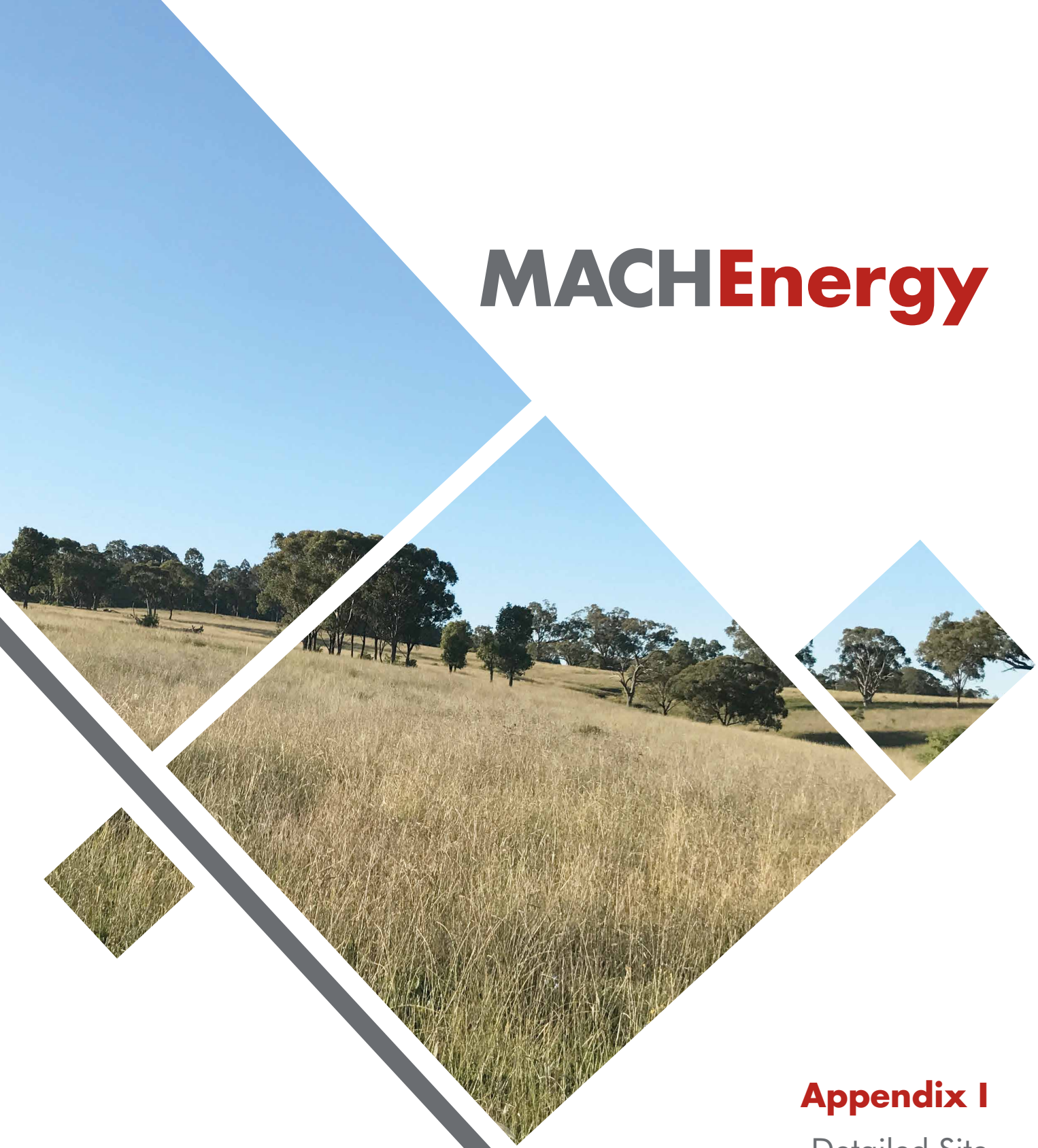
MACHEnergy



Appendix I

Detailed Site Investigation

Detailed Site Investigation

MACH Energy Australia

Mount Pleasant Operation Rail Modification

Prepared for:

MACH Energy Australia

December 2017

(Report: J000373 – Tier 1 Detailed Site Investigation 2.0)

Document Record

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EXECUTIVE SUMMARY

SESL Australia (SESL) was engaged by MACH Energy Australia Pty Ltd (MACH Energy) to conduct a Tier 1 Detailed Site Investigation (DSI) for the Mount Pleasant Operation Rail Modification (the Modification). The site of the proposed works is located approximately 3 kilometres (km) north-west of Muswellbrook, in the upper Hunter Valley of New South Wales (NSW).

Prior to being engaged by MACH Energy to conduct this DSI, SESL was engaged by MACH Energy to undertake a Tier 1 Preliminary Site Investigation (PSI). The PSI, which was undertaken by SESL in October 2017, indicated that a more detailed assessment and investigation of contamination should be carried out prior to commencement of construction of any works that are approved under the Modification. The purpose of carrying out this more detailed assessment and investigation of contamination was to better determine the presence/extent of contamination associated with the Areas of Environmental Concern (AECs) identified throughout the PSI.

This Tier 1 DSI was prepared in December 2017 with the site inspection and sampling conducted by SESL on the 22/11/2017, 23/11/2017 and 09/12/2017.

Following the investigation of AECs identified during the PSI, Actual Sources of Impact were confirmed through visual assessment and sampling & analysis. Actual Sources of Impact identified within the Modification footprint include:

- *SOI 1: Asbestos Containing Material (ACM) fragments observed on surface soils at the site (Feature of Interest 5, 18 & 22);*
- *SOI 2 Polycyclic aromatic hydrocarbons (PAHs) within fill materials exceeding adopted Ecological Screening Level (ESL) criteria (Feature of Interest 22);*
- *SOI 3: Total recoverable hydrocarbons (TRHs) exceeding ESL within soils impacted by storage drum fill (Feature 22);*
- *SOI 4: Elevated lead (Pb) exceeds Waste Classification criteria for General Solid Waste in some locations across the site (Feature of Interest 5 & 22); and*
- *SOI 5: Elevated nickel (Ni) exceeds Waste Classification criteria for General Solid Waste in some locations across the site (Feature of Interest 18, 19 & 22).*

Based on the site history review, the visual site inspection and soil sampling & laboratory analysis, the contaminating activities/items at the site are limited to: importation and land filling with soil materials of unknown origin & quality and the presence of ACM fragments.

On the basis of human health risk at the site, bonded ACM fragments are the only contaminants present at the site that must be managed as part of the proposed development. All other contaminant concentrations lie within the acceptable human health limits determined for this investigation, adopted from the HIL-D and HSL-D criteria. An Asbestos Management Plan (AMP) should be developed by a suitably qualified environmental consultant, and carried out by appropriately licensed contractors to ensure that the asbestos observed at the site is managed prior to intrusive works undertaken as part of the Modification.

Due to the nature of the fill materials observed at the site throughout this investigation (Feature of Interest 18 & 22), there is minor risk that asbestos may exist with materials unable to be observed during the intrusive sampling conducted at the site. An Unexpected Finds Protocol (UFP) should be developed by a suitably qualified and experienced environmental consultant to ensure that, if unexpected materials are present within the excavation area, potential contaminants (asbestos) are correctly identified and appropriately managed.

For the purpose of Waste Classification, contaminants are elevated above the criteria for General Solid Waste in accordance with the NSW EPA Waste Classification Guidelines Part 1: Classifying Waste (2014) in some sample locations. This is specifically in relation to elevated levels of lead and/or nickel at Features of Interest 5, 18, 19 and 22. If offsite disposal (i.e. outside of the proposed disturbance footprint) of any soil materials from features of interest 5, 18, 19 and 22 is proposed as part of the works associated with the proposed Modification, SESL recommends that further assessment may be required to determine the leachability of specific contaminants to reduce disposal costs. Disturbance of the soils at features of interest 5, 18, 19 and 22 (e.g. for construction related cut and fill activities), that remains within the proposed disturbance footprint, would not require any further assessment or management.

Based on this Tier 1 DSI, SESL considers that the site is suitable for the proposed works as part of the Modification, subject to:

- *Development of an AMP by an appropriately qualified and experienced environmental consultant;*
- *Management/Remediation of ACM present at the site in accordance with the AMP by appropriately qualified contractors; and*
- *Development of an UFP by an appropriately qualified and experienced environmental consultant.*

TABLE OF CONTENTS

DOCUMENT TABLES

ANALYTICAL TABLES

FIGURES

APPENDICES

ABBREVIATIONS

ABC	Ambient Background Concentration
ACL	Added Contaminant Limit
ACM	Asbestos Cement Material
AEC	Area of Environmental Concern
AHD	Australian Height Datum
ANZECC	Australian and New Zealand Environment and Conservation Council
AMP	Asbestos Management Plan
BTEX	Benzene, Toluene, Ethylbenzene and Xylenes
COC	Chain of Custody
CLM Act	Contaminated Land Management Act, 1997
CRC CARE	Cooperative Research Centre for Contamination Assessment and Remediation of the Environment
CSM	Conceptual Site Model
DQIs	Data Quality Indicators
DQOs	Data quality objectives
DEC	NSW Department of Environment and Conservation (now OEH)
DPs	Deposited Plans
DSI	Detailed Site Investigation
EILs	Ecological Investigation Levels
EPA	Environment Protection Authority
EP&A Act	NSW *Environmental Planning and Assessment Act, 1979*
ESLs	Ecological Screening Levels
HILs	Health Investigation Levels
HSLs	Health Screening Levels
Km	kilometres
NEPM	National Environment Protection (Assessment of Site Contamination) Measure 1999
NHMRC	National Health and Medical Research Council
Ni	Nickel

NSW	New South Wales
OCP	Organochlorine Pesticides
OEH	NSW Office of Environment and Heritage
OPP	Organophosphate Pesticides
PAHs	Polycyclic aromatic hydrocarbons
Pb	Lead
PSI	Preliminary Site Investigation
SEPP 55	Managing Land Contamination, Planning Guidelines SEPP 55 – Remediation of Land Guidelines
SESL	SESL Australia
TRH	Total Recoverable Hydrocarbon
UCL	upper confidence limit
UFP	Unexpected Finds Protocol
WA DoH	Western Australia Department of Health

1 INTRODUCTION

SESL Australia (SESL) was engaged by MACH Energy Australia Pty Ltd (MACH Energy) to conduct a Tier 1 Detailed Site Investigation (DSI) for the Mount Pleasant Operation Rail Modification (the Modification). The site of the proposed works is located approximately 3 kilometres (km) north-west of Muswellbrook, in the upper Hunter Valley of New South Wales (NSW) (see Figure 1).

The investigation area for this assessment comprises the extent of the Modification Area, including the rail loop and spur, the water pipeline and electricity transmission line. SESL has been advised that the proposed Modification components along Wybong Road fall within the currently approved mining lease area, and do not require any contamination investigation as part of this assessment. In addition, the area that falls within the existing railway easement has been excluded from the current investigation, given the disturbed nature of this land. Lots and Deposited Plans (DPs) within the area of the Modification are listed in Table 1 and the extent of the areas investigated are shown in Figure 2. Figure 2a provides the detail of the land title information.

Prior to being engaged by MACH Energy to conduct this DSI, SESL was engaged by MACH Energy to undertake a Tier 1 Preliminary Site Investigation (PSI). The PSI, which was undertaken by SESL in October 2017, indicated that a more detailed assessment and investigation of contamination should be carried out prior to commencement of construction of any works that are approved under the Modification. The purpose of carrying out this more detailed assessment and investigation of contamination was to better determine the presence/extent of contamination associated with the Areas of Environmental Concern (AECs) identified throughout the PSI.

This Tier 1 DSI was prepared in December 2017 with the site inspection and sampling conducted by SESL on the 22/11/2017, 23/11/2017 and 09/12/2017.

Table 1 – Land Parcel Summary

Lot	DP	Land Ownership	Comment
641	554159	Wesfarmers Bengalla Limited & Taipower Bengalla Pty Limited & New Hope Bengalla Pty Ltd & Mitsui Bengalla Investment Pty Ltd.	Rail Loop and/or Spur
72	626353	Wesfarmers Bengalla Limited & Taipower Bengalla Pty Limited & New Hope Bengalla Pty Ltd & Mitsui Bengalla Investment Pty Ltd.	Rail Loop and/or Spur
124	700578	Wesfarmers Bengalla Limited & Taipower Bengalla Pty Limited & New Hope Bengalla Pty Ltd & Mitsui Bengalla Investment Pty Ltd.	Rail Loop and/or Spur
123	700578	Wesfarmers Bengalla Limited & Taipower Bengalla Pty Limited & New Hope Bengalla Pty Ltd & Mitsui Bengalla Investment Pty Ltd.	Rail Loop and/or Spur
8	1170997	Wesfarmers Bengalla Limited & Taipower Bengalla Pty Limited & New Hope Bengalla Pty Ltd & Mitsui Bengalla Investment Pty Ltd.	Rail Loop and/or Spur

Lot	DP	Land Ownership	Comment
505	711996	Wesfarmers Bengalla Limited & Taipower Bengalla Pty Limited & New Hope Bengalla Pty Ltd & Mitsui Bengalla Investment Pty Ltd.	Rail Loop and/or Spur
7	1170997	Wesfarmers Bengalla Limited & Taipower Bengalla Pty Limited & New Hope Bengalla Pty Ltd & Mitsui Bengalla Investment Pty Ltd.	Rail Loop and/or Spur
8	770911	Mr R. K. & Mrs N. V. Googe	Water Pipeline and Electricity Transmission Line
1	780673	MACH Energy Australia Pty Ltd	Water Pipeline and Electricity Transmission Line
1	745369	MACH Energy Australia Pty Ltd	Water Pipeline and Electricity Transmission Line
1	544039	MACH Energy Australia Pty Ltd	Water Pipeline and Electricity Transmission Line
22	554140	MACH Energy Australia Pty Ltd	Water Pipeline and Electricity Transmission Line
21	554140	MACH Energy Australia Pty Ltd	Water Pipeline and Electricity Transmission Line
25	1053537	MACH Energy Australia Pty Ltd	Water Pipeline and Electricity Transmission Line
2	780673	MACH Energy Australia Pty Ltd	Water Pipeline and Electricity Transmission Line
23	1041946	MACH Energy Australia Pty Ltd	Water Pipeline and Electricity Transmission Line
24	742543	MACH Energy Australia Pty Ltd	Water Pipeline and Electricity Transmission Line

1.1 Background

The ultimate extent of the approved Bengalla Mine intersects the approved Mount Pleasant Operation rail spur.

While the intersection of the Bengalla Mine with the approved Mount Pleasant Operation rail infrastructure is still some years away, MACH Energy is proposing a Rail Modification to obtain approval for future rail and/or conveyor product transport facilities to manage this future interaction.

The Modification would primarily comprise:

- duplication of the approved rail spur, rail loop, conveyor and rail loading system and associated services;
- duplication of the Hunter River water supply pump station, water pipeline and associated electricity supply that currently follows the rail spur alignment; and
- demolition and removal of the redundant approved infrastructure within the extent of the Bengalla Mine, once the new rail, product loading and water supply infrastructure has been commissioned and is fully operational.

The Modification would not alter the number of approved train movements on the rail network or operational workforce of the Mount Pleasant Operation.

The area of disturbance being considered in the current investigation is provided in Figure 2.

1.2 Objectives

The objectives of this Tier 1 PSI were to:

- prepare a Tier 1 DSI in accordance with the *Environmental Planning Policy (SEPP) No* 55 – *Remediation of Land and relevant guidelines*, including the *Managing Land Contamination, Planning Guidelines SEPP 55 – Remediation of Land (SEPP 55 Guidelines)* (Department of Urban Affairs and Planning [DUAP] and the New South Wales [NSW] Environment Protection Authority [EPA], 1998) and the *National Environment Protection (Assessment of Site Contamination) Measure 1999* (April 2013), NEPC 2013, Canberra;
- assess the contamination status of surface and subsurface soils within the vicinity of features of interest identified in the PSI prepared for the site; and
- recommend management strategies including any additional investigations (if required).

1.3 Regulatory Guidelines

The investigation and preparation of this report was undertaken with reference to (but not limited to) the following laws, regulatory guidance documents and standards:

- NSW Environmental Planning and Assessment Act, 1979 (EP&A Act);
- State Environmental Planning Policy (SEPP) No 55 – Remediation of Land;
- Contaminated Land Management Act, 1997 (CLM Act);
- ANZECC and ARMCANZ (2000) Australian and New Zealand Guidelines for Fresh and Marine Water Quality (October 2000);
- ASTM (2000) Standard Practice D2488 90 Description and Identification of Soils (Visual-Manual Procedure);
- CRC CARE (2011) Health Screening Levels for Petroleum Hydrocarbons in Soil and Groundwater;
- CRC CARE (2013) Petroleum hydrocarbon vapour intrusion assessment: Australian guidance, CRC CARE Technical Report no. 23, CRC for Contamination Assessment and Remediation of the Environment, Adelaide, Australia;
- Enhealth (2012) Environmental Health Risk Assessment: Guidelines for assessing human health risks from environmental hazards, Department of Health and Ageing and EnHealth Council, Commonwealth of Australia (2012);
- National Environmental Protection Council (NEPC) (2013) National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended April 2013);
- NHMRC & NRMMC (2011) Australian Drinking Water Guidelines (ADWG) - National Health and Medical Research Council & Natural Resource Management Ministerial Council;
- NSW DEC (2006) Guidelines for the NSW Site Auditor Scheme (2nd Ed.) (2006);
- NSW DEC (2007) Guidelines for the Assessment and Management of Groundwater Contamination (March 2007);
- NSW DECCW (2010) Vapour Intrusion: Technical Practice Note, September 2010;
- NSW Department of Urban Affairs and Planning (1998) Managing Land Contamination: Planning Guidelines: SEPP 55 Remediation of Land, August (1998);
- NSW EPA (1995) Sampling Design Guidelines (1995);
- NSW EPA (1996) Protection of the Environment Operations (Waste) Regulation (1996);
- NSW EPA (2014) Technical Note: Investigation of Service Station Sites, NSW EPA, April (2014);
- NSW EPA (2014) Waste Classification Guidelines (November 2014);

- NSW EPA (2015) Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997 (July 2015);
- NSW OEH (2011) Guidelines for Consultants Reporting on Contaminated Sites (2011). NSW Office of Environment and Heritage;
- Standards Australia (1993) AS1726-1993. Geotechnical Site investigations Australian Standard;
- Standards Australia (2005) Guide to the investigation and sampling of sites with potentially contaminated soil. Part 1: Non-volatile and semi-volatile compounds AS4482.1 (2005) and Part 2: Volatile substances, AS4482.2 (2005);
- USEPA (2000) Guidance for the Data Quality Objectives Process, EPAC QA/G-4 DEC/600/r-96/055, United States Environmental Protection Agency Office of Environmental Information, Washington DC; and
- Western Australia Department of Health (2009) Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia.

1.4 Scope of Works

The scope of works for this DSI included the following:

- review the PSI prepared for the site;
- conduct a detailed site inspection of the areas of AEC identified in the PSI;
- intrusive soil sampling conducted by a suitably qualified environmental scientist for the purpose of laboratory analysis;
- laboratory analysis by a NATA accredited environmental laboratory of samples collected as part of this investigation;
- update of the Conceptual Site Model (CSM) developed during the PSI;
- preparation of this DSI report in accordance with EPA guidelines for contaminated lands assessment; and
- proposal of additional assessments or suitable remedial and validation strategies for the site, if required.

1.5 Personnel

SESL's Environmental Scientist conducted the site visit on the 22/11/2017, 23/11/2017 and 09/12/2017. The personnel involved for this report are listed in Table 2.

Table 2 – Report Personnel

Personnel	Position	Report Task
Ryan Jacka B. Env. Sc., M. Env. Sc., MEIANZ, ASSSI, CEnvP	Senior Environmental Scientist	• Conduct report review
Andrew Jacovides B. Nat. Sci. (Env Mgt)	Environmental Scientist	• Conduct site inspection • Conduct soil sampling • Report preparation
Subhas Nandy Ph.D., M.Tech., M.Sc., B.Sc. (Hons), MIAH	Senior Hydrogeologist	• Conduct report drafting, report review and authorisation

2 SITE DESCRIPTION

2.1 Site Location and Access

The Mount Pleasant Operation is located approximately 3 km north-west of Muswellbrook in the Upper Hunter Valley, NSW. The area of current investigation (i.e. the Modification) is generally bound by Wybong Road to the north, Overton Road to the west, the Muswellbrook-Ulan Rail Line to the southeast and Logues Lane and/or the Hunter River to the east (see Figure 2).

The subject area of this investigation is predominantly agricultural land, former mining land and rural residential properties, and is limited to the area of the Modification outside of the existing mining lease.

2.2 Site Identification

Table 3 describes the land subject to this Tier 1 DSI.

Table 3 – Site Identification

Site Owner(s)	See Table 1
Site Locality	Approximately 3 km north-west of Muswellbrook, NSW
Lot and DP Number	See Table 1
Local Government Areas	Muswellbrook Shire Council
Current Zoning	RU1 - Primary Production
Site Area (approximately)	The Modification Area being considered for this assessment is approximately 30 hectares in size.
Site Elevation (approximately)	138 m – 188 m AHD
Locality Map	Figure 1
Site Layout	Figure 2

m AHD = metres Australian Height Datum

2.3 Site Layout and Infrastructure

The site layout is shown on Figure 2 and consists of predominately cleared agricultural land. In addition to cleared agricultural land, the site:

- is located adjacent to some mine rehabilitation areas (Bengalla Mine) in the west;
- traverses existing Overton Road to Wybong Road;
- occurs partly within the boundary of the existing Muswellbrook-Ulan Rail Line; and
- is located adjacent to former Overton Underground Coal Mine, Blunts Butter Factory and Overton Homestead. The Modification may traverse through a portion of the former Overton Underground Coal Mine.

Farm houses and some other buildings within the Modification Area are generally connected to local electricity but are expected to have no connection to mains water or sewer lines.

2.4 Surrounding Land Use

The area in the vicinity of the site is primarily cleared open agricultural areas used for cattle grazing. The dominant land uses within and immediately adjacent to the Modification Area include open cut coal mining (Bengalla Mine to the west) and industrial activities, agriculture (dairying, thoroughbred breeding, cattle grazing and Lucerne hay production), as well as rural residential and rural areas. The Hunter River is located to the south and east and plays an important role in the region's mining, power generation and agricultural enterprise.

All lots within and adjacent to the site are zoned RU1 - Primary Production under the *Muswellbrook Local Environmental Plan 2009*.

3 ENVIRONMENTAL SETTING

3.1 Topography

The topography is characterised by undulating low hills with elevations of 138 m AHD to 188 m AHD within the Modification Area. The land slopes downwards towards the Hunter River to the south. The Hunter River alluvial floodplain is situated within the eastern and southern extents of the Modification Area.

The Overton Ridge (east of Overton Road) naturally reaches an elevation of 188 m AHD. To the south of Overton Ridge are the lower hill slopes which slopes towards Hunter River.

3.2 Geology and Soil Landscapes

The Modification Area traverses two distinct Soil Landscape Groups identified in the *Soil Landscape of the Singleton 1:250 000 sheet* (Kovac and Lawrie, 1991) and include:

- Hunter Group consists of Alluvial Soil; and
- Bayswater Group consists of Solodic Soil (Brown Chromosol, Red Chromosol, Brown Vertosol and Rudosol).

The site is situated in the north-west of the Hunter Coalfield, a division of the Sydney Basin on the western limb of the north-south trending Muswellbrook Anticline.

The stratigraphic sequence across the site is comprised of the late Permian Whittingham Coal Measures. The Whittingham Coal Measures are up to 800 metres thick and consist of sandstone, siltstone, claystone, conglomerate and tuff, within which intermittent coal seams exist. The Permian coal measures are overlain by thin Quaternary alluvial deposits. Quaternary alluvial deposits consist of sand and gravel along creek valleys and in the alluvial floodplain of the Hunter River.

3.3 Surface Water

The site is located within the Hunter River catchment, which has a total area of approximately 4,200 km^2 to Muswellbrook. Surface water features in the vicinity of the site consist of Hunter River and Rosebrook Creek. An unnamed creek traversed through the site which ultimately discharges to the Hunter River further southwest. A number of water management and sediment/erosion control dams associated with the Bengalla Mine are located on the western side of the Overton Road.

3.4 Acid Sulfate Soil

Due to the location and elevation of the site, no acid sulfate soils are anticipated near the site. However, there is potential to bury potentially acid forming overburden and coal reject materials in the overburden in the backfilled Bengalla Mine located adjacent to the site.

3.5 Proximity to Local Sensitive Environments

The most significant sensitive environments in the vicinity of the Modification are the Hunter River and an unnamed creek traversing the Modification Area. No other sensitive environment was identified within or in immediate proximity to the Modification Area.

4 SITE HISTORY

A review of the site history was undertaken to assess the historical use of the area, and in particular to identify activities with potential to contaminate soil, groundwater and surface water. The historical review included consideration of:

- current and historical aerial photographs (Appendices A and B);
- council planning documentation (Appendix C); and
- the NSW EPA Contaminated Lands Database (Appendix E).

4.1 Historical Title Search

No search of historical title was conducted for this Tier 1 DSI due to the minimal land use changes since the 1960's and the vast number of lots associated with the site.

4.2 Historical Aerial Photographs

Aerial photographs from 1958, 1964, 1974, 1989, 1998 and 2001 were reviewed for this assessment. Copies of the aerial photographs are provided in Appendix B.

Aerial photography for the six years listed above and recent imagery, indicates the area has historically been used for farming and agricultural purposes. A summary of the changes to each of the lots is provided in the Table 4 below. Initial investigation was conducted on wider area within and around the Modification Area. Table 4 below contains a description of the general lands history of the Modification Area based on a review of the aerial imagery.

Table 4 - Summary of Aerial Photographs Review

Lot	DP	Land Owner	Comment
641	554159	Wesfarmers Bengalla Limited & Taipower Bengalla Pty Limited & New Hope Bengalla Pty Ltd & Mitsui Bengalla Investment Pty Ltd.	Construction of track/roads appeared in 1974 with a small structure (likely to be shed) within the property. Three major structures (dwelling/farm house/sheds) were noted in 1989. A tank like feature is located on the southern side of the property. A small area close to the Overton Road and south of the access road to the property appears to be disturbed. All these features are still present.
124	700578	Wesfarmers Bengalla Limited & Taipower Bengalla Pty Limited & New Hope Bengalla Pty Ltd & Mitsui Bengalla Investment Pty Ltd.	Some development work oval track appeared in 1974. Track/road/ tree planting appeared in 1989. One large shed appeared in 1989 and was absent in 1998. A few more (3 to 4) small shed like structures and tanks appeared in 1989. Trees remained in 2003 and other structures were absent.
123	700578	Wesfarmers Bengalla Limited & Taipower Bengalla Pty Limited & New Hope Bengalla Pty Ltd & Mitsui Bengalla Investment Pty Ltd.	Some development work (track/road/ tree planting), oval track appeared in 1974. The shape of the track changed in 1989 to more circular. A large shed/building appeared in the south-east corner of the circular oval. Circular oval disappeared in 2003.

Lot	DP	Land Owner	Comment
8	1170997	Wesfarmers Bengalla Limited & Taipower Bengalla Pty Limited & New Hope Bengalla Pty Ltd & Mitsui Bengalla Investment Pty Ltd.	A shed like structure appeared on 1964 to 1998 (away from Overton Road) and disappeared in 2003. In 2003, a building/shed like structure and some filling/development occurred along the south-east corner of the plot close to the railway line.
505	711996	Wesfarmers Bengalla Limited & Taipower Bengalla Pty Limited & New Hope Bengalla Pty Ltd & Mitsui Bengalla Investment Pty Ltd.	The land is within a proclaimed Mine Subsidence District under the Mine Subsidence Compensation Act 1961. The approval of the Mine Subsidence Board is required for all subdivision and building, except for certain minor structures. Surface development controls are in place to prevent damage from old, current or future mining. It is strongly recommended prospective purchasers consult with the Mine Subsidence Board regarding mine subsidence and any surface development guidelines (Overton Colliery historical working) A building appeared in the 1964 aerial photo in the NE corner of the plot. A shed appeared close to the Overton Road in 1974 aerial photo. Four building like structures, three to four small sheds and dams and tank like structures are noted in 1989 aerial photo and these features are present till 2003 photos. A dam was noted in the southern section. The subject property is listed as an item of heritage under schedule 5 of the Muswellbrook Local Environmental Plan 2009.
7	1170997	Wesfarmers Bengalla Limited & Taipower Bengalla Pty Limited & New Hope Bengalla Pty Ltd & Mitsui Bengalla Investment Pty Ltd.	The land is within a proclaimed Mine Subsidence District under the Mine Subsidence Compensation Act 1961. The approval of the Mine Subsidence Board is required for all subdivision and building, except for certain minor structures. Surface development controls are in place to prevent damage from old, current or future mining. It is strongly recommended prospective purchasers consult with the Mine Subsidence Board regarding mine subsidence and any surface development guidelines. A building appeared in the 1964 aerial photo in the southern part of the plot. A shed at the middle of the plot was also noted. In the 1964 aerial photo, the Overton Road terminated at the building. A total four sheds appeared with in the plot. Another two building like structures appeared in close vicinity to the Overton Road. Two buildings/sheds like structure appeared along the west of the Overton Road in 1958 aerial photo. The subject property is listed as an item of heritage under schedule 5 of the Muswellbrook Local Environmental Plan 2009.
6	1170997	Wesfarmers Bengalla Limited & Taipower Bengalla Pty Limited & New Hope Bengalla Pty Ltd & Mitsui Bengalla Investment Pty Ltd.	The subject property is listed as an item of heritage under schedule 5 of the Muswellbrook Local Environmental Plan 2009. A dam is located in the north-west boundary. Some access tracks were built as appeared in the 1964 aerial photo. A shed appeared in the 1964 photo.
72	626353	Wesfarmers Bengalla Limited & Taipower Bengalla Pty Limited & New Hope Bengalla Pty Ltd & Mitsui Bengalla Investment Pty Ltd.	Mining work appeared in the 1998 aerial photos including stripping of top soil and open cut mine benches appeared on the north-east corner of the site. Mining work including some rehabilitation work was noted in the 2003 aerial photos. Rehabilitation work continued to recent times.
6	784436	Mach Energy Australia Pty Ltd	The railway track is visible along the southern section (parallel to the railway line) of the plot in the 1958 aerial photos; the plot contains a few large size trees/orchards in the western section of the plot since 1958; An earth road (Logues Lane) has existed along the southern and western boundary since 1964. In 1974 trees from the south-west section of the plot disappeared.

Lot	DP	Land Owner	Comment
2	784436	Mach Energy Australia Pty Ltd	A building has existed in the south-west corner since 1958. Railway track has existed along the southern section of the plot since 1958. A few buildings/sheds exist in the middle of the site since 1958 along with an access road. A few large trees were noted on the eastern portion of the site in the 1958 aerial photos. Wider earth made access roads/filling on the east of the building sites were noted in the 1989 photo.
25	1053537	MACH Energy Australia Pty Ltd	In 1958, two building/houses and a shed existed at the north of the property. One access road is present at the middle of the property. In 1964 another shed like structure appeared at the north-western corner and little more disturbance/filling close to the building site at the north. This property is within the mining lease area and some earthwork is noted in recent time.
24	742543	MACH Energy Australia Pty Ltd	In 1958, three houses/sheds and three small sheds existed at the eastern boundary of the property. One access road is present at the middle of the property. One small shed like structure appear at the west of the property. In 2003, a portion of the land in northeast corner appeared to be fenced off. An additional shed like structure appeared in the southeast corner in 2003.
23	1041946	MACH Energy Australia Pty Ltd	In 1958, two small structures appeared (not very clear) at the eastern side of the property. No changes were noted till date.
1	544039	MACH Energy Australia Pty Ltd	In 1958, two buildings/sheds appeared at the eastern side of the property. In 1964, a bit more activity in the eastern and northeastern corner of the property is noted. In 1989, one more shed like structure, one smaller shed and a swimming pool appeared in the aerial photo. No changes were noted till date.
22	554140	MACH Energy Australia Pty Ltd	In 1964, south-east corner of the property appeared disturbed and likely to contained a shed and appeared to be filled with fill material. In 1974, this area appeared to be more disturbed (excavation/filling) though the aerial photo is not very clear. Agricultural activity (orchard type) appeared at the north of the property. A building appeared in the 2003 aerial photo at the middle of the property. Two sheds also appeared. Orchard type plants disappeared in 2003. A small fenced off area appeared at the south of the property. No changes were noted till date.
21	554140	MACH Energy Australia Pty Ltd	In 1958, a shed like structure appeared at the southern section. In 1964, this south-eastern section appeared to be more disturbed and likely to have been filled with fill material. A small tank like structure appeared. In 1974, this area appeared to be more disturbed (excavation/filling) though the aerial photo is not very clear. A dam and a building and a shed appeared in the middle of the property. A bit more activity (car parking/storage of material) appeared around the shed located at the southern section in 2003. No more changes were noted till date.
2	780673	MACH Energy Australia Pty Ltd	Three erosional features appeared at the property. In 1964, a farm dam like feature appeared close to the Wybong Road.

Lot	DP	Land Owner	Comment
1	780673	MACH Energy Australia Pty Ltd	In 1958, three houses/sheds and two small sheds appeared at the north of the property. Another shed appeared south of these properties. An access road and erosional features are present. In 1964 a small farm dam like structure appear close to the Wybong Road. In 1974, The shed south of the properties disappeared. In 1989, the erosional feature in the middle appeared as a farm dam like feature at the middle of the property and extend to the adjacent property toward the north. No more changes were noted till date.
1	745369	MACH Energy Australia Pty Ltd	In 1958 one shed/house appeared in the south-west corner. One small shed appeared in the 1989 photo. No more changes till date.
8	770911	Mr R K & Mrs N V Googe	In 1958, one shed like structure appeared in centre of the property. The shed disappeared in 1989. No more changes were noted till date.

4.3 Site Zoning and Council Records

The *Muswellbrook Local Environmental Plan 2009* is the relevant local environmental plan regulating land use and development in the area. The site is zoned RU-1 Primary Production.

The planning certificates did not identify any contamination issues. No environmental hazards were identified.

The following properties were identified as listed as an item of heritage under schedule 5 of the *Muswellbrook Local Environmental Plan 2009*:

- Lot 505 and DP 711996;
- Lot 7 and DP 1170997; and
- Lot 6 and DP 1170997.

The following properties are listed within proclaimed Mine Subsidence District under the *Mine Subsidence Compensation Act 1961* and may be related to the former Overton Underground Coal Mine:

- Lot 505 and DP 711996; and
- Lot 7 and DP 1170997.

4.4 EPA Contaminated Sites Database

A search of the NSW EPA contaminated land public record was performed to assess if any part of the site or surrounding area has been declared as a contaminated site (Appendix E). It should be noted that this database is not a comprehensive list of all contaminated land in NSW, as this record only lists sites regulated under Part 3 of the NSW *Contaminated Land Management Act 1997.*

A search undertaken on the 19/10/2017 for the Muswellbrook Local Government Area, did not identify any contaminated sites within or adjacent to the site.

4.5 Dangerous Goods Licence Search

Land within the site has been predominately used for agricultural grazing in past, therefore the expected dangerous goods to be stored on site are likely hydrocarbon products (petroleum, diesel etc.) for machinery, and pesticides for agricultural purpose. In consideration of the size of the site, a dangerous good license search with NSW WorkSafe was not conducted for individual lots across the site. These chemicals (should they occur) are expected to be stored in working sheds and/or workshops, which were targeted as part of the site inspection (Section 5).

4.6 Previous Environmental Investigations

SESL is unaware of any previous environmental investigations pertaining to the contamination status of the site that may have been conducted.

4.7 Current Land Use and Associated Practices

The site has historically been used for agricultural purposes. Crops, pasture, woodlands, dams, rural residences and farm sheds are common site features throughout the area.

Activities associated with farming practices that may result in contamination may include, but are not limited to chemical storage, grain storage, maintenance sheds, pesticide use and livestock dips. Contaminants associated with these activities can include heavy metals, Organochlorine Pesticides (OCPs) and Organophosphate Pesticides (OPPs). Hazardous building materials including asbestos containing materials and lead paint may be present on site structures and surrounds due to their age. A limited number of features of interest were identified during the site inspection that may pose a risk (Section 5).

4.8 Integrity Assessment

The integrity of information provided in the Tier 1 DSI is considered reliable. The PSI followed appropriate methods of investigation with the desktop survey being consistent with field observation and anecdotal evidence presented. Details regarding the site history and present status of the site have been largely obtained from official records sourced from Muswellbrook Shire Council and NSW EPA and NSW Land and Property Information Division. These documents are considered accurate and credible. All information provided, as part of this report was believed to be true, accurate and representative of the past and present status of the site at the time of this investigation.

5 FEATURES OF INTEREST

5.1 Site Reconnaissance

An inspection of the site was undertaken by SESL on 04/10/2017 (as part of the PSI) and again on 09/12/2017 (as part of the DSI), to support the findings of the desktop review and identify site characteristics that may be suggestive of site contamination. A total of 22 features of interest were identified as part of the desktop review, particularly the review of historical and current aerial photographs (Section 4.2). The locations of these features are shown in Figures 3a-3e.

Following a finalisation of proposed developments/modification, twelve (12) features were determined to lie within the proposed works area. Additional site visits were conducted (22/011/2017, 23/11/2017 and 09/12/2017) as part of this DSI for the purpose of intrusive soil sampling. Samples were collected in varying quantities at each of the features determined to be dissected by the Modification, and the locations of these are shown on Figures 4a-4i. These features and the sampling regime are detailed below. The remaining sites are located outside of the Modification Area and are not considered further.

5.1.1 Feature of Interest Two

The feature (Figure 3a) is located within the Modification Area. This feature was selected based on a review of aerial photographs which indicated potential former agricultural activities within the investigation area and in the adjacent land to the east. The historical aerial photograph from 1989 indicated the presence of a shed/building to the east of the feature, which was absent in the aerial photograph from 2003.

During the site walkover, the land to the east of the Modification Area was observed to be significantly disturbed, including underground tanks/hardstand material, development of a retaining wall, dumped rubbish (including fly spray) and other disturbance. Intrusive sampling was conducted in seven (7) locations within the vicinity of this feature, with eight (8) samples collected for the purpose of contamination screen analysis.

5.1.2 Feature of Interest Three

The feature is located (Figure 3b) within the Modification Area. This feature was selected based on a review of aerial photographs and historical aerial photographs, which indicate the presence of a potential backfilled dam (or similar structure). Based on the review of this feature of interest, SESL considered there to be a risk of potential contamination associated with the possible fill material of unknown origin used for backfilling. A single sample was collected for the purpose of contamination screen analysis.

5.1.3 Feature of Interest Five

The feature is located (Figure 3b) within the Modification Area. This feature was selected based on a review of aerial photographs that indicated that man-made structures exist within the area. Inspection of the site confirmed this feature as the remains of a former structure, with a frame and concrete hardstand of a former building present at the site.

Several suspected Asbestos Containing Material (ACM) fragments were identified on the surface of the hardstand material. Intrusive sampling was conducted in three (3) locations within the vicinity of this feature, with three (3) samples collected for the purpose of contamination screen and asbestos in soil analysis.

5.1.4 Feature of Interest Six

The feature is located (Figure 3b) within the Modification Area. This feature was selected based on a review of aerial photographs that indicated agriculturally worked soils. During the site inspection, trees were present within the feature indicating that the area is likely a part of rehabilitation program. Two (2) samples were collected from surface soils within the vicinity of the feature, for the purpose of contamination screening.

5.1.5 Feature of Interest Seven

The feature is located (Figure 3b) within the Modification Area. This feature was selected based on a review of aerial photographs which showed a structure within close vicinity to the road. Inspection of this feature a large shed with minimal surrounding soil disturbance. SESL was unable to access the interior of the shed at the time of the site inspection. However, SESL has been advised that the shed has been used to store geological cores by the adjacent Bengalla Mine. A single sample was collected adjacent to the structure confirm if any contamination occurred within the site due to storage of the geological cores or any other chemicals.

5.1.6 Feature of Interest Sixteen

The feature is located (Figure 3a) within the Modification Area. This feature was selected based on a review of aerial photographs. Progressive mine related activity is noted within the aerial imagery. Currently the feature is used as a sediment dam for the adjacent Bengalla Mine rehabilitation. The soil within this feature has potential for accumulation of heavy metals and other contaminants from the mine site run off. Intrusive sampling was conducted within three (3) locations within the vicinity of this feature, with a total of six (6) samples collected for the purpose of contamination screen analysis.

5.1.7 Feature of Interest Seventeen

This feature is located within the Modification Area. This feature was selected (Figure 3c) based on a review of aerial photographs in the broad acre area which indicate a swale or erosion feature. This feature is suspected to be a naturally occurring basin in time of flood. SESL considers this area to have a potential to be contaminated, as it is expected to be a settling point for particles from surrounding areas in times of rain. Intrusive sampling was conducted in two locations within this feature for the purpose of contamination screen analysis.

5.1.8 Feature of Interest Eighteen

This feature is located within the Modification Area. This feature (Figure 3d) was selected based on a review of aerial photographs which indicated the presence of residential structures in the area, as well as potential filling, and soil disturbance. Intrusive soil sampling was conducted in eleven (11) locations within the vicinity of this feature, with eleven (11) samples collected for the purpose of contamination screen analysis.

5.1.9 Feature of Interest Nineteen

This feature is located within the Modification Area. This feature was selected (Figure 3d) based on a review of aerial photographs in the broad acre area which indicate a swale or erosion feature. This feature is suspected to be a naturally occurring basin in time of flood. SESL considers this area to have a potential to be contaminated, as it is expected to be a settling point for particles from surrounding areas in times of rain. A single sample was collected within the vicinity of this feature for the purpose of contamination screen analysis.

5.1.10 Feature of Interest Twenty

This feature is located within the Modification Area. This feature was selected (Figure 3e) based on a review of aerial photographs in the broad acre area which indicate a swale or erosion feature. This feature is suspected to be a naturally occurring basin in time of flood and is associated with the existing Rosebrook Creek. SESL considers this area to have a potential to be contaminated, as it is expected to be a settling point for particles from surrounding areas in times of rain. Cut and fill activity would have occurred in the past during construction of the road. Two (2) samples were collected within the vicinity of this feature for the purpose of contamination screen analysis.

5.1.11 Feature of Interest Twenty-one

This feature is located within the Modification Area. This feature was selected (Figure 3e) based on a review of aerial photographs and site inspection. SESL has been informed that this area was previously a gravel quarry. Two (2) samples were collected for the purpose of contamination screen analysis.

5.1.12 Feature of Interest Twenty-two

This feature is located within the Modification Area. This feature was selected (Figure 3e)based on a site inspection which identified historical filling activities with materials of unknown origin and scrap storage, including discarded vehicles, chemical storage drums, demolition waste and asbestos. Intrusive soil sampling was conducted in eight (8) locations within the vicinity of this feature, with ten (10) samples collected for the purpose of contamination screen analysis.

6 RELEVANT GUIDELINES FOR CONTAMINATION ASSESSMENT AND MANAGEMENT

6.1 Relevant Guidelines

Assessment criteria will be based on guidelines made or approved by the EPA under section 105 of the CLM Act. These include EPA's Contaminated Sites series of guidelines, and fundamental guideline documents such as the *Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites* (Australian and New Zealand Environment and Conservation Council [ANZECC]/National Health and Medical Research Council [NHMRC], 1992) and the National Environment Protection Measure 1999 (NEPM).

The NEPM incorporates a recommended general process for the assessment of site contamination and a set of 9 specific guidelines. The process and guidelines are closely based on previous documentation widely used for assessing site contamination (such as ANZECC/NHRMC [1992] and the various National Environmental Health Forum monographs and proceedings [Imray and Langley, 1999]). Assessment criteria have been drawn from other guidelines and information sources, if not available in the above guidelines.

6.2 Proposed Development

The Modification would include the development of predominantly agricultural land (including former mining land). Further detail on the Modification components is provided in Section 1.1.

6.3 National Environmental Protection (Assessment of Site Contamination) Measure 1999

The NEPM provides a national framework for conducting assessments of contaminated sites in Australia.

The purpose of the NEPM is to establish a nationally consistent approach to the assessment of site contamination to ensure sound environmental management practices by the community which includes regulators, site assessors, environmental auditors, landowners, developers and industry.

The NEPM addresses assessment of contamination, and does not provide specific guidance on prevention of site contamination. The desired environmental outcome for the NEPM is to provide adequate protection of human health and the environment, where site contamination has occurred, through the development of an efficient and effective national approach to the assessment of site contamination.

Schedule A in the NEPM outlines the general process for assessment of site contamination, with reference to Schedules B 1 to B 9 for guidance on each step of the process.

In broad terms, the assessment process as provided in Schedule A can be described as:

Tier 1 PSI — Preliminary investigation, laboratory analysis and interpretation, and assessment of results with reference to investigations levels.

Tier 1 DSI — Where required, detailed investigation, laboratory analysis and interpretation is completed, and the need for risk assessment to derive response levels and/or the need for remediation is evaluated.

Tier 2 or 3 — Site-specific risk assessment to confirm/define appropriate health and Ecological Investigation Levels (EILs).

Overarching guidance is provided on community consultation and risk communication, protection of health and safety during assessment of site contamination, and expected competencies of environmental auditors and related professionals.

The NEPM provides a framework for the use of investigation and screening levels for the protection of human health, ecosystems, groundwater resources and aesthetics. Investigations levels and screening levels are applicable to the Tier 1 site assessment. The adopted investigation and screening levels for this assessment is as follow:

- Health Investigation Levels (HILs);
- Health Screening Levels (HSLs);
- Ecological Investigation Levels (EILs); and
- Ecological Screening Levels (ESLs).

Tables from the NEPM relevant to the following sub-sections have been reproduced in Appendix D.

6.3.1 Health Investigation Levels (HILs)

HILs are scientifically based, generic assessment criteria designed to be used in the Tier 1 assessment for assessing human health risk via all relevant pathways of exposure. HILs are designed to be intentionally conservative and based on a reasonable worst-case scenario for the following generic land use settings:

A Residential with garden/accessible soil (home grown produce contributing less than 10% of vegetable and fruit intake; no poultry) this category includes children's day-care centres, preschools and primary schools.

B Residential with minimal opportunities for soil access, including dwellings with fully and permanently paved yard space such as high-rise apartments and flats.

C Public open space such as parks, playgrounds, playing fields (e.g. ovals), secondary schools and footpaths. It does not include undeveloped public open space (such as urban bushland and reserves), which should be subject to a site-specific assessment where appropriate.

D Commercial/industrial includes shops and offices as well as factories and industrial sites.

The site is predominantly agricultural land with some residential uses, which are considered a sensitive land use.

The NEPM Schedule B7 defined the HILs as the concentration of a contaminant that if exceeded will require further appropriate investigation and evaluation. It is also stated "levels in excess of the HILs do not imply unacceptability or that a significant health risk is likely to be present".

The NEPM Schedule B7 states at the very least, the maximum and the 95% upper confidence limit of the arithmetic mean contaminant as well as localised elevated values must be compared to the HILs. Two (2) additional (secondary) criteria should also be met, namely that the standard deviation of the results must be <50% of the relevant investigation level and that no single value exceeds 250% of the relevant investigation level.

The NEPM also states that the HILs are not intended to be used as clean-up levels for contaminated sites. The requirement of clean-up should be based on site-specific assessment and risk management options. As no analysis was conducted during this PSI, no HILs have been adopted.

6.3.2 Health Screening Levels (HSLs)

6.3.2.1 Petroleum Hydrocarbon Compounds

The NEPM adopts the HSLs for various petroleum hydrocarbon compounds developed by the Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC CARE). Friebel and Nadebaum (2011) provides the methodology for assessing human health risk via the inhalation and direct contact pathways of selected petroleum compounds and fractions.

The HSLs apply to the same land use scenarios with additional consideration of soil texture and depth to determine the appropriate soil, groundwater and soil vapour criteria.

The NEPM provides HSL fractions and corresponding equivalent carbon range for petroleum hydrocarbon compounds (see Table 5) HSLs are given only for F1, F2 and Benzene, Toluene, Ethylbenzene and Xylenes (BTEX) as the heavier petroleum compounds of F3 and F4 are non-volatile and do not pose a concern for vapour intrusion. However, exposure can be via direct contact pathways (dermal contact, incidental oral ingestion and dust in halation). Friebel and Nadebuam (2011) provides the HSLs for direct contact, however for most site assessments, these levels are unlikely to trigger further investigation or site management as the values are substantially higher than most soil screening levels.

Table 5 - HSL Fractions and Corresponding Equivalent Carbon Range

Fraction Number	Equivalent Carbon Number Range
F1	$C_6 – C_{10}$
F2	$>C_{10} – C_{16}$
F3	$>C_{16} – C_{34}$
F4	$>C_{34} – C_{40}$

Source: NEPM, 2013

As aforementioned, HSLs for soil, groundwater and soil vapor have been developed based on soil texture. The HSLs assume a uniform soil profile and the highest proportion of the soil texture from the soil profile should be used selecting the appropriate HSLs. For Tier 1 soil assessment, the HSL classifications of sand, silt and clay may be broadly applied to soil texture classification in Table A1 of Australian Standard 1726 as follows:

i) Coarse grained soil: >50% of particles (by weight) <63mm and >0.075mm:

- sand: >50% of particles (by weight) <2.36mm; or
- gravel: >50% of particles (by weight) >2.36mm.

ii) Fine-grained soil: >50% of particles (by weight) <0.075mm:

- silts and clays (liquid limit >50%);
- silts and clays (liquid limit <50%); or
- highly organic soils.

6.3.2.2 Asbestos

The NEPM adopted the HSLs from the *Western Australia Department of Health (WA DoH) Guidelines of Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia 2009* (WA DoH, 2009). The HSLs are based on scenario-specific likely exposure levels, which include bonded and friable asbestos levels.

Asbestos only poses human health risk when asbestos fibres are made airborne and inhaled. Bonded asbestos is not readily made airborne except through substantial physical damage. The NEPM states “the assessment and management of asbestos contamination should take into account the condition of the asbestos materials and the potential for damage and resulting release of asbestos fibres”.

The HSLs are to be used for Tier 1 assessment, in the event of an exceedance that triggers the need for a Tier 2 site-specific assessment. Site-specific assessments of asbestos contaminated sites should be designed to describe the nature and quantity of asbestos present in the soil that can sufficiently develop a risk management plan for the current and proposed land use of the site.

6.3.3 Ecological Investigation Levels (EILs)

EILs have been developed for assessing risk to terrestrial ecosystem for common contaminants in soil (Table 6). The EILs are derived for specified levels of species protection depending on land use and are principally applied to the top 2 m of the soil.

Table 6 – EILs Land Use Criteria and Protection Levels

Land Use	Levels of Protection
Areas of ecological significance	99%
Urban residential areas and public open space (HIL A, B and C)	80%
Commercial and industrial	60%

Schedule B5 of the NEPM provides the EILs for Arsenic, Copper, Trivalent Chromium, DDT, Naphthalene, Nickel, Lead and Zinc. The methodology to derive the EILs considers the physicochemical properties of soil and contaminants and the capacity of the local ecosystem to accommodate increases in contaminant levels above ambient background.

EILs are obtained by summing added ambient background concentration (ABC) and added contaminant limit (ACL). ABC is the soil concentration in a specified locality that is the total of naturally occurring background level and the contaminant levels that have been introduced by general anthropogenic sources. ACL is the added concentration above the ABC of a contaminant which requires further investigation on the impact on ecological values.

The derivation of EILs takes into consideration the ageing of contamination (>2 years) and soil properties as the toxicity of soil contaminants will reduce over time. Values for ACL based on pH, cation exchange capacity and exposure scenario are provided for Lead, Zinc, Copper, Nickel and Trivalent Chromium. This method of deriving EILs only applies to metals and metalloids, with the exception of Arsenic.

Methodology for Tier 2 site-specific assessments to determine site-specific EILs is provided in schedule B5(b) of the NEPM.

6.3.4 Ecological Screening Levels (ESLs)

ESLs haven been developed for selected petroleum hydrocarbon compounds to assess risk to terrestrial ecosystem. The ESLs adopts the same four (4) fractions from the HSLs (**Table 5**), however the soil texture standards are only divided into two (2); coarse or fine.

ESLs were adopted based on a review of Canadian guidance, a risk based total petroleum hydrocarbon standards for human health and ecological aspects for various land uses in the *Canada-wide Standards for Petroleum Hydrocarbons (PHC) in Soil* (Canadian Council of Ministers of the Environment, 2008).

6.4 Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites (ANZECC/NHMRC, 2000)

The *Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites* (ANZECC/NHMRC, 2000) provide a risk management approach consistent with the attainment of environmental outcomes described in the NEPM.

Contamination of land is defined as the presence in, on, or under the land of a substance at a concentration above the concentration at which the substance is normally present in, on, or under (respectively) land in the same locality, being a presence that presents a risk of harm to human health or any other aspect of the environment.

The objectives of contaminated site remediation (ANZECC/NHMRC, 2000) are to:

1. render a site acceptable and safe for the long term continuation of its existing/proposed use;
2. minimise environmental and health risks both on and off site to acceptable levels; and
3. maximise to the extent practicable, the potential future uses of the site.

The ANZECC/NHRMC (2000) guidelines provides two basic approaches in dealing with contaminated sites.

i) a strict adherence to a set of preferred soil criteria used to define a condition of contamination and to serve as the standard which sites must meet in order to be considered to have been decontaminated; or

ii) a more flexible use of pre-determined soil criteria used chiefly to provide guidance as to whether a detailed investigation is required, confirm no further action is needed or provide guidance for clean-up in appropriate circumstances. This approach relies on careful consideration of site-specific data to derive acceptable criteria, which will ensure that public health, local amenity and soil, air water and quality are protected.

The ANZECC/NHRMC (1992) guidelines concluded that the most appropriate approach for Australia is to adopt the combination of both approaches that incorporates, at a national level a general set of management principles and soil quality guidelines which guide site assessment and may guide site clean-up action, eliminating where appropriate, the need to develop costly site specify criteria.

This approach also recognises that every site is different and that in many cases site specific acceptable criteria and clean-up technologies will need to be developed which reflect local conditions.

6.5 SEPP 55 Guidelines

The SEPP Guidelines (DUAP and EPA, 1998) establishes the best practice for managing land contamination through the planning and development control process. The planning and development control process as provided for in the EP&A Act plays an important role in the management of land contamination. The integration of land contamination management into the planning and development control process will:

- ensure that changes of land use will not increase the risk to health or the environment;
- avoid inappropriate restrictions on land use; and
- provide information to support decision-making and to inform the community.

The SEPP 55 Guidelines include:

a) information to assist in the investigation of contamination possibilities;

b) a decision making process that responds to the information obtained from an investigation;

c) information on how planning and development control can cover the issues of contamination and remediation;

d) a suggested policy approach for planning authorities;

e) discussion of information management systems and notification and notation schemes, including the use of section 149 planning certificates notations; and

f) approaches to prevent contamination and reduce the environmental impact from remediation activities.

The SEPP 55 Guidelines provides consistent statewide planning and development controls for the remediation of contaminated land and ensures the following:

- land use changes do not occur until planning authorities consider whether the land is contaminated and whether it needs to be remediated to make it suitable for the proposed use;
- remediation of contaminated land is permissible throughout the State;
- remediation requires consent only where it has the potential for significant environmental impacts or does not comply with a council's policy for contaminated land;
- most remediation proposals which require consent are advertised for public comment;
- all remediation is carried out in accordance with appropriate standards and guidelines;
- applications for remediation are not refused without substantial justification; and
- councils are notified at commencement and completion of remediation.

6.6 Relevant Legislation

NSW has a comprehensive suite of guidelines relating to assessment and management of contamination, administered under the CLM Act and the EP&A Act. These include the following:

- *Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites* (OEH, 2011);
- *Contaminated Sites: Guidelines for the NSW Site Auditor Scheme* (2nd edition) (DEC, 2006);
- *Contaminated Sites: Sampling Design Guidelines* (EPA, 1995);
- *SEPP 55 Guidelines* (DUAP and EPA, 1998); and
- *Waste Classification Guidelines Part 1: Classifying Waste* (EPA, 2014).

Guidelines approved under the CLM Act also include the *Australian Drinking Water Guidelines* (NHMRC, 2011)*, Water Quality Guidelines* (ANZECC/ARMCANZ, 2000) and *Guidelines for Managing Risk in Recreational Waters* (NHMRC, 2008)*.*

7 PRELIMINARY CONCEPTUAL SITE MODEL

A CSM was developed based on the information obtained during PSI process, to allow assessment of potential sources of impact, chemicals of concern, transport mechanism and receptors. An updated CSM has been developed following the undertaking of this DSI, and is provided in Section 12 of this report.

7.1 Sources of Impact

In summary, the sources of impact AECs identified within the proposed rail and water pipeline modification footprint include:

- AEC 1: Soil contamination associated with former unknown land use (Feature of Interest 2);
- AEC 2: Potential soil contamination associated with former agricultural activities (Feature of Interest 6);
- AEC 3: Asbestos in soil observed at the site (Feature of Interest 5, 18 & 22);
- AEC 4: Potential contamination associated with the infilling of a former farm dam (Feature of Interest 3);
- AEC 5: Potential contamination associated with storage of geological drill core and any other potential chemical (Feature of Interest 7);
- AEC 6: Potential contamination associated with mining activity, including soils within close vicinity to a former mine, and mine rehabilitation areas (Feature of Interest 16);
- AEC 7: Potential contamination associated with potentially contaminated runoff settling within low lying basin (Feature of Interest 17, 19, and 20);
- AEC 8: Potential contamination associated with former unknown structures, importation of potentially fill material, storage of material and carpark (Feature of Interest 18 & 22); and
- AEC 9: Potential contamination associated with the disturbed soil and former gravel quarry within the area of proposed pump station for water extraction from Hunter River (Feature of interest 21).

7.2 Contaminants of Concern

Based on the potential sources and the findings of the current investigation, the contaminants of concerns include the following:

- heavy metals (As, Cd, Cr, Cu, Pb, Ni, Hg, Zn);
- polycyclic aromatic hydrocarbons (Carcinogenic and Total);
- total recoverable hydrocarbons (TRH);
- BTEX and Naphthalene;
- volatile organic compounds;

- OCPs and OPPs; and
- asbestos.

7.3 Fate and Transport

7.3.1 Transport Medium and Control

The anticipated primary transport media for the migration of contaminants of concern are:

- migration of contaminated material through erosion and dust during construction works;
- surface runoff containing contaminants to open water bodies from workshop and storage sheds;
- inhalation of air-borne asbestos fibres during construction work; and
- migration through permeable soils to groundwater. Groundwater contamination risk is low based on the current list of AEC. Should soil contamination be confirmed in further investigations, groundwater may be considered a potential medium risk.

7.3.2 Potential Exposure Pathways

There are a number of mechanisms by which identified receptors may come into contact with contaminated sources, including the following:

- incidental dermal contact or ingestion of impacted soils and surface water;
- generation of impacted dusts, aerosols or sediments from impacted soils;
- inadvertent use of contaminated groundwater (low risk based on existing information); and
- surface runoff to open water bodies on site.

7.4 Potential Receptors

The potential human receptors are as follow:

- construction workers during construction being exposed to contaminated soil;
- workers on site;
- community members living within vicinity of the site or accessing water sources;
- visitors to the site; and
- future users of the developed site.

The potential ecological receptors are ecological communities within and around the site.

8 SOIL SAMPLING, ANALYSIS PLAN AND SAMPLING METHODOLOGY

8.1 Sampling Team

The details of the sampling team (see Table 7) and duties were as follows:

Sample collector:

- soil sample collection according to sampling regime;
- described soil horizon features;
- responsible for decontamination between sampling;
- identified testing location and depth of profiles;
- labelled sample containers;
- recorded field conditions current at sampling into the sample log;
- recorded soil profile information;
- nominated field duplicates at the nominated ratio; and
- recorded analytes to be tested for each sample.

Table 7 – Sampling Personnel

Personnel	Position	Qualifications	Project Task
Andrew Jacovides	Environmental Scientist	Bachelor of Natural Science (Environmental Management) Workcover Construction Work in NSW (White Card) Senior First Aid Certificate Manual Handling Training Waste Classification and Reform Training	- Conduct site observation and visual assessment - Sample collection - Record soil description

8.2 Sampling Regime – Soil

The fieldwork for the assessment was devised to address the issues identified as potential for contamination as set out in Section 7. The sampling objective was to gather information with regard to the type, location, level and extent of potential contamination that may be present at the site as a result of current or former land uses. This process provided sufficient supporting data (according to the Data Quality Objectives [DQO's]) to allow recommendations to be made on whether the possible site contamination is compliant with relevant legislation and guidelines in regards to the proposed development and land use.

For this assessment, the selection of the sampling locations was formed based on a judgemental sampling pattern. Samples were collected based on 'Features of Interest' identified as having the potential for the

presence of contamination during the desktop investigation. Samples were collected in locations selected within the feature of interest.

Sampling density for this investigation was based on professional discretion, with consideration to the potential contamination risk associated with each feature of interest. Rational for sampling is discussed in Table 8 below. Locations of the samples are presented in Figures 4a to 4i. Site Photographs are presented in Appendix A.

Table 8 – Sample Location Selection

Sampling Location	Date	Justification	Depth
BH1	22/11/2017	Within Feature of Interest 2 – Figure 3a	Surface
BH2	22/11/2017	Within Feature of Interest 2 – Figure 3a	Surface
BH3	22/11/2017	Within Feature of Interest 2 – Figure 3a	Surface
BH4	22/11/2017	Within Feature of Interest 2 – Figure 3a	Surface
BH4	22/11/2017	Within Feature of Interest 2 – Figure 3a	300-400 mm
BH5	22/11/2017	Within Feature of Interest 2 – Figure 3a	Surface
BH6	22/11/2017	Within Feature of Interest 2 – Figure 3a	Surface
BH7	22/11/2017	Within Feature of Interest 2 – Figure 3a	Surface
BH7	22/11/2017	Within Feature of Interest 2 – Figure 3a	300-400 mm
BH8	22/11/2017	Within Feature of Interest 2 – Figure 3a	Surface
BH9	22/11/2017	Within close proximity to Feature of Interest 5 - Figure 3b	Surface
BH10	22/11/2017	Within close proximity to Feature of Interest 5 - Figure 3b	Surface
BH11	22/11/2017	Within close proximity to Feature of Interest 5 - Figure 3b	Surface
BH12	22/11/2017	Within Feature of Interest 6 - Figure 3b	Surface
BH13	22/11/2017	Within Feature of Interest 6 - Figure 3b	Surface
BH14	22/11/2017	Within close proximity to Feature of Interest 7 - Figure 3b	Surface
BH15	22/11/2017	Within Feature of Interest 3 – Figure 3b	Surface
BH16	22/11/2017	Within Feature of Interest 17 – Figure 3c	Surface
BH17	23/11/2017	Within Feature of Interest 17 – Figure 3c	Surface
BH18	23/11/2017	Feature of Interest 16 – Figure 3a	Surface
BH18	23/11/2017	Feature of Interest 16 – Figure 3a	300-400 mm
BH19	23/11/2017	Feature of Interest 16 – Figure 3a	Surface

BH19	23/11/2017	Feature of Interest 16 – Figure 3a	300-400 mm
BH20	23/11/2017	Feature of Interest 16 – Figure 3a	Surface
BH20	23/11/2017	Feature of Interest 16 – Figure 3a	300-400 mm
BH1A	09/12/2017	Within Feature of Interest 22 – Figure 3e	Surface
BH2A	09/12/2017	Within Feature of Interest 22 – Figure 3e	Surface
BH3A	09/12/2017	Within Feature of Interest 22 – Figure 3e	Surface
BH3A	09/12/2017	Within Feature of Interest 22 – Figure 3e	300 mm
BH4A	09/12/2017	Within Feature of Interest 22 – Figure 3e	Surface
BH4A	09/12/2017	Within Feature of Interest 22 – Figure 3e	500 mm
BH5A	09/12/2017	Within Feature of Interest 22 – Figure 3e	Surface
BH6A	09/12/2017	Within Feature of Interest 22 – Figure 3e	Surface
BH7A	09/12/2017	Within Feature of Interest 22 – Figure 3e	Surface
BH8A	09/12/2017	Within Feature of Interest 22 – Figure 3e	Surface
BH9A	09/12/2017	Within Feature of Interest 21 – Figure 3e	Surface
BH10A	09/12/2017	Within Feature of Interest 21 – Figure 3e	Surface
BH11A	09/12/2017	Within Feature of Interest 22 – Figure 3e	Surface
BH12A	09/12/2017	Within Feature of Interest 22 – Figure 3e	Surface
BH13A	09/12/2017	Within Feature of Interest 20 – Figure 3e	Surface
BH14A	09/12/2017	Within Feature of Interest 19 – Figure 3d	Surface
BH15A	09/12/2017	Within Feature of Interest 19 – Figure 3d	Surface
BH16A	09/12/2017	Within Feature of Interest 18 – Figure 3d	Surface
BH17A	09/12/2017	Within Feature of Interest 18 – Figure 3d	Surface
BH18A	09/12/2017	Within Feature of Interest 18 – Figure 3d	Surface
BH19A	09/12/2017	Within Feature of Interest 18 – Figure 3d	Surface
BH20A	09/12/2017	Within Feature of Interest 18 – Figure 3d	Surface
BH21A	09/12/2017	Within Feature of Interest 18 – Figure 3d	Surface
BH22A	09/12/2017	Within Feature of Interest 18 – Figure 3d	Surface
BH23A	09/12/2017	Within Feature of Interest 18 – Figure 3d	Surface
BH24A	09/12/2017	Within Feature of Interest 18 – Figure 3d	Surface
BH25A	09/12/2017	Within Feature of Interest 18 – Figure 3d	Surface
BH26A	09/12/2017	Within Feature of Interest 18 – Figure 3d	Surface

8.3 Sample Collection – Soil

Sampling locations were selected based on the following process:

- visual inspection for contamination during the site walkover;
- samples were collected within areas proposed for development;
- sample collection was conducted on a judgemental based sample regime (See Figures 4a-4i);
- soil samples were recovered from each sample location using hand equipment (hand auger); and
- soil samples were collected in 150 mL glass jars.

The jars were then placed in a chilled container and forwarded to a NATA registered laboratory for analysis under Chain of Custody (COC) conditions. A copy of our COC is provided in Appendix F. The laboratory issued confirmation of sample receipt intact (presented in Appendix F).

9 QUALITY ASSURANCE & QUALITY CONTROL PLAN

9.1 Data Quality Objectives

The purpose of establishing data quality objectives is to ensure the field investigations and analyses are undertaken in a way that enables the collection and reporting of reliable data on which to base the site validation. The DQOs and the procedures designed to achieve these objectives are listed below (Table 9).

Table 9 – Data Quality Objectives

Process	Response
Step 1. Define the problem	Potentially contaminating current and historical activities at the site have included: - Former agricultural uses, including potential livestock dip – potential persistent pesticide use in few isolated areas - Deposition of imported fill of unknown origin in few isolated areas - Potentially contaminated material storage, including scrap and chemical drums in few isolated areas
Step 2. Identify the goal of the study	The objective of the investigation is to: - Assess the presence/degree of contamination in areas identified as Features of Interest (Figure 3) - Determine the suitability of the site for the proposed development and land use
Step 3. Identify information inputs	Data inputs for the project: -Desktop investigation for potential contamination (Review id aerial photos, Government records etc.) - Site Inspection - Soil Sampling -Subsurface Lithology - Analytical Results
Step 4. Define the boundaries of the Study	The areas subject to the intrusive investigation (see Figure 3 & 4) is along the proposed Railway Corridor and Water Pipeline (with the exception of Mining Lease Area and existing Railway). The vertical boundary of the assessment is the depth of soil sampling.
Step 5. Develop a Decision Rule	Concentrations of contaminants will be compared to the appropriate ASC NEPM criteria to assess the potential impacts to soil and to assess any need for further investigation or remediation. Soils: ASC NEPM (2013) Investigation Levels – Commercial/Industrial (HIL-D) and Ecological Investigation Level (EIL) as well as Waste Classification Criteria (considering any soil require offsite disposal) No expectation has been made regarding the contamination status of the site, and as such, detection limits of analysis have been allocated to determine compliance with the NEPM HIL-D and Waste Classification criteria.
Step 6. Specify limits on decision errors	The range of contaminant concentrations has the potential to vary from below detection limits of the analysis techniques (adequately lower than the HIL-A criteria) to very high concentrations, well exceeding the acceptability criteria. In the event of results being below detection, the consequences of decision errors are likely to be relatively minor.
Step 7. Optimise the design for obtaining data	Samples were collected in accordance with the sampling plan as per Section 8. Environmental Professionals undertook sampling.

9.2 Data Quality Indicators and Data Evaluation

SESL has selected the following Data Quality Indicators (DQIs) to ensure that the data obtained from the assessment is of sufficient quality to be used to draw reliable and representative conclusions in an assessment of the environmental conditions of the investigation area.

9.2.1 Documentation and Data Completeness

The completeness of data is defined as the percentage of analytical results that are considered valid. Valid chemical data values that have been identified as acceptable as qualified during the data validation process. The completeness is a comparison of the total number of samples accepted against the total number of samples, calculated as a percentage. The project goal for completeness is greater than 95%. Quality Assurance/Quality Control (QA/QC) for completeness includes the following:

- all critical locations sampled;
- sampling team are well informed, qualified and experienced;
- correct and complete documentation;
- appropriate analysis methods and Practical Quantification Limits (PQLs);
- compliance of sample holding times; and
- all data entries in the database are correct, properly entered, checked and that any typographical errors in the database are corrected and the data re-entered properly.

9.2.2 Data Comparability

Comparability expresses the confidence that the data may be considered to be equivalent for each sampling and analytical event and deemed suitable for comparison. In order to assess comparability, field procedures, laboratory sample preparation procedures, analytical procedures and reporting units must be known and similar to establish protocols (Standard Operating Procedures). Qualitatively, data subject to strict QA/QC procedures will be deemed more reliable, therefore more comparable, than other data.

9.2.3 Data Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents a characteristic of parameter variations at sample points or environmental conditions and obtaining suitable samples from these sites.

Sample selection and analysis will be conducted in order to meet the specific objectives of the particular phase of work. Analysis for the contaminants of concern will be selectively conducted based on the identified contaminants of concern, and the field observations.

9.2.4 Precision and Accuracy for Sampling and Analysis

Precision and accuracy for sampling and analysis expresses the quantitative measure of the variability and closeness of the data. This DQI is crucial to provide information to data users of the reliability, unreliability or qualitative value of the data representing each analyte in each environmental matrix. QA/QC includes:

- correct and appropriate Standard Operating Procedures applied and complied with;
- assessment of RPDs are satisfactory; and
- independent review of QA/QC data satisfactory.

9.3 Field and Laboratory Quality Assurance Program

Quality Assurance (QA) and Quality Control (QC) practices were applied to all stages of data gathering and subsequent sample handling procedures. These are designed to provide control over both field and laboratory operations. Additionally, the analytical laboratories will complete their own internal QA procedures (as required by NATA registration) during the analysis of samples. Details of the QA/QC program are described below.

9.3.1 Quality Assurance

All fieldwork followed the SESL procedure to ensure that all environmental samples are collected by a set of uniform and systematic methods as required by the QA system.

The SESL field procedure describes the following:

- decontamination procedures;
- sample identification procedures;
- information requirements for field sampling sheets;
- chain of custody information requirements; and
- field calibration requirements (if necessary).

9.3.2 Quality Control Results

The results of the field and laboratory quality control samples were assessed to determine:

- the quality of the data generated;
- if the data meets the objectives of the study; and
- if the data is acceptable for the intended use.

9.3.3 *Field QC*

Two duplicate sample was collected during the sampling works conducted at the site. These duplicates were collected simultaneously and identically to the corresponding primary samples, with no reference to its corresponding sample marked on the sampling containers. Additionally, a single rinsate blank sample was collected at the conclusion of the sampling event, to validate decontamination procedures, and ensure that cross contamination had not occurred between samples.

9.3.4 *Laboratory Quality Control*

The following data quality indicators will be used for the investigation:

- all samples were analysed by NATA accredited methods in accordance with NEPC (1999) amended in 2013 guidelines;
- maximum acceptable sample holding times was 30 days;
- samples were appropriately handled;
- laboratory method blank analyses were required to be below the limits of reporting PQL;
- all compound concentrations were (if required) spiked at similar concentration to sample results;
- all PQLs must be less than the assessment criteria;
- the relative percent difference of duplicates was determined and compared to the following criteria for acceptability. The acceptance criteria are:
  a) less than 30% for field duplicates. Where concentrations were less than 5 times the LOR, RPDs were not calculated;
  b) less than 30% for inter laboratory duplicates;
  c) no limit for laboratory duplicates where the detection is less than 10 times the PQL; and
  d) less than 50% for laboratory duplicates where the detection is between 10 and 20 times the PQL.
  e) less than 20% for laboratory duplicates where the detection limit is greater than 20 times the PQL.
- RPDS for control spike duplicates to be compared to an acceptable limit of 25%;
- RPDs for Matrix Spike Duplicates to be compared to an acceptable limit of 25%; and
- percent recoveries of control spikes and matrix spikes to be compared to an acceptable range of 70-130%. In addition, percent recoveries of surrogates were also compared to the USEPA surrogate recovery limits.

All laboratory analysis was conducted at NATA accredited laboratory under COC procedures. Analysis was conducted through ALS Environmental Division Sydney located in Smithfield, NSW (NATA #825).

Spike recovery analysis was conducted for each group of contaminants to determine the suitability and accuracy of the results obtained.

9.3.5 Laboratory Blanks

Laboratory or control blanks consist of reagents specific to each individual method and are prepared and analysed by laboratories in the same manner as regular samples. The preparation and analysis of laboratory blanks enable the measurement of contamination within the laboratory.

Ideally, no contamination should be present in blanks. However, in the event that contamination is detected, the following actions are taken:

- the organic test results are not to be corrected by subtracting any blank value;
- if any analyte is found in blank but not a sample, no action is taken;
- no absolute results are reported unless the analyte concentration within a sample exceeds 10 times the amount in any blank for common contaminates, or five times the amount for any other analyte; and
- professional judgment is used where little or no contamination is present in the associated blanks, but contamination is suspected in actual samples.

9.4 QA/QC Results

QA/QC procedures conducted as part of the DSI included standard laboratory procedures (see QA/QC plan in Section 9).

9.4.1 Field Duplicate Samples and Rinsate Sample

Field duplicate samples (blind field replicate samples submitted to the laboratory to provide a check of the precision (repeatability) of the laboratory's analysis of soil were submitted to the laboratory for analysis.

Data for primary and duplicate samples was collated and reported as a RPD of the concentration of both samples. See Table 10 for RPD results. Detailed calculation of RPDs is presented in Table A2. One rinsate sample collected during the investigation indicated that the results (Table A3) were below the limit of reporting, indicating no cross contamination occurred during sampling.

Table 10 – Summary of Soil RPDs

Summary of Quality Sample Results			
Total RPDs	528	actual	
Total RPD > 30% & Result >5x LOR	3	0.57%	min. target
Total RPD <= 30% or Result <5x LOR	525	99.43%	=>95%
Total Primary	53	actual	min. target
Total Field Duplicates	6	11.3	10.0%

9.5 Laboratory QA/QC

Laboratory QA/QC for soil analysis comprised COC documentation, sample integrity and holding times, sample temperatures on receipt, use of acceptable NATA-registered laboratory methods and laboratory QA/QC results.

ALS has provided a QA/QC report of laboratory control samples performance, and other quality performance records provided with laboratory certificates in Appendix F.

Table 11 – Laboratory QAQC Performance

Lab	Report #	Quality Control Samples	Holding Times	Frequency of Quality Control Samples	Comments
ALS	ES1725818	No outliers.	No outliers.	No outliers.	The performance of laboratory QA/QC samples is considered acceptable.
ALS	ES1731292	No outliers.	No outliers.	No outliers.	The performance of laboratory QA/QC samples is considered acceptable.

9.6 Statement on Data Quality

Overall, the data quality objectives were met during the investigation, as demonstrated throughout the report. Documentation was maintained and complete, sufficient data was collected to characterise the site in accordance with statutory requirements, the data have been shown to be of sufficient quality to provide confidence that the data is representative of site conditions, and precision and accuracy has been demonstrated in the field and laboratory QA/QC programs.

The overall data quality performance against DQOs indicates the analytical data is considered to be representative of site conditions at the time the investigation, and suitable to enable valid assessment of the site.

9.7 Reporting

On completion of the assessment, SESL has prepared this report summarising the works performed and assessed the results and findings in order to demonstrate compliance with the objectives of the DSI.

Based on the identified contaminants of concern and field observations and screening, soil samples were submitted for analysis.

Table 12 – Summary of Sample Analysis provides a summary of the sampling regime for the DSI. Please note that results from samples collected during the DSI conducted by SESL have been included in this summary

Table 12 – Summary of Sample Analysis

Analyte	Primary Samples	QAQC Samples
Heavy metals (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg)	53	6
Organochlorine Pesticides (OCP)	53	6
Organophosphate Pesticides (OPP)	53	6
Polycyclic Aromatic Hydrocarbons (PAH)	53	6
Benzene, Toluene, Ethylbenzene & Xylene (BTEX)	53	6
Total Recoverable Hydrocarbons (TPH)	53	6
Polychlorinated Biphenyl	53	6
Asbestos in Soil	7	1

* 13 samples collected, 2 QA/QC samples collected.

10 ASSESSMENT CRITERIA

Criteria for the soil assessment within the area subject to the proposed Modification has been adopted from relevant environmental legislation and guidelines, based on the proposed works and land use.

10.1 Health Investigation Levels

HILs are scientifically based, generic assessment criteria designed to be used in the Tier 1 assessment for assessing human health risk via all relevant pathways of exposure. HILs are designed to be intentionally conservative and based on a reasonable worst-case scenario for the following generic land use settings.

For this assessment, HIL D – Commercial and Industrial Site (HIL-D) has been adopted as the core assessment criteria. HIL-D has been selected for this assessment based on the understanding that only worker undertaking the earthwork will be involved during the modification and railway operation is commercial/Industrial in nature. Following the completion of the Modification, human exposure to soils within the investigation area is likely to be minimal. Should there an alteration to the proposed land use, a review of the adopted HIL for this assessment is required.

10.2 Health Screening Levels

HSLs are similar to HILs in that they apply the same land use scenarios, but they provide guidance for exposure risks for petroleum hydrocarbon compounds and asbestos, and give consideration of soil texture and depth to determine the appropriate soil, groundwater and soil vapour criteria.

For this assessment, HSL D – Commercial and Industrial Site (HSL-D) criteria has been adopted as the core assessment criteria.

10.3 Ecological Investigation/Screening Levels

EILs and ESLs have been developed for assessing risk to terrestrial ecosystem for common contaminants in soil. The EILs are derived for specified levels of species protection depending on land use and are principally applied to the top 2 m of the soil.

For this assessment, EIL and ESL Commercial and Industrial Site criteria has been adopted for this assessment. These criteria have been selected based on the understanding that soil materials are already present at the site, and that the works proposed for the Modification are unlikely to influence the distribution of soils or exposure of ecology to potential contamination.

10.4 Waste Classification Guidelines

The NSW EPA Waste Classification Guidelines provide guidance on assessment criteria for the classification of non pre-classified solid wastes for the purpose of offsite disposal. It's SESL's understanding that solid wastes are not proposed to be disposed of offsite as part of the Modification works. In the event that wastes are required to be disposed of offsite, the classification of these wastes in accordance with the guidelines is required, and consideration has been given to that throughout the preparation of this investigation.

11 SUMMARY OF RESULTS

11.1 Site Conditions

The subject area of this investigation is predominantly agricultural land, former mining land and rural residential properties, and is limited to the area of the Modification outside of the existing mining lease.

Natural surface soil materials consisted primarily of brown silty, sandy or clay loam topsoils, free from visible indicators or contamination or foreign materials. Where fill materials were observed (refer to Section 5), soil materials varied significantly, with foreign materials observed in some feature of interest locations, as discussed in Section 5.

The topography is characterised by undulating low hills with elevations of 138 m AHD to 188 m AHD within the Modification Area. The land slopes downwards towards the Hunter River to the south. The Hunter River alluvial floodplain is situated within the eastern and southern extents of the Modification Area. The Overton Ridge (east of Overton Road) naturally reaches an elevation of 188 m AHD. To the south of Overton Ridge are the lower hill slopes which slopes towards Hunter River.

Bonded ACM fragments were identified at three (3) of the Features of Interest at the site (5, 18 & 22). At Feature 5, ACM fragments were identified only on hardstand concrete present as remains of a former structure. At Features 18 & 22, ACM fragments were identified on the surface soils in some areas within the vicinity of the Features (refer to Figure 4f & Figure 4h). Asbestos in soil analysis was conducted on samples collected at each of these Features of Interest, with asbestos fibres being found to be absent from all samples.

11.2 Identified Fill Material

Fill material was identified in isolated areas across the Modification Area and surrounds. Specifically, fill materials were identified within the vicinity of Feature of Interest 18 and Feature of Interest 22 (refer to Figures 4f & 4h).

Fill material location, description and depth is detailed in Table 13 below.

Table 13 – Fill Material Identification

Fill Material Location	Description	Depth
Feature of Interest 18	Light, pale brown sand clay fill material with significant rock inclusions and some ACM fragment inclusions. Material of unknown origin	Assumed 100-200 mm
Feature of Interest 22	Dark brown sand loam. ACM fragments observed on the surface of fill materials. Fill material assumed to have been used to level the site and/or provide access to nearby former gravel quarry	Assumed >1000 mm

11.3 Schedule of Laboratory Analysis

As part of this assessment, all laboratory analysis was conducted by ALS Environmental Division Sydney (NATA #825). No inter-laboratory QA samples were analysed.

11.4 Laboratory Results

A total of fifty-two (52) soil samples were collected from surface and sub-surface soils at the site based on a judgemental sampling pattern, for the purpose of contamination screen analysis. Samples were collected based 'Features of Interest' identified as having the potential for the presence of contamination, during the PSI.

Analytical results for samples collected as part of this detailed assessment were primarily compared against the HILs and HSLs for Commercial/industrial (HIL-D & HSL-D). These assessment criteria were selected based on an understanding of the proposed land use, and the very limited human exposure to soils that is likely to occur at the site following the completion of the Modification.

All contaminants of potential concern were determined to be in concentrations below the threshold adopted for this assessment (HIL-D & HSL-D) in all sample locations. A summary of results compared to the assessment criteria can be seen in Analytical Table A1, and accompanied by complete NATA laboratory certificates, COC documentation and sample receipt advice in Appendix F.

Laboratory results for a single sample (BH5A Surface – Feature of Interest 22) indicates that TRH (C16-34 & C34-40) concentrations exceed the adopted ESL criteria. Additionally, a single sample (BH3A) exceeded the adopted ESL concentration for Benzo(a)pyrene. In consideration of the location of these samples (contaminants do not extend laterally or vertically), and the contaminant concentrations within surrounding sample locations, SESL considers these to be isolated result that should not be considered when assessing potential remediation required at the site.

Elevated lead (Pb) and Nickel (Ni) concentrations were observed above the criteria for General Solid Waste in accordance with the NSW EPA Waste Classification Guidelines Part 1: Classifying Waste (2014) in some sample locations. Lead was observed to be elevated above the General Solid Waste criteria (100 mg/kg) in three (3) sample locations at Feature of Interest 5 and two (2) locations at Feature of Interest 22. Nickel was observed to be elevated above the General Solid Waste criteria (40 mg/kg) in one (1) sample location at Feature of Interest 18, two (2) locations at Feature of Interest 19 and five (5) locations at Feature of Interest 22.

12 UPDATED CONCEPTUAL SITE MODEL

The CSM for the site was updated following the additional data obtained through the sampling and analysis undertaken as part of this DSI. The updated CSM has been developed based on the actual sources of impact, chemical concern, transport mechanisms and receptors.

12.1 Sources of Impact

In summary, the Sources of Impact (SOI) identified within the proposed rail and water pipeline modification footprint include:

- SOI 1: ACM fragments observed on surface soils at the site (Feature of Interest 5, 18 & 22);
- SOI 2 Polycyclic aromatic hydrocarbons (PAHs) within fill materials exceeding adopted ESL criteria only in one sample (Feature of Interest 22). Nearby sample did not exceed the criteria indicating the extent of this contamination is laterally limited;
- SOI 3: Total recoverable hydrocarbons (TRHs) exceeding ESL within soils impacted by storage drum fill within a very limited lateral and vertical area of extent (Feature 22);
- SOI 4: Elevated lead (Pb) exceeds Waste Classification criteria for General Solid Waste in some locations across the site (Feature of Interest 5 & 22); and
- SOI 5: Elevated nickel (Ni) exceeds Waste Classification criteria for General Solid Waste in some locations across the site (Feature of Interest 18, 19 & 22).

12.2 Contaminants of Concern

On the basis of human health risk at the site, bonded ACM fragments are the only contaminants present at the site that must be managed as part of the proposed development. All other contaminant concentrations lie within the acceptable limits determined for this investigation, adopted from the HIL-D and HSL-D criteria.

13 CONCLUSION

13.1 Site Characterisation

The area of the Modification encompasses 20 individual lots (detailed in Table 1). The subject area of this investigation is predominantly agricultural land, former mining land and rural residential properties, and is limited to the area of the Modification outside of the existing mining lease.

In summary, the SOI identified within the proposed rail and water pipeline modification footprint include:

- SOI 1: ACM fragments observed on surface soils at the site (Feature of Interest 5, 18 & 22);
- SOI 2 Polycyclic aromatic hydrocarbons (PAHs) within fill materials exceeding adopted ESL criteria in one sample (Feature of Interest 22). Nearby sample did not exceed the criteria indicating the extent of this contamination is laterally limited;
- SOI 3: Total recoverable hydrocarbons (TRHs) exceeding ESL within soils impacted by storage drum fill with limited area of extent (Feature 22);
- SOI 4: Elevated lead (Pb) exceeds Waste Classification criteria for General Solid Waste in some locations across the site (Feature of Interest 5 & 22); and
- SOI 5: Elevated nickel (Ni) exceeds Waste Classification criteria for General Solid Waste in some locations across the site (Feature of Interest 18, 19 & 22).

13.2 Summary

Based on the site history review, the visual site inspection and soil sampling & laboratory analysis, the contaminating activities/items at the site are limited to: importation and land filling with soil materials of unknown origin & quality and the presence of ACM fragments.

On the basis of human health risk at the site, bonded ACM fragments are the only contaminants present at the site that must be managed as part of the proposed development. All other contaminant concentrations lie within the acceptable human health limits determined for this investigation, adopted from the HIL-D and HSL-D criteria. An AMP must be developed by a suitably qualified environmental consultant, and carried out by appropriately licensed contractors to ensure that the asbestos observed at the site is managed prior to intrusive works undertaken as part of the Modification.

Due to the nature of the fill materials observed at the site throughout this investigation (Feature of Interest 18 & 22), there is minor risk that asbestos may exist with materials unable to be observed during the intrusive sampling conducted at the site. An Unexpected Finds Procedure (UFP) must be developed by a suitably qualified and experienced environmental consultant to ensure that, if unexpected materials are present within the excavation area, potential contaminants (asbestos) are correctly identified and appropriately managed.

For the purpose of Waste Classification, contaminants are elevated above the criteria for General Solid Waste in accordance with the NSW EPA Waste Classification Guidelines Part 1: Classifying Waste (2014) in some sample locations. This is specifically in relation to elevated levels of lead and/or nickel at Features of Interest 5, 18, 19 and 22. If offsite disposal (i.e. outside of the proposed disturbance footprint) of any soil materials from features of interest 5, 18, 19 and 22 is proposed as part of the works associated with the proposed Modification, SESL recommends that further assessment may be required to determine the leachability of specific contaminants to reduce disposal costs. Disturbance of the soils at features of interest 5, 18, 19 and 22 (e.g. for construction related cut and fill activities), that remains within the proposed disturbance footprint, would not require any further assessment or management.

Based on this Tier 1 DSI, SESL considers that the site is suitable for the proposed works as part of the Modification, subject to:

- Development of an Asbestos Management Plan (AMP) by an appropriately qualified and experienced environmental consultant;
- Management/Remediation of ACM present at the site in accordance with the AMP by appropriately qualified contractors; and
- Development of an Unexpected Finds Protocol (UFP) by an appropriately qualified and experienced environmental consultant.

14 LIMITATIONS

This report only covers the site conditions at the time of inspection on 04/10/2017, 22/11/2017, 23/11/2017 and 09/12/2017. Should there be any variation in the site conditions beyond this date, such as imported fill, chemical spillage, illegal dumping, further assessment will be required.

This report is for the use of the client and any relevant authorities that rely on the information for development applications and approval processes. Any reliance on this report by third parties shall be at such parties' sole risk. This report shall only be presented in full and may not be used to support any other objective other than those set out in the report.

SESL's assessment is necessarily based on the result of limited site investigations and upon the restricted program of visual assessment of the surface and consultation of available records. Neither SESL, nor any other reputable consultant, can provide unqualified warranties nor does SESL assume any liabilities for site conditions not observed, or accessible during the time of investigations.

No site investigations can be thorough enough to provide absolute confirmation of the presence or absence of substances, which may be considered contaminating, hazardous or polluting. Similarly, the level of testing undertaken cannot be considered to unequivocally characterise the degree or extent of contamination on site. In addition, regulatory or guideline criteria for the evaluation of environmental soil and groundwater quality are frequently being reviewed and concentrations of contaminants which are considered acceptable at present may in the future be considered to exceed acceptance criteria. Similar conditions may prevail in regard to site remediation standards as different regulatory mechanisms are developed and implemented.

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Analytical Table 1 - Soil Results Summary

	Asbestos	BTEX							Halogenated Benzenes	Lead	Metals							Organochlorine Pesticides			
	Asbestos fibres	Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)	Xylene Total	Total BTEX	Hexachlorobenzene	Lead	Arsenic	Cadmium	Chromium (III+VI)	Copper	Mercury	Nickel	Zinc	4,4-DDE	a-BHC	Aldrin	Aldrin + Dieldrin
	Detect	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL		0.2	0.5	0.5	0.5	0.5	0.5	0.2	0.05	5	5	1	2	5	0.1	2	5	0.05	0.05	0.05	0.05
NSW 2014 General Solid Waste CT1 (No Leaching)		10	288	600			1,000			100	100	20			4	40					
NSW 2014 Restricted Solid Waste CT2 (No Leaching)		40	1,152	2,400			4,000			400	400	80			16	160					
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand 0-1 m		3					230														
NEPM 2013 Table 1B(5) Generic EIL - Comm/Ind											160										
NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Coarse Soil 0-2 m		75	135	165			180														
NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil									80	1,500	3,000	900		240,000	730	6,000	400,000				45
Lab Report Number	**Field ID**	**Date**																			
ES1729769	**BH1 Surface**	**24/11/2017**	-	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	22	5	<1	12	15	<0.1	12	108	<0.05	<0.05	<0.05	<0.05
ES1729769	**BH2 Surface**	**24/11/2017**	-	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	14	<5	<1	16	15	<0.1	13	42	<0.05	<0.05	<0.05	<0.05
ES1729769	**BH3 Surface**	**24/11/2017**	-	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	12	6	<1	11	14	<0.1	11	46	<0.05	<0.05	<0.05	<0.05
ES1729769	**BH4 Surface**	**24/11/2017**	-	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	13	8	<1	15	20	<0.1	18	42	<0.05	<0.05	<0.05	<0.05
ES1729769	**BH4 300-400**	**24/11/2017**	-	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	14	7	<1	16	19	<0.1	19	44	<0.05	<0.05	<0.05	<0.05
ES1729769	**BH5 Surface**	**24/11/2017**	-	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	14	<5	<1	13	14	<0.1	9	54	<0.05	<0.05	<0.05	<0.05
ES1729769	**BH6 Surface**	**24/11/2017**	-	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	14	6	<1	14	15	<0.1	15	41	<0.05	<0.05	<0.05	<0.05
ES1729769	**BH7 Surface**	**24/11/2017**	Not Detected	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	12	6	<1	6	15	<0.1	10	55	<0.05	<0.05	<0.05	<0.05
ES1729769	**BH7 300-400**	**24/11/2017**	-	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	7	<5	<1	6	6	<0.1	5	21	<0.05	<0.05	<0.05	<0.05
ES1729769	**BH8 Surface**	**24/11/2017**	-	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	15	5	<1	13	14	<0.1	11	79	<0.05	<0.05	<0.05	<0.05
ES1729769	**BH9 Surface**	**24/11/2017**	Not Detected	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	410	<5	<1	45	20	<0.1	25	312	<0.05	<0.05	<0.05	<0.05
ES1729769	**BH10 Surface**	**24/11/2017**	Not Detected	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	384	<5	<1	40	16	<0.1	19	249	<0.05	<0.05	<0.05	<0.05
ES1729769	**BH11 Surface**	**24/11/2017**	Not Detected	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	168	<5	1	30	29	<0.1	19	591	0.48	<0.05	<0.05	<0.05
ES1729769	**BH12 Surface**	**24/11/2017**	Not Detected	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	60	<5	<1	42	17	<0.1	21	115	<0.05	<0.05	<0.05	<0.05
ES1729769	**BH13 Surface**	**24/11/2017**	-	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	44	<5	<1	49	13	<0.1	19	40	<0.05	<0.05	<0.05	<0.05
ES1729769	**BH14 Surface**	**24/11/2017**	-	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	13	<5	<1	46	13	<0.1	24	36	<0.05	<0.05	<0.05	<0.05
ES1729769	**BH15 Surface**	**24/11/2017**	-	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	79	6	<1	17	22	<0.1	13	95	<0.05	<0.05	<0.05	<0.05
ES1729769	**BH16 Surface**	**24/11/2017**	-	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	23	<5	<1	43	41	<0.1	40	435	<0.05	<0.05	<0.05	<0.05
ES1729769	**BH17 Surface**	**24/11/2017**	-	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	15	<5	<1	41	39	<0.1	39	138	<0.05	<0.05	<0.05	<0.05
ES1729769	**BH18 Surface**	**24/11/2017**	-	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	12	6	<1	10	21	<0.1	16	49	<0.05	<0.05	<0.05	<0.05
ES1729769	**BH18 300-400**	**24/11/2017**	-	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	12	<5	<1	9	21	<0.1	13	48	<0.05	<0.05	<0.05	<0.05
ES1729769	**BH19 Surface**	**24/11/2017**	-	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	14	8	<1	9	17	<0.1	11	42	<0.05	<0.05	<0.05	<0.05
ES1729769	**BH19 300-400**	**24/11/2017**	-	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	13	6	<1	9	17	<0.1	11	40	<0.05	<0.05	<0.05	<0.05
ES1729769	**BH20 Surface**	**24/11/2017**	-	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	13	8	<1	11	16	<0.1	13	42	<0.05	<0.05	<0.05	<0.05
ES1729769	**BH20 300-400**	**24/11/2017**	-	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	12	8	<1	14	17	<0.1	14	42	<0.05	<0.05	<0.05	<0.05
ES1729769	**BH1A Surface**	**11/12/2017**	-	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	70	<5	<1	67	32	<0.1	50	198	<0.05	<0.05	<0.05	<0.05
ES1729769	**BH2A Surface**	**11/12/2017**	-	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	69	<5	<1	58	40	<0.1	40	142	<0.05	<0.05	<0.05	<0.05
ES1729769	**BH3A Surface**	**11/12/2017**	Not Detected	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	126	7	<1	14	59	<0.1	7	84	<0.05	<0.05	<0.05	<0.05
ES1729769	**BH3A 300**	**11/12/2017**	-	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	5	<5	<1	37	29	<0.1	42	62	<0.05	<0.05	<0.05	<0.05
ES1729769	**BH4A Surface**	**11/12/2017**	-	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	6	<5	<1	36	32	<0.1	44	76	<0.05	<0.05	<0.05	<0.05
ES1729769	**BH4A 500**	**11/12/2017**	-	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	5	<5	<1	39	32	<0.1	45	63	<0.05	<0.05	<0.05	<0.05
ES1729769	**BH5A Surface**	**11/12/2017**	-	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.25	10	<5	<1	34	32	<0.1	40	118	<0.25	<0.25	<0.25	<0.25
ES1729769	**BH6A Surface**	**11/12/2017**	-	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	12	<5	<1	32	31	<0.1	39	95	<0.05	<0.05	<0.05	<0.05
ES1729769	**BH7A Surface**	**11/12/2017**	-	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	7	<5	<1	34	33	<0.1	44	78	<0.05	<0.05	<0.05	<0.05
ES1729769	**BH8A Surface**	**11/12/2017**	-	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	8	<5	<1	32	28	<0.1	38	91	<0.05	<0.05	<0.05	<0.05
ES1729769	**BH9A Surface**	**11/12/2017**	-	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	5	<5	<1	26	20	<0.1	32	57	<0.05	<0.05	<0.05	<0.05
ES1729769	**BH10A Surface**	**11/12/2017**	-	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	6	<5	<1	24	18	<0.1	30	55	<0.05	<0.05	<0.05	<0.05
ES1729769	**BH11A Surface**	**11/12/2017**	-	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	11	<5	1	27	24	<0.1	32	318	<0.05	<0.05	<0.05	<0.05
ES1729769	**BH12A Surface**	**11/12/2017**	-	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	177	<5	<1	32	22	<0.1	27	184	<0.05	<0.05	<0.05	0.11
ES1729769	**BH13A Surface**	**11/12/2017**	-	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	7	<5	<1	11	12	<0.1	13	50	<0.05	<0.05	<0.05	<0.05
ES1729769	**BH14A Surface**	**11/12/2017**	-	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	8	<5	<1	48	45	<0.1	54	93	<0.05	<0.05	<0.05	<0.05
ES1729769	**BH15A Surface**	**11/12/2017**	-	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	8	<5	<1	40	40	<0.1	47	90	<0.05	<0.05	<0.05	<0.05
ES1729769	**BH16A Surface**	**11/12/2017**	-	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	9	<5	<1	38	30	<0.1	35	98	<0.05	<0.05	<0.05	<0.05
ES1729769	**BH17A Surface**	**11/12/2017**	-	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	9	<5	<1	39	35	<0.1	39	108	<0.05	<0.05	<0.05	<0.05
ES1729769	**BH18A Surface**	**11/12/2017**	-	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	8	<5	<1	34	28	<0.1	28	85	<0.05	<0.05	<0.05	<0.05
ES1729769	**BH19A Surface**	**11/12/2017**	-	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	9	<5	<1	38	30	<0.1	34	98	<0.05	<0.05	<0.05	<0.05
ES1729769	**BH20A Surface**	**11/12/2017**	-	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	11	<5	<1	21	24	<0.1	21	153	<0.05	<0.05	<0.05	<0.05
ES1729769	**BH21A Surface**	**11/12/2017**	-	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	9	<5	<1	40	31	<0.1	35	112	<0.05	<0.05	<0.05	<0.05
ES1729769	**BH22A Surface**	**11/12/2017**	-	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	12	<5	<1	39	36	<0.1	40	129	<0.05	<0.05	<0.05	<0.05
ES1729769	**BH23A Surface**	**11/12/2017**	Not Detected	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	10	<5	<1	28	33	<0.1	70	71	<0.05	<0.05	<0.05	<0.05
ES1729769	**BH24A Surface**	**11/12/2017**	-	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	43	<5	<1	18	34	<0.1	18	1,300	<0.05	<0.05	<0.05	<0.05
ES1729769	**BH25A Surface**	**11/12/2017**	-	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	44	<5	<1	35	37	<0.1	36	164	<0.05	<0.05	<0.05	<0.05
ES1729769	**BH26A Surface**	**11/12/2017**	-	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	18	<5	<1	28	26	<0.1	28	220	<0.05	<0.05	<0.05	<0.05

Analytical Table 1 - Soil Results Summary

			Organochlorine Pesticides																			Organophosphorous Pesticides
			b-BHC	chlordane	Chlordane (cis)	Chlordane (trans)	d-BHC	DDD	DDT	DDT+DDE+DDD	Dieldrin	Endosulfan	Endosulfan I	Endosulfan II	Endosulfan sulphate	Endrin	Endrin aldehyde	Endrin ketone	g-BHC (Lindane)	Heptachlor	Heptachlor epoxide	Methoxychlor	Azinophos methyl
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL			0.05	0.05	0.05	0.05	0.05	0.05	0.2	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.2	0.05
NSW 2014 General Solid Waste CT1 (No Leaching)												60											
NSW 2014 Restricted Solid Waste CT2 (No Leaching)												240											
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand 0-1 m																							
NEPM 2013 Table 1B(5) Generic EIL - Comm/Ind									640														
NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Coarse Soil 0-2 m																							
NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil				530						3,600		2,000				100				50		2,500	
Lab Report Number	**Field ID**	**Date**																					
ES1729769	**BH1 Surface**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH2 Surface**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH3 Surface**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH4 Surface**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH4 300-400**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH5 Surface**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH6 Surface**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH7 Surface**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH7 300-400**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH8 Surface**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH9 Surface**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH10 Surface**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH11 Surface**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	0.48	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH12 Surface**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH13 Surface**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH14 Surface**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH15 Surface**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH16 Surface**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH17 Surface**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH18 Surface**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH18 300-400**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH19 Surface**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH19 300-400**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH20 Surface**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH20 300-400**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH1A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH2A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH3A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH3A 300**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH4A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH4A 500**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH5A Surface**	**11/12/2017**	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<1	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<1	<0.25
ES1729769	**BH6A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH7A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH8A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH9A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH10A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH11A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH12A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	0.11	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH13A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH14A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH15A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH16A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH17A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH18A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH19A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH20A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH21A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH22A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH23A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH24A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH25A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05
ES1729769	**BH26A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05

Analytical Table 1 - Soil Results Summary

			Organophosphorous Pesticides													PAH						
			Bromophos-ethyl	Carbophenothion	Chlorfenvinphos	Chlorpyrifos	Chlorpyrifos-methyl	Diazinon	Dichlorvos	Dimethoate	Ethion	Fenthion	Malathion	Methyl parathion	Monocrotophos	Prothiofos	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene TEQ (zero)	Benzo(a) pyrene	Benzo(b+j)fluoranthene
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL			0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.2	0.2	0.05	0.5	0.5	0.5	0.5	0.5	0.5	0.5
NSW 2014 General Solid Waste CT1 (No Leaching)						4																0.8	
NSW 2014 Restricted Solid Waste CT2 (No Leaching)						16																3.2	
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand 0-1 m																							
NEPM 2013 Table 1B(5) Generic EIL - Comm/Ind																							
NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Coarse Soil 0-2 m																						1.4	
NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil						2,000															40		
Lab Report Number	**Field ID**	**Date**																					
ES1729769	**BH1 Surface**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH2 Surface**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH3 Surface**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH4 Surface**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH4 300-400**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH5 Surface**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH6 Surface**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH7 Surface**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH7 300-400**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH8 Surface**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH9 Surface**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH10 Surface**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH11 Surface**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH12 Surface**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH13 Surface**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH14 Surface**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH15 Surface**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH16 Surface**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH17 Surface**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH18 Surface**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH18 300-400**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH19 Surface**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH19 300-400**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH20 Surface**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH20 300-400**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH1A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH2A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH3A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	3.5	4.5	14.5	19.1	12.9	17.9
ES1729769	**BH3A 300**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH4A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH4A 500**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH5A Surface**	**11/12/2017**	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<1	<1	<0.25	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH6A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH7A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH8A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH9A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH10A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH11A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH12A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH13A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH14A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH15A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH16A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH17A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH18A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH19A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH20A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH21A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH22A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH23A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH24A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH25A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**BH26A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Table 1 - Soil Results Summary

			PAH										Pesticides				Polychlorinated Biphenyls	TPH/TRH				
			Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	PAHs (Vic EPA List)	Demeton-S-methyl	Fenamiphos	Parathion	Pirimphos-ethyl	PCBs (Sum of total)	C6-C9	C10-C14	C15-C28	C29-C36	C6-C10
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.05	0.05	0.2	0.05	0.1	10	50	100	100	10
NSW 2014 General Solid Waste CT1 (No Leaching)																		50	650				
NSW 2014 Restricted Solid Waste CT2 (No Leaching)																		50	2,600				
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand 0-1 m																							
NEPM 2013 Table 1B(5) Generic EIL - Comm/Ind										370													
NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Coarse Soil 0-2 m																							
NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil													4,000					7					
Lab Report Number	**Field ID**	**Date**																					
ES1729769	**BH1 Surface**	**24/11/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10
ES1729769	**BH2 Surface**	**24/11/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10
ES1729769	**BH3 Surface**	**24/11/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10
ES1729769	**BH4 Surface**	**24/11/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10
ES1729769	**BH4 300-400**	**24/11/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10
ES1729769	**BH5 Surface**	**24/11/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10
ES1729769	**BH6 Surface**	**24/11/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10
ES1729769	**BH7 Surface**	**24/11/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10
ES1729769	**BH7 300-400**	**24/11/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10
ES1729769	**BH8 Surface**	**24/11/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10
ES1729769	**BH9 Surface**	**24/11/2017**	<0.5	<0.5	<0.5	<0.5	1.1	<0.5	<0.5	<0.5	1	0.7	2.8	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10
ES1729769	**BH10 Surface**	**24/11/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10
ES1729769	**BH11 Surface**	**24/11/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10
ES1729769	**BH12 Surface**	**24/11/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10
ES1729769	**BH13 Surface**	**24/11/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10
ES1729769	**BH14 Surface**	**24/11/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10
ES1729769	**BH15 Surface**	**24/11/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10
ES1729769	**BH16 Surface**	**24/11/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10
ES1729769	**BH17 Surface**	**24/11/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10
ES1729769	**BH18 Surface**	**24/11/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10
ES1729769	**BH18 300-400**	**24/11/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10
ES1729769	**BH19 Surface**	**24/11/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10
ES1729769	**BH19 300-400**	**24/11/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10
ES1729769	**BH20 Surface**	**24/11/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10
ES1729769	**BH20 300-400**	**24/11/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10
ES1729769	**BH1A Surface**	**11/12/2017**	<0.5	<0.5	<0.5	<0.5	0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.1	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10
ES1729769	**BH2A Surface**	**11/12/2017**	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	<0.5	<0.5	<0.5	0.6	1.2	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10
ES1729769	**BH3A Surface**	**11/12/2017**	7.9	6.5	13.9	1.5	27.6	<0.5	6.4	0.5	12.8	29.7	160	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	380	270	<10
ES1729769	**BH3A 300**	**11/12/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10
ES1729769	**BH4A Surface**	**11/12/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10
ES1729769	**BH4A 500**	**11/12/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10
ES1729769	**BH5A Surface**	**11/12/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.25	<0.25	<1	<0.25	<0.1	<10	<50	1,820	3,720	<10
ES1729769	**BH6A Surface**	**11/12/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10
ES1729769	**BH7A Surface**	**11/12/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10
ES1729769	**BH8A Surface**	**11/12/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10
ES1729769	**BH9A Surface**	**11/12/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10
ES1729769	**BH10A Surface**	**11/12/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10
ES1729769	**BH11A Surface**	**11/12/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10
ES1729769	**BH12A Surface**	**11/12/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10
ES1729769	**BH13A Surface**	**11/12/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10
ES1729769	**BH14A Surface**	**11/12/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10
ES1729769	**BH15A Surface**	**11/12/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10
ES1729769	**BH16A Surface**	**11/12/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10
ES1729769	**BH17A Surface**	**11/12/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10
ES1729769	**BH18A Surface**	**11/12/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10
ES1729769	**BH19A Surface**	**11/12/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10
ES1729769	**BH20A Surface**	**11/12/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10
ES1729769	**BH21A Surface**	**11/12/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10
ES1729769	**BH22A Surface**	**11/12/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10
ES1729769	**BH23A Surface**	**11/12/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10
ES1729769	**BH24A Surface**	**11/12/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	0.5	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	100	230	<10
ES1729769	**BH25A Surface**	**11/12/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10
ES1729769	**BH26A Surface**	**11/12/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1	<10	<50	<100	<100	<10

Analytical Table 1 - Soil Results Summary

			TPH/TRH					
			C10-C16	C16-C34	+C10-C36 (Sum of total)	C10-C40 (Sum of total)	C34-C40	F1 minus BTEX	F2 minus Naphthalene
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL			50	100	50	50	100	10	50
NSW 2014 General Solid Waste CT1 (No Leaching)					10,000				
NSW 2014 Restricted Solid Waste CT2 (No Leaching)					40,000				
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand 0-1 m								260	
NEPM 2013 Table 1B(5) Generic EIL - Comm/Ind									
NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Coarse Soil 0-2 m				1,700			3,300	215	170
NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil									
Lab Report Number	**Field ID**	**Date**							
ES1729769	**BH1 Surface**	**24/11/2017**	<50	<100	<50	<50	<100	<10	<50
ES1729769	**BH2 Surface**	**24/11/2017**	<50	<100	<50	<50	<100	<10	<50
ES1729769	**BH3 Surface**	**24/11/2017**	<50	<100	<50	<50	<100	<10	<50
ES1729769	**BH4 Surface**	**24/11/2017**	<50	<100	<50	<50	<100	<10	<50
ES1729769	**BH4 300-400**	**24/11/2017**	<50	<100	<50	<50	<100	<10	<50
ES1729769	**BH5 Surface**	**24/11/2017**	<50	<100	<50	<50	<100	<10	<50
ES1729769	**BH6 Surface**	**24/11/2017**	<50	<100	<50	<50	<100	<10	<50
ES1729769	**BH7 Surface**	**24/11/2017**	<50	<100	<50	<50	<100	<10	<50
ES1729769	**BH7 300-400**	**24/11/2017**	<50	<100	<50	<50	<100	<10	<50
ES1729769	**BH8 Surface**	**24/11/2017**	<50	<100	<50	<50	<100	<10	<50
ES1729769	**BH9 Surface**	**24/11/2017**	<50	100	<50	100	<100	<10	<50
ES1729769	**BH10 Surface**	**24/11/2017**	<50	110	<50	110	<100	<10	<50
ES1729769	**BH11 Surface**	**24/11/2017**	<50	<100	<50	<50	<100	<10	<50
ES1729769	**BH12 Surface**	**24/11/2017**	<50	100	<50	100	<100	<10	<50
ES1729769	**BH13 Surface**	**24/11/2017**	<50	<100	<50	<50	<100	<10	<50
ES1729769	**BH14 Surface**	**24/11/2017**	<50	<100	<50	<50	<100	<10	<50
ES1729769	**BH15 Surface**	**24/11/2017**	<50	<100	<50	<50	<100	<10	<50
ES1729769	**BH16 Surface**	**24/11/2017**	<50	<100	<50	<50	<100	<10	<50
ES1729769	**BH17 Surface**	**24/11/2017**	<50	<100	<50	<50	<100	<10	<50
ES1729769	**BH18 Surface**	**24/11/2017**	<50	<100	<50	<50	<100	<10	<50
ES1729769	**BH18 300-400**	**24/11/2017**	<50	<100	<50	<50	<100	<10	<50
ES1729769	**BH19 Surface**	**24/11/2017**	<50	<100	<50	<50	<100	<10	<50
ES1729769	**BH19 300-400**	**24/11/2017**	<50	<100	<50	<50	<100	<10	<50
ES1729769	**BH20 Surface**	**24/11/2017**	<50	<100	<50	<50	<100	<10	<50
ES1729769	**BH20 300-400**	**24/11/2017**	<50	<100	<50	<50	<100	<10	<50
ES1729769	**BH1A Surface**	**11/12/2017**	<50	<100	<50	<50	<100	<10	<50
ES1729769	**BH2A Surface**	**11/12/2017**	<50	<100	<50	<50	<100	<10	<50
ES1729769	**BH3A Surface**	**11/12/2017**	<50	570	650	750	180	<10	<50
ES1729769	**BH3A 300**	**11/12/2017**	<50	<100	<50	<50	<100	<10	<50
ES1729769	**BH4A Surface**	**11/12/2017**	<50	<100	<50	<50	<100	<10	<50
ES1729769	**BH4A 500**	**11/12/2017**	<50	<100	<50	<50	<100	<10	<50
ES1729769	**BH5A Surface**	**11/12/2017**	130	4,360	5,540	8,010	3,520	<10	130
ES1729769	**BH6A Surface**	**11/12/2017**	<50	<100	<50	<50	<100	<10	<50
ES1729769	**BH7A Surface**	**11/12/2017**	<50	<100	<50	<50	<100	<10	<50
ES1729769	**BH8A Surface**	**11/12/2017**	<50	<100	<50	<50	<100	<10	<50
ES1729769	**BH9A Surface**	**11/12/2017**	<50	<100	<50	<50	<100	<10	<50
ES1729769	**BH10A Surface**	**11/12/2017**	<50	<100	<50	<50	<100	<10	<50
ES1729769	**BH11A Surface**	**11/12/2017**	<50	<100	<50	<50	<100	<10	<50
ES1729769	**BH12A Surface**	**11/12/2017**	<50	<100	<50	<50	<100	<10	<50
ES1729769	**BH13A Surface**	**11/12/2017**	<50	<100	<50	<50	<100	<10	<50
ES1729769	**BH14A Surface**	**11/12/2017**	<50	<100	<50	<50	<100	<10	<50
ES1729769	**BH15A Surface**	**11/12/2017**	<50	<100	<50	<50	<100	<10	<50
ES1729769	**BH16A Surface**	**11/12/2017**	<50	<100	<50	<50	<100	<10	<50
ES1729769	**BH17A Surface**	**11/12/2017**	<50	<100	<50	<50	<100	<10	<50
ES1729769	**BH18A Surface**	**11/12/2017**	<50	<100	<50	<50	<100	<10	<50
ES1729769	**BH19A Surface**	**11/12/2017**	<50	<100	<50	<50	<100	<10	<50
ES1729769	**BH20A Surface**	**11/12/2017**	<50	<100	<50	<50	<100	<10	<50
ES1729769	**BH21A Surface**	**11/12/2017**	<50	<100	<50	<50	<100	<10	<50
ES1729769	**BH22A Surface**	**11/12/2017**	<50	<100	<50	<50	<100	<10	<50
ES1729769	**BH23A Surface**	**11/12/2017**	<50	<100	<50	<50	<100	<10	<50
ES1729769	**BH24A Surface**	**11/12/2017**	<50	280	330	460	180	<10	<50
ES1729769	**BH25A Surface**	**11/12/2017**	<50	<100	<50	<50	<100	<10	<50
ES1729769	**BH26A Surface**	**11/12/2017**	<50	<100	<50	<50	<100	<10	<50

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Analytical Table 2

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Analytical Table 2 - RPD Results Summary

				BTEX							Halogenated Benzenes	Lead	Metals	
				Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)	Xylene Total	Total BTEX	Hexachlorobenzene	Lead	Arsenic	Cadmium
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR				0.2	0.5	0.5	0.5	0.5	0.5	0.2	0.05	5	5	1
Lab Report Number	**Sample Code**	**Field ID**	**Date**											
ES1729769	**ES1729769001**	**BH1 Surface**	**24/11/2017**	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	22	5	<1
ES1729769	**ES1729769026**	**QA1**	**24/11/2017**	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	11	6	<1
				0	0	0	0	0	0	0	0	<5x LOR	18	0
ES1729769	**ES1729769022**	**BH19 Surface**	**24/11/2017**	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	14	8	<1
ES1729769	**ES1729769028**	**QA3**	**24/11/2017**	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	15	9	<1
				0	0	0	0	0	0	0	0	7	12	0
ES1729769	**ES1729769011**	**BH9 Surface**	**24/11/2017**	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	410	<5	<1
ES1729769	**ES1729769027**	**QA2**	**24/11/2017**	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	517	<5	<1
				0	0	0	0	0	0	0	0	23	0	0
	ES1729769	**BH22A Surface**	**11/12/2017**	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	12	<5	<1
	ES1729769	**QA1**	**11/12/2017**	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	11	<5	<1
RPD				0	0	0	0	0	0	0	0	9	0	0
	ES1729769	**BH23A Surface**	**11/12/2017**	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	10	<5	<1
	ES1729769	**QA2**	**11/12/2017**	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	11	<5	<1
RPD				0	0	0	0	0	0	0	0	10	0	0
	ES1729769	**BH24A Surface**	**11/12/2017**	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	43	<5	<1
	ES1729769	**QA3**	**11/12/2017**	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	40	<5	<1
RPD				0	0	0	0	0	0	0	0	7	0	0

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Analytical Table 2 - RPD Results Summary

				Metals					Organochlorine Pesticides					
				Chromium (III+VI)	Copper	Mercury	Nickel	Zinc	4,4-DDE	a-BHC	Aldrin	Aldrin + Dieldrin	b-BHC	chlordane
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR				2	5	0.1	2	5	0.05	0.05	0.05	0.05	0.05	0.05
Lab Report Number	**Sample Code**	**Field ID**	**Date**											
ES1729769	**ES1729769001**	**BH1 Surface**	**24/11/2017**	12	15	<0.1	12	108	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
ES1729769	**ES1729769026**	**QA1**	**24/11/2017**	9	10	<0.1	8	57	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
				29	<5x LOR	0	40	62	0	0	0	0	0	0
ES1729769	**ES1729769022**	**BH19 Surface**	**24/11/2017**	9	17	<0.1	11	42	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
ES1729769	**ES1729769028**	**QA3**	**24/11/2017**	13	17	<0.1	12	43	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
				36	0	0	9	2	0	0	0	0	0	0
ES1729769	**ES1729769011**	**BH9 Surface**	**24/11/2017**	45	20	<0.1	25	312	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
ES1729769	**ES1729769027**	**QA2**	**24/11/2017**	50	18	<0.1	25	335	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
				11	11	0	0	7	0	0	0	0	0	0
	ES1729769	**BH22A Surface**	**11/12/2017**	39	36	<0.1	40	129	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	ES1729769	**QA1**	**11/12/2017**	40	36	<0.1	39	126	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
RPD				3	0	0	3	2	0	0	0	0	0	0
	ES1729769	**BH23A Surface**	**11/12/2017**	28	33	<0.1	70	71	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	ES1729769	**QA2**	**11/12/2017**	28	34	<0.1	75	70	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
RPD				0	3	0	7	1	0	0	0	0	0	0
	ES1729769	**BH24A Surface**	**11/12/2017**	18	34	<0.1	18	1,300	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	ES1729769	**QA3**	**11/12/2017**	17	31	<0.1	16	1,160	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
RPD				6	9	0	12	11	0	0	0	0	0	0

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Analytical Table 2 - RPD Results Summary

				Organochlorine Pesticides										
				Chlordane (cis)	Chlordane (trans)	d-BHC	DDD	DDT	DDT+DDE+DDD	Dieldrin	Endosulfan	Endosulfan I	Endosulfan II	Endosulfan sulphate
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR				0.05	0.05	0.05	0.05	0.2	0.05	0.05	0.05	0.05	0.05	0.05
Lab Report Number	**Sample Code**	**Field ID**	**Date**											
ES1729769	ES1729769001	BH1 Surface	24/11/2017	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
ES1729769	ES1729769026	QA1	24/11/2017	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
				0	0	0	0	0	0	0	0	0	0	0
ES1729769	ES1729769022	BH19 Surface	24/11/2017	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
ES1729769	ES1729769028	QA3	24/11/2017	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
				0	0	0	0	0	0	0	0	0	0	0
ES1729769	ES1729769011	BH9 Surface	24/11/2017	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
ES1729769	ES1729769027	QA2	24/11/2017	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
				0	0	0	0	0	0	0	0	0	0	0
	ES1729769	BH22A Surface	11/12/2017	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	ES1729769	QA1	11/12/2017	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
RPD				0	0	0	0	0	0	0	0	0	0	0
	ES1729769	BH23A Surface	11/12/2017	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	ES1729769	QA2	11/12/2017	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
RPD				0	0	0	0	0	0	0	0	0	0	0
	ES1729769	BH24A Surface	11/12/2017	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	ES1729769	QA3	11/12/2017	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
RPD				0	0	0	0	0	0	0	0	0	0	0

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Analytical Table 2 - RPD Results Summary

				Organochlorine Pesticides							Organophosphorous Pesticides			
				Endrin	Endrin aldehyde	Endrin ketone	g-BHC (Lindane)	Heptachlor	Heptachlor epoxide	Methoxychlor	Azinophos methyl	Bromophos-ethyl	Carbophenothion	Chlorfenvinphos
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR				0.05	0.05	0.05	0.05	0.05	0.05	0.2	0.05	0.05	0.05	0.05
Lab Report Number	**Sample Code**	**Field ID**	**Date**											
ES1729769	**ES1729769001**	**BH1 Surface**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05
ES1729769	**ES1729769026**	**QA1**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05
				0	0	0	0	0	0	0	0	0	0	0
ES1729769	**ES1729769022**	**BH19 Surface**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05
ES1729769	**ES1729769028**	**QA3**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05
				0	0	0	0	0	0	0	0	0	0	0
ES1729769	**ES1729769011**	**BH9 Surface**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05
ES1729769	**ES1729769027**	**QA2**	**24/11/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05
				0	0	0	0	0	0	0	0	0	0	0
	ES1729769	**BH22A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05
	ES1729769	**QA1**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05
RPD				0	0	0	0	0	0	0	0	0	0	0
	ES1729769	**BH23A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05
	ES1729769	**QA2**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05
RPD				0	0	0	0	0	0	0	0	0	0	0
	ES1729769	**BH24A Surface**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05
	ES1729769	**QA3**	**11/12/2017**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<0.05
RPD				0	0	0	0	0	0	0	0	0	0	0

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Analytical Table 2 - RPD Results Summary

				Organophosphorous Pesticides										
				Chlorpyrifos	Chlorpyrifos-methyl	Diazinon	Dichlorvos	Dimethoate	Ethion	Fenthion	Malathion	Methyl parathion	Monocrotophos	Prothiofos
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR				0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.2	0.2	0.05
Lab Report Number	**Sample Code**	**Field ID**	**Date**											
ES1729769	ES1729769001	BH1 Surface	24/11/2017	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05
ES1729769	ES1729769026	QA1	24/11/2017	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05
				0	0	0	0	0	0	0	0	0	0	0
ES1729769	ES1729769022	BH19 Surface	24/11/2017	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05
ES1729769	ES1729769028	QA3	24/11/2017	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05
				0	0	0	0	0	0	0	0	0	0	0
ES1729769	ES1729769011	BH9 Surface	24/11/2017	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05
ES1729769	ES1729769027	QA2	24/11/2017	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05
				0	0	0	0	0	0	0	0	0	0	0
	ES1729769	BH22A Surface	11/12/2017	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05
	ES1729769	QA1	11/12/2017	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05
RPD				0	0	0	0	0	0	0	0	0	0	0
	ES1729769	BH23A Surface	11/12/2017	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05
	ES1729769	QA2	11/12/2017	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05
RPD				0	0	0	0	0	0	0	0	0	0	0
	ES1729769	BH24A Surface	11/12/2017	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05
	ES1729769	QA3	11/12/2017	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2	<0.2	<0.05
RPD				0	0	0	0	0	0	0	0	0	0	0

Analytical Table 2 - RPD Results Summary

				PAH									
				Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a) pyrene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR				0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lab Report Number	**Sample Code**	**Field ID**	**Date**											
ES1729769	**ES1729769001**	**BH1 Surface**	**24/11/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**ES1729769026**	**QA1**	**24/11/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
				0	0	0	0	0	0	0	0	0	0	0
ES1729769	**ES1729769022**	**BH19 Surface**	**24/11/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ES1729769	**ES1729769028**	**QA3**	**24/11/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
				0	0	0	0	0	0	0	0	0	0	0
ES1729769	**ES1729769011**	**BH9 Surface**	**24/11/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.1
ES1729769	**ES1729769027**	**QA2**	**24/11/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
				0	0	0	0	0	0	0	0	0	0	<5x LOR
	ES1729769	**BH22A Surface**	**11/12/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	ES1729769	**QA1**	**11/12/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
RPD				0	0	0	0	0	0	0	0	0	0	0
	ES1729769	**BH23A Surface**	**11/12/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	ES1729769	**QA2**	**11/12/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
RPD				0	0	0	0	0	0	0	0	0	0	0
	ES1729769	**BH24A Surface**	**11/12/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	ES1729769	**QA3**	**11/12/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
RPD				0	0	0	0	0	0	0	0	0	0	0

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Analytical Table 2 - RPD Results Summary

				PAH						Pesticides				Polychlorinated Biphenyls
				Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	PAHs (Vic EPA List)	Demeton-S-methyl	Fenamiphos	Parathion	Pirimphos-ethyl	PCBs (Sum of total)
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR				0.5	0.5	1	0.5	0.5	0.5	0.05	0.05	0.2	0.05	0.1
Lab Report Number	**Sample Code**	**Field ID**	**Date**											
ES1729769	**ES1729769001**	**BH1 Surface**	**24/11/2017**	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1
ES1729769	**ES1729769026**	**QA1**	**24/11/2017**	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1
				0	0	0	0	0	0	0	0	0	0	0
ES1729769	**ES1729769022**	**BH19 Surface**	**24/11/2017**	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1
ES1729769	**ES1729769028**	**QA3**	**24/11/2017**	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1
				0	0	0	0	0	0	0	0	0	0	0
ES1729769	**ES1729769011**	**BH9 Surface**	**24/11/2017**	<0.5	<0.5	<1	1.0	0.7	2.8	<0.05	<0.05	<0.2	<0.05	<0.1
ES1729769	**ES1729769027**	**QA2**	**24/11/2017**	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1
				0	0	0	<5x LOR	<5x LOR	<5x LOR	0	0	0	0	0
	ES1729769	**BH22A Surface**	**11/12/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1
	ES1729769	**QA1**	**11/12/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1
RPD				0	0	0	0	0	0	0	0	0	0	0
	ES1729769	**BH23A Surface**	**11/12/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1
	ES1729769	**QA2**	**11/12/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1
RPD				0	0	0	0	0	0	0	0	0	0	0
	ES1729769	**BH24A Surface**	**11/12/2017**	<0.5	<0.5	<0.5	<0.5	0.5	0.5	<0.05	<0.05	<0.2	<0.05	<0.1
	ES1729769	**QA3**	**11/12/2017**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.2	<0.05	<0.1
RPD				0	0	0	0	0	0	0	0	0	0	0

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Analytical Table 2 - RPD Results Summary

				TPH									
				C6-C9	C10-C14	C15-C28	C29-C36	C6-C10	C10-C16	C16-C34	+C10-C36 (Sum of total)	C10-C40 (Sum of total)	C34-C40	F1 minus BTEX
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
LOR				10	50	100	100	10	50	100	50	50	100	10
Lab Report Number	**Sample Code**	**Field ID**	**Date**											
ES1729769	**ES1729769001**	**BH1 Surface**	**24/11/2017**	<10	<50	<100	<100	<10	<50	<100	<50	<50	<100	<10
ES1729769	**ES1729769026**	**QA1**	**24/11/2017**	<10	<50	<100	<100	<10	<50	<100	<50	<50	<100	<10
				0	0	0	0	0	0	0	0	0	0	0
ES1729769	**ES1729769022**	**BH19 Surface**	**24/11/2017**	<10	<50	<100	<100	<10	<50	<100	<50	<50	<100	<10
ES1729769	**ES1729769028**	**QA3**	**24/11/2017**	<10	<50	<100	<100	<10	<50	<100	<50	<50	<100	<10
				0	0	0	0	0	0	0	0	0	0	0
ES1729769	**ES1729769011**	**BH9 Surface**	**24/11/2017**	<10	<50	<100	<100	<10	<50	100	<50	100	<100	<10
ES1729769	**ES1729769027**	**QA2**	**24/11/2017**	<10	<50	<100	<100	<10	<50	100	<50	100	<100	<10
				0	0	0	0	0	0	0	0	0	0	0
	ES1729769	**BH22A Surface**	**11/12/2017**	<10	<50	<100	<100	<10	<50	<100	<50	<50	<100	<10
	ES1729769	**QA1**	**11/12/2017**	<10	<50	<100	<100	<10	<50	<100	<50	<50	<100	<10
RPD				0	0	0	0	0	0	0	0	0	0	0
	ES1729769	**BH23A Surface**	**11/12/2017**	<10	<50	<100	<100	<10	<50	<100	<50	<50	<100	<10
	ES1729769	**QA2**	**11/12/2017**	<10	<50	<100	<100	<10	<50	<100	<50	<50	<100	<10
RPD				0	0	0	0	0	0	0	0	0	0	0
	ES1729769	**BH24A Surface**	**11/12/2017**	<10	<50	100	230	<10	<50	280	330	460	180	<10
	ES1729769	**QA3**	**11/12/2017**	<10	<50	130	290	<10	<50	360	420	600	240	<10
RPD				0	0	26	23	0	0	25	24	26	29	0

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Analytical Table 2 - RPD Results Summary

				TPH
				F2 minus Naphthalene
				mg/kg
LOR				50
Lab Report Number	**Sample Code**	**Field ID**	**Date**	
ES1729769	**ES1729769001**	**BH1 Surface**	**24/11/2017**	<50
ES1729769	**ES1729769026**	**QA1**	**24/11/2017**	<50
				0
ES1729769	**ES1729769022**	**BH19 Surface**	**24/11/2017**	<50
ES1729769	**ES1729769028**	**QA3**	**24/11/2017**	<50
				0
ES1729769	**ES1729769011**	**BH9 Surface**	**24/11/2017**	<50
ES1729769	**ES1729769027**	**QA2**	**24/11/2017**	<50
				0
	ES1729769	**BH22A Surface**	**11/12/2017**	<50
	ES1729769	**QA1**	**11/12/2017**	<50
RPD				0
	ES1729769	**BH23A Surface**	**11/12/2017**	<50
	ES1729769	**QA2**	**11/12/2017**	<50
RPD				0
	ES1729769	**BH24A Surface**	**11/12/2017**	<50
	ES1729769	**QA3**	**11/12/2017**	<50
RPD				0

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Analytical Table 3

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Analytical Table A3 - Rinsate Results

			BTEX							PAH	TPH		
			Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)	Xylene Total	Total BTEX	Naphthalene	C6-C9	C6-C10	F1 minus BTEX
			µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	mg/L	mg/L
Lab Report Number	**Field ID**	**Date**											
ES1729769	**Rinsate**	**9/12/2017**	<1	<2	<2	<2	<2	<2	<0.001	<5	<20	<0.02	<0.02

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Figure 1

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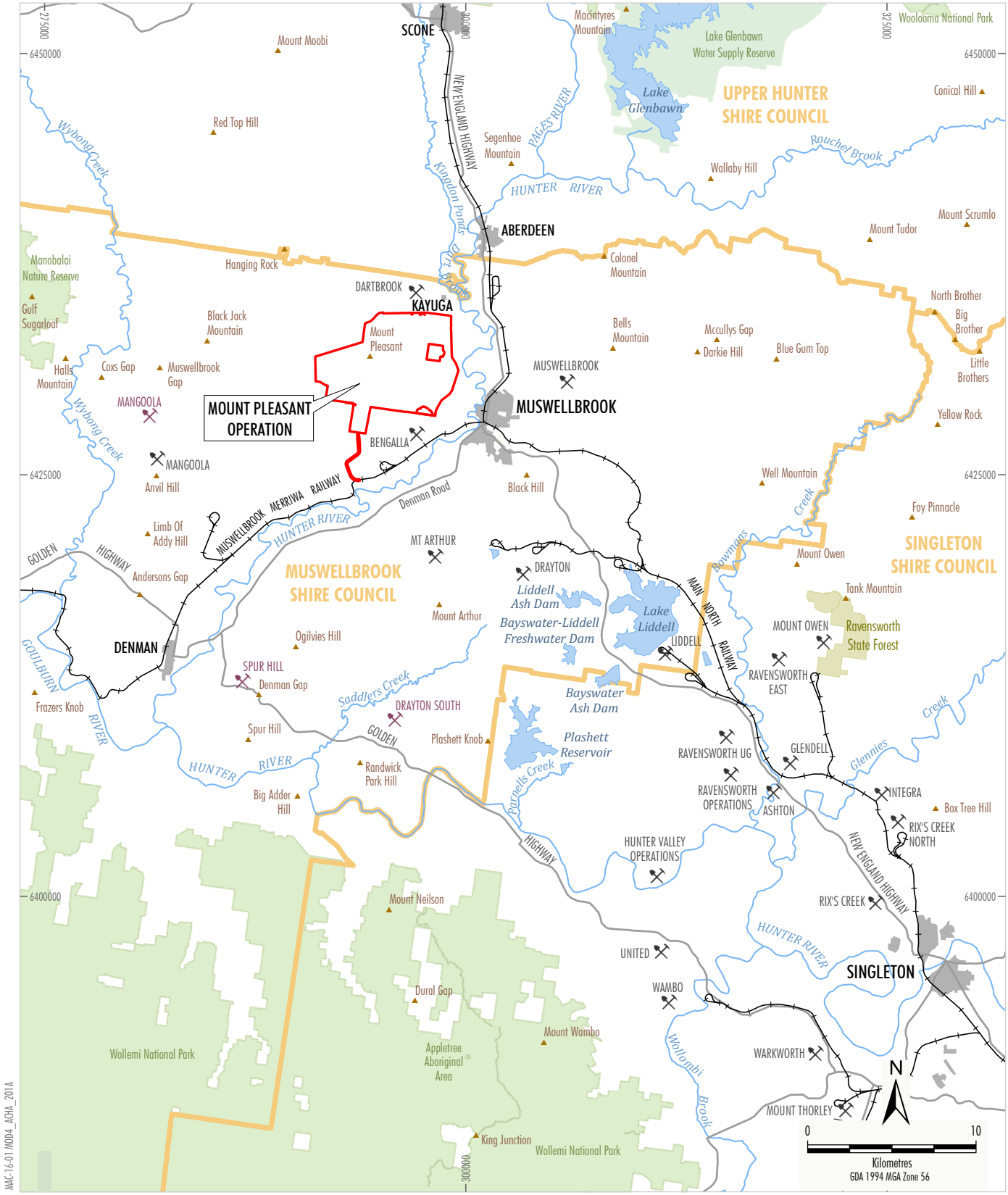

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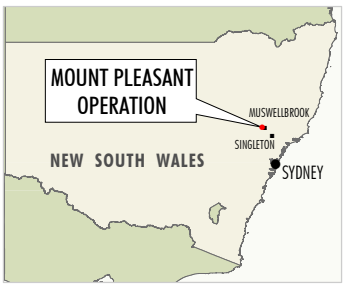

LEGEND

- Mining Operation
- Proposed Mining Operations (Application Lodged)
- Mining Lease Boundary (Mount Pleasant)
- Railway
- Local Government Boundary
- State Forest
- National Parks and Wildlife Estate

Source: Geoscience Australia (2006); NSW Division of Resources & Energy (2016); Land and Property Information (2016)

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MOUNT PLEASANT OPERATION

Project Location

Figure 1

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Figure 2

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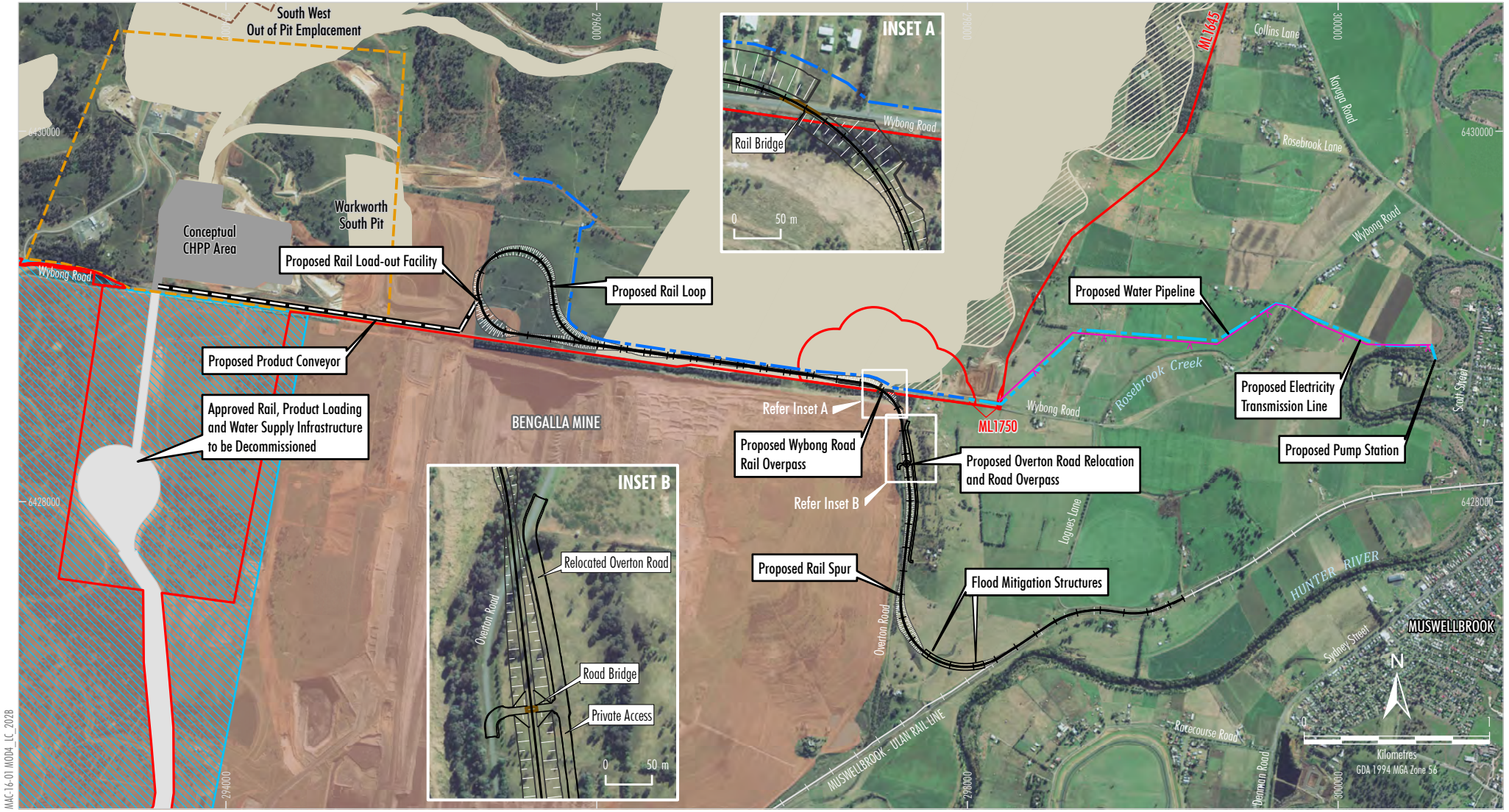

MAC-16-01 MOD4_LC_202B

LEGEND

- Mining Lease Boundary
- Infrastructure Area Envelope
- Indicative Off-site Coal Transport Infrastructure
- Approximate Extent of Approved Surface Development (1997 EIS Year 20)*
- Conveyor/Services Corridor Envelope
- Bengalla Mine Approved Disturbance Boundary (SSD-5170)

Subject to Separate Modification (Modification 3)

- Emplacement Extension
- Area Relinquished for Overburden Emplacement and Major Infrastructure

Key Elements of the Modification #

- Proposed Rail
- Proposed Product Conveyor
- Proposed Water Pipeline - Above Ground
- Proposed Water Pipeline - Buried
- Proposed Pump Station Electricity Transmission Line

Notes:

* Excludes some project components such as water management infrastructure, infrastructure within the Infrastructure Area Envelope, off-site coal transport infrastructure, road diversions, access tracks, topsoil stockpiles, power supply, temporary offices, other ancillary works and construction disturbance.

\# Modification would also include additional minor components not shown, e.g. access tracks, rail signalling and electricity supply, etc.

Source: NSW Land & Property Information (2017); NSW Division of Resources & Geoscience (2017); Department of Planning and Environment (2016); MACH Energy (2017)
Orthophoto: MACH Energy (July 2017)

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MOUNT PLEASANT OPERATION

General Arrangement of the Key Modification Elements

Figure 2

Figure 2a: Land Title Information
Location: Mount Pleasant Operation Rail Modification NSW
Project: J000373
Date: 22/11/2017

Figure 2b: Land Title Information

Location: Mount Pleasant Operation Water Pipeline NSW (Project: J000373)

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Figure 3

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Title: Figure 3a: Features of Interest
Location: Mount Pleasant
Project: J000373 - Preliminary Site Investigation
Date: 04/10/2017

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Title: Figure 3b: Features of Interest
Location: Mount Pleasant
Project: J000373 - Preliminary Site Investigation
Date: 04/10/2017

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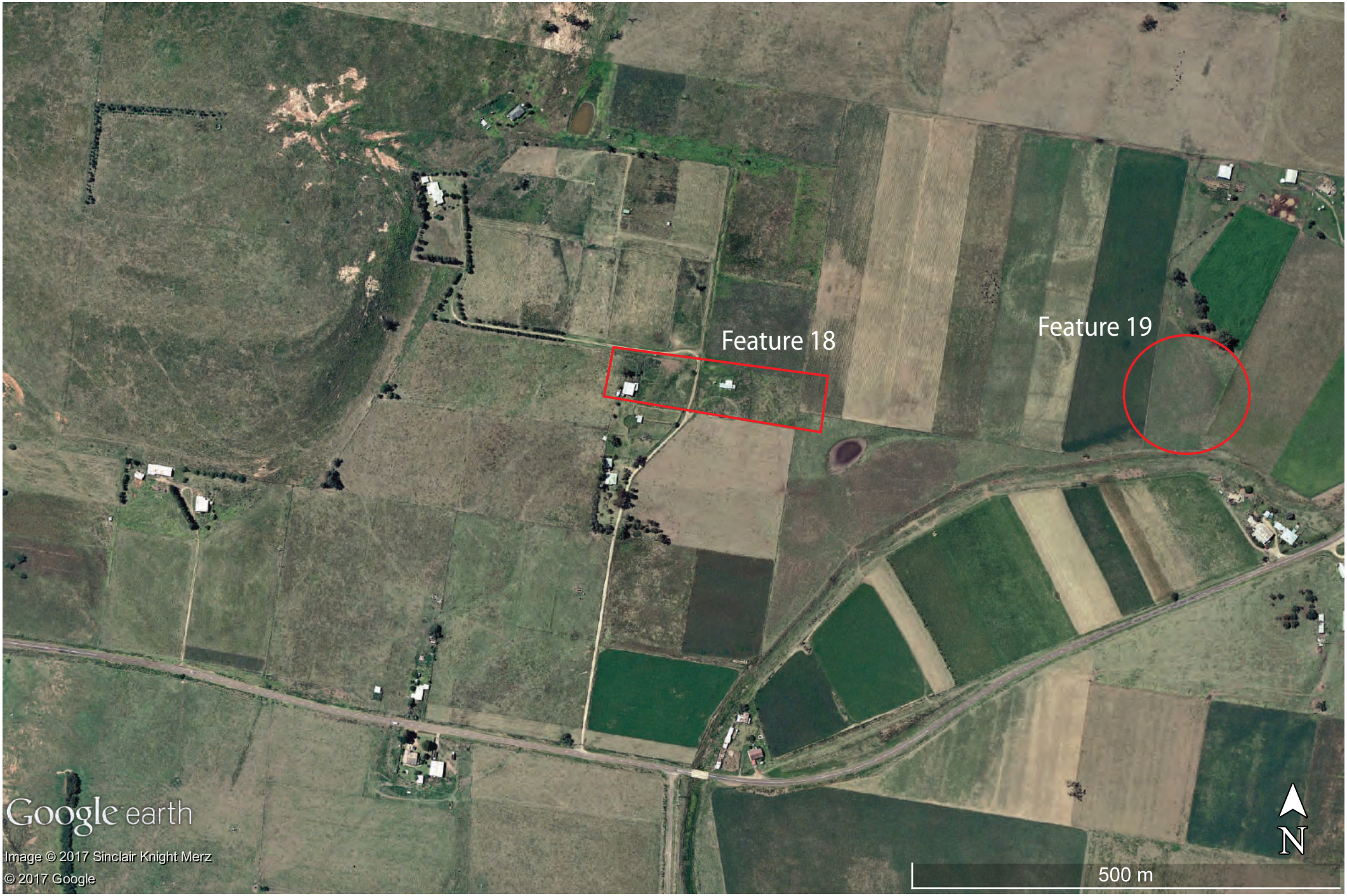
Environment & Soil Sciences

Title: Figure 3c: Features of Interest
Location: Mount Pleasant
Project: J000373 - Preliminary Site Investigation
Date: 04/10/2017



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Title: Figure 3d: Features of Interest
Location: Mount Pleasant
Project: J000373 - Preliminary Site Investigation
Date: 06/12/2017

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Title: Figure 3e: Features of Interest
Location: Mount Pleasant
Project: J000373 - Preliminary Site Investigation
Date: 06/12/2017

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Figure 4

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Title: Figure 4a: Sample Locations
Location: Mount Pleasant
Project: J000373 - Detailed Site Investigation
Date: 09/12/2017

Legend

Borehole Locations

Note: Approximate locations

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Title: Figure 4b: Sample Locations
Location: Mount Pleasant
Project: J000373 - Detailed Site Investigation
Date: 09/12/2017

Legend

Borehole Locations

Note: Approximate locations

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Title: Figure 4c: Sample Locations
Location: Mount Pleasant
Project: J000373 - Detailed Site Investigation
Date: 09/12/2017

Legend

Borehole Locations

Note: Approximate locations

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Title: Figure 4d: Sample Locations
Location: Mount Pleasant
Project: J000373 - Detailed Site Investigation
Date: 09/12/2017

Legend

Borehole Locations

Note: Approximate locations

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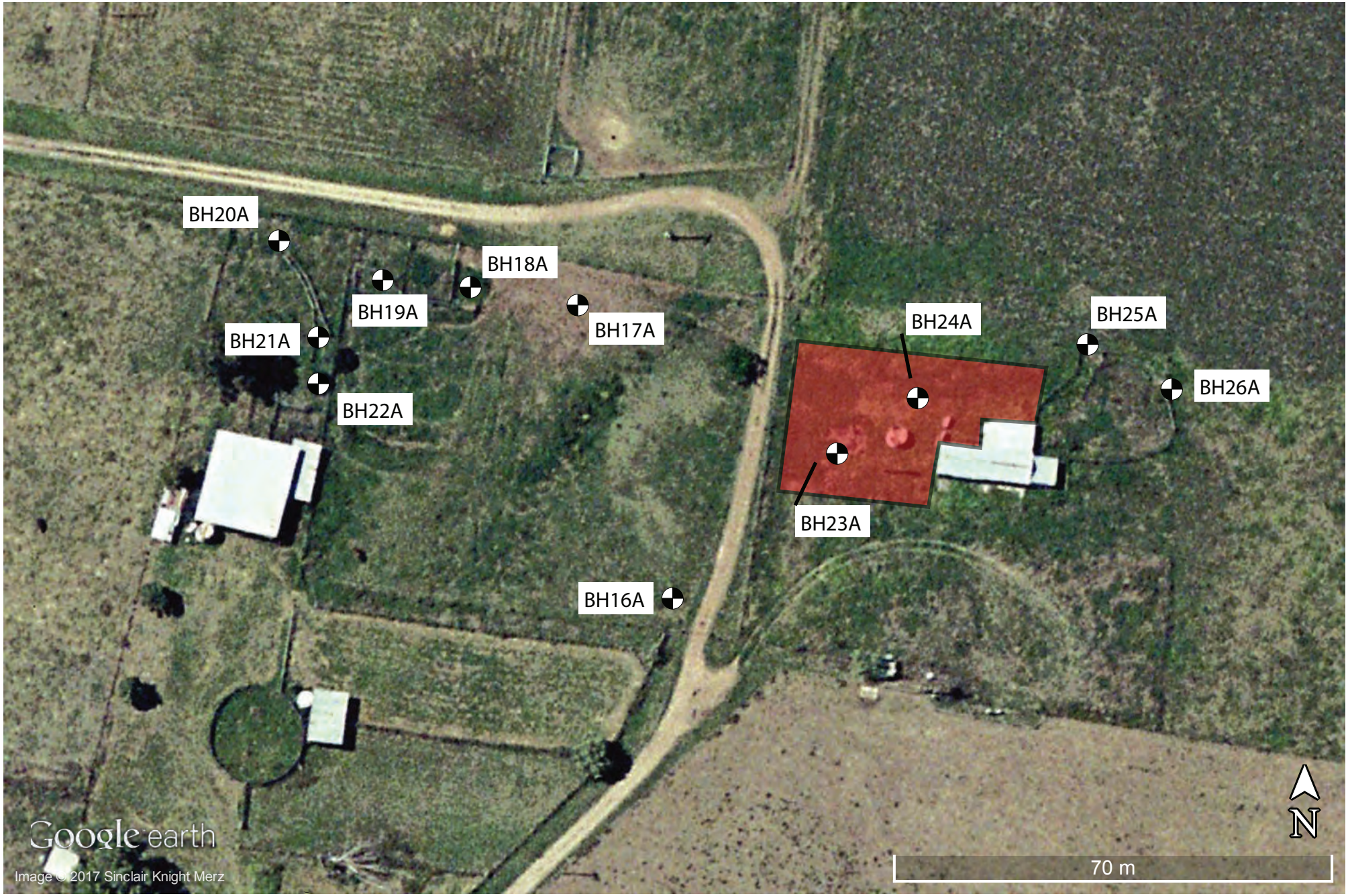
Environment & Soil Sciences

Title: Figure 4e: Sample Locations
Location: Mount Pleasant
Project: J000373 - Detailed Site Investigation
Date: 09/12/2017

Legend

Borehole Locations

Note: Approximate locations



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Title: Figure 4f: Sample Locations
Location: Mount Pleasant
Project: J000373 - Detailed Site Investigation
Date: 09/12/2017

Legend

- Borehole Locations
- Identified Fill Material

Note: Approximate locations

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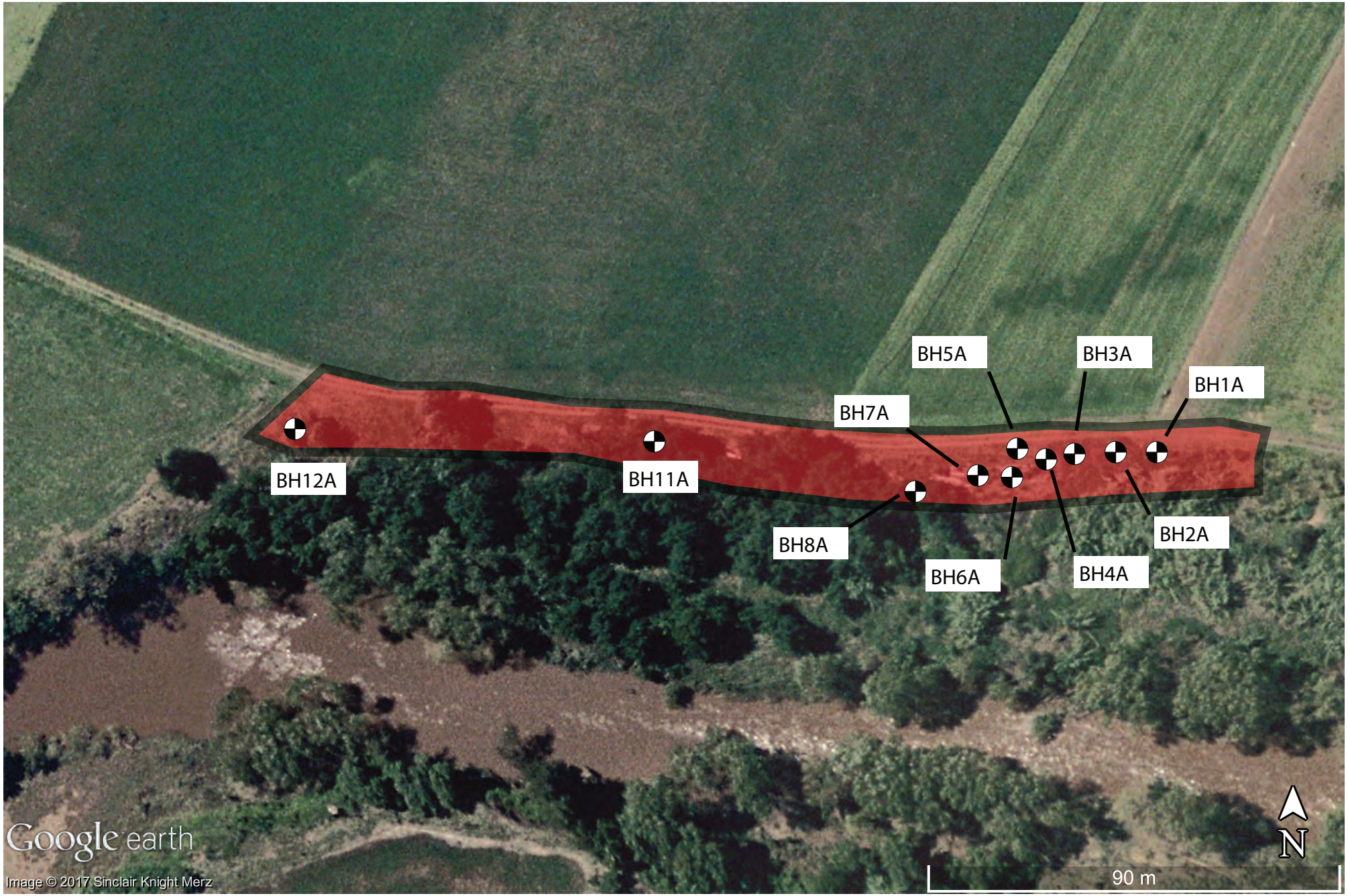
Title: Figure 4g: Sample Locations
Location: Mount Pleasant
Project: J000373 - Detailed Site Investigation
Date: 09/12/2017

Legend

Borehole Locations

Note: Approximate locations



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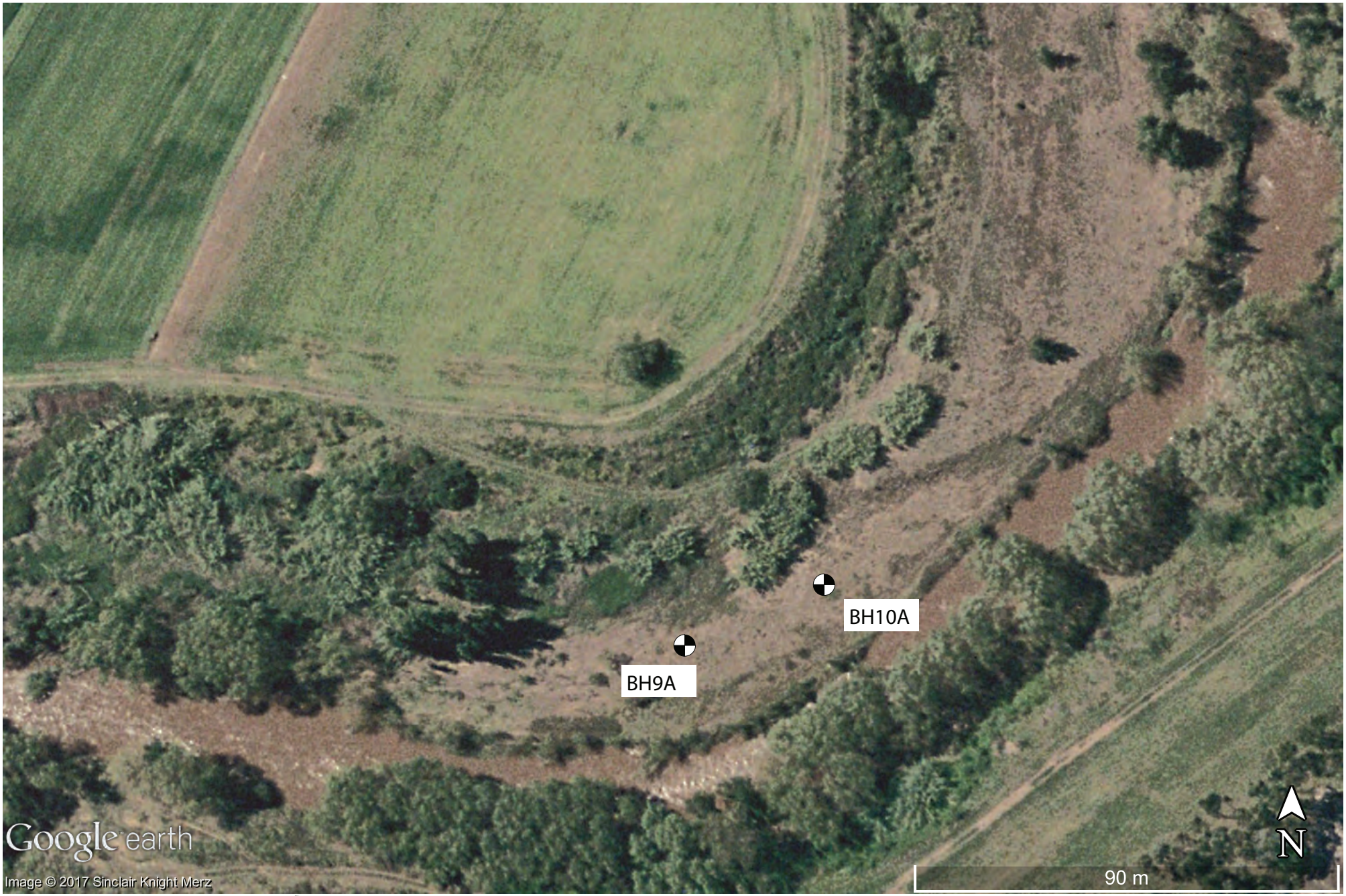
Title: Figure 4h: Sample Locations
Location: Mount Pleasant
Project: J000373 - Detailed Site Investigation
Date: 09/12/2017

Legend

Borehole Locations

Identified Fill Materials

Note: Approximate locations



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Title: Figure 4i: Sample Locations
Location: Mount Pleasant
Project: J000373 - Detailed Site Investigation
Date: 09/12/2017

Legend

Borehole Locations

Note: Approximate locations