T1-5		Ziplock & Bulk bag	Trench 1					/	/	/	/
Composite T2-1 to T2-5			Trench 2					/	/	/	/
Composite T3-1 to T3-5			Trench 3					/	/	/	/
Composite T4-1 to T4-5			Trench 4					/	/	/	/
Composite T-QC1 to T-QC5		NIL	Trench QC					/	/	/	/

Special Laboratory Instructions: Foreign materials* Type III RTA test method T, Asbestos ID** to Australian Standard

Chain of Custody

Laboratory Quotation / Order No:

Job No: 4242AA

Dispatch to: (Address & Phone No.)	Sampled by:	Consigning Officer: A Williams Date Dispatched: 23/9/15
Attention:	Project Manager: (report results to)	Courier Service: A&B Courier Consignment Note No: #473434

Relinquished by:	Date:	Time:	Received by:
	〃	〃	

Comments	Sample Matrix	Container Type and Preservative	Sample No.	Date Sampled	Analyses Required: PAHs	TPHs	MAHs = BTEX	Metals:
	SOIL	1Le, 250mL jar + Zip	CBH503 / 0.15-0.25	21/9/15				
	〃	jar only	CBH503 / 0.85-0.95	↓				
	〃	Jar + Ziplock	CBH504 / 0.2-0.2	22/9/15				
	〃	Jar + Ziplock	CBH505 / 0.1-0.15					
	〃	Jar + Ziplock	CBH506 / 0.1-0.25					
	〃	Jar + Ziplock	CBH506 / 0.3-0.4					
	〃	Jar + Ziplock	CBH507 / 0.15-0.25					
	〃	Jar + Ziplock	CBH508 / 0.15-0.25					
	〃	Ziplock only	SS1 / 0.0-0.05					
	〃	Jar + Ziplock	SS2 / 0.0-0.05					
	〃	〃	SS3 / 0.0-0.05					
	↓	↓	SS4 / 0.0-0.05	↓				
	WATER	Amber, Vials, Plastic (HNO3)	WB1	22/9/15				
	〃	Vials	Trip Spike					
	〃	Vials	Trip blank					
	SOIL	Jar only	QC2	22/9/15				
	↓	↓	QC1	21/9/15				

Special Laboratory Instructions:

Sample Receipt 1 Syd

Subject: FW. COC - ENAUWOLL04242AA

From: Manuel Fernandez [mailto:Manuel.Fernandez@coffey.com]
Sent: Wednesday, 23 September 2015 4:10 PM
To: Sample Receipt 1 Syd; Charl DuPreez; EnviroSampleNSW
Cc: Alexander Williams
Subject: RE: COC - ENAUWOLL04242AA

Hi Ellen,

Just put it on hold - thanks

Kind Regards

Manuel Fernandez
Principal Environmental Engineer

118 Auburn Street
Wollongong, NSW 2500, Australia

t: +61 2 4201 1430 (direct)
t: +61 2 4201 1400 (office)
m: +61 401 106 772

coffey

#473434

From: Sample Receipt 1 Syd [mailto:sample_syd_1@eurofins.com.au]
Sent: Wednesday, 23 September 2015 4:01 PM
To: Manuel Fernandez; Charl DuPreez; EnviroSampleNSW
Cc: Alexander Williams
Subject: RE: COC - ENAUWOLL04242AA

Hi Manuel,
Sample QC1A was received can you let me know if it is to be forwarded to another lab?
Thank you
Ellen

Sample Receipt 1 Syd
Phone : +61 2 9900 8400
Email : sample_syd_1@eurofins.com.au

Analytical discussion on PFOS linear and branched isomers quantification explained - click here for more information

From: *Manuel Fernandez [mailto:Manuel.Fernandez@coffey.com]*
Sent: *Wednesday, 23 September 2015 2:13 PM*
To: *Charl DuPreez; EnviroSampleNSW*
Subject: *COC - ENAUWOLL04242AA*

Hi Charl,

coffey

Chain of Custody

No: 28205

Laboratory Quotation / Order No.

Job No: ENAUWOL 04242AA1 Sheet 1 of 3

Dispatch to: (Address & Phone No.) Eurofins MGT Unit 3F, 16 Mars Rd WEST LANE COVE NSW 2066	Sampled by A. Williams	Consigning Officer: A Williams Date Dispatched: 23/9/15
Attention: Sample Receipt	Project Manager (report results to) M. Fernandez	Courier Service: MEB Couries Consignment Note No: REVISED COC #473434

Relinquished by	Date	Time	Received by:	Date:	Time
A. Williams	23/9/15	07:00	Elaine Gosk	230915	

Comments	Sample Matrix	Container Type and Preservative	Sample No.	Date Sampled	Analyses Required: TPH/BTEX/PAH (B4)	PAHs	TPH/BTEX	MAHs = BTEX	Metals: M8	pH/EC	Foreign Materials	Asbestos ID	Sample Condition on Receipt
	SOIL	Ice; 250mL jar	T1-1	21/9/15									
			T1-2										
			T1-3										
			T1-4										
			T1-5										
			T2-1										
			T2-2										
			T2-3										
			T2-4										
			T2-5										
			T3-1										
			T3-2										
			T3-3										
			T3-4										
	↓	Jar ~~+ Ziplock~~	T3-5	↓									
	↓	Jar + Ziplock	T3-6	↓									

Special Laboratory Instructions:

Detection Limits:

Turnaround Required Standard 5 DAY

JOB NUMBER MUST BE REFERENCED ON ALL SUBSEQUENT PAGES

642209-06

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

coffey

Chain of Custody

No: 28206

Laboratory Quotation / Order No:

Job No: ENAWOLL 04242AA

Sheet 2 of 3

Dispatch to: (Address & Phone No.)	Sampled by: A Williams	Consigning Officer: A. Williams Date Dispatched: 23/9/15
Attention:	Project Manager (report results to):	Courier Service: Consignment Note No:

Relinquished by:	Date:	Time:	Received by:	Date:	Time:

Comments	Sample Matrix	Container Type and Preservative	Sample No.	Date Sampled	Analyses Required: PAHs	TPH/BTEX/OAH	MAHs = BTEX	Metals: as listed	pH/EC	Foreign Materials*	Asbestos ID**	Sample Condition on Receipt
	SOIL	Ice, 250mL jar	T4-1	23/9/15								
			T4-2									
			T4-3									
			T4-4									
			T4-5			/						
			T-QC1									
Please form composite samples for pH, EC, metals analysis as listed below			T-QC2			/						
			T-QC3									
			T-QC4									
			T-QC5									
Composite T1-1 to T1-5		Ziplock & Bulk bag	Trench 1									
Composite T2-1 to T2-5			Trench 2									
Composite T3-1 to T3-5			Trench 3									
Composite T4-1 to T4-5			Trench 4									
Composite T-QC1 to T-QC5		NIL	Trench QC									

Special Laboratory Instructions: Foreign materials* Type III RTA test method T, Asbestos ID** to Australian Standard

Detection Limits:

Turnaround Required: Standard 5 Day

JOB NUMBER MUST BE REFERENCED ON ALL SUBSEQUENT PAGES

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

coffey

Chain of Custody

No: 28207

Laboratory Quotation / Order No:

Job No: ENAUWOLL 04241AA

Sheet 3 of 3

Dispatch to (Address & Phone No.)	Sampled by:	Consigning Officer: A. Williams Date Dispatched: 23/9/15
Attention:	Project Manager: (report results to)	Courier Service: M&B Courier Consignment Note No:

Relinquished by:	Date:	Time:	Received by:	Date:	Time:

Comments	Sample Matrix	Container Type and Preservative	Sample No.	Date Sampled	Analyses Required: PAHs	TPHs	BTEX & TRH C6-C10/BTEX	Metals *	B+	TRH C6-C10/BTEX	Asbestos	VHC Acid Extractable Semi-Volatile							Sample Condition on Receipt
	SOIL	1Le, 250mL jar + Zip	CBH503/0.15-0.25	21/9/15				/	/			/							
		jar only	CBH503/0.85-0.95	↓									/						
		Jar + Ziplock	CBH504/0.2-0.25	22/9/15				/	/			/							
		Jar + Ziplock	CBH505/0.1-0.15					/	/			/							
		Jar + Ziplock	CBH506/0.1-0.25																
		Jar + Ziplock	CBH506/0.3-0.4					/	/			/							
		Jar + Ziplock	CBH507/0.15-0.25					/	/			/							
		Jar + Ziplock	CBH508/0.15-0.25					/	/			/							
		Ziplock only	SS1/0.0-0.05								/								
		Jar + Ziplock	SS2/0.0-0.05					/			/								
		↓	SS3/0.0-0.05																
	↓	↓	SS4/0.0-0.05	↓				/	/		/	/							
	WATER	Amber, Vials, Plastic HNO3	WB1	22/9/15				/	/										
		Vials	Trip Spike				/												
	↓	Vials	Trip blank							/									
	SOIL	Jar only	QC2	22/9/15															
	↓	↓	QC1	21/9/15				/	/			/							

Special Laboratory Instructions: RA = TPH, BTEX, PAH

* metals = As, Cd, Cr, Cu, Pb, Hg, Ni, Zn

Detection Limits:

Turnaround Required: Standard.

JOB NUMBER MUST BE REFERENCED ON ALL SUBSEQUENT PAGES

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

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

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

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

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

Sample Receipt Advice

Company name:	**Coffey Environments Pty Ltd Wollongong**
Contact name:	Manuel Fernandez
Project name:	ENAUWOLL04242AA
COC number:	28205-07
Turn around time:	5 Day
Date/Time received:	Sep 23, 2015 2:45 PM
Eurofins | mgt reference:	**473434**

Sample information

☑ A detailed list of analytes logged into our LIMS, is included in the attached summary table.

☑ Sample Temperature of a random sample selected from the batch as recorded by Eurofins | mgt Sample Receipt : 1.6 degrees Celsius.

☑ All samples have been received as described on the above COC.

☑ COC has been completed correctly.

☑ Attempt to chill was evident.

☑ Appropriately preserved sample containers have been used.

☑ All samples were received in good condition.

☑ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.

☑ Appropriate sample containers have been used.

☑ Sample containers for volatile analysis received with zero headspace.

☒ Some samples have been subcontracted.

N/A Custody Seals intact (if used).

Notes

No bag received for sample SS4/0.0-0.05 asbestos conducted from jar

Contact notes

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

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

Results will be delivered electronically via e.mail to Manuel Fernandez - Manuel_Fernandez@coffey.com.

This page has been left intentionally blank

ANNEXURE 10

ANNEXURE 10

Geotechnical Assessment

Riverbank Stability

prepared by

Coffey Geotechnics

118 Auburn St
Wollongong
NSW 2500 Australia

t: +61 2 4201 1400
f:+61 2 4201 1401

coffey.com

8 October 2015

Our ref: ENAUWOLL04242AA-L01

Manildra Group Pty Ltd
36 Bolong Road, Bomaderry NSW 2541

Attention: Aaron Ticehurst

Dear Aaron,

Geotechnical assessment - Potential effects of proposed starch dryer on stability of Abernathy's Creek and northern bank of Shoalhaven River

1. Introduction

Manildra Group is proposing to construct a new starch dryer to the east of the existing maintenance building. The required objective for the geotechnical assessment was to assess potential effects of the development of the proposed starch dryer plant on the stability of the Abernathy's Creek bank and the northern bank of the Shoalhaven River.

2. Site visit and observations

A Coffey senior geotechnical engineer visited the site on 18 September 2015 and observed the existing condition of the banks of Abernathy's Creek and the ground surface adjacent to the banks where it passes the proposed site for the new starch dryer plant. Our observations are summarised as follows:

- The southern and eastern extent of the proposed starch dryer building will be positioned approximately on the current alignment of the southern and eastern walls of the existing warehouse/workshop which is to be demolished (see Photograph 1 below);
- The footprint of the proposed dryer will be positioned approximately 8m from the top of the western bank of Abernathy's Creek at the southern end of the building and 16m from the top of the creek bank at the northern end;
- The approximate height of the creek banks is 3.5m;

- The creek banks (specifically western bank nearest the Dryer Plant) are relatively steep with slopes ranging from approximately 35º to 45º adjacent to the proposed location for the new Dryer, with flatter slope to the south;
- The depth of the water in the creek at the time of observation was approximately between 0.5m to 1m with a steady flow;
- The water level had increased to about 1m below the crest of the bank during the recent flooding event and then returned to the level as observed above a few days after the flooding event; and
- No sign of any slumping or failure of the banks due to the recent flooding was observed.
- Parts of the creek banks were covered with thick vegetation at the time of our site observations. comprising mainly grass, creepers and weeds, with trees ranging from small to mature towards the southern and northern sections of the creek near the proposed site Dryer Plant ;

Photograph 1 – Existing warehouse/workshop and pedestrian bridge over Abernathy's Creek at the proposed location for dryer plant; view looking north. Note mounded surface along top of creek bank

- There is a pedestrian bridge (see Photographs 1 to 3) over Abernathy's Creek (approximately 10 m from the south-east corner of the proposed dryer site) which will remain following construction of the new dryer. The creek banks exhibited no signs of instability or erosion at or adjacent to the bridge abutments where the banks were clear of vegetation;

Photograph 2 – Existing pedestrian bridge and thick vegetation over western banks of creek-view looking north-east.

Photograph 3 – Pedestrian bridge abutments and eastern creek bank; view looking east.

- The ground surface adjacent to top of the western bank of Abernathy's Creek is near level and is mainly a gravel surfaced hard stand area. The ground surface adjacent to the eastern bank was mainly concrete paved (footpath) to the south of the existing pedestrian bridge. No cracking of the concrete paving , or signs of instability were observed on the ground surface adjacent to the banks (see Photograph 4 below);

Photograph 4 – View of creek banks showing paved areas either side of creek and thick vegetation over the banks to the south of the site; photo looking south.

- There is a raised earth mound (see Photographs 1 and 2) approximately 0.5m high running along the western bank crest to the south of the existing building. It appears that the mound prevents surface water from flowing directly overflow over the bank;

  Surface water on the western side of the creek generally appears to be directed to the surface drains to the south and north of the existing building (at the proposed location for Dryer) and then is piped to the creek at each location. We are advised by Manildra that the outlet of the northern pipe is near the creek bed (below water) and was not visible. The southern surface water drains to the creek through a pipe (approximately 150mm in diameter) located to the south east of the site (see Photograph 5 below) and positioned at a higher elevation on the bank. No obvious signs of local/general instability or recent erosion were observed at this drainage outlet;

Photograph 5 – Surface water drain to the south-east of the site; view looking north.

- The creek banks (specifically to the south of the pedestrian bridge) were covered with relatively thick vegetation at the time of our site visit. However, no obvious signs of any recent local/general instability or erosion of the banks were observed at the time of our site visit;
- There are a number of trees on both creek banks to the north of the pedestrian bridge (see Photograph 6 below);

Photograph 6 – Trees on the western creek bank to the north of the pedestrian bridge, and old rock revetment on the western bank; view looking south-west.

- The lower part of the western creek bank to the north of the pedestrian bridge was covered by an old rock revetment (see Photograph 6) which appeared to have minimal interlock between the rocks, but has been effective in protecting this part of the bank for some years . The eastern bank and southern part of the western bank were not protected by any rock revetment or similar;

Assessment and recommendations

We understand that a deep foundation system (piles) will be used to transfer loads from the new dryer plant structure to the bedrock. We also understand that there will be no significant excavations or filling and the current ground surface will remain at or very close to current levels. Therefore, taking into account the position of the new dryer relative to the nearest creek bank (a minimum of 8m from top of western bank) and the existing condition of the creek banks, it is assessed that the development of the new dryer building will not adversely affects the stability of the Abernathy's creek banks.

In relation to potential effects of the dryer building on the stability of the northern bank of the Shoalhaven River, it is assessed that as the river bank is approximately 100m from the dryer site, the development of the dryer building will not adversely affect the stability of the river bank.

In order to manage surface water flows from the new building (roof and paved surrounds), we recommend the following:-

- Provision of dedicated drainage paths (pipes and or open lined channels) with regularly spaced outlets to the western bank of the creek and suitable erosion protection at the discharge points;
- Any excavations deeper than 600mm required for drainage or service installations between the dryer building and the western bank of Abernathy's Creek should be reviewed by Coffey, including shoring support and backfill requirements;
- During and following the construction, regularly monitoring the creek banks should be carried out by observation following significant rainfall events. Should any signs of instability or obvious erosion become evident, geotechnical advice should be sought; and
- The area between the dryer building and the western creek bank should not be accessed by heavy vehicles or used for storage of heavy containers or equipment.

We draw your attention to the document following the report entitled "Important Information about Your Coffey Report" which should be read in conjunction with this report.

Should you have any questions in relation to this report please contact the undersigned in our Wollongong office.

For and on behalf of Coffey

Kourosh Kianfar
Project Geotechnical Engineer

Attachment: Important Information about Your Coffey Report

Important information about your **Coffey** Report

As a client of Coffey you should know that site subsurface conditions cause more construction problems than any other factor. These notes have been prepared by Coffey to help you interpret and understand the limitations of your report.

Your report is based on project specific criteria

Your report has been developed on the basis of your unique project specific requirements as understood by Coffey and applies only to the site investigated. Project criteria typically include the general nature of the project; its size and configuration; the location of any structures on the site; other site improvements; the presence of underground utilities; and the additional risk imposed by scope-of-service limitations imposed by the client. Your report should not be used if there are any changes to the project without first asking Coffey to assess how factors that changed subsequent to the date of the report affect the report's recommendations. Coffey cannot accept responsibility for problems that may occur due to changed factors if they are not consulted.

Subsurface conditions can change

Subsurface conditions are created by natural processes and the activity of man. For example, water levels can vary with time, fill may be placed on a site and pollutants may migrate with time. Because a report is based on conditions which existed at the time of subsurface exploration, decisions should not be based on a report whose adequacy may have been affected by time. Consult Coffey to be advised how time may have impacted on the project.

Interpretation of factual data

Site assessment identifies actual subsurface conditions only at those points where samples are taken and when they are taken. Data derived from literature and external data source review, sampling and subsequent laboratory testing are interpreted by geologists, engineers or scientists to provide an opinion about overall site conditions, their likely impact on the proposed development and recommended actions. Actual conditions may differ from those inferred to exist, because no professional, no matter how qualified, can reveal what is hidden by earth, rock and time. The actual interface between 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, owners should retain the services of Coffey through the development stage, to identify variances, conduct additional tests if required, and recommend solutions to problems encountered on site.

Your report will only give preliminary recommendations

Your report is based on the assumption that the site conditions as revealed through selective point sampling are indicative of actual conditions throughout an area. This assumption cannot be substantiated until project implementation has commenced and therefore your report recommendations can only be regarded as preliminary. Only Coffey, who prepared the report, is fully familiar with the background information needed to assess whether or not the report's recommendations are valid and whether or not changes should be considered as the project develops. If another party undertakes the implementation of the recommendations of this report there is a risk that the report will be misinterpreted and Coffey cannot be held responsible for such misinterpretation.

Your report is prepared for specific purposes and persons

To avoid misuse of the information contained in your report it is recommended that you confer with Coffey before passing your report on to another party who may not be familiar with the background and the purpose of the report. Your report should not be applied to any project other than that originally specified at the time the report was issued.

Important information about your **Coffey** Report

Interpretation by other design professionals

Costly problems can occur when other design professionals develop their plans based on misinterpretations of a report. To help avoid misinterpretations, retain Coffey to work with other project design professionals who are affected by the report. Have Coffey explain the report implications to design professionals affected by them and then review plans and specifications produced to see how they incorporate the report findings.

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, drawings, etc. are customarily included in our reports and are developed by scientists, engineers or geologists based on their interpretation of field logs (assembled by field personnel) and laboratory evaluation of field samples. These logs etc. should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way.

Geoenvironmental concerns are not at issue

Your report is not likely to relate any findings, conclusions, or recommendations about the potential for hazardous materials existing at the site unless specifically required to do so by the client. Specialist equipment, techniques, and personnel are used to perform a geoenvironmental assessment. Contamination can create major health, safety and environmental risks. If you have no information about the potential for your site to be contaminated or create an environmental hazard, you are advised to contact Coffey for information relating to geoenvironmental issues.

Rely on Coffey for additional assistance

Coffey is familiar with a variety of techniques and approaches that can be used to help reduce risks for all parties to a project, from design to construction. It is common that not all approaches will be necessarily dealt with in your site assessment report due to concepts proposed at that time. As the project progresses through design towards construction, speak with Coffey to develop alternative approaches to problems that may be of genuine benefit both in time and cost.

Responsibility

Reporting relies on interpretation of factual information based on judgement and opinion and has a level of uncertainty attached to it, which is far less exact than the design disciplines. This has often resulted in claims being lodged against consultants, which are unfounded. To help prevent this problem, a number of clauses have been developed for use in contracts, reports and other documents. Responsibility clauses do not transfer appropriate liabilities from Coffey to other parties but are included to identify where Coffey's responsibilities begin and end. Their use is intended to help all parties involved to recognise their individual responsibilities. Read all documents from Coffey closely and do not hesitate to ask any questions you may have.

* For further information on this aspect reference should be made to "Guidelines for the Provision of Geotechnical information in Construction Contracts" published by the Institution of Engineers Australia, National headquarters, Canberra, 1987.