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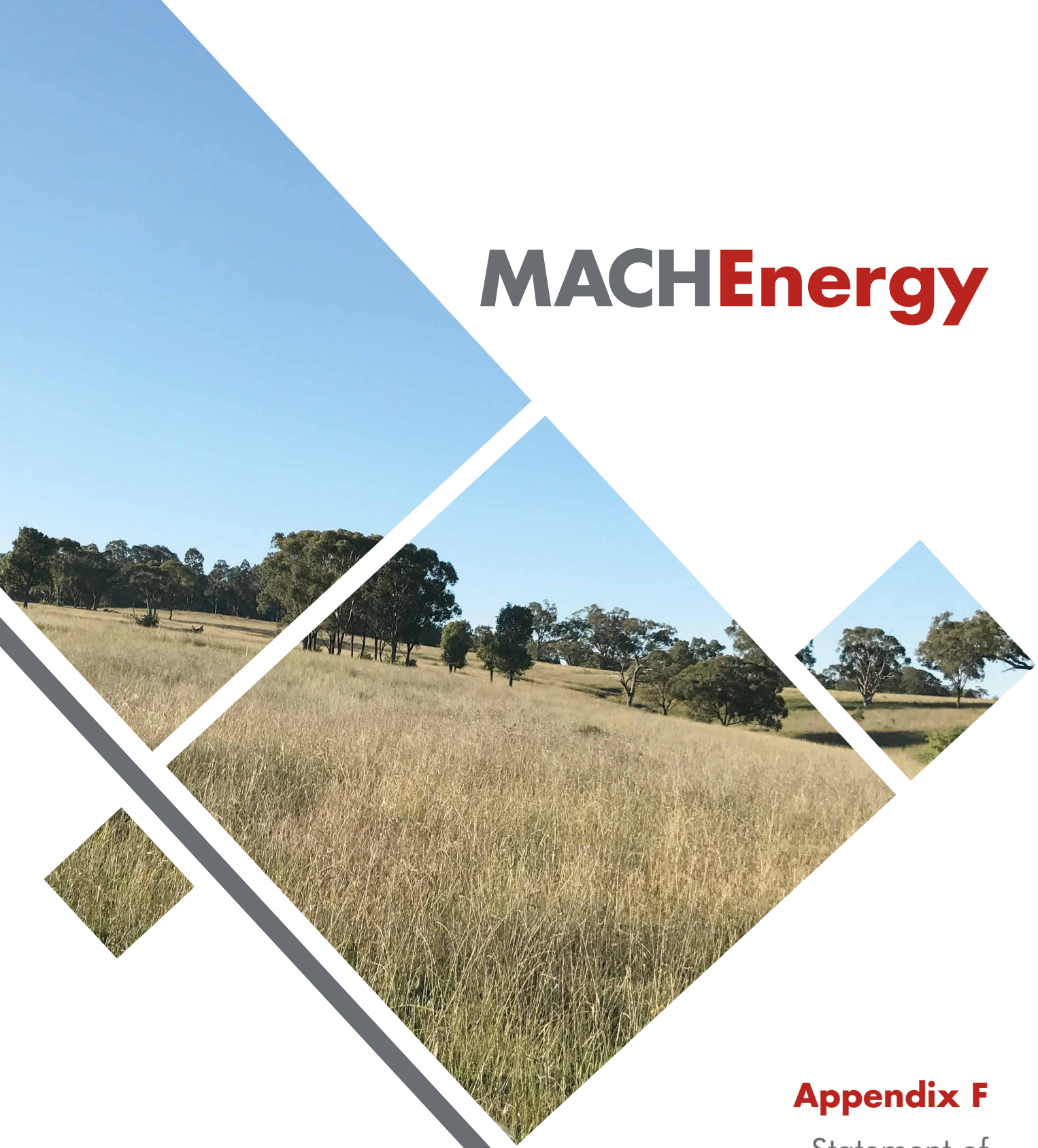

Appendix F

Statement of
Heritage Impact

EXTENT

HERITAGE ADVISORS
TO AUSTRALIA AND
THE ASIA PACIFIC
Incorporating AHMS and Futurepast

Mount Pleasant Operation Rail Modification

Statement of Heritage Impact

Prepared for MACH Energy Australia Pty Ltd

19 December 2017

Built & Urban Heritage | Aboriginal Heritage | Archaeology | Interpretation | Intangible Cultural Heritage | World Heritage

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PROJECT: Mount Pleasant Operation Rail Modification

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EXECUTIVE SUMMARY

EXTENT Heritage Pty Ltd has been engaged by MACH Energy Australia Pty Ltd to prepare a Statement of Heritage Impact for certain works that may impact non-Aboriginal cultural heritage places at Mount Pleasant, in the vicinity of Muswellbrook, New South Wales. The proposed works (known as 'the Rail Modification') involve the construction of new rail and coal loading infrastructure and associated facilities, and water infrastructure.

The Rail Modification would be located 2 kilometres (km) west of the town of Muswellbrook. The significant heritage homesteads of Edinglassie and Balmoral are located some 1 km to the south and south east of the proposed works respectively. They would not be impacted by the proposed works.

Five heritage places of local significance are located within and in proximity to the Rail Modification area. These are: Overdene Homestead, Overton Orchard, Overton Race Track, Bengalla Homestead, Blunts Butter Factory. In addition, two places of heritage interest are also located within or in proximity to the Rail Modification area, including the Overton Colliery and the previously recorded MP13.

Three of these would be impacted by the proposed works: Overton Orchard and Race Track (which formed part of the former Overdene Estate) and MP13. The rail line would remove the western third of Overton Orchard and Race Track. This impact would be partly mitigated by the retention of the remainder of the orchard and track and retention of the homestead itself, within a generous curtilage. If the Rail Modification proceeds, it would still be possible to gain an appreciation of the former layout of the estate and the ways in which it operated. The impact would also be mitigated by the photographic documentation of the sites prior to the work proceeding.

MP13 would be removed by the proposed works. A report prepared in 2014 indicated that this location might contain archaeological 'relics' as defined by the NSW *Heritage Act 1977*. The present Statement of Heritage Impact re-assesses this site as being not a heritage place and as having low potential to contain 'relics'.

CONTENTS

1 INTRODUCTION 1
1.1 Project Description 1
1.2 Approach and Methodology 2
1.3 Limitations 5
1.4 Authorship 5
1.5 Terminology 6
2 STATUTORY CONTROLS 7
2.1 Environmental Planning and Assessment Act 1979 7
2.2 Heritage Act 1977 7
2.3 Muswellbrook Local Environmental Plan 2009 7
3 PROPOSED WORKS 8
3.1 Approved Mount Pleasant Operation 8
3.2 Proposed Works 8
4 PHYSICAL DESCRIPTION – HERITAGE PLACES 10
4.1 Heritage Places 10
5 LISTINGS 11
5.1 Statutory and Non-Statutory Listings 11
6 HISTORIC CONTEXT 12
6.1 A Brief History of Muswellbrook 12
6.2 Heritage Places Within the Modification Area and Adjacent to the Proposed Works 12
7 PHYSICAL DESCRIPTION 21
7.1 Overton Estate 21
7.2 Bengalla Homestead 47
7.3 MP13 47
8 STATEMENTS OF HERITAGE SIGNIFICANCE 50
8.1 Overdene Homestead 50
8.2 Overton Orchard and Race Track 52
8.3 M404 52
8.4 Blunt's Butter Factory 53
8.5 Overton Colliery 53
8.6 Bengalla Homestead 53
8.7 MP13 54
9 THE POTENTIAL ARCHAEOLOGICAL RESOURCE 56
9.1 Overdene Homestead 56
9.2 Overton Orchard and Race Track 56
9.3 Blunt's Butter Factory 57

9.4 MP13 57
10 ASESSMENT OF HERITAGE IMPACTS 59
10.1 Overdene Homestead 59
10.2 Overton Orchard and Race Track 59
10.3 Blunt's Butter Factory 60
10.4 Overton Colliery 61
10.5 Bengalla Homestead and Former Estate 61
10.6 MP13 61
10.7 M404, Cuttings, Two Sheds and a Possible Pump House 61
11 CONCLUSION AND RECOMMENDATIONS 62
11.1 Conclusions 62
11.2 Recommendations 62
12 REFERENCES 64

List of Tables

Table 1 Heritage Places within or in the Vicinity of the Modification Area

Table 2 Responses to 'Statements of Heritage Impacts' Questions for the Overton Orchard and Race Track (From: Statements of Heritage Impact [Heritage Office and Department of Urban Affairs and Planning, 2002])

List of Figures

Figure 1 Overview of the study area

Figure 2 Map of Overton Estate in 1910 produced as part of an article in the Australasian

Figure 3 Image from an article on Overton in the Australasian

Figure 4 Image from an article on Overton in The Daily Telegraph

Figure 5 View north-east of Overdene Homestead during the site visit of 2017

Figure 6 Overton orchard showing site boundary, proposed rail alignment and all features identified in 2017

Figure 7 Image from the Agricultural Gazette of NSW

Figure 8 View south of the southern raised bed at the entry gates

Figure 9 View south of the northern raised bed at the entry gates

Figure 10 View south of both features showing the association with the entry gate and the avenue of trees that continue to the west

Figure 11 M403A view south over one of the stone surrounded planting beds

Figure 12 M403A view south west of another stone surrounded planting bed

List of Figures (continued)

Figure 13 View east over M403T

Figure 14 Fragmented ceramic pipe at the eastern end of M403T

Figure 15 Mix of early 20th century and modern bricks at the eastern end of M403T

Figure 16 Structural timbers located east of M403T

Figure 17 Sandstone lined depression at M403U

Figure 18 M403B fragmented and disturbed concrete slab

Figure 19 An example of one of the possible irrigation ditches at M403L

Figure 20 View south east over M403R concrete piers

Figure 21 Detail view of concrete piers showing evidence of the former location of posts

Figure 22 View west over the sandstone retaining wall

Figure 23 View west over M403O

Figure 24 Detail view of the concrete post mould at M403E

Figure 25 Sandstone and brick steps at the northern end of M403S

Figure 26 View west over septic tank located to the east of M403R

Figure 27 Overton Racing Track showing the boundary of the site and the proposed rail alignment

Figure 28 View north at the northern end of the Overton Race Track

Figure 29 View north-east at the northern end of the Overton Race Track

Figure 30 NSW 1972 Trigonometry Survey Marker

Figure 31 View north-west over M404

Figure 32 View east over the low walls and foundations present on the southern edge of M404

Figure 33 Blunt's Butter Factory site map showing locations of features of interest, curtilage area and proposed rail alignment

Figure 34 View south-east over the butter factory showing currently fenced off area

Figure 35 View south of the eastern side of Blunt's butter factory showing in situ concrete blocks

Figure 36 Detail view of section of original wall with tiles attached

Figure 37 View of ground surface inside the ruins of Blunt's Butter Factory showing mix of gravel, bricks and ceramic

Figure 38 Concrete-lined pit to the east and downslope of the Butter Factory

List of Figures (continued)

Figure 39 Aerial image showing the general area of Overton Colliery adjacent to proposed rail alignment

Figure 40 Panoramic view north over Overton Colliery

Figure 41 View north over the house site

Figure 42 View south-west over Feature 2 at MP13

Figure 43 View north-east over the dairy

Figure 44 Timber-lined well at MP13

Figure 45 Muswellbrook LEP whole-of-property listing areas for Overdene and Blunt's Butter Factory, including Modification Area boundary and proposed location of proposed rail alignment

Figure 46 Aerial image showing the location of Overdene Homestead relative to the proposed rail alignment

Figure 47a Areas of high archaeological potential from AECOM and Hansen Bailey (2015)

Figure 47b Curtilage area overlain on a recent aerial image

1 INTRODUCTION

1.1 Project Description

EXTENT Heritage Pty Ltd (Extent) has been engaged by MACH Energy Australia Pty Ltd (MACH Energy) to prepare a Statement of Heritage Impact (SOHI) for certain works that may impact non-Aboriginal cultural heritage places at the Mount Pleasant Operation (MPO), in the vicinity of Muswellbrook, New South Wales (NSW). The proposed works (known as 'the Rail Modification' [the Modification]) are described in detail in Section 3.1.

The Modification would primarily comprise:

- duplication of the approved rail spur, rail loop, conveyor and rail load-out facility 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.

We understand that the Modification would not alter the number of approved train movements on the rail network.

This SOHI assesses the potential adverse heritage impacts for non-Aboriginal heritage places. It identifies historic heritage values affected by the proposed works, demonstrates measures taken to avoid/minimise/mitigate impacts, identifies conservation outcomes, and considers relevant government policies. It has regard to (among other documents): *The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance* (Australia International Council on Monuments and Sites [Australia ICOMOS], 2013) (hereafter The Burra Charter), the *NSW Heritage Manual* (Department of Urban Affairs and Planning [DUAP], 1996), *Assessing Cultural Heritage Significance* (NSW Heritage Office, 2001), and *Assessing Significance for Historical Archaeological Sites and 'Relics'* (Office of Environment and Heritage [OEH], 2009).

The proposed works would be located 2 kilometres (km) west of the town of Muswellbrook. The significant heritage homesteads of Edinglassie and Balmoral are located some 1 km to the south and south east of the proposed works, respectively. They would not be impacted by the Modification.

A number of other known and potential heritage places would be located in closer proximity to the proposed works, including Blunt's Butter Factory and the Overdene Homestead. This SOHI focuses on those places that are in closer proximity to the proposed works (i.e. generally within 300 m).

Six places in the north of the MPO area (MP02, MP14, MP15, MP16, MP18 and MP19) were assessed in the *'Mount Pleasant Historical Heritage Study'* conducted by Veritas Archaeology & History Service (VAHS) (2014). That report has been endorsed by the former NSW Department of Planning and Infrastructure. The VAHS report concluded that it would be appropriate to 'demolish when required' those places (2014). Therefore, they are not included in this SOHI.

The Modification would occur to the north and immediate east of the approved and operational Bengalla Mine and north of the approved and operational Mt Arthur Coal Mine. Other associated infrastructure would be placed north of Wybong Road, west of the Hunter River. The formerly quiet rural setting of the heritage places assessed in this report has been modified by mine activities over many years. Therefore, the Modification would result in additional disturbance within an already compromised rural landscape. This has been a relevant consideration in this SOHI's assessment.

Matthew Harris (Heritage Advisor, Extent) conducted a site investigation of the study area in September 2017. This report also draws upon existing historical information contained within the *Muswellbrook Shire Wide Heritage Study* (EJE Group 1996), the *Muswellbrook Shire Council Local Environmental Plan* (LEP) 2009, *'Hunter Estates: A Comparative Heritage Study of pre-1850s Homestead Complexes in the Hunter Region'* produced by the OEH (2013), and the *'Mount Pleasant Historical Heritage Study'* conducted by VAHS (2014).

1.2 Approach and Methodology

This report comprises two sections – one being an assessment of the heritage significance of non-Aboriginal heritage places within the Modification area, and the second being a SOHI for each place having regard to the proposed works. The SOHI reviews the relevant statutory heritage controls, assesses the impact of the proposal on the identified heritage places, and makes recommendations for actions in mitigation of identified adverse heritage impacts.

1.2.1 Heritage Significance Assessment

Places of interest potentially impacted by the proposed development were assessed against the heritage assessment criteria contained within the NSW guideline document entitled *Assessing Heritage Significance* (NSW Heritage Office, 2001). Specifically, places were assessed against the following criteria (which are a reflection of the more broadly expressed criteria in Article 1.2 of The Burra Charter):

Criterion (a)

An item is important in the course, or pattern, of NSW's cultural or natural history (or the cultural or natural history of the local area);

Criterion (b)

An item has strong or special association with the life or works of a person, or group of persons, of importance in NSW's cultural or natural history (or the cultural or natural history of the local area);

Criterion (c)

An item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW (or the local area);

Criterion (d)

An item has strong or special association with a particular community or cultural group in NSW (or the local area) for social, cultural or spiritual reasons;

Criterion (e)

An item has potential to yield information that will contribute to an understanding of NSW's cultural or natural history (or the cultural or natural history of the local area);

Criterion (f)

An item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history (or the cultural or natural history of the local area);

Criterion (g)

An item is important in demonstrating the principal characteristics of a class of NSW's
- cultural or natural places; or
- cultural or natural environments.

(or a class of the local area's
- cultural or natural places; or
- cultural or natural environments.)

No direct community consultation was carried out in the preparation of this report. However, comment is sometimes made on the potential 'social significance' (criterion [d]) of places, having regard to community views expressed in publicly accessible published material.

A search was made of all relevant statutory heritage registers for previously identified heritage places that may be impacted by the Modification. Desktop historical research also informs our heritage assessments.

The former Australian Heritage Commission compiled a number of Australian historical themes to guide practitioners in the assessment of historic heritage places (‘*A framework for use in heritage assessment and management*’, 2001). In making the assessments in this report, particular regard was had to:

- Theme 2: Peopling Australia, including the subthemes of ‘Migrating’ and ‘Promoting settlement’;
- Theme 3: Developing local, regional and national economies, including the subthemes of ‘Developing primary production’, ‘Struggling with remoteness, hardship and failure’;
- Theme 4: Building settlements, towns and cities, including the subthemes of ‘Planning urban settlements’, ‘Supplying urban services’, ‘Making settlements to serve rural Australia’;
- Theme 5: Working, including the subthemes of ‘Working on the land’; and
- Theme 8: Developing Australia’s cultural life, including the subtheme of ‘Living in the country and rural settlements’.

In making the assessments, regard was also made to the related historical themes produced by the NSW Heritage Council (‘*New South Wales Historical Themes’*, 2001) which includes themes concerning ‘migration’, ‘agriculture’, ‘pastoralism’, ‘towns, suburbs and villages’, ‘land tenure’, ‘accommodation’ and ‘domestic life’.

The heritage assessments in this SOHI distinguish between places of State and local significance. Any places that failed to meet the criteria for either State or local significance were assessed in this report as being ‘not a heritage place’. The guideline document *‘Assessing Heritage Significance’* (NSW Heritage Office, 2001) states:

- State significance means significance to the people of NSW.
- Local significance means significance within the local government area.

This reflects section 4A of the NSW *Heritage Act 1977* which states that ‘State heritage significance’:

> *...in relation to a place, building, work, relic, moveable object or precinct, means significance to the State in relation to the historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic value of the item.*

It then states that ‘local heritage significance’:

> *...in relation to a place, building, work, relic, moveable object or precinct, means significance to an area in relation to the historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic value of the item.*

Some of the structures assessed in this report were in a poor state of repair. A Practice Note prepared as an adjunct to The Burra Charter by Australia ICOMOS (*Understanding and assessing cultural significance*) states:

> *The physical condition of a place does not generally influence its significance, but will often be a factor in determining policy for the place. Guidance: A place may be in ruinous condition, yet still be significant if its values can be clearly understood. In this case the condition does not influence significance, but will have a bearing on the development of policy for the place*.

The assessments in this report also appreciate that the fabric of a heritage place may be only part of its significance. Article 1.2 of The Burra Charter states:

> *Cultural significance is embodied in the place itself, its fabric, setting, use, associations, meanings, records, related places and related objects.*

Conservation of the heritage values embodied in some of the places discussed in this report is dependent on an understanding, assessment of, and response to the 'setting'. A Practice Note prepared as an adjunct to The Burra Charter, entitled *Understanding and assessing cultural significance* states:

> *'Place' in the Burra Charter has a broad meaning, and includes its elements, objects, spaces and views. Place may have tangible and intangible aspects. Guidance: A place should be considered in its wider physical, social or spiritual context. It should not be assessed in isolation. A group of individual places with shared histories, common social associations, or complementary aesthetic characteristics may form a larger 'place' or a serial place. Care is needed in defining the extent of the place and the tangible and intangible elements of the place. Its setting may include views to and from the place, its cultural context and relationships, and links between this place and other places.*

These principles are reflected in the NSW government guideline entitled *NSW Heritage Manual* (DUAP, 1996). In particular, the above principles have guided the assessment of the potential impacts to the rural residences identified in this report.

Archaeological 'relics' are protected by the NSW *Heritage Act 1977*. Section 4 of the NSW *Heritage Act 1977* defines a 'relic' as:

> *...any deposit, artefact, object or material evidence that:*
>
> > *(a) relates to the settlement of the area that comprises New South Wales, not being Aboriginal settlement, and*
> >
> > *(b) is of State or local heritage significance.*

Section 4A of the NSW *Heritage Act 1977* states that 'local heritage significance':

> *...in relation to a place, building, work, relic, moveable object or precinct, means significance to an area in relation to the historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic value of the item.*

In addition to these considerations (above), where the potential archaeological resource has been assessed in this report, regard has been given to the following three fundamental questions:

- Might the site yield data that cannot be obtained from any other source?
- Might the site yield data that cannot be obtained from any other site?
- Might the site yield data that would contribute to addressing substantive research questions?

The intactness of the potential archaeological site, having regard to levels of disturbance, was also central to assessments of archaeological significance in this report, on the grounds that disturbed sites generally have lower potential to yield meaningful data than intact sites.

1.2.2 Statement of Heritage Impact

This SOHI applies the principles presented in the NSW government guideline entitled *Statements of Heritage Impact* (NSW Heritage Office, 2002). Where the Modification would have a direct and physical impact on a heritage place, this report will address the following questions provided from the guideline:

- Have all options for retention and adaptive re-use been explored?
- Can all of the significant elements of the heritage item be kept and any new development be located elsewhere on the site?
- Is demolition essential at this time or can it be postponed in case future circumstances make its retention and conservation more feasible?
- Has the advice of a heritage consultant been sought? Have the consultant's recommendations been implemented? If not, why not?

In other cases this report considers the following questions provided in that document in relation to 'new development adjacent to a heritage item':

- How is the impact of the new development on the heritage significance of the item or area to be minimised?
- Why is the new development required to be adjacent to a heritage item?
- How does the curtilage allowed around the heritage item contribute to the retention of its heritage significance?
- How does the new development affect views to, and from, the heritage item? What has been done to minimise negative effects?
- Is the development sited on any known, or potentially significant archaeological deposits? If so, have alternative sites been considered? Why were they rejected?
- Is the new development sympathetic to the heritage item? In what way (e.g. form, siting, proportions, design)?
- Will the additions visually dominate the heritage item? How has this been minimised?
- Will the public, and users of the item, still be able to view and appreciate its significance?

1.3 Limitations

The study area was inspected by Matthew Harris of Extent. The inspection was restricted to the exterior of known and potential heritage places. It did not include a comprehensive assessment of the physical condition of structures assessed by this SOHI. The remaining extant VAHS site (i.e. MP13) to the north of the Modification area was not accessible in September of 2017, and the assessment of this site is based on the information presented in VAHS (2014) and desktop research.

This SOHI includes an assessment of the potential historical archaeological resource. During Mr Harris' field work he traversed the study area on foot and by four-wheel drive, remaining alert to visible evidence of potential sub-surface archaeological material. This survey comprised only a sample of the study area. In places, long grass reduced visibility.

This SOHI relies on the historical research undertaken for the reports described in Section 1.4 below.

1.4 Authorship

This report was prepared by:

- Matthew Harris – principal author (Heritage Advisor).
- Dr Andrew Sneddon – co-author and QA review (Associate Director).

This report relies on the historical research contained in the following documents, occasionally supplemented with additional research:

- *Muswellbrook Shire-Wide Heritage Study: Final Report* (EJE Group, 1996).
- Muswellbrook LEP (2009).
- *Hunter Estates: A Comparative Heritage Study of pre 1850s Homestead Complexes in the Hunter Region* (OEH, 2013).
- *Mount Pleasant Historic Heritage Study* (VAHS, 2014).
- *Bengalla Mine Historic Heritage Management Plan* (AECOM, 2015).

The above reports and documents include detailed histories of heritage places within or directly adjacent to the Modification Area. This report reproduces or draws upon the historical research conducted as part of the above reports, with additional research supplementing it where necessary.

1.5 Terminology

The terminology in this report follows definitions presented in The Burra Charter. Article 1 provides the following definitions:

Place means site, area, land, landscape, building or other work, group of buildings or other works, and may include components, contents, spaces and views.

Cultural significance means aesthetic, historic, scientific, social or spiritual value for past, present or future generations.

Cultural significance is embodied in the place itself, its fabric, setting, use, associations, meanings, records, related places and related objects.

Places may have a range of values for different individuals or groups.

Fabric means all the physical material of the place including components, fixtures, contents, and objects.

Conservation means all the processes of looking after a *place* so to retain its *cultural significance.*

Maintenance means the continuous protective care of the f*abric* and *setting* of a *place*, and is to be distinguished from repair. Repair involves restoration or reconstruction.

Preservation means maintaining the *fabric* of a *place* in its existing state and retarding deterioration.

Restoration means returning the existing *fabric* of a *place* to a known earlier state by removing accretions or by reassembling existing components without the introduction of new material.

Reconstruction means returning the *place* to a known earlier state and is distinguished from *restoration* by the introduction of new material into the *fabric*.

Adaptation means modifying a *place* to suit the existing use or a proposed use.

Use means the functions of a place, as well as the activities and practices that may occur at the place.

Compatible use means a use that respects the *cultural significance* of a *place*. Such a use involves no, or minimal, impact on cultural significance.

Setting means the area around a *place*, which may include the visual catchment.

Related place means a place that contributes to the *cultural significance* of another place.

2 STATUTORY CONTROLS

2.1 Environmental Planning and Assessment Act 1979

The NSW *Environmental Planning and Assessment Act 1979* allows for the preparation of planning instruments to direct development within NSW. This includes Regional Environmental Plans and LEPs which are administered by local government and determine land use and the process for development applications. The Muswellbrook LEP includes provisions relating to the conservation of heritage places, including a schedule of heritage places in the shire that are of local significance. Some places that may be impacted by the Modification are included in the Muswellbrook LEP local heritage register. The NSW *Environmental Planning and Assessment Act 1979* also establishes the broad frameworks for environmental assessment that underpin this SOHI.

2.2 Heritage Act 1977

Section 3 of the NSW *Heritage Act 1977* states (among other things) that it is an object of the NSW *Heritage Act 1977* to promote an understanding of the State's heritage and to encourage its conservation. The NSW *Heritage Act 1977* establishes the NSW Heritage Council and the NSW State Heritage Register (SHR) as important mechanisms for achieving these objectives. Although the NSW *Heritage Act 1977* applies to certain aspects of local heritage (e.g. the Minister may make an interim heritage order in relation to places of local significance), it principally applies to conserve places of State significance, especially through inclusion on the SHR.

None of the properties assessed in this report are listed on the SHR.

The NSW *Heritage Act 1977* also defines and protects archaeological 'relics' (Section 1.2.1). Under the NSW *Heritage Act 1977* Act it is illegal to disturb or excavate any land knowing or having reasonable cause to suspect that the disturbance or excavation will disturb or destroy 'relics' (section 139). Where ground disturbance may impact a 'relic' the proponent of the activity must seek an excavation permit pursuant to section 140 of the NSW *Heritage Act 1977*. No formal listing for relics is required, and they are protected if they are deemed to be of local significance or higher.

The Modification will not impact any 'relics', provided the recommendations contained in this SOHI are observed. However, they are proposed to be located in the vicinity of some known and potential 'relics' which are described in this SOHI.

2.3 Muswellbrook Local Environmental Plan 2009

The Muswellbrook LEP controls development in relation to heritage items within the Muswellbrook Local Government Area. Clause 5.10.1 outlines the aims of the Muswellbrook Shire Council in relation to heritage items, these being:

(a) to conserve the environmental heritage of Muswellbrook,
(b) to conserve the heritage significance of heritage items and heritage conservation areas, including associated fabric, settings and views,
(c) to conserve archaeological sites,
(d) to conserve Aboriginal objects and Aboriginal places of heritage significance.

Muswellbrook Shire Council requires that a SOHI accompany a Development Application that has the potential to disturb archaeological sites or heritage items or developments that are within a heritage conservation area.

3 PROPOSED WORKS

3.1 Approved Mount Pleasant Operation

MACH Energy requires an Environmental Assessment in relation to the Rail Modification to the approved MPO under section 75W of the NSW *Environmental Planning and Assessment Act 1979*. The MPO Development Consent DA 92/97 was granted on 22 December 1999. The MPO was also approved under the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* in 2012 (EPBC 2011/5795).

MACH Energy acquired the MPO from Coal & Allied Operations Pty Ltd on 4 August 2016. MACH Energy commenced construction activities at the MPO in November 2016, in accordance with Development Consent DA 92/97 and EPBC 2011/5795.

The approved MPO includes the construction and operation of an open cut coal mine and associated rail spur and product coal loading infrastructure. The mine is approved to produce up to 10.5 million tonnes per annum of run-of-mine coal. Up to approximately nine trains per day of thermal coal product from the MPO will be transported by rail to the port of Newcastle for export or to domestic customers for use in electricity generation.

3.2 Proposed Works

The ultimate extent of the approved Bengalla Mine open cut intersects the approved MPO rail spur. While the intersection of the Bengalla Mine open cut with the approved MPO rail infrastructure is still some years away, MACH Energy is proposing the 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 load-out facility 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.

We understand that the Modification would not alter the number of approved train movements on the rail network.

Relevant infrastructure, the key components of the Modification, and known and potential heritage places within (and in the vicinity of) the Modification Area are depicted in Figure 1.

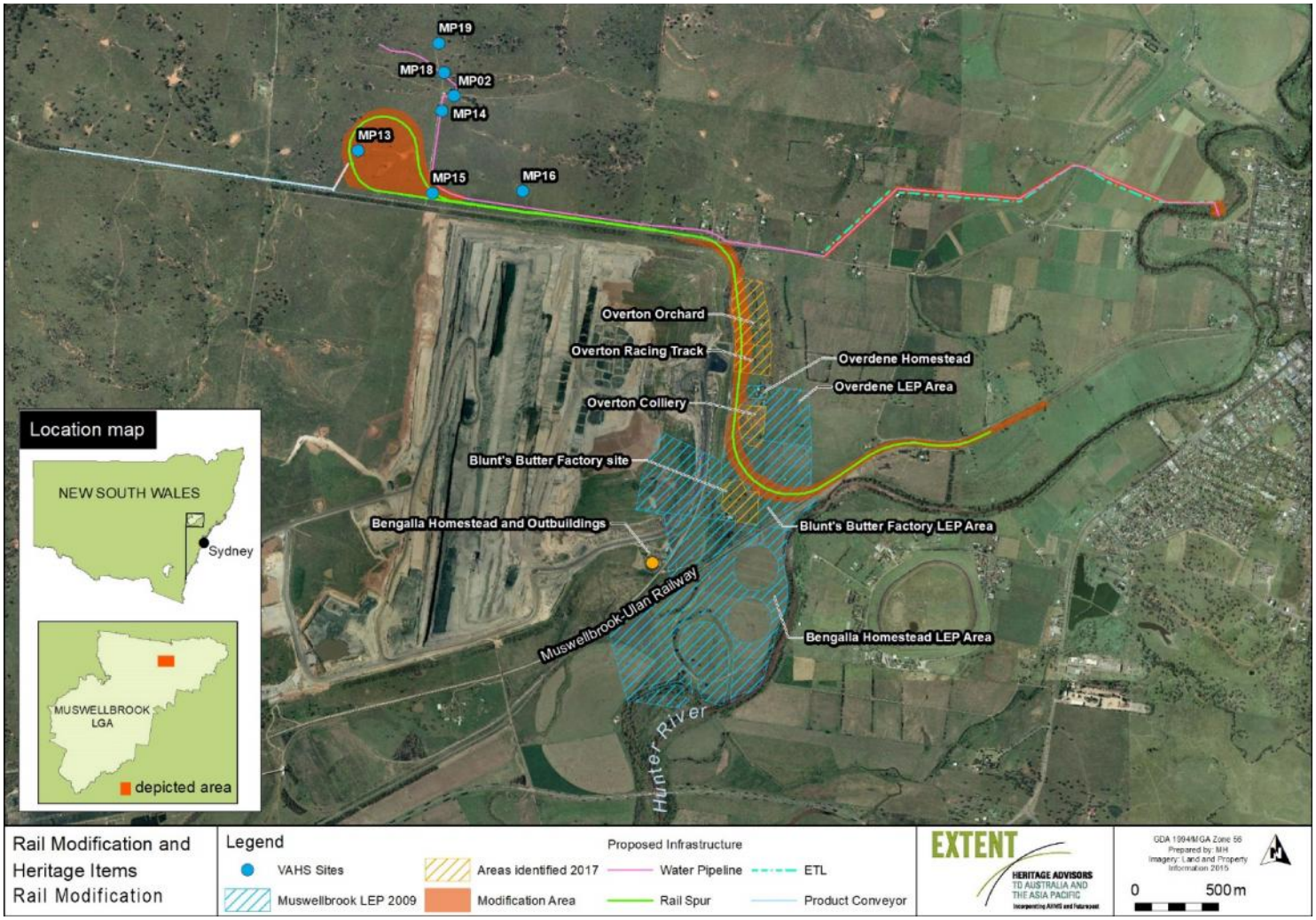

Figure 1 Overview of the study area including known and potential heritage items within it, or in its immediate vicinity. The blue hatched areas represent whole-of-property listings for Blunts Butter Factory, Overdene and Bengalla Homesteads on the Muswellbrook LEP. These are large areas, and the proposed rail infrastructure will pass through parts of them. This SOHI concludes that the heritage values of the butter factory and Bengalla and Overdene homesteads are embodied by discrete locations within these broader listing areas. MP02, MP14-16 and MP18-19 have been previously assessed as part of an existing project approval as not warranting in situ retention.

4 PHYSICAL DESCRIPTION – HERITAGE PLACES

4.1 Heritage Places

There are a number of known and potential heritage places within, and in the immediate vicinity of, the Modification Area. Table 1 lists those places, and provides their listing status on a number of statutory or non-statutory registers, and a reference to the section in this SOHI that discusses them. They are also illustrated in Figure 1.

Table 1 Heritage Places Within or in the Vicinity of the Modification Area

Item	Site Information			Report Section	
	Proximity to Modification Area	Item Type	Listing	Significance Assessment	SOHI
Overdene Homestead	Within	Homestead Complex	LEP	8.1	Section 10.1
Overton Orchard and Race Track (M403)	Within	Agricultural complex	Partially within Overdene LEP curtilage	8.2	Section 10.2
Work building (M404)	Within	Industrial building	None	8.3	Section 10.7
Blunt's Butter Factory	Within	Industrial Complex	LEP	8.4	Section 10.3
Overton Colliery	Proximity	Industrial Complex	Within Overdene LEP curtilage	8.5	Section 10.4
Bengalla Homestead	Proximity	Homestead Complex	LEP	8.6	Section 10.5
MP13	Within	House, dairy, piggery	None	8.7	Section 10.6
NOTE: LEP = Muswellbrook LEP					

In addition to the places presented in Table 1, there are two sheds of indeterminate date to the southeast of Overton/Overdene, two areas of cuttings in the side of the slope east of Overton Orchard and Race Track, and a possible pump-house on the western bank of the Hunter River. These places are greater than 100 metres (m) from the proposed works and will not be impacted by them. They are included but are not treated in detail by this SOHI. Nevertheless, taking a cautious approach, this SOHI includes recommendations to protect them from inadvertent damage caused by the movement of plant or equipment through the Modification Area during construction (Section 11.1).

5 LISTINGS

5.1 Statutory and Non-Statutory Listings

Table 1 presents the places that are identified as heritage items on the *Muswellbrook Local Environmental Plan 2009* (local heritage register).

No places within the Modification Area are on the following statutory and non-statutory lists:

- The NSW SHR.
- The National Heritage List.
- The National Trust list of classified sites.
- The Australian Institute of Architects Register of Significant 20th Century Buildings.

6 HISTORIC CONTEXT

6.1 A Brief History of Muswellbrook

The following historic overview of Muswellbrook is taken from VAHS (2014: 35-37). Non-Aboriginal settlement of Muswellbrook dates to as early as 1824, when government surveyor Henry Dangar set aside 640 acres for a village that was to become Muswellbrook. Following Dangar's survey, large grants of land in the area were awarded to wealthy settlers in return for taking on convict labourers. This early period of Muswellbrook saw the establishment of a number of estates, including Edinglassie, Overton and Bengalla estates, among others. Wool was the dominant industry at the time, with small-scale agriculture also established by settlers in the region. With Muswellbrook situated close to the Hunter River, and linked to the port at Morpeth by the main track through the Liverpool plains, population continued to increase. By 1841, Muswellbrook had 215 residents, shops, several hotels and a flourmill.

The Crown Lands Acts of 1861, (also known as the Robertson Lands Acts after the NSW premier at the time, John Robertson) and the opening of a railway to Muswellbrook in 1869 saw rapid population increase. The farming of cattle and sheep, and breeding and rearing of horses were the major industries at the time. It was also at this period that Carl Brecht started to develop his 'Rosemount' vineyard. Several large homesteads were constructed as symbols of prosperity in the region, including a number that survive today. The end of the 19th century saw the rise of large-scale commercial dairying in Muswellbrook, with the first creameries opening in the 1890's. The Closer Settlement Acts of the early 20th century saw another increase in population and the subdivision of many large estates in Muswellbrook.

The opening the first large-scale open cut coal mine in 1944 significantly altered the town, bringing a new, dominant industry, an increase in population, and new developments. The second half of the 20th century saw major increases in population at Muswellbrook. In 1947, the town's population was recorded at 3939 – by 2016, the population had increased threefold to 12,075.

6.2 Heritage Places Within the Modification Area and Adjacent to the Proposed Works

The following sections provide a brief historic overview of the heritage places that are within the vicinity of or immediately adjacent to the proposed development, providing a basis for the significance assessments that follow. The places discussed in Sections 6.2.1 to 6.2.4 are discussed separately, but they were originally all part of the large Overton Estate owned by Thomas Blunt.

6.2.1 Overdene/Overton Estate, Overton Orchard and Race Track

In 2015, AECOM and Hansen Bailey completed a conservation management plan (CMP) for Overdene Homestead which included a historic overview of the site, which was adapted from Turner (1996). The historical overview of Overdene/Overton presented in this report is adapted from the AECOM and Hansen Bailey (2015:14-19) CMP, supplemented with additional historical research.

The land for Overton/Overdene forms part of 2560 acres of rich riverfront land originally granted to Captain Francis Allman (1780-1860). Allman founded Overton, then known as Kelso Place, in 1825. Allman was not successful in the Hunter Valley, and in 1833 the majority of his grant at Overton was sold to John Kerr McDougall. Allman retained 640 acres of the original land, leading to two properties named Overton existing side by side until Allman's Overton was subsumed into the neighbouring Bengalla estate.

The McDougall family were early free immigrants to NSW, and owned land in a variety of locations in the Hunter Valley. From his residence at Parramatta, J.K. McDougall managed Overton from 1833, but his son, John McDougall took up residence at the property some time in the 1830's. The 1841 census shows McDougall as the owner of a sheep station of 2560 acres with 13 residents, including seven convicts on assignment. Richard C. Dangar, (brother of Henry Dangar, the government surveyor that set aside the original land for Muswellbrook) and John Tuckey also lived at Overton during this time. As this period predates the construction of the sandstone cottage known as Overdene, the McDougall, Dangar and Tuckey families all lived in timber houses at unknown locations on the property, none of which remain. The McDougall tenure ended in 1858, when Overton was sold to Henry Nowland.

Henry Nowland is a significant figure in the history of the Hunter Valley. Nowland owned a great deal of land around Singleton and New England, and he was, according to a family member, 'at one time the largest landholder and employer of labour' in the Upper Hunter. Nowland was a leading citizen, owner of many properties around Muswellbrook, including Overton, Collatoota and properties in town, and supported various charities and causes in Muswellbrook until his death in 1863.

Following his death, the Nowland family retained Overton for another decade, and it was during this time that the sandstone cottage that remains on the property was erected by Mrs Nowland. A fire was reported at the property[1] in 1869, apparently only leaving the stone walls standing. The date at which the residence was repaired is unclear, though it is very likely that repair occurred almost immediately as the cottage was used as a manager's residence once the property was sold to Thomas Blunt in 1873.

Blunt initially focussed on breeding draught horses at Overton, and by 1885 between Overton and a much smaller property known as Brogheda he owned 75 horses, 112 cattle and 2711 sheep. To obtain feed for his stock, Blunt began what would become one of the prominent features of Overton – the irrigation of Lucerne crops.

Blunt began irrigating the property using a windmill, and later installed a steam engine, at least by 1895. The engine was powerful enough to pump 1700 gallons of water from the Hunter River and helped to produce an irrigated crop of Lucerne averaging 2.5 to 3 tons per acre, a very high output at that time. By this time, the estate also carried 8,500 sheep and had a shearing shed that was demolished in 1991. At some time during the Blunt tenure, a coal mine was opened on the property to provide fuel for the estate (see Section 6.2.4).

Eight years later, in 1903, either Thomas Blunt, or his son, opened a small creamery and butter factory on the property. Blunt's butter factory is discussed in detail in Section 6.2.3. A piggery and dairy was established on the property around the same time, and by 1905 Blunt was milking 600-700 cows daily on the property[2]. In order to find the best cattle for his herd, Blunt employed a buyer to 'travel the country to pick up small lots of heifers where he could'[3]. By 1910 Overton had six dairies, each milking about 80 cows, and was averaging the sale of 80 pigs per month after fattening on the estate.

Subdivision of Overton as part of the Australian Government's early 20th century policy of Closer Settlement led to the dismantling of Overton after subdivision in 1912. The riverfront sections of the estate were divided into 10 to 200 acre lots, with only the section containing the butter factory, cottage and steam engine remaining with the Blunt family. The house now called Overton was likely built following subdivision. The remainder of the 20th century saw Overton (now known as Overdene) sold to the Scholes family, the Moore family, and then to the Tibbeys. Occupation of the sandstone cottage

[1] *Matiland Mercury*, 30 January 1869 (p6a).
[2] *Australasian,* 18 March 1905 (p6[3]).
[3] Ibid.

continued until 1972, when the Tibbey family constructed and moved into the brick residence adjacent to Overdene. Owen and Lee Carter purchased Overdene in 1985, but did not re-occupy Overdene.

The most prominent period for the estate was during Blunt's tenure. Overton estate was seen as an example of the rich agricultural potential of the Upper Hunter in the late 19th and early 20th century[4]. By 1910, the estate featured the sandstone homestead that remains, several dairies, a piggery, a coal mine, an orchard (referred to in this report as site M403), grape vines, a creamery and a butter factory[5,6]. Overton also had several outbuildings including managers cottages, a woolshed, hay shed, stables, loose-boxes for stock, and yards. The orchard contained 300 fruit trees and 500 grape vines in 1905[7]. Sometime before 1910, Thomas Blunt erected a public school on the property 'attended by 30 children of the 120 or more employees and settlers on the estate"[8]. A private training ground and race course for Blunt to engage in recreational 'hobby-racing' of horses, which is still extant at the site (Section 7.1.3), was also erected sometime before 1910[9]. A map of the Overton Estate can be seen in Figure 2.

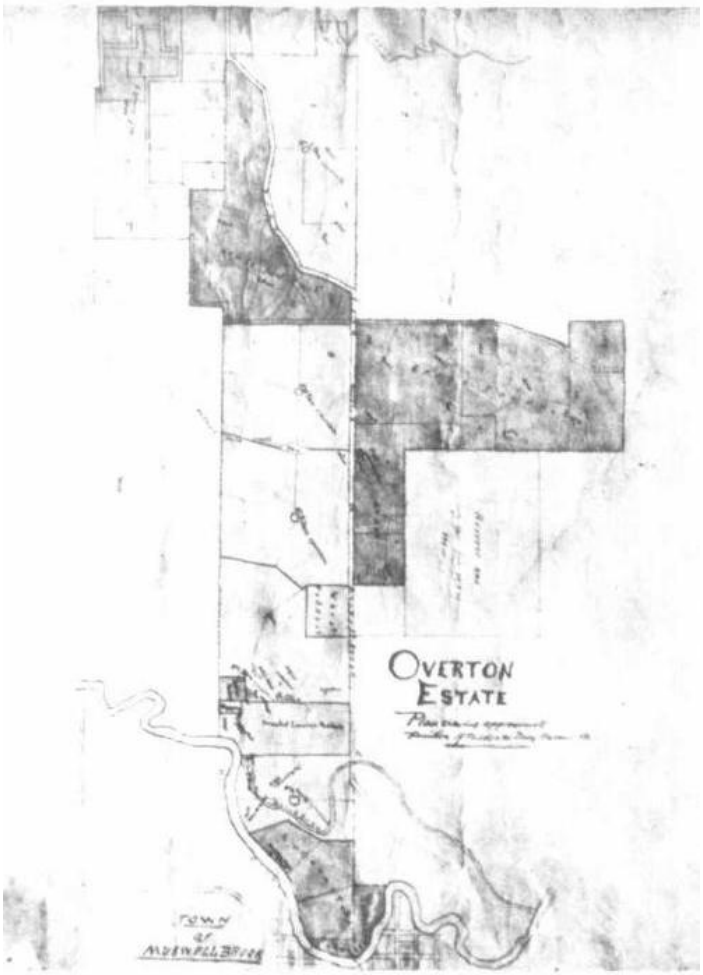

Figure 2 Map of Overton Estate in 1910 produced as part of an article in the* Australasian *(9 July 1910 [p30]). North is to the right.

[4] *Australasian,* 18 March 1905 (p6).
[5] *Scone Advocate,* 22 August, 1905 (p2).
[6] *Maitland Daily Mercury,* 29 January 1902 (p5).
[7] *Scone Advocate,* 22 August, 1905 (p2).
[8] *Muswellbrook Chronicle*, 15 June 1910 (p2).
[9] Ibid.

Overton was also notable at the time for the success of the irrigation systems that Blunt had constructed. Blunt had several pumping stations and irrigated 250 acres[10], producing remarkable quantities of Lucerne for the time (Figure 3). This system of irrigation and use of the elevated position of the property was also exploited in the working of the butter factory, discussed in Section 6.2.3.

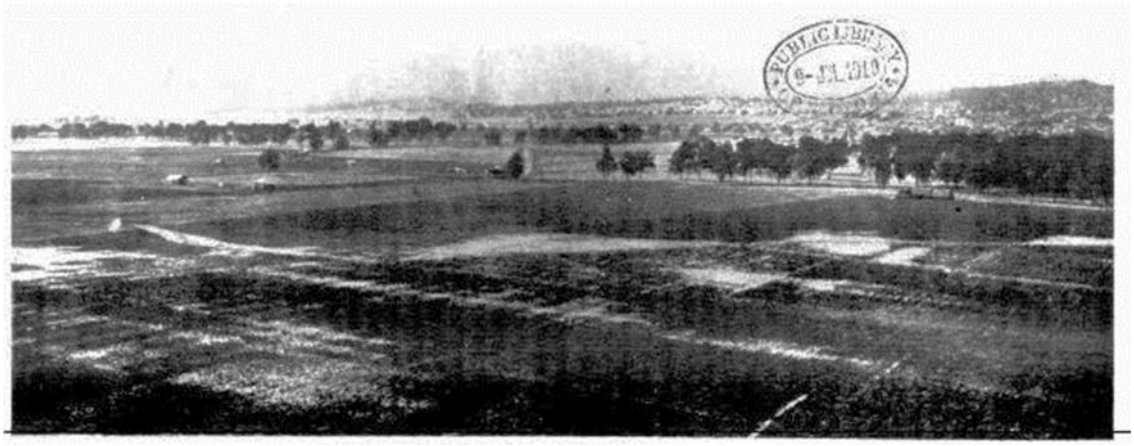

Figure 3 Image from an article on Overton in the* Australasian *(9 July 1910 [p30]). The caption reads: "Irrigated Lucerne Paddocks with the Town of Muswellbrook in the Background". Photo appears to have been taken from the ridge where Overdene homestead stands today.

For all of these achievements and improvements to Overton, little remains at the property today. To the north of Overdene homestead, sections of the orchard are still extant, as is the hobby-racing track. Overdene homestead remains, and is currently boarded up and fenced off to inhibit further dilapidation. The butter factory, piggery and associated pipes, troughs and dams survive as ruins (Section 6.2.3). None of the original outbuildings remain, and it is difficult to discern the original layout of the estate from the evidence that remains at the site. Systematic subdivision and neglect have made it difficult to interpret the original layout or relationship between the homestead, its outbuildings (none of which survive), the colliery and the butter factory. The modern buildings that surround Overdene homestead today were all erected after the subdivision sale in 1959 (VAHS, 2014:652). However, some foundations of buildings in the orchard and evidence of irrigation were located to the north of the homestead (Section 7.1.2).

6.2.2 M404

The history of this structure was not able to be determined. However, the concrete slab, metal columns and piece of sparrow-pecked sandstone indicate an early 20th century construction. It is possible that this building was erected by Blunt or a later owner of Overton, though its function is unknown.

6.2.3 Blunt's Butter Factory

Thomas Blunt opened a butter factory at Overton in 1903 to supplement the successful dairy that was running on the property. In 1910 it was the largest butter factory in the state, and one of the most modern. The interior of the factory was finished in white Minton tiles and concrete floors that gave it a 'bright and cleanly aspect'[11].

The butter factory was part of a larger complex that included vats for milk prior to separation, a series of pipes for distributing milk and cream, and paddocks and yards for fattening calves and pigs. These

[10] *Australasian,* 18 March 1905 (p6).
[11] *Muswellbrook Chronicle*, 15 June 1910 (p2[3])

yards were downslope from the butter factory, which occupies a high point on the ridge above the flood plain.

Milk carts would back onto a platform on the hillside and discharge their load into a large vat, which would gravity-feed to the separators. The carts were of a design that seems to have been an innovation of Blunt's, that used a large zinc-lined tank instead of the more common milk cans. This facilitated less handling of individual milk cans, and faster cleaning of the tank. The butter factory included a steam pipe that would clean the tanks and fill them with hot water after milk had been unloaded[12].

After separating the milk at the top of the hill, the skimmed milk was fed into troughs for the calves, and then any remaining milk was transported down to the base of the hill for use in the piggery (Figure 4). Once the milk had been distributed, hot water was sent through the pipes to clean the pipes and troughs. Finally, cold water was pumped through to provide water for the stock.

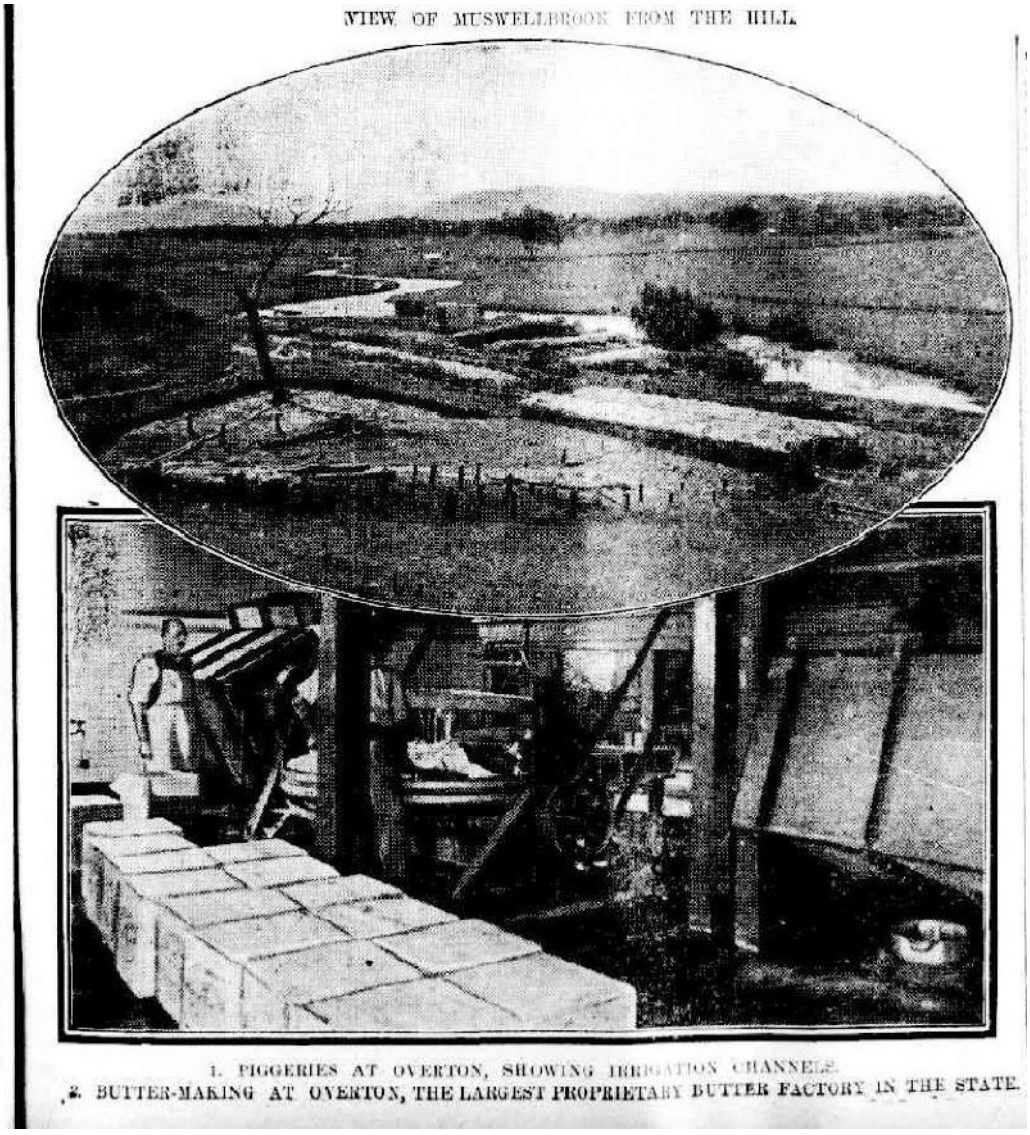

Figure 4 Image from an article on Overton in* The Daily Telegraph *(5 October 1910 [p11]). The caption reads: "1. [top image] Piggeries at Overton, showing irrigation channels. 2 [bottom image] Butter-making at Overton, the largest proprietary butter factory in the state". Top image taken looking east at the bottom of the slope below Blunt's butter factory.

[12] *Australasian,* 18 March 1905 (p6).

This system was seen as an innovative labour-saving setup, and Blunt's Butter Factory produced as much as 30 tons of butter per week by one estimate[13], and serviced up to 260 dairies in the region[14]. *The Muswellbrook Chronicle* reported that in 1910, there were 'five large and four small' vans and 35 horses that were employed to collect cream for the factory from as far away as Merriwa[15]. The butter was mostly exported, and in 1910 it was reported that Blunt was supplying butter to Manila, Philippines[16]. The rise of other co-operative dairies in the 1930s probably resulted in the closure of Blunt's Butter Factory, and the site seems to have been abandoned at that time. Today, the site of the butter factory contains half-buried concrete slabs and pockets of rubble left by the demolition of the original buildings. No walls survive. In places, broken piping and earthworks are visible.

6.2.4 Overton Colliery

The opening of the Muswellbrook to Merriwa Railway in 1915 facilitated the development of a small coal mine at Overton after coal was found there in 1917[17]. It is likely that George Blunt had opened the mine at Overton some years earlier, but in 1921 Overton Colliery Company Ltd. was registered as a syndicate with George Atkins acting as mine manager. The colliery employed 12 men in 1922[18], 18 in 1923, and at least 13 in 1924 prior to its abandonment in 1925[19]. It appears to have been an entirely underground operation and no clear evidence of entrances or shafts is visible in the area of the Modification, although some degraded terracing of unknown origin is visible downslope of the proposed rail line. Today, the general area of the colliery would be adjacent to the proposed rail line, with the proposed rail batters on its western most edge.

6.2.5 Bengalla Homestead and Estate

The 2560 acres of fertile land that would become Bengalla estate was granted to Captain Samuel Wright. Originally from Ireland, Wright had fought with distinction in the Napoleonic Wars as an ensign with the 3rd Regiment in 1806, arriving with his regiment in NSW 1823. He held posts as Commandant at Port Macquarie, Westernport, and Newcastle, and had explored the Macleay River, which was known at the time as Wrights River. In 1826, Wright left the army to become a free settler.

Wright began improvements at the estate immediately and by 1828 there were nine men working on the estate: one free man acting as overseer, an ex-convict labourer and seven convicts. Several buildings were constructed in the 1820s, but these do not survive and little is known about them. It is possible that they were erected at the site of the Old Bengalla homestead, 5.2 km south of the extant homestead known as Bengalla.

Wright continued to develop the property during his ownership. By 1838, when he sold Bengalla to Captain D.C.F. Scott, Wright was running sheep and cattle, growing wheat, and had a vineyard with at least ten varieties of vine.

Following Wright's tenure, according to AECOM (2015:11-12), the original constructor of Bengalla homestead is unclear, but most evidence points toward Scott as the original constructor. In 1843, following the collapse of the Bank of Australia, Scott lost the Bengalla estate because it was still mortgaged to Wright. The property reverted to Wright and he is presumed to have lived in the homestead while the Scott family moved to Sydney until the death of Scott in 1881.

By 1851, Wright was in financial difficulties. Following a failed attempt to arrange an annuity to provide for himself in old age, he wrote his will, left it with his agents and boarded the night steamship for Newcastle. He was never seen again and suicide was presumed. Following Wright's death, the

[13] *Australasian*, 9 July 1910 (p30).
[14] *Muswellbrook Chronicle,* 15 June 1910 (p2[3]).
[15] Ibid.
[16] *Daily Telegraph*, 5 October 1910 (p11[6]).
[17] *Maitland Mercury,* 4 September 1917 (p7).
[18] *Muswellbrook Chronicle*, 18 July 1922 (p2).
[19] *Government Gazette of the State of NSW*, 31 July 1925, Issue No. 102 (p3417).

terms of his will set out that Bengalla should be sold. Due to the circumstances of his death, the sale did not take place until 1853, and the *Sydney Morning Herald* provides a detailed description of the property and the resulting sale by auction. The 12,335 acres of the estate were divided into 13 blocks. Two of these had small farms. Also on the property were a lime quarry and kiln, and a stone quarry, both with huts. The locations of these structures and quarries are unknown. The homestead complex consisted of a house with six rooms, outbuildings, a store and cellar, coach house, box and yards, two cottages, a carpenters' shop, huts and a vineyard. From the outbuildings that existed in 2015, the paintings by Maria Scott, and oral histories, it is likely that this homestead complex stood on the site of the present farmhouse on the Dalamar Stud. However, what is known is that by the 1840s at least ten outbuildings were around the homestead, but none survive.

The sale of Bengalla in 1853 saw the estate owned by Henry Osborne, who sold it to John Hudson Keys, who was at that time the manager of St. Helier's Estate, between Muswellbrook and Scone. J.H. Keys took up residence at Old Bengalla Homestead and built the property into one of the most successful in the Hunter Valley. By 1885, J.H. Keys had acquired more land, expanding to 18,000 acres carrying 32 horses, 1010 cattle and 3280 sheep. Bengalla was at this time the largest estate in Muswellbrook, and was over three times the size of Overton. Around this time, at least fifteen householders and as many as 100 persons lived on Bengalla according to the electoral roll.

The principal building project during his tenure was the house now known as Bengalla, but called at that time Inglebrae. Keys kept meticulous records of his management practices, and was unusual in his refusal to hire architects or builders. As AECOM (2015:15) notes Keys' methods produced 'good husbandry, but not great architecture', and the present house is a reflection of the frugality of the elder Keys. The first stage was constructed in 1877, and the bedroom wing was added by the second Keys generation in 1895. The estate continued to expand under J.H. Keys' son, R.T. Keys, and by 1911 Bengalla encompassed 20,000 acres.

R.T. Keys was hailed as a successful and progressive grazier at the time, focussing on fattening beef for the Sydney market. Fattening of cattle in the Hunter Valley at this time was common, but R.T. Keys was a pioneer of live exports of cattle to Great Britain. The first shipments of cattle were made in 1893, with good results. By 1895 Keys had a good trade relationship with Britain, and was regularly purchasing and driving cattle south from Queensland. The Queensland bottle tree (*Brachychiton rupestris*) planted in the front garden is a lasting symbol of this relationship. R.T. Keys was also an early pioneer of creameries in the region, and similar to Overton, Bengalla was dairying and irrigating Lucerne by 1897.

During his tenure, the homestead was extended and improved. In 1895 an eastern wing was constructed and a second drawing room added, all of locally made bricks, slate roof and striped bull-nosed iron verandas.

Following the death of R.T. Keys in 1909, and similar to Overton and many other estates in the Hunter Valley at this time, the Closer Settlement policies of the Australian Government saw the subdivision of Bengalla. J.H. Keys the second (II) oversaw the subdivision of Bengalla into 42 farm lots of between 100 and 700 acres. Further modifications to the estate came in 1915 with the opening of the railway that divided the property, with J.H. Keys II retaining 8000 acres for dairying and Lucerne growing. J.H Keys II worked the property until his death in 1952.

1953 saw further subdivision for the purposes of solider settlement, with the Keys family retaining a reduced 1300 acres by 1978. The homestead was carefully maintained in keeping with its original architecture, and a brick toilet block was erected to replaced a timber structure behind the western wing. In 1995 the estate was sold to Bengalla Mining Company.

The development of the Bengalla open cut mine saw the construction of an Emplacement Area 115 m to the north, and a visual bund 30 m distant. The bund is the current visual backdrop to the homestead, and the development of the mine has altered the setting to remove the link between

Bengalla homestead and the farmland surrounding it. In 2015, AECOM and Hansen Bailey prepared a CMP for Bengalla Mining Company in order to update the Schedule of Conservation works as the homestead is located within the approved mining area under Development Application 211/93.

The primary features of the property, being the homestead, outbuildings and ornamental plantings are adjacent to the Modification area, but will not be impacted by the Modification either directly in terms of physical impacts, or indirectly in terms of views and setting.

6.2.6 MP13 (also known as 'Humphries')

VAHS included MP13 in the *'Mount Pleasant Historic Heritage Study'* in 2014. That report included a detailed discussion of MP13. The following summary history reproduces and paraphrases the VAHS report:

- Portion 7 and 8 appear to be pre-emptive leases taken up by George Seabrook in 1862. John Neill's map dated 3rd Feb 1863 shows that there was a house and yard on the land then. This is the site of MP12. He stated that the map was prepared for George Seabrook's CP and ACP purchase of Portions 7 and 8.
- On 7th May 1866, it was transferred to Mary Ann Seabrook, then Harriet Nowland 8th February 1872 followed by her daughter, Harriet Farlow Nowland on 8 January 1874.
- George Seabrook Jnr. was living in Muswellbrook by 1873.
- H.F. Nowland gave her address as Bollibon, Muswellbrook when she applied for administration of the estate of her mother, Harriet Nowland on 4 October 1880.
- H.F. Nowland was the occupier in 1885 where she is listed as having 600 acres, 4 horses, 21 cattle and 450 sheep.
- In 1904 Edward Higgens, Parkinson advertised that they were to auction on 2nd November 1904, a portion of the estate of H.F. Nowland consisting of 360 acres of her CP land.
- 1906. It is our mournful duty to record the death on Sunday night last, of H.F. Nowland, of Bollibon, which occurred at the residence of Nurse Lucas, where the deceased had underwent an operation a few months ago, in consequence of suffering a poisoned foot, caused, it is said through cutting corns. The operation was successfully performed by Dr Halcomb (in conjunction with Dr Scott); but other complications occurring the patient never recovered, and died as stated above. The deceased, who lived a retired life on her estate, Bollibon, a few miles out of town, was a member of one of the oldest and best-known families in the district. The funeral took place on Tuesday morning last; when the body, after being taken to St. Alban's Church, where a portion of the burial service was read, was laid to rest in the Church of England cemetery, where the Rev Canon Regg read the concluding portion of the solemn service. Mr A R Lang conducted the funeral arrangements.
- Miss H. Nowland of Bollibon died interstate so relatives for the administration of the estate took proceedings. Sarah Lumley (sister) and David Gould Hegarty (nephew) made application. All her kin except her brother, Archibald Nowland who made a separate application, supported their application. Administration granted to Sarah Lumley and Pierce Hegarty.
- In 1906, A Muswellbrook Estate. Messrs Higgens, Parkinson & Co announced the sale of Bollibon Estate, five miles from Muswellbrook to take place on the ground. The place is well adapted for dairying purposes, being only one mile from Overton butter factory, and as it is intended to dispose of all stock, an excellent opportunity is open to secure an up-to-date and adequately fitted dairy farm in a good district.
- Edward Higgens, Parkinson & Co. reported that they had sold the estate of the late H. F. Nowland to Thomas Blunt of Overton. Estate consisted of 83 acres freehold and 200 acres conditional purchase, with dwelling house, outbuildings, yards, three dams and a splendid well.
- In 1907, Archibald Nowland made claims on the estate of his sister H.F. Nowland for administration between her illness and death. In court, he stated that there were 60 – 70 head of cattle on the property. His sister had been assisted prior to her illness by Henry Waldron, who

was a lad of about 17 years of age when he started with his sister. He had worked for her for about 16 – 17 years. The fences were in a very poor state of repair and he had them repaired. Claimed his sister had lived all her life on Bollibon. Henry Waldron stated that there were about 70 – 80 cattle on the property and at one time had about 800 sheep. Verdict for defendants.

- Portions 7 and 8 were transferred to Thomas Blunt on 18th January 1907. Blunt took out a mortgage with The Australian Mutual Provident Society on 4th March 1907 and on 12th October 1911 the mortgage was with The City Mutual Life Assurance Society Ltd.
- Thomas Blunt disposed of his property, Overton on 8th April 1912 to William F Robey. The sale included Portion 8. At this stage Overton consisted of 5538 acres 1 rood and 24 perches, William F. Robey paid £44,000.
- 1915, Portion 7 and 8 were sold by William F. Robey to John Malcolm Campbell Humphries and Kenneth William Humphries, as tenants in common, graziers of Muswellbrook. Transferred dated 20th July 1916 though the document was produced 30th July 1915 and entered 6th August 1915.
- J.M.C. & K.W. Humphries purchased Lots 25 and 26 in the subdivision of Overton, this comprised Portions 7, 8 and 210; and area of 243 acres for which they paid £1400. Sale took place on 30th June 1915.
- On 1st July 1920, J.M.C. & K.W. Humphries split their properties and K.W. Humphries purchased the other half of Portions 7, 8 and 210 for £700. Property was called Bollybong, corruption of Bollibon.
- It appears from the interview with Col Bates that K.W.D. Humphries held the land for a long period.

7 PHYSICAL DESCRIPTION

7.1 Overton Estate

Overdene, Overton Orchard and Race Track, Overton Colliery and Blunt's Butter Factory are discussed separately below for the sake of clarity, but they were all at one time part of the large Overton Estate. However, the visual and functional relationship between these disparate elements has now largely been lost due to subdivision, subsequent development, and demolition of the original structures. The following descriptions of Overdene Homestead and Blunt's Butter Factory are adapted from AECOM and Hansen Bailey (2015) and *Muswellbrook Shire Wide Heritage Study* (1996), and have been updated where necessary to reflect the current physical condition of the sites.

7.1.1 Overdene Homestead

This section is a summary of the physical description presented in the AECOM and Hansen Bailey (2015: 20-28) CMP for Overdene Homestead. All comments on the condition of the structural elements are drawn from that report and do not reflect the condition of the house in 2017, as access was not possible. The original tin roof has been replaced and other structural refurbishments have been made following the CMP (AECOM and Hansen Bailey, 2015).

Overdene is located on Overton Road (Old Bengalla Road) turning south off Wybong Road. The Hunter River is to the west, and the Bengalla Mine is to the east. The house looks east back across the flood plain to the town of Muswellbrook, which lies immediately to the east, on the opposite bank of the Hunter River. The house occupies an elevated position in the landscape, looking east over what is now grazing land on the flood plain. The Bengalla Mine waste emplacement now blocks all views out to the west. Overdene is surrounded by a chain-link fence, and all openings have been boarded up.

The original relationship between Overdene and its now demolished outbuildings has been lost due to successive development and construction of new buildings at the site. The AECOM and Hansen Bailey report established a heritage curtilage for the building that includes the homestead and a small area to the west that are areas of archaeological potential.

Overdene is a house in the classic Georgian style (Figure 5). The front façade is symmetrical, centred around an entrance door, with two pairs of French doors and shutters to either side. The roof presents a long, low ridgeline, punctuated by chimneys rising from the northern and southern elevations.



Figure 5 View north-east of Overdene Homestead during the site visit of 2017.

The original roof was hipped, with the ridge returning down both sides to form a pair of hips with box gutter between, creating a low, formal roof line to the front typical of this style. The roof timbers are hardwood with nailed joints. Shingles, presumably original, are still in place and appear to be in good condition. The current corrugated iron cladding is also in good condition with few obvious leaks. The fascia and soffit board are timber, with galvanized steel Ogee profile gutters.

Roof joinery includes a timber fascia and soffit board, both with beaded edge. The gutter is of galvanised steel in Ogee profile, presumably of the same age as the roof sheeting. Downpipes were circular, presumably galvanised steel, though all of the original piping is missing. Guttering has generally failed and as all downpipes are missing, rainwater discharges near the building.

A bell cast veranda ran around all sides, although this has been completely removed. A kitchen wing and other outbuildings were located to the rear. These buildings have been demolished, although the flashing on the rear of the house indicates the presence of some of the former structures. The veranda originally wrapped around all four sides of the house, though was broken at the rear allowing for what was presumably a covered walkway to run from the back door, with the veranda roof returned into the wall. The form of these elements is evident by the flashings and rebates for the edge beams in the stonework. The floor of the veranda was formed up with sandstone to match the house, and a timber floor has been constructed over the top of the original to bring it flush with the interior. The wooden veranda is no longer present at the site, though the metal wall plates have been retained and have been stacked internally (AECOM, 2015:23).

External walls are of coursed sandstone, roughly dressed and sparrow pecked. Courses are roughly consistent at 300 Millimetres (mm) high on all façades, however the coursing to the front and side facades is more consistent than to the rear, which might be better described as being random coursed. To the front façade especially, almost all of the stones are a full course in height and anything up to 600-700 mm long and larger for the lintels, with a fairly consistent cream toning throughout. To the rear façade, such large stones are generally restricted to only the quoins and

lintels, with smaller roughly squared stone as infill, including many of a soft red tone. The quality of the side façades lies somewhere in between. This variation in quality of construction is typical of the period, the finer quality being restricted to the "on-view" facades.

Lintels are of dressed, fine-grained sandstone that is free of colour variations, similar to the internal hearthstones. Lintels are finished with a sparrow- or convict-peck and include a keystone in the course above all openings except the front door. Door thresholds are timber except the back door which is dressed stone that has subsequently cracked.

An additional opening was formed in the northern wall sometime soon after construction. A timber lintel and reveals were installed, but the surrounding stonework was not adequately supported and is now badly cracked, particularly to the eastern reveal. Some cast iron air vents of a geometric pattern remain at floor level, though they are badly rusted and many are missing.

The front door is four-panelled with heavy mouldings and embossed panels. The front door is the only one to feature a fanlight, which is split by a central mullion. The French doors along the front façade are of similar construction. The single remaining shutters that are in place are badly deteriorated. All windows are double-hung sash on pulleys and counterweights, with six panes.

There is major cracking around the new opening to the north where there is evidence of subsidence and cracking. There is some rising damp and loss of pointing to the lower sections of all walls. Joints to the rear wall are however badly eroded in places, and a few smaller stones have fretted away or been dislodged. Air vents are in poor repair and probably inoperative in terms of ventilating the sub-floor space.

The building features three full-heights from floor level chimneys and fireplaces constructed of sandstock bricks. The chimneys are toothed into the stone coursing in a roughly symmetrical fashion. The chimneys feature decorative plinths and capping. Only one chimney pot of the three chimneys remains *in situ*. In 2015, AECOM and Hansen Bailey noted that another was *ex situ* in the garden near the house, but this was not noted in 2017.

The internal layout of Overdene is typical of the period, being a double pile plan with central hall. Two main rooms (presumably the sitting and dining rooms) are at the front of the house, each measuring approximately 4.2 m x 4.5 m. Fireplaces are located centrally on the external side walls. At the rear, the right hand room is repeated, and the left hand room is broken into to smaller spaces, measuring ~3.9 m x 2.4 m. The hall narrows in the rear to maximise the width of these small rooms, with the change in width disguised by an arch and pilasters. All walls are sandstock bricks and finished with lime plaster. Floors are timber, and were likely polished originally. Ceilings were lath and plaster but have been replaced with Masonite sheeting. Internal doors are four paneled with simple mouldings.

7.1.2 Overton Orchard and Race Track

A number of features were located by the survey undertaken for this SOHI in the area to the north of Overdene, referred to here as Overton Orchard or M403 (Figure 6). Most of these features are concrete footings or depressions indicating the previous locations of buildings on the site. There is very little documentary evidence to indicate when these structures were built, but they appear to relate to the early 20th century based on the construction methods and other physical evidence associated with the features.

Figure 6 depicts the location of all identified features and the general layout of the Overton Orchard, located 300m north of Overdene homestead. The orchard covers an area of roughly 76 square metres, and contains nine areas of various sizes delineated by cultural plantings and windbreaks. An avenue of cultural plantings oriented east-west was presumably the main entrance from Overton Road, and leads into the area where the majority of building remains were located. Most features were located within three sections to the northeast. All other sections contained no structural

remains or potential archaeological features, but did contain evidence of what are possibly former irrigation channels (Figure 7). These areas likely represent what remains of the orchard that was originally on the property, though there is little documentary evidence to confirm this.



Figure 6 Overton orchard showing site boundary, proposed rail alignment and all features identified in 2017 (blue shaded areas within the inset map).



Figure 7 Image from the* Agricultural Gazette of NSW (1905:1007). *The caption reads: "Orchard in process of being irrigated". This process of irrigating orchards may have been practiced at Overton, resulting in the linear depressions that are common at the site.

7.1.3 Miscellaneous Features within the Orchard Area

Those structural remains that were identified in the 2017 survey were either concrete footings and slabs or depressions indicating the location of posts that had been removed. The following features were identified (Figures 6 and 8-26):

- Two stone-lined elevated garden beds that likely formerly contained ornamental plantings to fringe the entry way to the west. Each bed measured roughly 6 m x 3 m and was raised above the surrounding ground surface by 300 mm. A concrete slab lined the base of each, with large natural sandstone blocks forming a retaining barrier for the soil inside only on the slab to the south. A fragment of a brick bearing a diamond shaped frog was found in association. An avenue of cultural plantings leads down the driveway to the east (Figures 8 - 10).
- Various stone surrounded planting beds (M403A [Figures 11 and 12], M403P, M403T [Figures 13-16]), some with fragmented ceramic pipe contained within, and several depressions surrounded by sandstone cobbles (M403N, M403U, M403V) were located (Figure 17).
- A concrete slab that was heavily fragmented and disturbed at the southern and northern ends (M403B, Figure 18). Several likely irrigation ditches, including the possible remains of a sluice gate were located in the area around M403 (Figure 19). A large area that likely contains a concrete slab below the current ground surface (M403R, Figures 20-22). Several concrete blocks and piers can be seen above ground. A mix of modern and early 20th century bricks were found in association. Both slabs were likely the footings for structures.
- M403S: A sandstone retaining wall with stone and brick steps at the northern end. The bricks appear to be early 20th century bricks common to the Muswellbrook area, but frogs were not visible. Some ex-situ bricks that appear to be of the same fabric were found closely associated, and bore a diamond-shaped frog. A circular concrete slab that appears to be the cap of a septic tank was located to the east of M403R and M4035.

- A rectangular concrete pit (M403O, Figure 23) with black plastic underlay was located to the east of M403C. The northern and southern ends of the pit are capped with sandstone blocks.
- Six depressions each measuring 1 m across, one being a concrete post mould (M403D, Figure 24) indicating the likely location of a structure.
- A series of concrete slabs oriented east west and arranged from upslope to downslope (M403Q). Five concrete slabs were located in total, four of which were rectangular, and one circular.



Figure 8 View south of the southern raised bed at the entry gates



Figure 9 View south of the northern raised bed at the entry gates



Figure 10 View south of both features showing the association with the entry gate and the avenue of trees that continue to the west.



Figure 11 M403A view south over one of the stone surrounded planting beds



Figure 12 M403A view south west of another stone surrounded planting bed.



Figure 13 View east over M403T. The alignment of stone extended for 20 m to the east. Located at the eastern end of the alignment were many fragments of ceramic pipe (Figure 14), and a mix of early and later 20th century bricks. Sandstone cobbles and structural timbers covered the area to the east, extending down almost to the edge of the slope.



Figure 14 Fragmented ceramic pipe at the eastern end of M403T



Figure 15 Mix of early 20th century and modern bricks at the eastern end of M403T



Figure 16 Structural timbers located east of M403T



Figure 17 Sandstone lined depression at M403U, similar depressions were found in several locations around the eastern portion of the orchard.



Figure 18 M403B fragmented and disturbed concrete slab



Figure 19 An example of one of the possible irrigation ditches at M403L. Ditch runs parallel and to the left hand side of the scale bar. Sandstone cobbles were placed perpendicular to the run of the channel at the northern end, and may be the remains of a sluice gate.



Figure 20 View south east over M403R concrete piers, the pier shown in detail in Figure 21 is in the mid-ground in the left hand corner. The sandstone retaining wall (M403S) can be seen in the foreground of the right hand side frame.



Figure 21 Detail view of concrete piers showing evidence of the former location of posts



Figure 22 View west over the sandstone retaining wall. The edge of M403R can be seen in the foreground. A red brick bearing a diamond-shaped frog that appears to be the same fabric as the bricks in the steps at the northern end of the retaining wall is visible on the surface near the scale.



Figure 23 View west over M403O.



Figure 24 Detail view of the concrete post mould at M403E

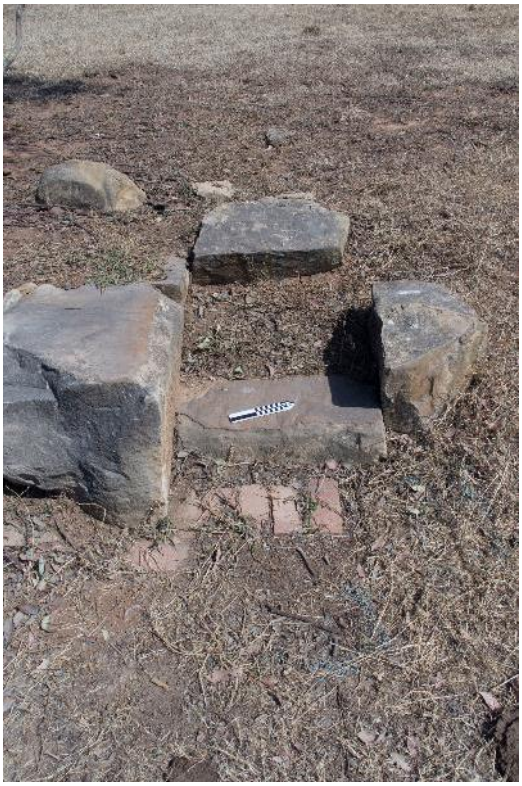

Figure 25 Sandstone and brick steps at the northern end of M403S



Figure 26 View west over septic tank located to the east of M403R, scale is 15 centimetres (cm).

To the south of the features described above is Thomas Blunt's 'hobby-racing' track (Figures 27–30). The Overton Race Track is a 600 m circuit that skirts the edge of the ridge to the west. The Overton Race Track is cut into the surrounding landscape, and is between 8 m and 13 m wide. There is also a 1972 NSW trigonometry survey marker inside the Overton Race Track on the eastern side (Figure 30).



Figure 27 Overton Racing Track showing the boundary of the site and the proposed rail alignment.



Figure 28 View north at the northern end of the Overton Race Track. Note that the track has been cut into the landscape and has an embankment on the inside track.



Figure 29 View north-east at the northern end of the Overton Race Track. Note that the track has been cut into the landscape and has an embankment on either side.



Figure 30 NSW 1972 Trigonometry Survey Marker

7.1.4 M404

Site M404 consists of a concrete slab measuring roughly 14 m × 10 m. On the northern side of the slab stand six metal columns roughly 300 mm in diameter and 2.2 m high (Figure 31). Wooden beams span the length of the columns on the south and north side, and are connected by badly sagging battens indicating a former roof. To the south-west, a low wood-moulded concrete wall is connected

to lower brick foundation walls that stand 150-200 mm high (Figure 32). The original form and function of the structure is difficult to interpret based on the remaining evidence.



Figure 31 View north-west over M404.



Figure 32 View east over the low walls and foundations present on the southern edge of M404.

7.1.5 Blunt's Butter Factory

The following description of the site is adapted from the Muswellbrook Shire Wide Historic Heritage Study site card (1996) and AECOM (2015) and has been updated where necessary to reflect the site visit conducted in 2017 (Figure 33). Very little remains at the site of the Blunt's Butter Factory/Overton Creamery (Figure 33). There are no standing structures present at the site (Figures 34-38). All that remains are the concrete foundations and rubble. Some of the remaining concrete sections have the original glazed white tiles attached. The site has been almost totally destroyed and is in quite poor physical condition. The potential for archaeological relics to exist at the site is discussed in Section 9.3

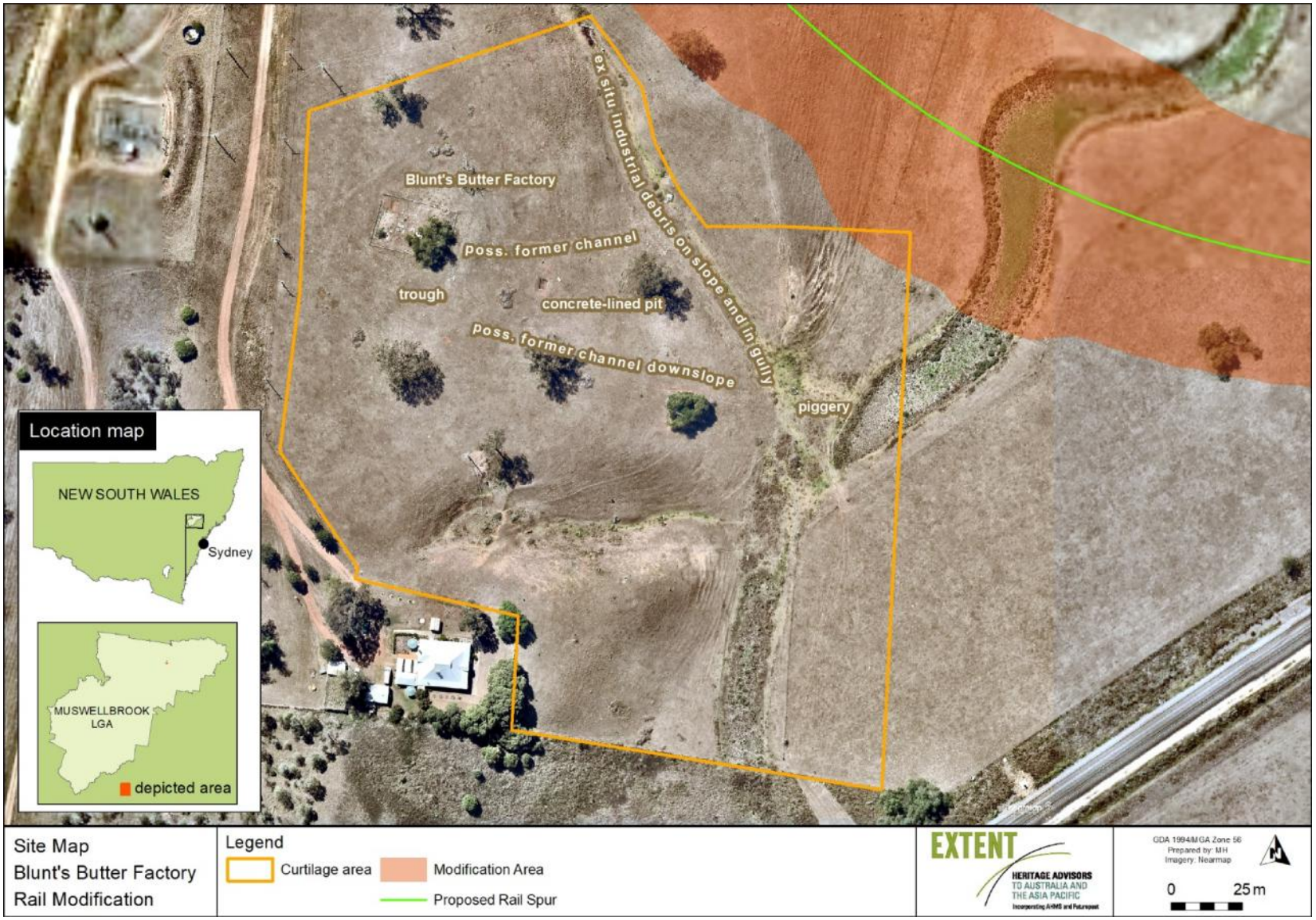

Figure 33 Blunt's Butter Factory site map showing locations of features of interest, curtilage area and proposed rail alignment.



Figure 34 View south-east over the butter factory showing currently fenced off area.



Figure 35 View south of the eastern side of Blunt's butter factory showing in situ concrete blocks.



Figure 36 Detail view of section of original wall with tiles attached.



Figure 37 View of ground surface inside the ruins of Blunt's Butter Factory showing mix of gravel, bricks and ceramic.



Figure 38 Concrete-lined pit to the east and downslope of the Butter Factory.

7.1.6 Overton Colliery

Overton Colliery is located on the southern slope of the hill below Overdene homestead (Figure 39). No clear evidence of entrances or shafts was visible on the surface. It is possible that the entrances were located further to the east. Some degraded terracing of unknown origin, and occasional shallow depressions on the surface, may relate in some way to the former mine works but they may also reflect agricultural activity unrelated to any mine activity (Figure 40). There is a small shed at the top of the hill that has an unclear association with the colliery as a construction date was not able to be determined, although it appears to be no older than the early 20th century.

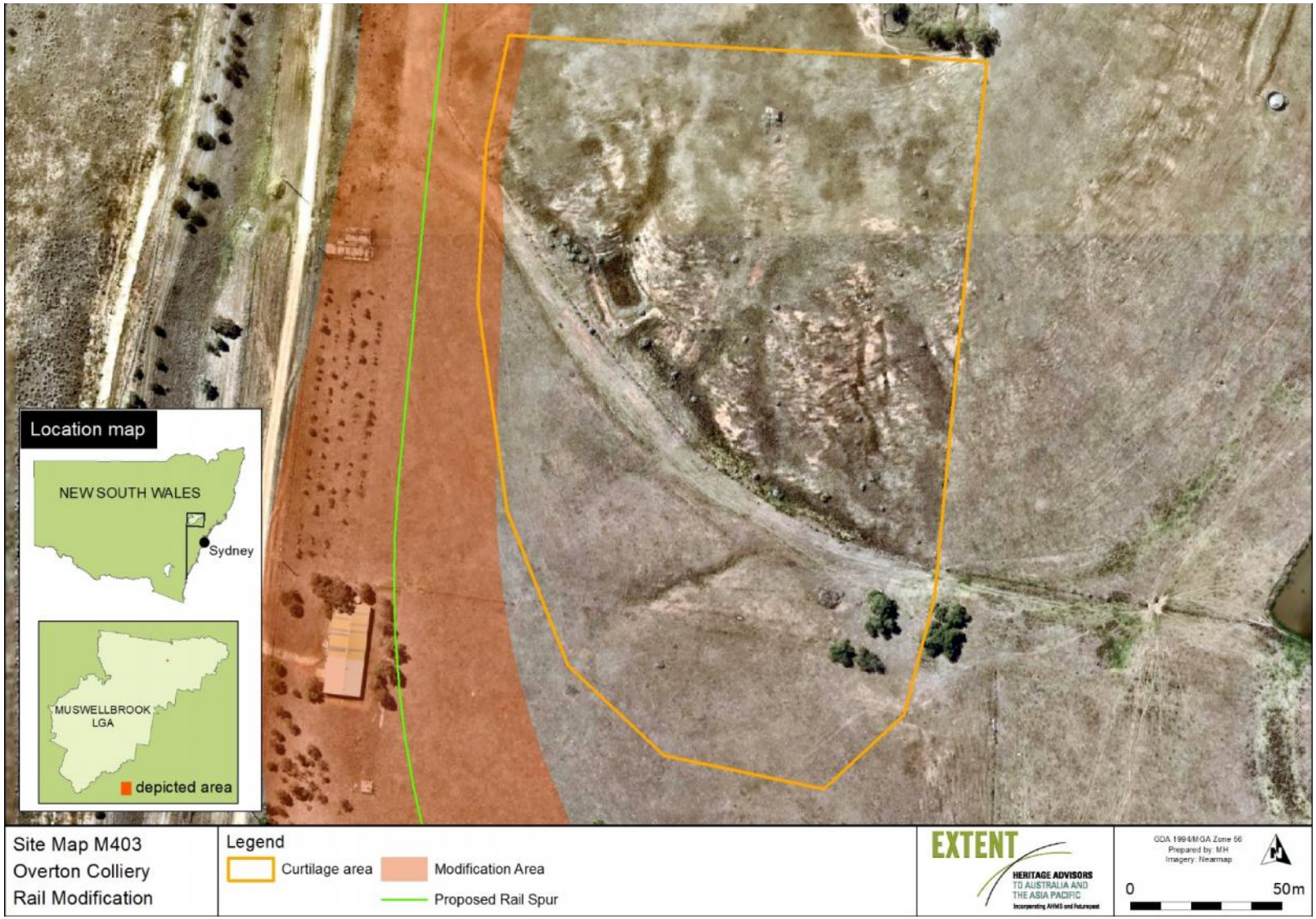

Figure 39 Aerial image showing the general area of Overton Colliery adjacent to proposed rail alignment.



Figure 40 Panoramic view north over Overton Colliery. Overdene Homestead is visible at top of the hill in the centre of the frame.

7.2 Bengalla Homestead

The principal features of Bengalla Estate are the homestead buildings with the 1877 house, the 1895 extension and 1960's additions, combined with gardens, outbuildings, a tennis court, farm sheds and several archaeological sites. These features are all outside the Modification area. To the north, the visual curtilage is defined by the mine operation area, and to the south by the Muswellbrook-Ulan Rail Line that acts as a visual boundary between the homestead area and the river flats beyond. The Muswellbrook LEP curtilage also includes the area between the Muswellbrook-Ulan Rail Line and the Hunter River. The survey conducted in September 2017 noted only two items within the areas to the south of Bengalla Homestead (a small shed and a possible pumping station) (Figure 1), neither of which will be impacted by the proposed works.

7.3 MP13

The following physical description of MP13 is taken from VAHS (2014:172). The site contains six features:

- House site (Figure 41). Very little remains of the house. There is the brick base of a chimney and a large number of bricks scattered over the area. To the north, there two places with piers, 30 and 40 cm high that most likely were tank stands. There is some concrete with netting in it that has come from the inside of a corrugated iron tank that has been repaired. Artefacts include part of an iron bed frame and the front of a fuel stove. The stove is marked KEB top right and left corners while there is WEDGEWOOD at the bottom (See Plan 52). There are six pepper trees to the west, which were most likely planted to screen the sun in summer. There is no indication of house size or building method.
- Feature 2 (Figure 42). The purpose of this building is unknown. The floor is made of concrete, approximately 6 m x 6 m with, perhaps an entrance in the right hand bottom corner. This corner has a spoon drain so the building must have been cleaned from time to time. The area has been fenced with rabbit proof netting with a couple of gate ways. Round and rectangular posts have been used in the fence. There is a fig tree within the yard. A dairy had been considered, but there is no indication that a separator has been mounted on the floor. (See Plan 53).
- Dairy/milking shed (Figure 43). This is a concrete slab approximately 4 m x 13 m. The slab has been extended to the east or there was a separate room here. There are two drains in the floor. At the western end of the slab, there are blocks that indicate machinery was mounted here. Perhaps mechanical milking or a separator.
- Piggery. This area contains concrete floors and troughs, which indicates it was a piggery. It is highly disturbed.
- Tank stand. This a stand built for two tanks. Round bush timber has been used for the posts and recycled split rails from a fence have been used to stop stock getting under it.
- Well & boiler. Site contains a timber lined well (Figure 44). Timber is hand split. This would be the 'splendid well' mentioned by Edward Higgens, Parkinson in their 1906 sale of Bollibon. Boiler is a vertical steam boiler of unknown origin. It is partly buried in the soil at the base of a tree.



Figure 41 View north over the house site (VAHS, 2014: Plate 103)



Figure 42 View south-west over Feature 2 at MP13 (VAHS, 2014: Plate 105)



Figure 43 View north-east over the dairy (VAHS, 2014:Plate 106)



Figure 44 Timber-lined well at MP13

8 STATEMENTS OF HERITAGE SIGNIFICANCE

8.1 Overdene Homestead

Overdene Homestead is listed on the Muswellbrook LEP (2009) and the Hunter Valley Regional Environmental Plan (1989) as a place of local significance. It is on the non-statutory register of heritage places maintained by the National Trust. The site is of local historical significance. AECOM and Hansen Bailey (2015) undertook a heritage significance assessment in 2015 and concluded that Overdene satisfies criteria (a) – (f). This report agrees with that assessment. The ways in which the homestead and its immediate surrounds satisfy these criteria are presented below and adapted from AECOM and Hansen Bailey (2015).

Overdene is of local historical significance through its demonstration of the pattern and course of settlement in the Muswellbrook area (criterion [a]). The property was one of the earliest in the area, and was owned by many prominent families including the McDougalls, Nowlands and Blunts. Overdene also demonstrates the impacts of both the Closer Settlement Act, and the development of the Muswellbrook-Merriwa railway that divided the property in 1915. The association with several prominent families and individuals from the Muswellbrook area satisfies criterion (b), including Francis Allman, John McDougall and especially George Blunt and his family. The Blunt family managed Overton during its most productive period, and were involved in innovative methods of irrigation, cropping, animal breeding, coal mining, railway construction and the processing of dairy goods, all of which have been central to the subsequent development of the Hunter Valley.

Overdene is of aesthetic significance (criterion [c]) as a well-proportioned Colonial Georgian style cottage constructed of locally quarried sandstone. The cottage has had few alterations since construction, and has retained its readability as a Georgian cottage. The house also occupies a prominent position in the landscape and is visible from Muswellbrook and the approach along Wybong Road.

Overdene is likely to meet the threshold for local significance under criterion (d), for having a strong association with the Muswellbrook rural farming community (although no community consultation was undertaken for this SOHI to confirm this).

The built form at Overdene has the potential to yield information that could shed new light on domestic arrangements and the construction of early (i.e. 19th century) homesteads in the region (criterion [e]). The AECOM report identifies areas of high archaeological potential immediately surrounding the house. These areas are discussed further in Section 9.1, but the proposed development would not impact these areas (Section 11.2). If there were potential archaeological deposits further from the house and within the Modification Area (e.g. the location of the public school erected on the property by Thomas Blunt is unknown), then they will have been impacted by significant ground disturbance over the last century. The intentional demolition of the outbuildings following the subdivision sale in 1959, the construction of the Bengalla Mine to the west, and the intensive use of the floodplain below for grazing and agriculture would mean that any potential archaeological deposits within the whole-of-property listing on the Muswellbrook LEP are likely to be disturbed.

As noted, Overdene Homestead is included in the Muswellbrook LEP 2009 as a place of local significance. The LEP listing captures the entirety of the historic property allotment, and therefore captures the historic home as well as a number of post-1950s buildings, and large tracts of vacant land (Figure 45). The heritage values of the homestead are principally embodied in the historic structure itself, and in a small area adjacent to it, where there are extant cultural plantings and the potential for historical archaeology. As discussed below, the proposed rail infrastructure would pass along the western edge of the 'heritage item' as listed in the whole-of-property LEP listing, but would be 135 m west of the discrete part of the property that actually embodies local heritage values (Figure 46).

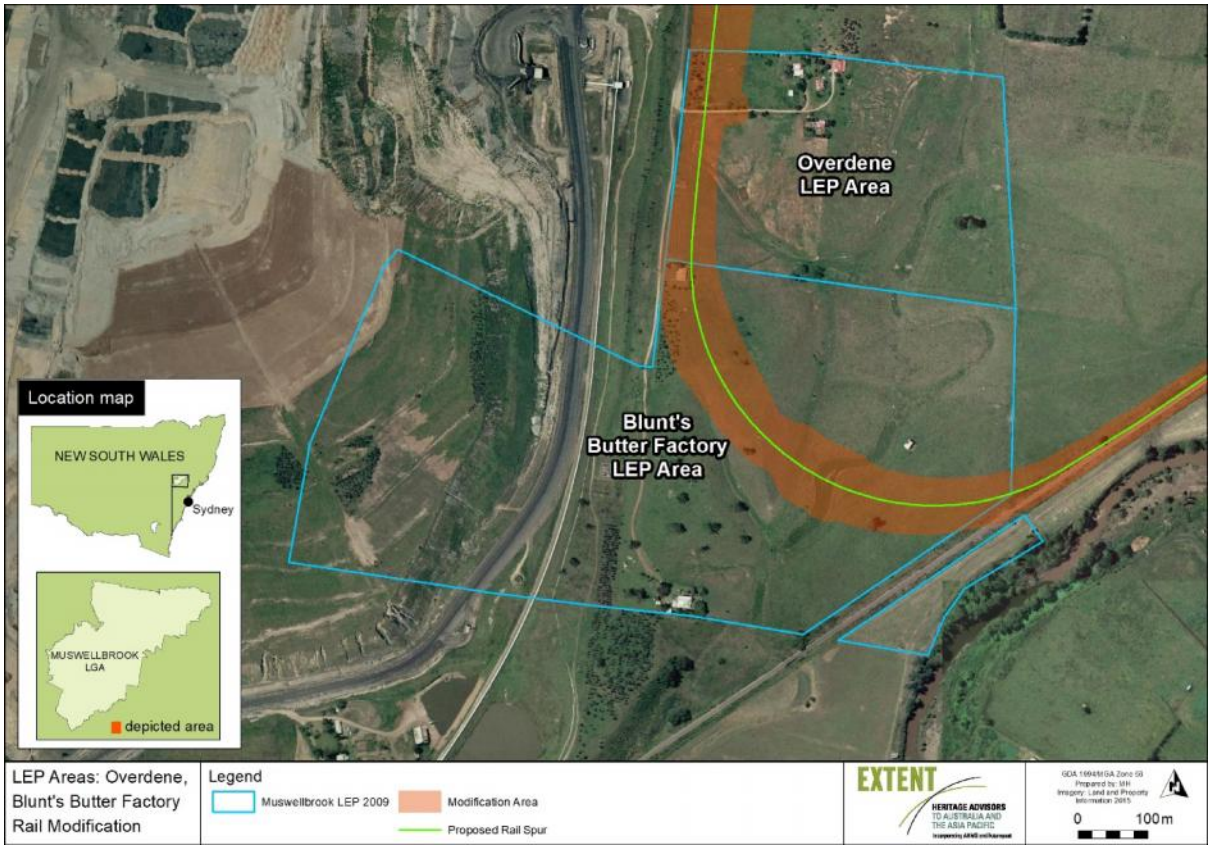

Figure 45 Muswellbrook LEP whole-of-property listing areas for Overdene and Blunt's Butter Factory, including Modification Area boundary and proposed location of proposed rail alignment.

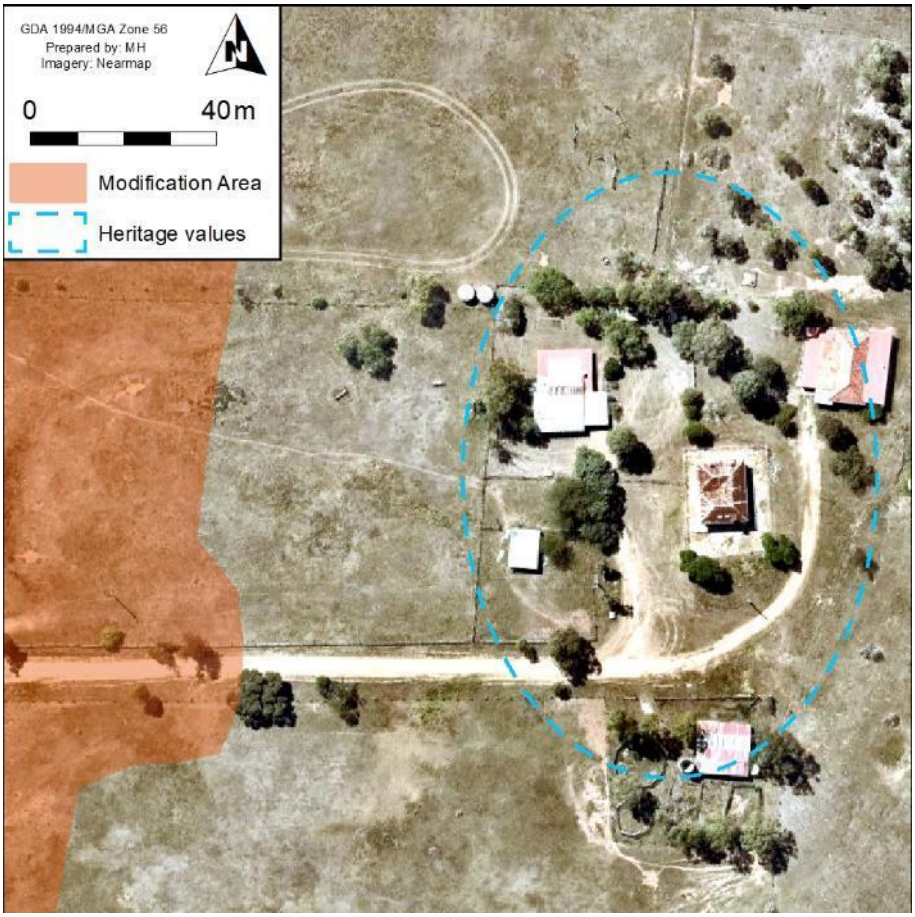

Figure 46 Aerial image showing the location of Overdene Homestead relative to the proposed rail alignment. The oval shape captures the homestead, extant cultural plantings, a collection of post-1959 buildings, and the area identified by AECOM as potentially containing historical archaeological relics. This area amply embodies the local heritage values for the homestead. The proposed rail infrastructure would be 135m west of the homestead itself, the most significant heritage feature of the property.

8.2 Overton Orchard and Race Track

The remains of the Overton Orchard and Race Track, were historically part of the Overdene Estate (see Figures 6 and 27-29). The orchard played a role in the agricultural history of the Muswellbrook area (criterion [a]). The Overton Orchard and Race Track form part of the broader estate, once a suite of functionally related structures and work areas, with strong associations with the pioneering agricultural work of Thomas Blunt (criterion [b]). Although in declining condition, the avenues of ornamental trees and the curve of the Overton Race Track, are attractive features of a rural farming complex, which capture a pleasant rural aesthetic (criterion [c]).

8.3 M404

The ruins present at M404 are difficult to interpret in their current form. The site appears to have been intentionally demolished at some point since abandonment. The site is not mentioned in any of the historic descriptions of the Overton Estate, or the Overton Colliery in the early 20th century, being an unremarkable rural building relating to some work activities of the property. It is not historically significant (criterion [a]) and has no obvious association with prominent individuals or communities (criteria [b] or [d]). It is aesthetically unremarkable (criterion [c]). It is not a rare type of structure in terms of form or function, nor is it a particularly good representative of this class of structure

(criteria [f] and [g]). The site is in poor condition, and has low potential for *in situ* archaeological deposits that might make a contribution to substantive research questions (criterion [e]). M404 is not a heritage place.

8.4 Blunt's Butter Factory

AECOM (2015) assessed the heritage significance of the place, concluding that Blunt's Butter Factory is of local significance on historical (criterion [a]) and technical/research grounds (criterion [e]). This report agrees with this assessment, concluding that Blunt's Butter Factory is of local significance. This SOHI has adapted the statements of significance below from AECOM (2015).

Blunt's Butter Factory is one of the earliest creameries in the Muswellbrook area, and the first butter factory. The factory serviced a wide area and utilised many modern and innovative methods for transporting and processing milk, and using the by-products in secondary industries fattening cattle and pigs. The site highlights the development of the agricultural industry in the Hunter Valley away from traditional practices of running sheep towards dairying, fattening cattle and dairy products. For these reasons the site satisfies the requirements of criterion (a). There is potential for relatively intact archaeological deposits to survive at the site that would satisfy the definition of a 'relic' under the NSW *Heritage Act 1977* (also criterion [e]). These might yield information that would contribute to an understanding of the operation of a butter factory at this time (criterion [e]). However, these potential 'relics' would be in discrete locations only. This is discussed in greater detail in Section 9.3.

Blunt's Butter Factory is listed on the Muswellbrook LEP as a place of local significance, and the curtilage area, as listed, is indicated in Figure 393. This is a whole-of-property listing that includes large areas of the property that contain no buildings (and likely never did) and have low archaeological potential. The area of the butter factory and support buildings, including areas of potential archaeology, is much smaller than the Muswellbrook LEP listed area. It is these areas that actually embody the local heritage values for which it is listed. The discrete area that embodies the local heritage values described above is illustrated in Figure 33. It will not be impacted by the Modification provided the recommendations contained in this report are followed.

8.5 Overton Colliery

The Overton Colliery operated for a short period of time and represents an early, although not uncommon, foray into small coal mines in the early settlement of the Muswellbrook region. Overton Colliery played a modest role in the historical development of coal mining (criterion [a]). It has low potential to contain 'relics' as defined by the NSW *Heritage Act 1977*. Isolated artefacts from the colliery might assist to address research questions regarding the operation of a small coal mine that operated for a short period in the 1920s (criterion [e]). However, any remaining evidence of the mine's former workings, and the potential archaeological resource, are likely to be of considerable depth underground such that the proposed works will not impact them.

8.6 Bengalla Homestead

The Muswellbrook LEP lists Bengalla Homestead as being locally significant for its importance to the historical development of Muswellbrook, its association with the Keys family, and for its potential archaeological resource. Bengalla Homestead (the building) is outside the Modification Area and would not be impacted by the proposed works.

The Muswellbrook LEP listing for the homestead also captures vacant land to its south, extending to the Hunter River. These areas would be more directly impacted by the Modification. Historically, they were used for irrigation farming of Lucerne, and later for dairying during the Keys tenure. These areas

have been significantly disturbed by later farming activities and by the construction of a railway line in 1915. The irrigation farming of Lucerne at the Overton Estate (further north) was pioneered by Thomas Blunt, and attracted considerable attention in agricultural circles at the time. Bengalla Estate adopted the same farming practices but at a later date. It lacks the historical significance of the earlier activities on the Overton Estate. These areas of land, although on the LEP whole-of-property listing, do not meet the threshold for local significance for historical reasons (criterion [a]). For a period, those lands were in the ownership of local community-members but they do not have the association with those people that the homestead does (criterion [b]). They do not meet the threshold for aesthetic significance (criterion [c]) and do not appear to be of social significance to the community (criterion [d]). They have low potential to contain historical archaeological relics that might yield information about the local area (criterion [e]). Being heavily disturbed farmland, they are neither rare nor good representative examples of a class of place in the region (criteria [f] and [g]).

In summary, the Bengalla Homestead is of local heritage significance. It will not be impacted by the Modification. The agricultural land to the homestead's south is included in the LEP's listing of the Bengalla Homestead but it does not embody the same heritage values as the homestead itself. It would be appropriate to reduce the heritage curtilage of the homestead for the purposes of the LEP listing to exclude large parts of the area to the homestead's south. It is these areas through which the proposed road and rail infrastructure would pass.

8.7 MP13

The VAHS report (2014:182) assessed the site of MP13 as being of moderate local significance for satisfying the following criteria:

- Criterion (a): The site shows evidence of significant human activity in the development of a mechanised dairy in the early 1900s.
- Criterion (b): The site may be associated with a significant person, i.e. Thomas Blunt who was instrumental in introducing mechanisation to the farming industry, developing dairying and butter production on a large scale.
- Criterion (e): Site has potential to yield further substantial archaeological information on an early mechanised dairy.
- Criterion (f): The site demonstrates a process that is in danger of being lost i.e. small family operated dairy.

The VAHS report concluded that:

> *The site represents an attempt to manage a dairy on non-irrigated land. It has evidence of mechanisation of the milking process and secondary use of skimmed milk. Due to these features, it is of importance to the history of the dairy industry and land use. There is very little evidence as to the accommodation type, size or material and this should be examined further.*

In fact, few above-ground remains survive at the site of MP13. Only the cracked and partial slabs of the house and dairy survive, together with a derelict timber tank stand shaded by trees. MP13 is better understood and assessed as an archaeological site. The extant structures (such as they are) and trees do not display evidence of significant human activity (criterion [a] according to the VAHS report). The site's historical significance is more appropriately assessed against criterion (e) i.e. for the potential of the archaeological resource to yield information that will contribute to an understanding of NSW's or the local area's history. In this regard, MP13 has limited ability to yield data that:

- Cannot be gained from other sources – the mechanisation of dairying is well-understood and documented by academic works over many years (Burley 1962).

- Cannot be gained from other sites/dairies, many of which include structures from the early 20th century that are still standing and in use.
- Would address substantive research questions about the well-understood mechanisation of dairies in the region.

These conclusions are reinforced by the high levels of disturbance evident at the site since it was abandoned, which will have disturbed the potential archaeological resource. Section 9.4 discusses the potential archaeological resource in detail, concluding that the site is unlikely to yield information that will contribute to the understanding of NSW's cultural or natural history at a state or local level and does not satisfy criterion (e).

Further, the association of the remains of the structures at the site with Thomas Blunt (criterion [b] according to the VAHS report) is tenuous. VAHS (2014:171) states that the property was sold by Blunt in 1912 to William F Robey. At that time, the sale lithograph for Overton Estate showed "…the well, no buildings" (VAHS, 2014:172), indicating that the dairy was likely not erected by Blunt or associated with his methods for dairying in the region. VAHS (2014:172) also states that the dairy "was most likely set up by the Humphries Bros".

MP13 is not a heritage place and has low potential to contain 'relics' as defined by the NSW *Heritage Act 1977* (for more on the potential archaeological resource see Section 9 below).

9 THE POTENTIAL ARCHAEOLOGICAL RESOURCE

9.1 Overdene Homestead

AECOM and Hansen Bailey (2015:28) reported that no evidence of former structures was noted to the rear of the house where the kitchen may have been located. Remnant flashing and chasing on the rear wall indicate where some parts of the former structures were attached. While various outbuildings as well as fences, etc. must have existed around the house, no documentary evidence has been sighted that would indicate their location. AECOM and Hansen Bailey did note, however, that there is a high potential for *in situ* sub-surface archaeological evidence to exist in the area indicated in Figure 47a and 47b. This report agrees with that assessment. This area would not be impacted by the Modification.

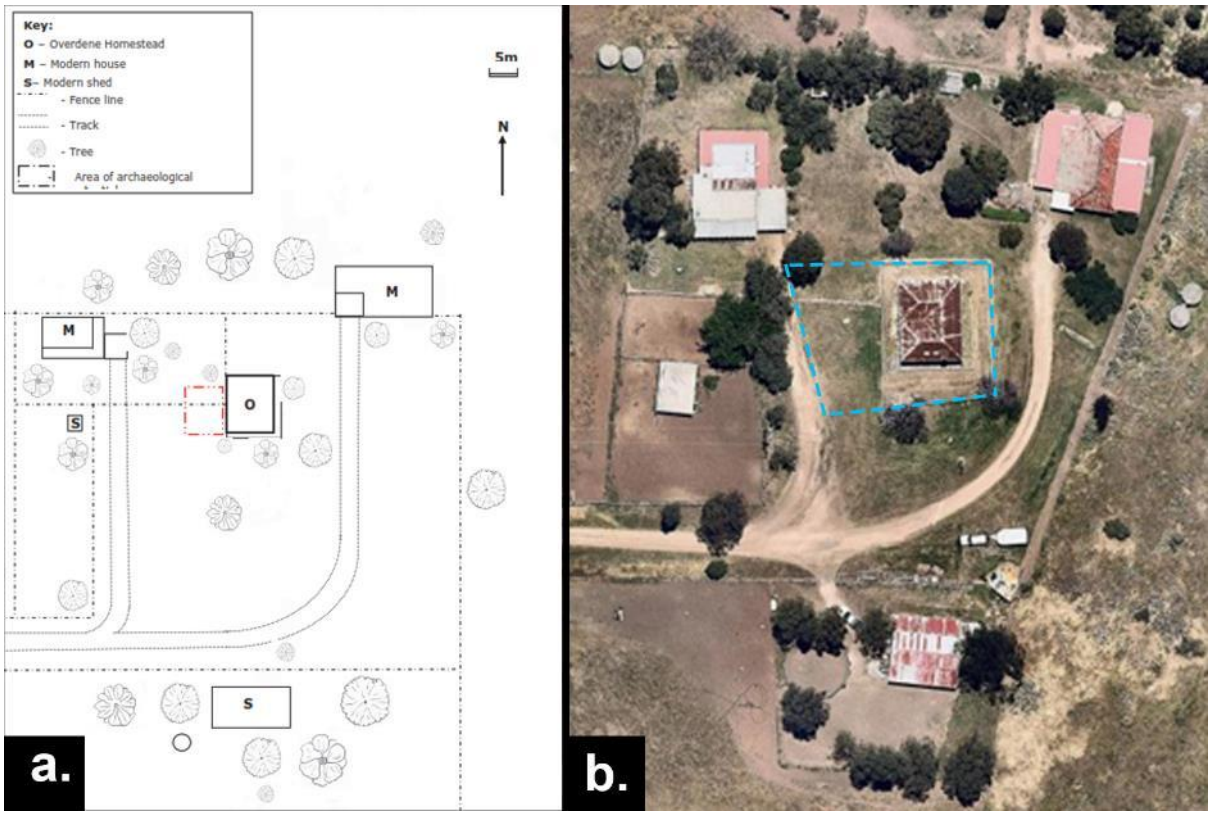

Figure 47a Areas of high archaeological potential from AECOM and Hansen Bailey (2015) and Figure 47b the same curtilage area overlain on a recent aerial image for additional clarification. Note that the proposed alignment is 100 m west of the westernmost boundary of the curtilage area, passing through the heavily disturbed paddock to the west, closest to Overton Road.

9.2 Overton Orchard and Race Track

As noted in Figure 6 and Figures 8–26 and Section 7.1.3, discrete locations within the orchard area contain stone kerbing, concrete slabs and other evidence of former structures. These locations were identified during the 2017 fieldwork underpinning this SOHI. They would not be impacted by the Modification provided the recommendations contained in this report are followed.

The proposed rail infrastructure would pass to the immediate west of these locations. The area that it would pass through was also surveyed by an archaeologist in 2017 and no surface indicators of archaeological 'relics', as defined by the NSW *Heritage Act 1977*, were observed. There is low potential for sub-surface remains to survive in this area. If any unanticipated sub-surface features were encountered during the construction activities, these would likely comprise isolated and disturbed garden/orchard features with limited potential to address substantive research questions about the operation of the orchard. In the part of the orchard through which the rail infrastructure would pass, there is low potential for archaeological 'relics' to survive.

This SOHI has assessed the Overton Race Track itself as a structure (or 'work') rather than as an archaeological site (or 'relic').

9.3 Blunt's Butter Factory

The site inspection carried out in September 2017 identified an area around the former butter factory that has the potential to contain archaeological materials, some of which may constitute 'relics' as defined by the NSW *Heritage Act 1977* (see area indicated by the orange boundary in Figure 33). This area would not be impacted by the Modification provided the recommendations contained in this SOHI are followed. There is low potential for 'relics' relating to the Blunt Butter factory to survive outside of the boundary marked in orange in Figure 33.

9.4 MP13

VAHS (2014) assessed the potential archaeological resource at MP13 and concluded (page 182) that 'test excavation' should be undertaken there because:

> *The site represents an attempt to manage a dairy on non-irrigated land. It has evidence of mechanisation of the milking process and secondary use of skimmed milk. Due to these features, it is of importance to the history of the dairy industry and land use. There is very little evidence as to the accommodation type, size or material and this should be examined further.*

This SOHI re-assesses MP13 as having low potential to contain 'relics' as defined by the NSW *Heritage Act 1977*. The structures that once existed at MP13 date to 1915 and later. All the buildings on the site, aside from the extant tank stand, appear to have been intentionally demolished in the mid-to-late 20th century. In broad terms, it is possible that the following kinds of artefacts exist at MP13:

- Evidence of dwelling footprints (but most of these are presently visible anyway, as damaged concrete slabs).
- Evidence of dairying equipment (but the useful equipment has clearly been stripped from the buildings for reuse elsewhere, prior to the demolition of the buildings).
- Footpaths and garden beds (kerbing etc).
- Cesspits and drains.
- Garbage pits and dumps.
- Isolated artefacts.

However, such artefacts, if they exist, will have limited ability to yield information that will contribute to an understanding of the local area's history. As noted above, the Heritage Division's guideline document entitled '*Assessing Significance for Historical Archaeological Sites and 'Relics'* (NSW Office of Environment and Heritage, 2009) provides three questions to assist practitioners to assess the scientific significance of archaeological sites:

- Can the site contribute knowledge that no other resource can?
- Can the site contribute knowledge that no other site can?
- Is this knowledge relevant to general questions about human history or other substantive questions relating to Australian history, or does it contribute to other major research questions?

In fact, the potential archaeological resource at MP13, such as it is, has limited ability to yield data that:

- Cannot be gained from other sources – for example, the mechanisation of dairying is well-understood and documented by academic works over many years (Burley, 1962).
- Cannot be gained from other sites/dairies, many of which include structures from the early 20th century that are still standing and in use.
- Would address substantive research questions about the well-understood mechanisation of dairies in the region.

These conclusions are reinforced by the high levels of disturbance evident at the site since it was abandoned, which will have disturbed the potential archaeological resource.

This conclusion is reflected in the management recommendations provided in Section 11.2.

Figure 44 above captures a timber-lined well at MP13. This well constitutes a 'work' rather than a 'relic' under the NSW *Heritage Act 1977*. There is some potential for objects to have fallen into the well over the course of the 20th century and these might constitute 'relics'. This is reflected in the management recommendations provided in Section 11.

10 ASESSMENT OF HERITAGE IMPACTS

10.1 Overdene Homestead

Overdene Homestead is listed in the Muswellbrook LEP as a place of local significance.

The proposed rail alignment would be located 135 m west of Overdene Homestead. The homestead, and its potential archaeological resource, would not be physically impacted by the Modification (Figure 47a and 47b).

A dilapidation inspection report prepared by Parsons Brinkerhoff (2015) noted that the structure has a number of structural defects. Vibration from passing trains has the potential to exacerbate existing structural defects. However, we understand that the potential for further damage to the structure of Overdene Homestead resulting from vibration is unlikely (Wilkinson Murray, 2017). Providing the recommendations in Section 11.2 are followed, this would therefore not constitute an adverse heritage impact.

Overdene Homestead has not been used or occupied for many years. There are no adverse impacts in relation to the use of the homestead. The homestead is located in a compromised setting with the views to the west already altered by the Bengalla Mining Company waste emplacement. The dominant views out of the property to the east will not be impacted.

10.2 Overton Orchard and Race Track

The Overton Orchard and Race Track form part of the former Overdene Estate but do not form part of the listing of the homestead on the Muswellbrook LEP (2009). This reflects the fact that the former estate has been much sub-divided and altered through the 20th century, with most of the former buildings there demolished. The Overton Orchard and Race Track have not been functional for many years, further reducing the relationship between them and the house. Nevertheless, at one time they were functionally and physically associated with the homestead and they assist people to 'read' the former relationship between the early homestead and its agricultural and recreational areas. They make a contribution to the homestead's local heritage significance in this respect.

The Modification would physically impact approximately the western 40% of these areas. The western half of the avenue of trees leading down the driveway from the west, garden beds at the entry gate, and other cultural plantings and previous areas of cultivation would be removed. About a 40% of the Overton Race Track would be removed, on its western side. This would be an adverse heritage impact, especially in terms of the former estate's readability. However, the impact would be partly mitigated by the retention of the remainder of the Overton Orchard and Race Track and retention of the homestead itself, within a generous curtilage. If the Modification proceeds, it would still be possible to gain an appreciation of the former layout of the estate and the ways in which it operated.

Discrete areas containing garden beds and the remains of work areas were identified within parts of the Overton Orchard area in 2017 (Figure 6). These would not be impacted by the Modification. The parts of the orchard and race track that would be impacted have low potential to contain archaeological 'relics'.

In relation to the identified impacts on the Overton Orchard and Race Track see Table 2 below.

Table 2 Responses to 'Statements of Heritage Impact' Questions for the Overton Orchard and Race Track (from: *Statements of Heritage Impact* [Heritage Office and DUAP, 2002]).

Question	Reply
How is the impact of the new development on the heritage significance of the item or area to be minimised?	The movement of heavy vehicles and machinery over the retained parts of the Overton Race Track and orchard will be minimised. Extant cultural plantings within retained areas will be retained *in situ*, although do not require ongoing maintenance. The Overton Orchard and Race Track will be recorded prior to works proceeding, and a copy of the record deposited with the Muswellbrook Shire Council Library. Identified areas east of the Modification (but still within the former Orchard area) that have the potential to contain relics will not be disturbed.
Why is the new development required to be adjacent to the heritage item?	Engineering requirements, including integration with pre-existing infrastructure.
How does the curtilage allowed around the heritage item contribute to the retention of its heritage significance?	The heritage values for the former estate are principally embodied by the Overdene Homestead. This will be retained *in situ* within a generous curtilage. The relationship between the house and work/recreational areas will be still be readable.
How does the new development affect views to, and from, the heritage item? What has been done to minimise negative effects?	Views to and from Overdene Homestead will not be adversely impacted. Views to and from the western parts of the Overton Orchard and Race Track will be impacted but views to and from the retained parts on the east will not be significantly impacted. Views to the east over the Hunter and out to Muswellbrook will be maintained.
Is the development sited on any known or potentially significant archaeological deposits?	There is low potential for 'relics' in the impacted area. Identified areas east of the Modification (but still within the former orchard area) that have the potential to contain relics will not be disturbed.
Is the new development sympathetic to the heritage item? In what way (e.g. form, siting, proportions, design)?	The new development would retain approximately 60% of the Overton Race Track and Orchard area *in situ*.
Will the additions visually dominate the heritage item? How has this been minimised?	The proposed rail spur and loop will be a low new feature in the landscape. It will be visible but not dominant.
Will the public, and users of the item, still be able to view and appreciate its significance?	The public is not currently able to access the Homestead or Orchard and Race Track, which are adjacent to operational mine sites. The new work would result in no new impacts in this regard.

10.3 Blunt's Butter Factory

This SOHI has identified the location of the former butter factory, including ruined structures and potential archaeological remains (Figure 33). These features would not be impacted by the Modification provided the recommendations in Section 11.2 are followed.

10.4 Overton Colliery

The proposed rail infrastructure would be located adjacent to the former Overton Colliery. Were the project approved, the rail batters may encroach slightly into the general area of the former colliery. Also, construction of the rail infrastructure may necessitate the movement of heavy plant and equipment over the site area depicted in Figure 39. These activities would not result in any adverse heritage impacts.

10.5 Bengalla Homestead and Former Estate

Bengalla Homestead is of local heritage significance. It would be located 330 m from the proposed road alignment and 750 m from the proposed rail spur and loop. The homestead complex at Bengalla would not be physically impacted by the proposed development. In non-physical terms, the homestead is already located adjacent to operational mining facilities and within a compromised setting. The proposed road and rail infrastructure would not result in any additional impacts to the homestead's setting.

The Muswellbrook LEP listing of the Bengalla Homestead also captures vacant land to the south of the homestead, extending to the Hunter River. This land once formed part of the Bengalla Estate. The proposed infrastructure would pass through some of this vacant land, but these former farm areas do not embody the same heritage values as the homestead itself. The construction of the proposed infrastructure in these areas would not constitute an adverse heritage impact. These areas were inspected in September 2017 and were found to contain no built heritage places and low potential for archaeological 'relics'.

10.6 MP13

MP13 has low potential to contain archaeological 'relics' and removal as part of the Modification would not constitute an adverse heritage impact.

10.7 M404, Cuttings, Two Sheds and a Possible Pump House

M404 would be removed by the construction of the rail spur and loop. This structure is not a heritage item. Two sheds, cuttings and a possible pump house were identified during the 2017 field survey (Figure 1). These would not be impacted by the Modification.

11 CONCLUSION AND RECOMMENDATIONS

11.1 Conclusions

Provided the recommendations presented in Section 11.2 are followed, the Modification would have no impact on:

- Overdene Homestead.
- The garden/orchard features within the former Overton Orchard, identified in 2017 (blue areas in Figure 6).
- Blunts Butter Factory.
- Bengalla Homestead and the broader estate.
- Miscellaneous sheds, cuttings and the pump house visible in the wider landscape.

There would be an adverse impact on the Overton Orchard and the Race Track in that they would experience partial demolition. These places once formed part of the Overdene Estate and they contribute to the local heritage significance of the Overdene Homestead. The impact would be partly mitigated by the retention of the remainder of the Overton Orchard and Race Track, and retention of the homestead itself, within a generous curtilage. If the Modification proceeds, it would still be possible to gain an appreciation of the former layout of the estate and the ways in which it operated.

The former Overton Colliery would not be impacted by the proposed works.

MP13 would be removed. However, this is not a heritage place. It has low potential to contain 'relics' as defined by the NSW *Heritage Act 1977*. Should any archaeological remains be encountered (e.g. the base of the extant timber-lined well) these could be removed subject to the procedures recommended in Section 11.2 below.

M404 would be removed but this is not a heritage place.

11.2 Recommendations

In relation to Overdene Homestead it is recommended that:

- Maintenance of the building should continue to be undertaken by the owner (consistent with the CMP [AECOM, 2015]).

In relation to the Overton orchard and race track it is recommended that:

- The movement of heavy vehicles and machinery over the parts of the Overton Orchard and Race Track that will be retained, should be kept to a minimum. Those areas illustrated in blue in Figure 6 should be marked off during construction of the proposed infrastructure to prevent any movement of vehicles and machinery across them.
- In those parts of the Overton Orchard and Race Track that will be retained, the extant cultural plantings should be retained *in situ*, although do not require ongoing maintenance.
- Prior to the works proceeding, a photographic record should be made of the Overton Orchard and Race Track. This need not be to the level achieved by photographic archival recording prepared in accordance with the guideline document entitled *How to Prepare Archival Records of Heritage Items* (NSW Heritage Office, 1998), but it should comprise a bound report containing colour images with supporting text. A copy of this report should be deposited with the Muswellbrook Shire Council Library.

In relation to Blunt's Butter Factory it is recommended that:

- The movement of heavy vehicles and machinery be prevented within the area bounded in orange in Figure 33. If construction requirements make this impossible, relevant contractors must work with an archaeologist to identify appropriate points of access and routes through the area of archaeological sensitivity.

In relation to MP13 it is recommended that:

- The Modification could proceed without the need for an excavation permit pursuant to section 140 of the NSW *Heritage Act 1977* or the presence of an archaeologist (with the following exception).
- If artefacts are exposed at the base of the well, works are to cease while an archaeologist is engaged to advise on whether or not they constitute 'relics' under the NSW *Heritage Act 1977* and whether or not works might proceed pursuant to an application for an 'exception' or excavation permit.

In relation to M404, it would be appropriate for its demolition to proceed without further involvement of a heritage practitioner. No conservation measures are required. It is not a heritage place.

In relation to the visible sheds within the Modification area (see Figure 1) it would be appropriate for the works to proceed without any particular management measures being put in place. They are not heritage places.

In relation to the cuttings (illustrated in Figure 1), steps should be put in place to prevent the movement of heavy machinery and vehicles across them.

In relation to the possible pump house (illustrated in Figure 1), steps should be put in place to prevent the movement of heavy machinery and vehicles across it.

In relation to Bengalla Homestead and the broader Bengalla Estate, there are no adverse heritage impacts and no recommendations for heritage management.

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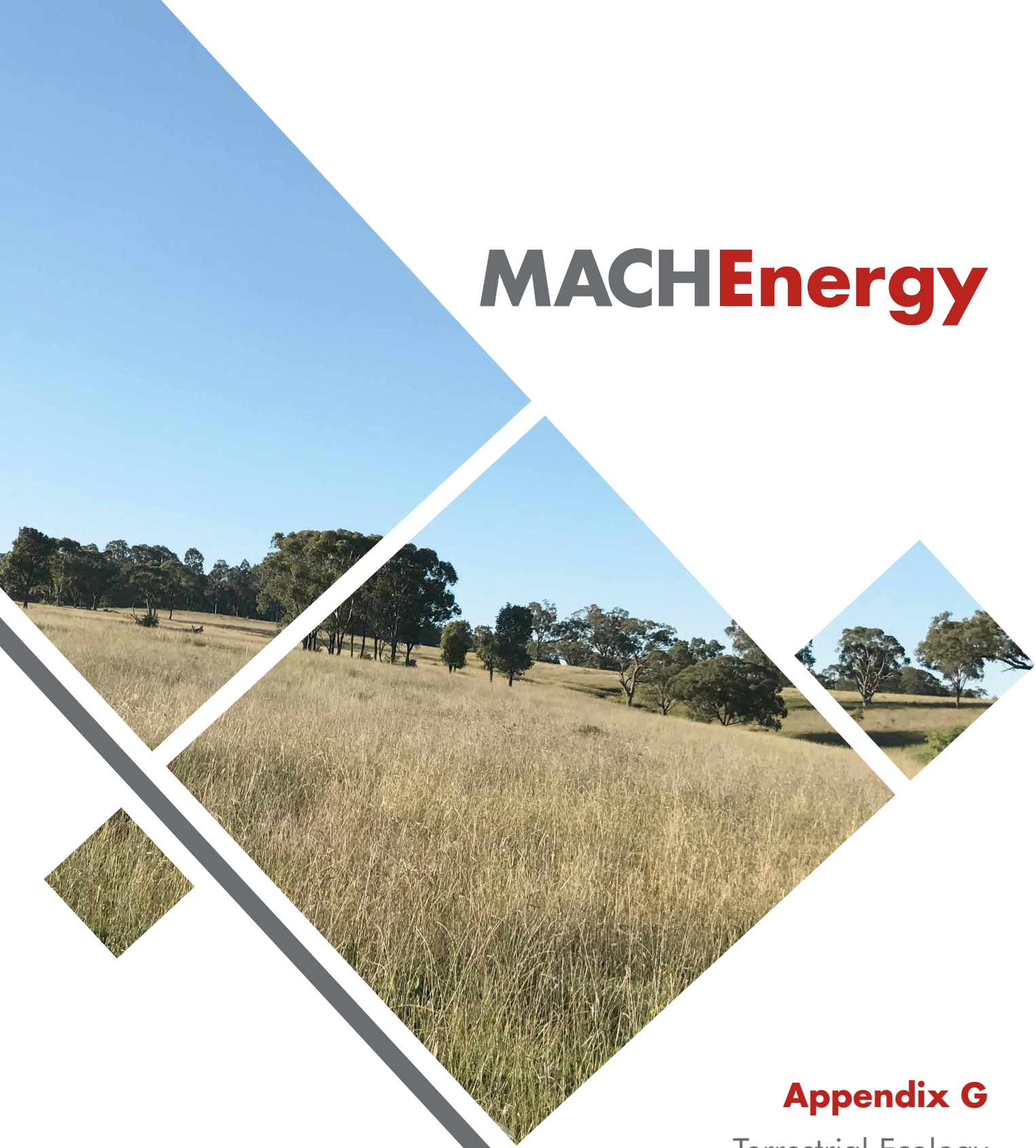
MACHEnergy



Appendix G

Terrestrial Ecology Assessment

MOUNT PLEASANT OPERATION RAIL MODIFICATION

TERRESTRIAL ECOLOGY ASSESSMENT



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CONTENTS

1 INTRODUCTION 1

1.1 Overview of the Mount Pleasant Operation 1

1.2 Overview of the Modification 1

2 DESCRIPTION OF MODIFICATION AREA AND RELINQUISHMENT AREA 3

2.1 Modification Area 3

2.2 Relinquishment Area 3

3 REGIONAL VEGETATION MAPPING 6

4 METHODS 7

4.1 Plant Community Types 7

4.2 Flora 7

4.3 Fauna 8

5 RESULTS 10

5.1 Modification Disturbance Area 10
5.1.1 Habitat Types 10
5.1.2 Flora Species 14
5.1.3 Fauna Species 14

5.2 Relinquishment Area 14
5.2.1 Habitat Type 14
5.2.2 Flora Species 15
5.2.3 Fauna Species 15

6 IMPACT ASSESSMENT 16

6.1 Habitat for Threatened Species 16

6.2 Threatened Species 17
6.2.1 Birds 17
6.2.2 Bats 19
6.2.3 Marsupials 21

7 SUMMARY 23

8 REFERENCES 24

FIGURES

FIGURE 1 MODIFICATION GENERAL ARRANGEMENT 2

FIGURE 2 THE MODIFICATION DISTURBANCE AREAS OVERLAID ON 1953 AERIAL PHOTO 4

FIGURE 3 VEGETATION COMMUNITIES MAPPED ACROSS THE SOUTH WESTERN OUT OF PIT EMPLACEMENT AREA, PADDOCK TREES AND FLORISTIC PLOTS 5

FIGURE 4 REGIONAL VEGETATION MAPPING ACROSS THE MODIFICATION DISTURBANCE AREA 9

FIGURE 5 VARIOUS HABITAT AREAS MAPPED ACROSS THE MODIFICATION DISTURBANCE AREA 11

FIGURE 6 THE VEGETATION OF THE PUMP STATION AREA 13

1 INTRODUCTION

1.1 Overview of the Mount Pleasant Operation

MACH Energy Australia Pty Ltd (MACH Energy) acquired the Mount Pleasant Operation (MPO) from Coal and Allied Operations Pty Ltd (Coal & Allied) on 4 August 2016. MACH Energy commenced construction activities at the MPO in November 2016, in accordance with Development Consent DA 92/97 and the *Environmental Protection and Biodiversity Conservation Act, 1999* (EPBC Act) (EPBC 2011/5795).

The approved MPO includes the construction and operation of an open cut coal mine and associated rail spur and product coal loading infrastructure. The mine is approved to produce up to 10.5 million tonnes per annum of run-of-mine coal. Up to approximately nine trains per day of thermal coal product from the MPO will be transported by rail to the port of Newcastle for export or to domestic customers for use in electricity generation.

1.2 Overview of the Modification

MACH Energy is seeking a modification (the Modification) to the approved MPO under section 75W of the New South Wales (NSW) *Environmental Planning and Assessment Act, 1979.* The MPO Development Consent DA 92/97 was granted on 22 December 1999. The MPO was also approved under the EPBC Act in 2012 (EPBC 2011/5795).

The ultimate extent of the approved Bengalla Mine open cut intersects the approved MPO rail spur. While the intersection of the Bengalla Mine open cut with the approved MPO rail infrastructure is still some years away, MACH Energy is proposing a 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 and associated conveyor and rail loading systems;
- duplication of the Hunter River water supply pump station and associated water pipeline 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 MPO.

Components of the Modification traverse existing approved disturbance areas (i.e. within the approved extent of the MPO[1]). These areas are excluded from the additional disturbance areas assessed as part of this assessment. The components of the Modification being considered in this assessment are presented in Figures 1 and 2.

As part of the Modification, MACH Energy is relinquishing its approval in relation to a portion of the South West Out of Pit Emplacement footprint (Figure 3) to restrict the area used for major infrastructure. This area is considered in further detail in Section 2.

[1] As permitted by Development Consent DA 92/97, including areas nominally depicted in Appendix 1 of DA 92/97 and/or the approved Mining Operations Plan.

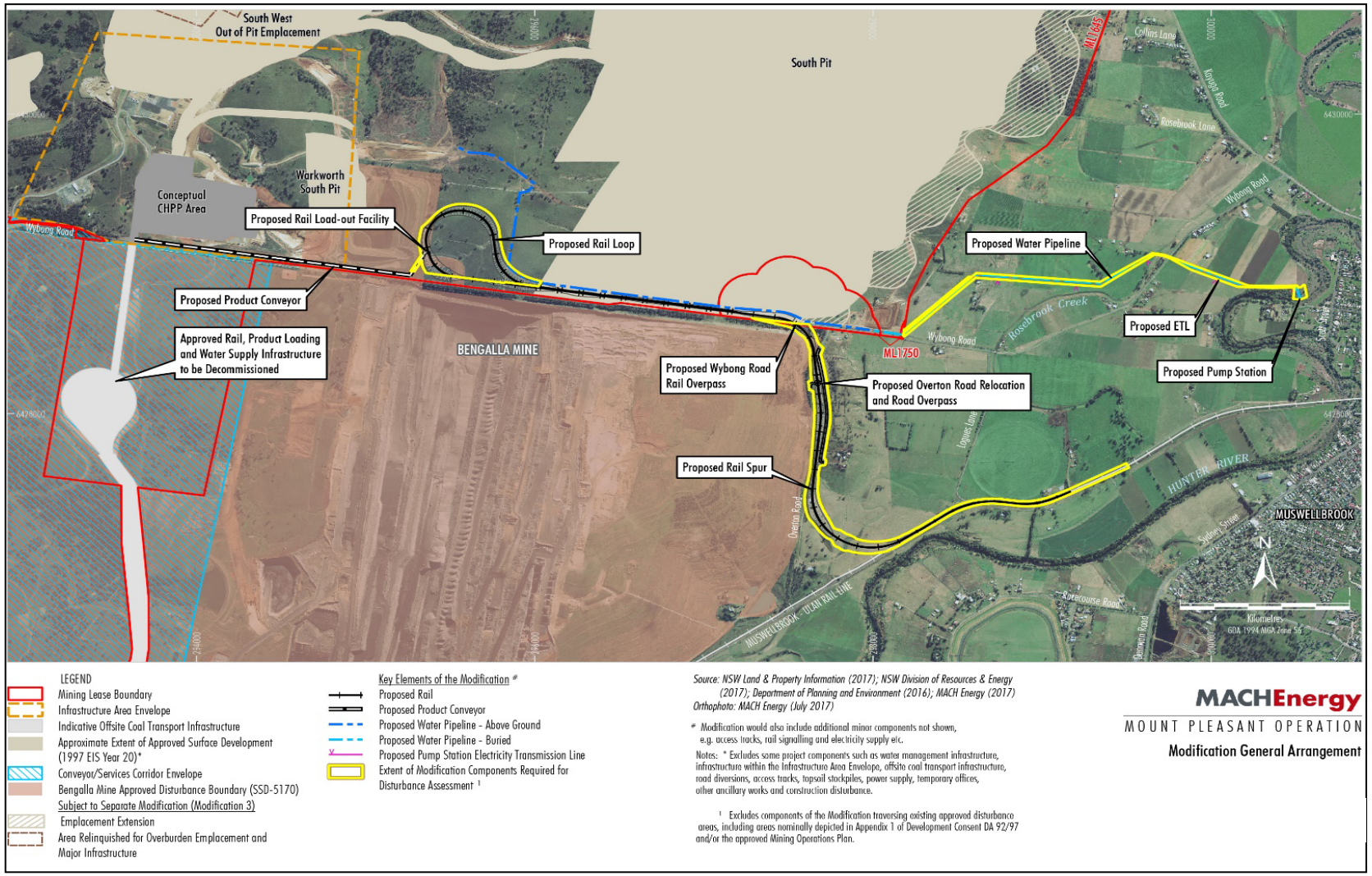

Figure 1 Modification General Arrangement

2 DESCRIPTION OF MODIFICATION AREA AND RELINQUISHMENT AREA

2.1 Modification Area

One of the key components of the Modification consists of a rail loop that is located on derived native grassland with scattered trees. The rail line continues east from the loop along Wybong Road for approximately 2 kilometres (km) through a portion of the already approved MPO and/or the adjacent public road infrastructure. At Overton Road the rail line turns south through a corner of the Bengalla Mine rehabilitated waste emplacement onto agricultural land for a further 3 km until it connects to the existing Muswellbrook-Ulan Rail Line.

The rail loop is located on elevated land (approximately 220 m Australian Height Datum [AHD]) with the rail spur running across gradually sloping land to an elevation of approximately 150 m AHD, at which point it drops onto the Hunter Floodplain for the last 1.5 km.

The water pipeline taking water from the Hunter River will be buried underground for approximately 2.5 km beneath agricultural land on the Hunter Floodplain, where the vegetation is a mix of grazing pasture and cultivated crops. It then continues west on the surface crossing lands associated with the approved MPO. An overhead powerline supplying the pumps at the Hunter River will be located beside the pipeline.

The Modification lies within:

- Muswellbrook Local Government area;
- Hunter Local Land Services area;
- Sydney Basin Bioregion, Hunter sub-region;
- Central Western Slopes Botanical Division; and
- Central Hunter Foothills and Upper Hunter Channels and Floodplain Mitchell landscapes.

Clearing of Hunter Valley vegetation commenced in the early 1800's. The earliest available aerial photographs from 1953 (Figure 2) show that the Modification area and surrounds was almost totally cleared and is in much the same condition (with regard to remnant vegetation) as it is in 2017. It can be concluded that all of the land associated with the Modification has been subject to previous clearance activities, and used for agricultural purposes in excess of 60 years, and most likely much longer.

2.2 Relinquishment Area

The eastern portion of the South West Out of Pit Emplacement consists of a mosaic of derived native grassland with patches of woodland and scattered paddock trees, with the main species being White Box (*Eucalyptus albens*), and Narrow-leaved Ironbark (*Eucalyptus crebra*) along with Spotted Gum (*Corymbia maculata*). In this region White Box are often referred to as White Box-Coastal Grey Box (*Eucalyptus moluccana*) hybrids (Grey Box x White Box).

The South West Out of Pit Emplacement is presented in Figure 3.



Figure 2 The Modification Disturbance Areas overlaid on 1953 aerial photo

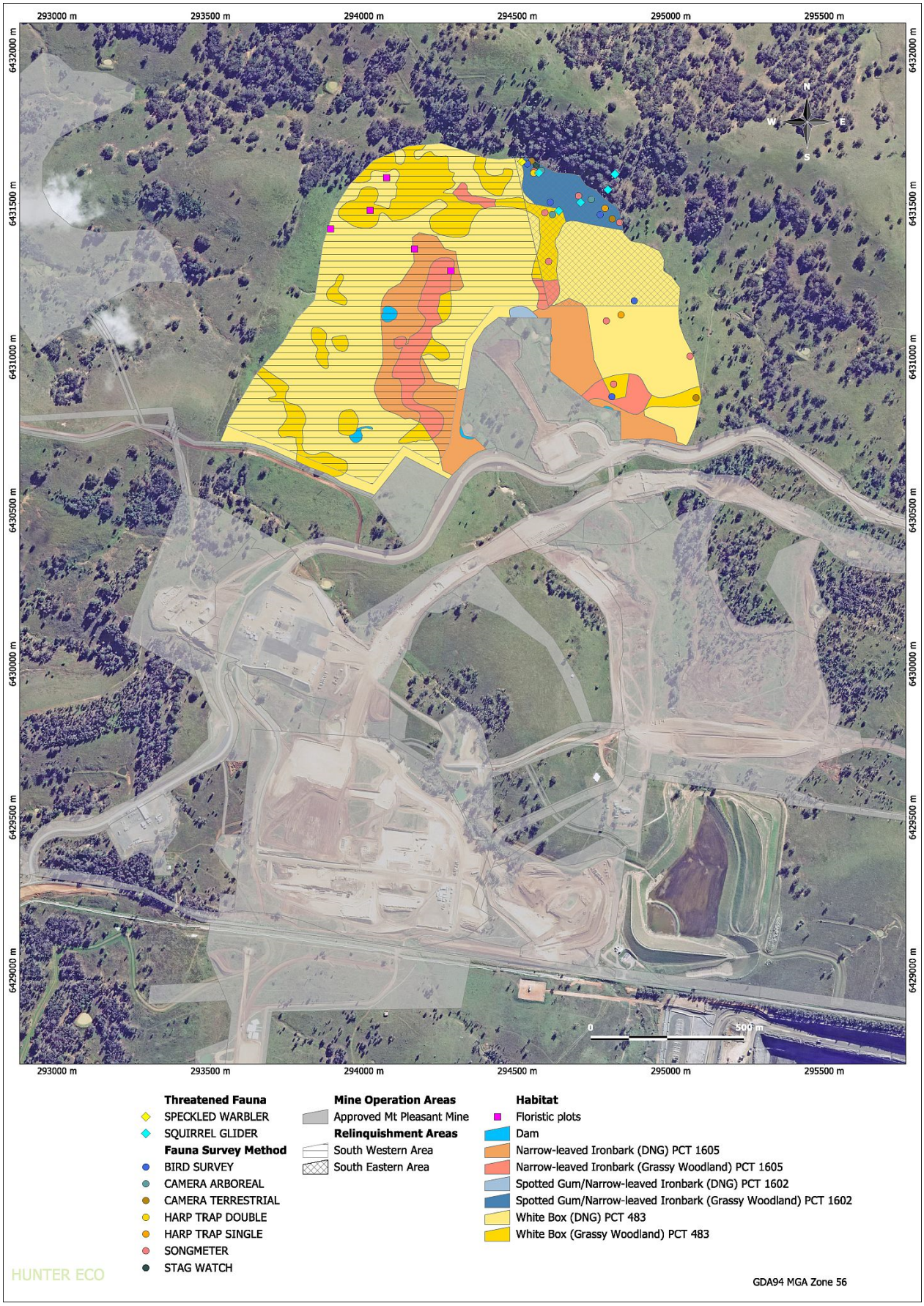

Figure 3 Vegetation Communities Mapped Across the South Western Out of Pit Relinquishment Areas, Fauna Survey Sites, Fauna Recorded and Floristic Plots

3 REGIONAL VEGETATION MAPPING

There are two regional vegetation mapping projects that include the Modification area: the Hunter Remnant Vegetation Project (Peake, 2006) and the Hunter Native Vegetation Mapping (Sivertsen et al., 2011). Peake (2006) does not show any mapped remnant native vegetation in or near the Modification area. Sivertsen et al. (2011) maps the Modification area as non-native vegetation, other than for the riparian habitat located along the Hunter River (Figure 4).

Based on these local and regional studies, vegetation in the vicinity of the Modification is a highly disturbed combination of exotic pastures, derived grassland, plantings, scattered mature trees and predominantly exotic riparian vegetation along the Hunter River.

4 METHODS

As a guide for targeted surveying; threatened species, communities and populations known or predicted to occur within the Hunter Central Rivers Catchment Management Authority – Hunter sub-catchment were extracted from the NSW BioNET database. Further data was obtained from the Commonwealth Protected Matters Search Tool from within a 10 km radius of the MPO area. The initial data extracts were filtered to remove any marine or aquatic habitat species and communities (addressed in the separate Aquatic Ecology Assessment), as well as any for where the immediate MPO region lies well outside of their geographic range.

All potentially occurring threatened species, populations and communities were assessed for their likelihood of occurring in or near the Modification disturbance area.

4.1 Plant Community Types

In principle, Plant Community Types (PCT) are determined by comparing floristic content as compiled from sample plots and transects strategically placed across the disturbance area with PCT descriptions in BioNET.

Floristic plots consisted of a 20 metre (m) x 20 m plot nested in a 50 m x 20 m plot. Although not the assessment pathway relevant to this assessment, data was collected according to the requirements of the NSW Biodiversity Assessment Methodology (BAM). All flora species present in the 20 m x 20 m plot were identified and their percentage foliage cover was scored. The number of individuals present was also estimated for species with a cover score of 5% or less. Diameter at Breast Height (DBH) was recorded for any trees within the 50 m x 20 m plot and tallied against the following intervals: <5, 5–9, 10–19, 20–29, 30–49, 50–79, and 80+ centimetres (cm). Percentage litter cover was determined in five one metre square plots evenly located across the 50m x 20m plot.

4.2 Flora

All flora species were recorded in the floristic sample plots along with their exotic or native status and the growth form of all native species. Threatened status was also assessed. A list of the flora species recorded within the Modification disturbance area is provided in Appendix 1.

Flora surveys and vegetation mapping within the eastern portion of the South West Out of Pit Emplacement was undertaken recently for a separate modification application to the MPO, and will be relied on for the purposes of this assessment (Hunter Eco, 2016). A list of the flora species recorded within the South West Out of Pit Emplacement is provided in Appendix 2.

The threatened flora, populations and ecological communities and their likelihood of occurrence within the Modification disturbance area is provided in Appendix 3. Specifically, it was assessed that the habitat was unsuitable for ground orchids because of the long-term grazing history, no connectivity with any known populations, and the large areas of pasture and cropping land. Eco Logical conducted a targeted orchid search on 4 and 5 October 2016 through the mixed woodland and grassland to the north, including the land in and around that relinquished for Modification 3 with no orchids recorded (ELA 2017a).

4.3 Fauna

A fauna survey was conducted by Eco Logical Australia (ELA) and their report can be found in Appendix 4.

Additional fauna surveys within the eastern portion of the South West Out of Pit Emplacement area were undertaken by ELA. A copy of the results is provided in Appendix 5.

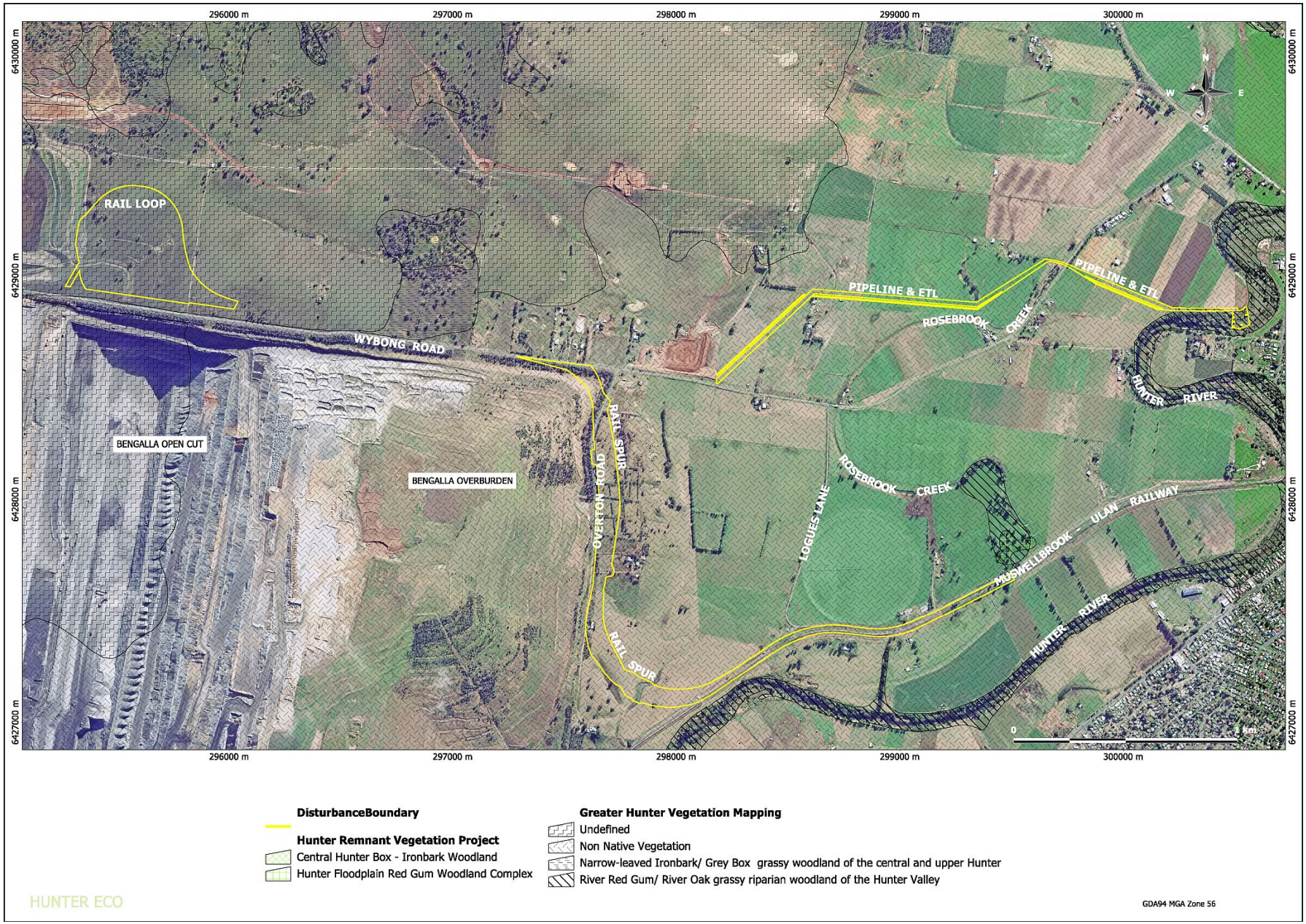

Figure 4 Regional vegetation mapping across the Modification Disturbance Area

5 RESULTS

With the landscape being highly modified there were no areas of vegetation that could be clearly classified as discrete vegetation communities. Consequently, habitat types are described with notes about inferred communities where applicable.

5.1 Modification Disturbance Area

5.1.1 Habitat Types

Within and around the Modification disturbance area four habitat types were assessed. These are mapped in Figure 5 and described in the following sections. Figure 5 also shows the location of the 13 floristic sample plots collected for this assessment.

Native Grassland (21.97 ha)
Located entirely within the rail loop this area contained mixed cover of native tussock gasses and weeds. From four floristic plots there were 19 weed species and 17 native species. Native species were dominated by the grasses *Aristida ramosa* and *Bothriochloa decipiens* with weed species dominated by *Galenia pubescens, Carthamus lanatus, Hyparrhenia hirta* and *Hedypnois rhagadioloides*. There were four High Threat Weed species including *Galenia pubescens, Carthamus lanatus, Hyparrhenia hirta* and *Opuntia stricta.*

Scattered within the rail loop area were nine large (DBH 50-80 or 80+ cm) Narrow-leaved Ironbark (*Eucalyptus crebra*) trees and the presence of these trees indicated that a likely appropriate PCT was PCT1605 *Narrow-leaved Ironbark - Native Olive shrubby open forest of the central and upper Hunter*. Pepper Trees and Kurrajong (*Brachychiton populnea*) were also located within the rail loop area. Six trees were observed to contain hollows, providing potential habitat for threatened fauna species (in particular bats and birds). These trees collectively provide ~0.1 ha of threatened fauna habitat.

Planted Trees (2.90 ha)
This was a part of the habitat in the rail spur corridor area. This habitat consisted of a portion of rehabilitation associated with the Bengalla Mine at the corner of Wybong and Overton Roads, along with windbreaks in the paddocks east of Overton Road. The Bengalla rehabilitation was dominated by Sugar Gum (*Eucalyptus cladocalyx*), a South Australian species planted widely in the Hunter Valley along with Mugga Ironbark (*Eucalyptus sideroxylon*), Slender-leaved Mallee (*Eucalyptus leptophylla*), *Acacia salicina* and *Casuarina glauca*. The windbreaks were dominated by Pepper Tree (*Schinus molle*), Sugar Gum (*Eucalyptus cladocalyx*) and Silky Oak (*Grevillea robusta*). These were single lines of trees in a rectangular mosaic. There were also several Sugar Gum paddock trees in the area.

There was no remnant native vegetation in or near the Modification disturbance area that would assist with determining which PCT may have been present prior to clearing.

Although mostly non-endemic, this habitat is considered to provide potential habitat for some threatened bird and bat species, albeit marginal and not likely to be critical for survival of any species.

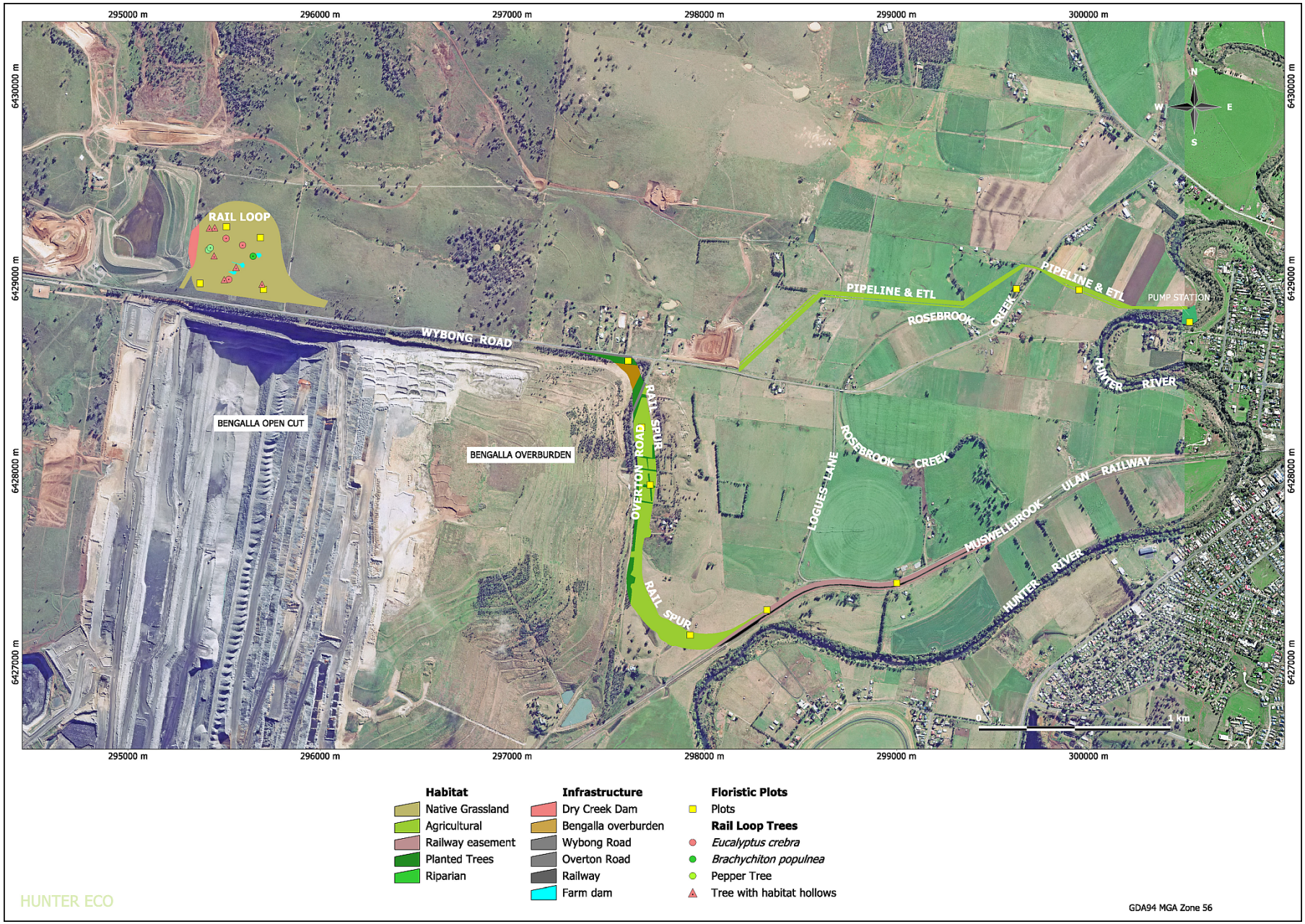

Figure 5 Various habitat areas mapped across the Modification Disturbance Area

Agricultural Land and Rail Infrastructure (21.45 ha)
This was a part of the habitat in the rail spur corridor area and the water pipeline/electricity transmission line (ETL) alignment (agricultural land only). The agricultural land consisted of grazed pasture and cultivated crops such as Lucerne or Oats. The rail infrastructure area is the narrow strip of land between the railway line and the fenced agricultural land. The strip consists in part of a formed vehicular track, access points, small buildings and drainage ways. All of the area is part of the rail construction zone and does not consist of the original land form. The results from five floristic plots showed that out of thirty species recorded, only two were native species (*Boerhavia dominii* and *Portulaca oleracea*), both present as isolated individuals. There were several exotic Hackberry (*Celtis occidentalis*) Trees scattered along the rail infrastructure area. The vegetation within these areas is of a highly disturbed nature and is in extremely poor condition. This habitat is not currently considered to provide habitat for threatened flora or fauna species.

Riparian (0.56 ha)
The location for the Hunter River Pump Station, this habitat takes in an area from the Hunter River high bank to the water. Results from a floristic plot and meander survey showed that the vegetation almost entirely consisted of weeds and exotic trees. There were small numbers of River Oak (*Allocasuarina cunninghamii*) and a group of White Cedar (*Melia azedarach*). The river margin was dominated by Weeping Willow (*Salix* sp.) behind which were Poplar (*Populus nigrans*), Pepper Tree (*Schinus molle*) and Large-leaved Privet (*Ligustrum lucidum*). There were several large patches of Giant Reed (*Arundo donax*) and Green Cestrum (*Cestrum parqui*). Dominant ground species were the grasses *Melinis repens*, *Bromus sterilis* and *Paspalum urvillei*, along with *Ambrosia tenuifolia, Echium plantagineum, Heliotropium amplexicaule* and *Tradescantia fluminensis*. A large amount of Balloon Vine (*Cardiospermum grandiflorum*) was draped over much of the tree canopy. There were six High Threat Weed species. Figure 6 shows a detailed map of the vegetation within the riparian habitat.

West of the pump station area the vegetation consisted of dense Black Locust (*Robinia pseudoacacia*) trees and African Boxthorn (*Lyceum ferocissimum*) while to the east, upstream, the vegetation was similar to that within the pump station area.

Comparing the species content and riparian location at the pump station site with descriptions of PCTs in the NSW BioNET database indicates that the closest match for this habitat type is PCT1714 *River Oak – White Cedar grassy riparian forest* of the Dungog area and Liverpool Ranges. This PCT is noted as containing similar exotic species content to that found at the pump station site (along with River Oak and White Cedar) as well as occurring in the Central Hunter Alluvial Plains landscape. PCT1714 is not a listed threatened ecological community.

The vegetation within the riparian area is of a highly disturbed nature and is in extremely poor condition. Notwithstanding, the Modification would avoid the clearance of mature River Oak and exotic Weeping Willow and Poplar in the vicinity of the proposed pump station. This is the annual clearing potential marginal camp habitat for flying foxes.

The area of this habitat to be disturbed by the Modification is therefore not considered to provide threatened species habitat.



Figure 6 The vegetation of the pump station area

5.1.2 Flora Species

Appendix 1 provides a list of flora species recorded within the Modification disturbance area, including a breakdown of the species identified within each of the above-described broad habitat types.

No threatened flora species or populations were recorded.

5.1.3 Fauna Species

A fauna survey was conducted by ELA, and a copy of their report is provided in Appendix 4. Bat call analysis was undertaken by Greg Richards and Associates and the results are presented in Appendix 6. In summary, the surveys undertaken for the Modification recorded several threatened bats and a threatened bird in the Modification disturbance area, including:

- *Miniopterus orianae* (*schreibersii*) *oceanensis* (Eastern Bentwing-Bat) – vulnerable (BC Act);
- *Mormopterus norfolkensis* (Eastern Freetail Bat)[2] – vulnerable (BC Act); and
- Speckled Warbler (*Chthonicola sagittata*) – vulnerable (BC Act).

Surveys also conservatively identified possible records of other threatened bats, although the records were not able to be confidently confirmed as these species. These bats include Eastern False Pipistrelle (*Falsistrellus tasmaniensis*), Yellow-bellied Sheath-tailed Bat (*Saccolaimus flaviventris*) and Greater Broad-Nosed Bat (*Scoteanax rueppellii*) (all listed as vulnerable under the BC Act) (Appendix 6).

Several additional bat calls were not identifiable between bentwing and forest bats. These calls could belong to one of a few different species however given the definite records of the Eastern Bentwing-Bat they are assumed to belong to that species (Appendix 6).

5.2 Relinquishment Area

5.2.1 Habitat Type

As described in Section 2, as part of the Modification MACH Energy is further restricting the area in the South West Out of Pit Emplacement footprint used for major infrastructure (Figure 3).

Vegetation communities mapped across the wider South West Out of Pit Emplacement area (including the eastern portion being considered as part of this assessment) include the following (Hunter Eco, 2016):

- Narrow-leaved Ironbark (grassy woodland and derived native grassland);
- Spotted Gum/Narrow-leaved Ironbark (grassy woodland and derived native grassland); and
- White Box (grassy woodland and derived native grassland).

The assignment of derived grassland communities was made according to the nearest paddock tree species. Figure 3 shows the vegetation communities mapped across the South West Out of Pit Emplacement.

[2] There appears to be an error in the listing Act whereby the common name for *M. norfolkensis* is listed as the Eastern Freetail Bat, which is actually *M. petersi* (Appendix 6).

5.2.2 Flora Species

Appendix 2 provides a list of flora species recorded within the wider South West Out of Pit Emplacement area (including the eastern portion being considered as part of this assessment). Flora surveys conducted in grassland through the western portion of South West Out of Pit Emplacement footprint showed 3.5 times the native species diversity compared with that of the grassland in the rail loop in the current proposal (Mean 28 versus 8 native species per plot).

No threatened flora species or populations were recorded.

5.2.3 Fauna Species

A fauna survey within the eastern portion of the South West Out of Pit Emplacement was conducted by ELA, and a copy of their report is provided in Appendix 5. Bat call analysis was undertaken by Greg Richards and Associates and the results are presented in Appendix 6. In summary, the surveys undertaken within the relinquishment area recorded several threatened species, including:

- Speckled Warbler (*Chthonicola sagittata*) – vulnerable (BC Act);
- Squirrel Glider (*Petaurus norfolcensis*) – vulnerable (BC Act);
- Eastern False Pipistrelle (*Falsistrellus tasmaniensis*) – vulnerable (BC Act) (possible record);
- Yellow-bellied Sheathtail Bat (*Saccolaimus flaviventris*) – vulnerable (BC Act);and
- Greater Broad-nosed Bat (*Scoteanax rueppellii*) – vulnerable (BC Act) (possible record).

The surveys also recorded Eastern Cave Bat (*Vespadelus troughtoni*) (vulnerable - BC Act) nearby the relinquishment area. Considering that no known caves are located in the vicinity it is expected that this species uses the area for foraging.

Although not recorded during the current surveys, the area is also considered to provide potential habitat for several other threatened terrestrial fauna species, including the threatened bats recorded (and possibly recorded) in the vicinity of the rail spur alignment.

6 IMPACT ASSESSMENT

6.1 Habitat for Threatened Species

Tables 1 and 2 present the relative areas of threatened terrestrial fauna habitat present within the Modification disturbance area and also the eastern portion of the South West Out of Pit Emplacement footprint being relinquished via the Modification. Flora surveys conducted in grassland through the western portion of South West Out of Pit Emplacement footprint (immediately adjacent to the proposed relinquishment area) showed 3.5 times the native species diversity compared with that of the grassland in the rail loop in the current proposal (Mean 28 versus 8 native species per plot).

The eastern portion of the South West Out of Pit Emplacement footprint being relinquished contains approximately 9 ha of grassland and 6 ha of woodland with mature trees providing foraging, nesting and roosting habitat for threatened fauna. This area is contiguous with the western portion of South West Out of Pit Emplacement footprint.

The eastern portion of the South West Out of Pit Emplacement footprint being relinquished also contains 15 ha of threatened ecological communities (Table 2).

In summary, when comparing the area to be disturbed and the area being relinquished[3], the Modification would have the following ecological gains:

- 12 ha less threatened fauna species habitat disturbed (15 ha versus 3 ha); and
- 15 ha less BC Act listed threatened ecological community disturbed (15 ha versus 0 ha).

Table 1
Comparison of Threatened Terrestrial Species Habitat

Potential Threatened Terrestrial Fauna Habitat	Area to be Disturbed (ha)	Eastern Portion of South West Out of Pit Emplacement (ha)
Grassland	0	9.2
Planted Trees/Woodland	3.0[1]	5.9
Total	**3.0**	**15.1**

[1.] Consists solely of planted trees used as a visual screen of the Bengalla Emplacement at the corner of Wybong Road and Overton Road and trees planted as part of the Overton Orchard (total 2.9 ha), as well as six hollow trees in the rail loop (approximately 0.1 ha).

Table 2
Comparison of BC Act Listed Threatened Ecological Communities

Threatened Ecological Community		Area to be Disturbed (ha)	Eastern Portion of South West Out of Pit Emplacement (ha)
Central Hunter Ironbark-Spotted Gum-Grey Box Forest in the NSW North Coast and Sydney Basin Bioregions	Grassy Woodland	0	3.9
White Box Yellow Box Blakely's Red Gum Woodland	Derived Native Grassland	0	9.1
	Grassy Woodland	0	1.7
	Total	**0**	**14.7**

[3] Relinquishment excludes more flexible and relatively minor infrastructure such as light vehicle roads, disturbance associated with water management structures and other ancillary infrastructure.

6.2 Threatened Species

The impact of the Modification on threatened species was assessed for those species known to occur, or considered as possibly occurring in or near the Modification. Appendix 3 provides a list of potential threatened flora and assesses their potential to occur in the Modification disturbance area. No threatened flora species, populations or communities are present or considered potential occurrences. Appendix 4 includes an assessment of the potential for threatened fauna to occur within the Modification disturbance area. Threatened birds and bats are considered potential occurrences and are assessed in the sections below. Birds considered as possible itinerant visitors were not assessed. Assessment of threatened bird and bat species was conducted using the seven factor test from section 5A EP&A Act, on the basis that this Modification enjoys the benefit of the savings provision contained in clause 28 of the *Biodiversity Conservation (Savings and Transitional) Regulation, 2017*.

6.2.1 Birds

Scientific Name	Common Name
Nocturnal Raptors	
Ninox connivens	Barking Owl
Tyto novaehollandiae	Masked Owl
Ninox strenua	Powerful Owl
Diurnal Raptors	
Falco subniger	Black Falcon
Hieraaetus morphnoides	Little Eagle
Circus assimilis	Spotted Harrier
Honeyeaters	
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)
Grantiella picta	Painted Honeyeater
Anthochaera phrygia	Regent Honeyeater
Robins and Warblers	
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)
Petroica boodang	Scarlet Robin
Chthonicola sagittata	Speckled Warbler
Parrots and Lorikeets	
Lathamus discolor	Swift Parrot
Neophema pulchella	Turquoise Parrot
Glossopsitta pusilla	Little Lorikeet
Finches	
Stagonopleura guttata	Diamond Firetail
Treecreepers and Sittellas	
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)
Daphoenositta chrysoptera	Varied Sittella
Babblers	
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)
Woodswallows	
Artamus cyanopterus cyanopterus	Dusky Woodswallow

(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

There is marginal foraging habitat for the nocturnal and diurnal raptors which they may use sporadically as part of a much larger home range. There were no suitably large hollows for roosting or breeding by the nocturnal raptors. Some tall trees in the rail loop could be suitable nesting trees for the diurnal raptors, however no nests were present.

The planted tree habitat was considered suitable for remaining threatened birds with a pair of Speckled Warbler recorded on the Bengalla strip on the corner of Wybong and Overton Roads. 14 ha of planted tree habitat would remain including the majority of the Bengalla strip. There is also a large amount of connected woodland to the west and north-west of the Modification. With respect to the Speckled Warbler any local population would extend into the immediate region to include more birds than the pair recorded. Diamond Firetail are generally sedentary species so their absence suggests that there is not a viable local population using the Modification habitat. The remainder of these birds are generally wintering species to the area meaning that there is unlikely to be a viable local population present. The Modification would not place a viable local population of any of these threatened birds at risk of extinction.

(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,

No endangered population of this species has been listed.

(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

Not applicable

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Not applicable

(d) in relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

18% of the planted trees habitat would be removed leaving 14 ha.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

The planted tree habitat is linear in form with the narrow rail spur (up to 90 m wide) cutting through parts. This would not create habitat fragmentation for these birds.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,

The planted tree habitat is mostly in low condition as a consequence of being in a grazing landscape. At best it is likely to be part of a larger foraging area for these birds, other than for the Speckled Warbler.

(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),

No critical habitat was present.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

The Modification would not increase losses of these bats. In fact consistent with recovery plan principles, in combination with the associated disturbance relinquishment area, there would be net conservation of bat habitat and populations.

(g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

The Modification occurs on predominantly non-native vegetation. It is unlikely that the Modification would involve any key threatening processes.

6.2.2 Bats

Scientific Name	Common Name
Microbats	
Nyctophilus spp	
Mormopterus norfolkensis	East Coast Freetail Bat
Miniopterus orianae (schreibersii) oceanensis	Eastern Bent-wing Bat
Vespadelus troughtoni	Eastern Cave Bat
Falsistrellus tasmaniensis	Eastern False Pipistrelle
Scoteanax rueppellii	Greater Broad-Nosed Bat
Myotis macropus	Large-footed Myotis
Miniopterus australis	Little Bentwing-bat
Saccolaimus flaviventris	Yellow-bellied Sheath-tailed Bat/ Yellow-bellied Pouched Bat
Megabats	
Pteropus poliocephalus	Grey-headed Flying-fox

(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

The insectivorous Microbats variously forage through or over woodland and open grassland. They roost in caves, man-made structures, tree hollows or under loose bark. The Modification is unlikely to displace any of these bats or restrict foraging habitat. Any viable local population would not be placed at risk of extinction.

The Grey-headed Flying Fox is a wide-ranging forager travelling up to 20 km from a roost site to feed on blossom and fruit. Several of the planted and natural tree species when in blossom would provide a food source for these bats. In the context of a 20 km foraging range the loss of the few trees by the Modification would not place a viable local population at risk of extinction.

(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,

No endangered population of this species has been listed.

(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

Not applicable

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Not applicable

(d) in relation to the habitat of a threatened species, population or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

Potential Microbat roosting habitat might be removed for one or more of these threatened bats with the loss of paddock trees in the rail loop. Stag watching recorded bats leaving some hollows but the species using them was not determined. Aerial foraging habitat would not be substantially restricted. Surveys have found numerous hollows in the south eastern relinquishment area.

No potential roosting habitat for the Grey-headed Flying-fox would be lost due to the Modification proceeding.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

The Modification would not fragment foraging habitat for these bats.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,

Negligible habitat for these bats would be removed by the Modification

(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),

No critical habitat was present.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

The Modification would not increase losses of these bats. In fact consistent with recovery plan principles, in combination with the associated disturbance relinquishment area, there would be net conservation of bat habitat and populations.

(g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

Other than for the rail loop the Modification occurs on predominantly non-native vegetation. It is unlikely that the Modification would involve any key threatening processes.

6.2.3 Marsupials

Scientific Name	Common Name
Marsupials	
Dasyurus maculatus	Spotted-tailed Quoll

(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,

The Spotted-tailed Quoll has very large home ranges, 750 ha for females and 3500 ha for males. Preferred habitat is a variety of vegetation types and the open, disturbed habitat in the Modification would be marginal at best for the species. A viable local population would not be placed at risk of extinction by the Modification proceeding.

(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,

No endangered population of this species has been listed.

(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or

Not applicable

(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,

Not applicable

(d) in relation to the habitat of a threatened species, population or ecological community:

In response to the following three parts, the habitat in the Modification is already almost entirely cleared with some highly fragmented post-clearing planted areas. The Modification will not alter the existing state.

(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,

(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),

No critical habitat was present.

(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,

Consistent with recovery plan principles, in combination with the associated disturbance relinquishment area, there would be a reduction in disturbance of more suitable habitat.

(g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

Other than for the rail loop the Modification occurs on predominantly non-native vegetation. It is unlikely that the Modification would involve any key threatening processes.

7 SUMMARY

The Modification disturbance area is highly disturbed with little to no resemblance to its pre-clearing natural communities. Remaining vegetation is in very poor condition and provides limited habitat for threatened species. No threatened ecological communities or populations occur. The Modification includes the relinquishment of a portion of the South West Out of Pit Emplacement, which provides higher quality vegetation and habitat compared to the area to be disturbed.

The Modification would result in a net benefit to terrestrial ecology.

8 REFERENCES

Eco Logical Australia (2017a) *Targeted Surveys for Diuris tricolor and Prasophyllum petilum – Mount Pleasant Operation*. October 2016.

Eco Logical Australia (2017b) *Mount Pleasant Operation Rail Modification – Terrestrial Fauna Survey Report*.

Eco Logical Australia (2017c). *Mount Pleasant Operation Rail Modification – Portion of South West Out of Pit Emplacement – Terrestrial Fauna Survey Report*

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Peake, T.C. (2006). *The Vegetation of the Central Hunter Valley, New South Wales. A report on the findings of the Hunter Remnant Vegetation Project*. Hunter–Central Rivers Catchment Management Authority, Paterson.

Sivertsen, D., Roff, A., Somerville, M., Thonell, J., and Denholm, B. (2011) *Hunter Native Vegetation Mapping. Geodatabase Guide (Version 4.0)*, Internal Report for the Office of Environment and Heritage, Department of Premier and Cabinet, Sydney, Australia.

APPENDIX 1

Modification Disturbance Area Floristic List (Recorded in Each Habitat Type)

Family and Species	Habitat Type			
	Agriculture & Infrastructure	Native Grassland	Planted Trees	Riparian
Adiantaceae				
Cheilanthes sieberi		✓	✓	
Aizoaceae				
***Galenia pubescens*	✓	✓	✓	
**Galenia pubescens*	✓			
Anacardiaceae				
**Schinus molle*			✓	
Apiaceae				
**Foeniculum vulgare*	✓			
Asclepiadaceae				
**Gomphocarpus fruticosus*		✓		
Asteraceae				
***Carthamus lanatus*	✓	✓	✓	
**Ambrosia tenuifolia*				✓
**Cirsium vulgare*	✓	✓		
**Hedypnois rhagadioloides*		✓		
**Hedypnois rhagadioloides subsp. cretica*				✓
**Hypochaeris radicata*		✓		
**Senecio madagascariensis*		✓		✓
**Sonchus asper*		✓		✓
**Taraxacum officinale*		✓		
**Tragopogon porrifolius*	✓			
Calotis lappulacea			✓	
Chrysocephalum semipapposum		✓		
Vittadinia gracilis			✓	
Boraginaceae				
***Echium plantagineum*				✓
***Heliotropium amplexicaule*				✓
Brassicaceae				
**Rapistrum rugosum*	✓			
Lepidium pseudohyssopifolium			✓	
Lepidium sp.		✓		
Cactaceae				
***Opuntia stricta*		✓	✓	
Caryophyllaceae				
**Petrorhagia nanteuilii*		✓		
Casuarinaceae				
Casuarina cunninghamiana				✓
Casuarina glauca			✓	
Chenopodiaceae				
Enchylaena tomentosa			✓	
Maireana microphylla		✓		
Commelinaceae				
***Tradescantia fluminensis*			✓	✓

Convolvulaceae				
Convolvulus erubescens		✓	✓	
Cucurbitaceae				
**Citrullus lanatus*	✓			
Cyperaceae				
Fimbristylis dichotoma			✓	
Fabaceae (Mimosoideae)				
Acacia salicina			✓	
Gentianaceae				
**Centaurium erythraea*				✓
Geraniaceae				
**Geranium molle*	✓			
Erodium crinitum		✓	✓	
Linaceae				
**Linum trigynum*		✓		
Lomandraceae				
Lomandra confertifolia		✓		
Lomandra filiformis subsp. filiformis		✓	✓	
Lomandra longifolia		✓		
Lomandra multiflora subsp. multiflora		✓		
Malvaceae				
**Malva parviflora*	✓			
**Pavonia hastata*	✓			
**Sida rhombifolia*	✓	✓	✓	
Sida corrugata			✓	
Meliaceae				
Melia azedarach				✓
Myrtaceae				
Eucalyptus cladocalyx			✓	
Eucalyptus leptophylla			✓	
Eucalyptus sideroxylon			✓	
Nyctaginaceae				
Boerhavia dominii	✓			
Oxalidaceae				
**Oxalis pes-caprae*	✓			
Papaveraceae				
**Eschscholzia californica*				✓
Phormiaceae				
Dianella longifolia		✓		
Plantaginaceae				
**Plantago lanceolata*	✓	✓	✓	✓
Poaceae				
***Chloris gayana*				✓
***Hyparrhenia hirta*		✓		
***Paspalum dilatatum*	✓			
**Avena sativa*	✓			✓
**Bromus catharticus*	✓			
**Bromus molliformis*	✓	✓		

**Cynodon dactylon*	✓		✓	✓
**Hordeum leporinum*	✓			
**Lolium perenne*	✓	✓	✓	✓
**Melinis repens*				✓
**Paspalum urvillei*	✓			✓
**Sorghum halepense*	✓			
**Urochloa panicoides*	✓			
Aristida ramosa		✓		
Austrostipa scabra		✓		
Austrostipa sp.			✓	
Bothriochloa decipiens var. decipiens		✓		
Chloris ventricosa		✓		
Cymbopogon refractus		✓		
Eragrostis alveiformis			✓	
Rytidosperma sp.			✓	
Sporobolus creber			✓	
Polygonaceae				
**Polygonum aviculare*	✓			
Portulacaceae				
Portulaca oleracea	✓			
Primulaceae				
**Lysimachia arvensis*				✓
Proteaceae				
**Grevillea robusta*			✓	
Rubiaceae				
**Galium aparine*	✓			
Salicaceae				
***Populus nigra 'Italica'*				✓
Sapindaceae				
***Cardiospermum grandiflorum*				✓
Scrophulariaceae				
Myoporum montanum			✓	
Solanaceae				
***Cestrum parqui*				✓
***Lycium ferocissimum*		✓	✓	
Solanum cinereum		✓		
Verbenaceae				
**Verbena bonariensis*	✓	✓		✓

* Denotes weed **Denotes High Threat Exotic

APPENDIX 2

South West Out of Pit Emplacement Area Floristic List

Acanthaceae
Brunoniella australis
Adiantaceae
Cheilanthes sieberi
Aizoaceae
**Galenia pubescens*
Asclepiadaceae
**Gomphocarpus fruticosus*
Asteraceae
**Carthamus lanatus*
**Cirsium vulgare*
**Senecio madagascariensis*
Chrysocephalum semipapposum
Brassicaceae
Lepidium pseudohyssopifolium
Campanulaceae
Wahlenbergia luteola
Chenopodiaceae
Einadia polygonoides
Maireana microphylla
Commelinaceae
Commelina cyanea
Cyperaceae
**Cyperus aggregatus*
Euphorbiaceae
Phyllanthus virgatus
Fabaceae (Faboideae)
**Medicago polymorpha*
**Trifolium* sp.
Glycine clandestina
Glycine tabacina
Lomandraceae
Lomandra glauca
Malvaceae
**Modiola caroliniana*
**Sida rhombifolia*

Sida corrugata
Sida hackettiana
Oxalidaceae
Oxalis perennans
Plantaginaceae
**Plantago lanceolata*
Poaceae
**Cynodon dactylon*
**Panicum antidotale*
**Paspalum dilatatum*
**Setaria parviflora*
**Urochloa panicoides*
Aristida ramosa
Austrostipa scabra subsp. *falcata*
Bothriochloa decipiens
Dichanthium sericeum
Digitaria brownii
Enteropogon acicularis
Eragrostis alveiformis
Eragrostis leptostachya
Eriochloa pseudoacrotricha
Panicum queenslandicum
Paspalidium constrictum
Rytidosperma bipartitum
Sporobolus caroli
Sporobolus creber
Polygonaceae
Rumex brownii
Portulacaceae
Portulaca oleracea
Solanaceae
Solanum cinereum
Verbenaceae
**Verbena rigida*
Zygophyllaceae
Tribulus micrococcus

APPENDIX 3

Threatened Flora, Populations and Communities Likelihood of Occurrence within the Modification Disturbance Area

Threatened Flora

Scientific Name	Common Name	Status BC Act	Status EPBC Act	Likelihood of Occurrence
Diuris tricolor	Pine Donkey Orchid	V	-	**None**. No suitable habitat and impacted by long-term grazing.
Prasophyllum petilum (sp. Wybong)	*Prasophyllum* sp. Wybong	E	CE	**None**. No suitable habitat and impacted by long-term grazing.
Thesium australe	Austral Toadflax	V	V	**None**. No suitable habitat and impacted by long-term grazing.

V = vulnerable, E = endangered, CE = critically endangered

Threatened Populations

Endangered Population	Likelihood of Occurrence
Acacia pendula population in the Hunter catchment	**None**. No *Acacia pendula* present.
Cymbidium canaliculatum population in the Hunter Catchment[1]	**None.** No *Cymbidium canaliculatum* present.
Pine Donkey Orchid population in the Muswellbrook local government area	**None**. No suitable orchid habitat.

Threatened Communities

Community	Status BC Act	Status EPBC Act	Likelihood of Occurrence
Central Hunter Grey Box-Ironbark Woodland in the NSW North Coast and Sydney Basin Bioregions	E	-	**None**. No native woodland present.
Central Hunter Ironbark-Spotted Gum-Grey Box Forest in the NSW North Coast and Sydney Basin Bioregions	E	-	**None**. No native woodland present.
Central Hunter Valley Eucalypt Forest and Woodland	-	CE	**None**. No native woodland present.
Hunter Floodplain Red Gum Woodland in the NSW North Coast and Sydney Basin Bioregions	E	-	**None**. No native woodland present.
Hunter Lowland Redgum Forest in the Sydney Basin and NSW North Coast Bioregions	E	-	**None**. No native woodland present.
Hunter Valley Footslopes Slaty Gum Woodland in the Sydney Basin Bioregion	V	-	**None**. No native woodland present.
Hunter Valley Weeping Myall Woodland in the Sydney Basin Bioregion	CE	CE	**None**. No native woodland present.
Lower Hunter Spotted Gum-Ironbark Forest in the Sydney Basin Bioregion	E		**None**. No native woodland present.
White Box Yellow Box Blakely's Red Gum Woodland	E	CE	**None**. No native woodland present.

APPENDIX 4

Mount Pleasant Operation Rail Modification – Terrestrial Fauna Survey Report. (Eco Logical Australia, 2017b)

Mount Pleasant Operation Rail Modification

Terrestrial Fauna Survey Report

Prepared for
MACH Energy Australia Pty Ltd

12 December 2017



DOCUMENT TRACKING

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Contents

1 Introduction 1
1.1 The Modification 1
1.2 Study Area 3
1.3 Objectives 3

2 Methods 4
2.1 Data Audit 4
2.2 Field Survey 4
2.2.1 Diurnal Bird Surveys 10
2.2.2 Microbat Surveys 10
2.2.3 Reptile Surveys 10
2.2.4 Terrestrial and Arboreal Mammal Surveys 10

3 Results 11
3.1 Fauna Habitats 11
3.1.1 Mixed Native/Exotic Derived Grassland 11
3.1.2 Plantings 13
3.1.3 Agricultural Land 14
3.1.4 Hunter River Riparian Area 15
3.1.5 Disturbed Areas 16
3.1.6 Koala Habitat 17
3.2 Fauna Species 18
3.2.1 Diurnal Birds 21
3.2.2 Nocturnal Birds 21
3.2.3 Reptiles 22
3.2.4 Bats 22
3.2.5 Terrestrial and Arboreal Mammals 23

4 References 24

Appendix A Likelihood of Occurrence – Fauna Species A-1

Appendix B Fauna Species Recorded During Field Survey of Study Area between 8 and 13 November 2017 ..... B-1

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List of Figures

Figure 1: Proposed MOD 4 layout and study area 2

Figure 2: Fauna survey effort 9

Figure 3: Fauna survey results 19

Figure 4: Threatened Species Database Records (OEH 2017a) 20

List of Tables

Table 1: Weather Conditions During the Field Survey* 5

Table 2: Fauna Survey Methods 6

List of Photographs

Photograph 1: Derived native grassland in the study area, with scattered Narrow-leaved Ironbark, including some with hollows 11

Photograph 2: Disturbed ground in contour bank dominated by *Galenia pubescens* 12

Photograph 3: Surface disturbance (centre of photograph in inter-tussock spaces) from Feral Pigs in derived native grassland. 12

Photograph 4: Planted native vegetation (15-20 years old) adjacent to Wybong and Overton Roads. 13

Photograph 5: Other plantings among heavily grazed agricultural land. 14

Photograph 6: Agricultural land on Hunter River floodplain showing grazed and cropped areas 15

Photograph 7: Hunter River riparian area with disturbed ground layer, exotic Willow and Poplar, and a regenerating native Casuarina cunninghamiana (River Oak). 16

Photograph 8: Disturbed rail corridor dominated by exotic ground layer 17

Photograph 9: *E. camaldulensis* in rail corridor (trees will not be removed in this area, proposed works involve signal trenching only) 18

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Abbreviations

Abbreviation	Description
BC Act	NSW *Biodiversity Conservation Act, 2016*
DA	Development Application
ELA	Eco Logical Australia Pty Ltd
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999*
ha	hectare
km	Kilometre
m	Metre
MACH Energy	MACH Energy Australia Pty Ltd
Mtpa	million tonnes per annum
NSW	New South Wales
OEH	NSW Office of Environment and Heritage
ROM	run-of-mine
SEPP 44	State Environmental Planning Policy No. 44 - Koala Habitat Protection

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1 Introduction

Eco Logical Australia Pty Ltd (ELA) was engaged by MACH Energy Australia Pty Ltd (MACH Energy) to undertake targeted terrestrial fauna surveys for the proposed Rail Modification (the Modification) at the Mount Pleasant Operation. The fauna surveys have been undertaken to inform the potential presence of threatened fauna listed under the New South Wales (NSW) *Biodiversity Conservation Act, 2016* (BC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999* (EPBC Act), and habitat in the vicinity of the Modification.

The Mount Pleasant Operation Development Consent DA 92/97 was granted on 22 December 1999. The Mount Pleasant Operation was also approved under the EPBC Act in 2012 (EPBC 2011/5795).

The approved Mount Pleasant Operation includes the construction and operation of an open cut coal mine and associated rail spur and product coal loading infrastructure located approximately three kilometres (km) north-west of Muswellbrook in the Upper Hunter Valley of NSW.

The mine is approved to produce up to 10.5 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal. Up to approximately nine trains per day of thermal coal products from the Mount Pleasant Operation will be transported by rail to the port of Newcastle for export or to domestic customers for use in electricity generation.

1.1 The Modification

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

While the intersection of the Bengalla Mine open cut with the approved Mount Pleasant Operation rail infrastructure is still some years away, MACH Energy is proposing a Rail Modification to obtain approval for 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 load-out facility 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 current proposed layout of the Modification is shown in **Figure 1**.

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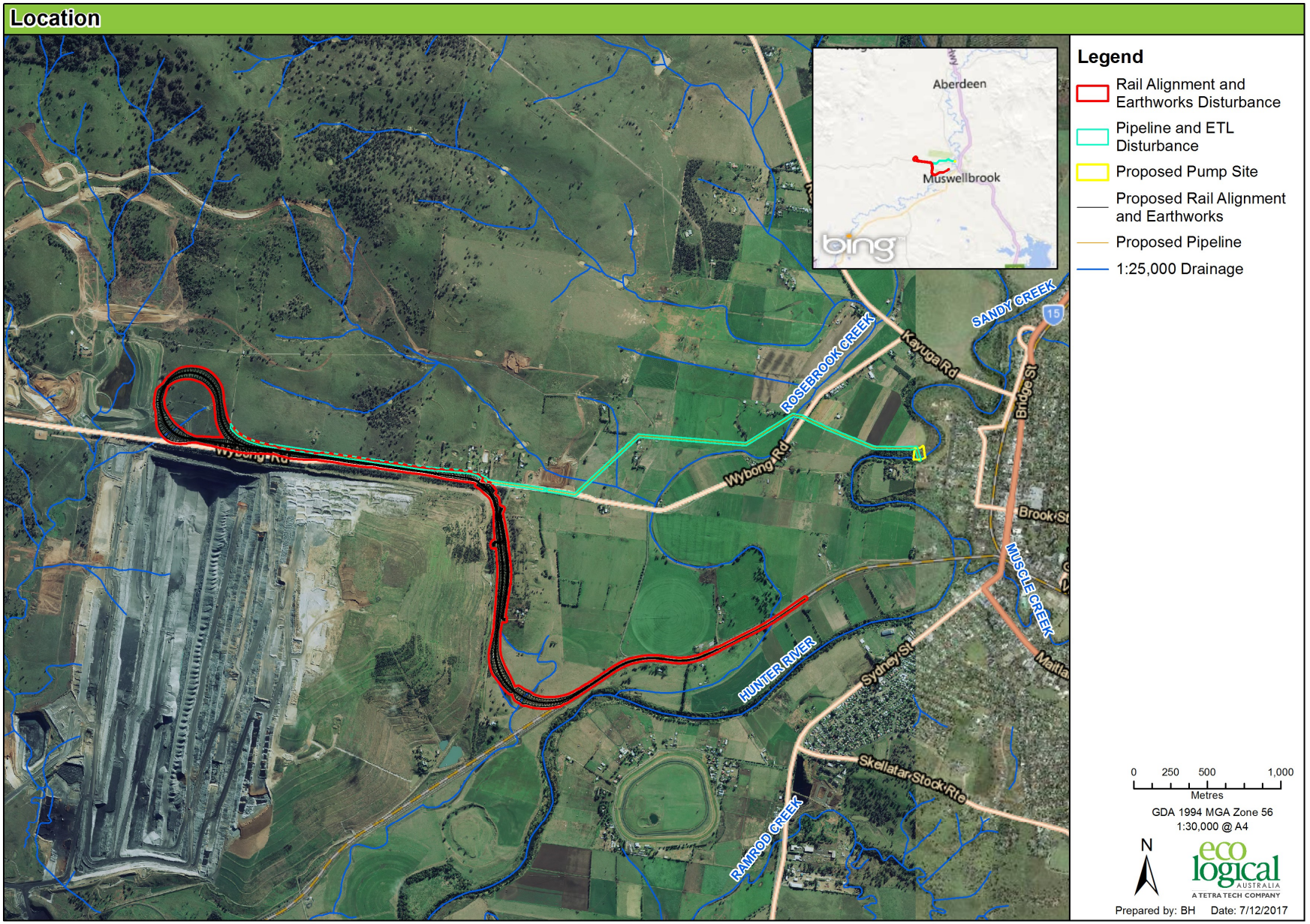

Figure 1: Proposed MOD 4 layout and study area

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1.2 Study Area

The study area for the field survey includes the extent of additional disturbance (i.e. disturbance not already approved) associated with the rail loop and spur, water supply pipeline, electricity transmission line to the pump station, and other supporting infrastructure. A detailed description of the Modification is provided in the main text of the Modification Environmental Assessment.

The study area is shown in **Figure 1**.

While the extent of disturbance will be limited where possible, it has been conservatively assessed that the entire study area may be subject to potential impacts.

1.3 Objectives

The fauna survey has been undertaken to provide the following information:

- a description of the fauna habitat characteristics of the study area and surrounds;
- identification of threatened fauna species within the study area;
- identification of habitat corridors and linkages between areas of remnant native vegetation that assist fauna movement through the area; and
- an assessment against the *State Environmental Planning Policy No. 44 - Koala Habitat Protection* (SEPP 44).

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2 Methods

2.1 Data Audit

Searches of the following databases were undertaken for the study area:

- BioNet Atlas of NSW Wildlife (Office of Environment and Heritage [OEH] 2017a) for the area bound by coordinates North: -32.16 West: 150.72 East: 150.99 South: -32.37 (Datum GDA94), a radius of 10 km from all study area elements.
- EPBC Protected Matters Search Tool (DoEE 2017a) using a 10 km buffer around coordinates -32.259886 150.881013, -32.268015 150.875005, -32.276143 150.853548, -32.273458 150.850114, -32.261628 150.851745, -32.257927 150.826768, -32.252047 150.828313, -32.260467 150.852689, -32.259886 150.880842, -32.259886 150.881013 (Datum GDA94).
- the Species Credit Species list generated from the BioBanking Credit Calculator (OEH 2017c) for the study area.

Threatened species identified in the database searches together with an assessment of the likelihood of occurrence for each species is provided in **Appendix A**. Each species' likelihood of occurrence was determined by reviewing records in the area, considering the habitat available and using expert knowledge of the species ecology.

Five terms for the likelihood of occurrence of species are used in this report, as defined below:

- "yes" = the species was or has been recorded on the site (i.e. the species is known to occur);
- "likely" = a medium to high probability that a species uses the site;
- "potential" = suitable habitat for a species occurs on the site, but there is insufficient information to categorise the species as likely, or unlikely to occur;
- "unlikely" = a very low to low probability that a species uses the site; and
- "no" = habitat on site and in the vicinity is unsuitable for the species.

2.2 Field Survey

The study area was surveyed over six days by ELA ecologists Tom Schmidt and Timothy Henderson. Field survey was undertaken from the 8th to the 10th November 2017, with collection of remaining field monitoring equipment (songmeters and remote cameras) on the 13th November 2017. Temperatures were cool to warm, ranging from 4.6 degrees Celsius (°C) to 27.6 °C, with light to moderate winds. No rainfall was recorded during the survey. Weather records were collected from the nearest public weather station in Scone (Bureau of Meteorology 2017) (**Table 1**).

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Table 1: Weather Conditions During the Field Survey*

Date	Minimum Temperature (°C)	Maximum Temperature (°C)	Rainfall (mm)	Wind speed (3pm) (km/h)
8 November 2017	12.5	22.8	0	30
9 November 2017	4.6	26.1	0	31
10 November 2017	5.5	27.3	0	24
11 November 2017	6.4	27.5	0	33
12 November 2017	7.7	27.6	0	24
13 November 2017	12.5	22.8	0	13

*Weather observations were taken from www.bom.gov.au, for Scone (station 061363).

The field survey was designed to target those Species Credit Species generated from the BioBanking Credit Calculator and their habitats (including, for example, tree hollows and native tussock grasses) identified from the data audit as potential, likely or known to occur within the study area.

The survey design was informed by and consistent with, relevant NSW and Commonwealth survey guidelines, including the NSW *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities (Working Draft)* (DEC 2004), *Survey Guidelines for Australia's Threatened Birds* (Department of Environment, Water, Heritage and the Arts [DEWHA] 2010a), *Survey Guidelines for Australia's Threatened Bats* (DEWHA 2010b), *Survey Guidelines for Australia's Threatened Mammals* (Department of Sustainability, Environment, Water, Population and Communities [SEWPaC] 2011a) and *Survey Guidelines for Australia's Threatened Reptiles* (SEWPaC 2011b). The survey consisted of:

- fauna habitat mapping and recording of habitat values (including hollow-bearing trees and a Koala habitat assessment infomed by SEPP 44);
- diurnal bird surveys;
- microbat detection devices (Songmeter SM2);
- remote camera surveys (Reconyx Hyperfire);
- nocturnal mammal and reptile surveys (spotlighting, active searches and call playback);
- active reptile searches;
- stag watching; and
- opportunistic fauna sightings recorded throughout the study area.

Fauna survey methods, the corresponding guidelines and survey effort justification are detailed below in **Table 2**.

Figure 2 shows the field survey locations.

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Table 2: Fauna Survey Methods

Fauna Group	Survey Type	Timing	Guideline Suggested Survey Effort	Survey Method	Justification
Reptiles	Habitat search	Nov- March	30 minute search on two separate days targeting specific habitat per 100 hectare (ha) stratification unit (DEC 2004). Methods for the Pink-tailed Worm Lizard typically include: • Searches restricted to an area of relatively homogeneous habitat within each site and a search beneath all rocks that can be turned is made. • Rock cover density rather than fixed area size determines a plot, and 150 to 200 rocks need to be turned to be reasonably confident of determining the species' presence or absence (DSEWPC 2011b). Methods for the Striped Legless Lizard typically include: • In areas with surface rock, artificial shelter site surveys or rock turning should be the primary technique. Active searching (checks under surface rock and debris and around tussocks) can generally be undertaken throughout the year as long as any limitations with respect to this survey technique are clearly outlined (DSEWPC 2011b). • In areas with little to no rocky habitat, artificial shelter site surveys or pitfall trapping should be used in conjunction with hand searches around tussocks. Artificial shelter sites should be installed at least three months prior to the initial survey/checks. They should typically be placed in vegetated areas. Tile grids should consist of 50 tiles, at five metre (m) spacing between tiles, arranged in a grid of 10 tiles by five, preferably positioned on a northerly aspect. As a minimum, two tile grids should be used for sites less than 2 ha in size, one grid per 3 ha for sites up to 30 ha, and 10 grids for sites greater than 30 ha in size. Artificial shelter sites should be checked at least twice a month, and ideally once a week during spring to early summer (that is, between early September to December). Shelter sites should not be checked more than once a week as this may lead to striped legless lizards abandoning the artificial shelters (DSEWPC 2011b).	Two active searches of at least 30 minutes on two separate days in potential habitat. Including rock, log and debris turning, and searching around tussocks. Surveys undertaken in mornings during November. Passive observations also made while travelling around the study area. Two 1 hour spotlighting surveys were also undertaken targeting suitable habitat for reptiles.	Surveys focused on highest quality habitat in the study area, and utilised suggested methods, except for tile grids and pitfalls which were unsuitable due to timeframes. Active searches of surface rock, logs and debris were undertaken. Rock and tussock habitat within the study area was sufficient to undertake active searches. The targeted species for this survey were the Pink-tailed Worm Lizard and the Striped Legless Lizard.
	Pitfall traps	Nov- March	24 trap nights preferably using six traps per 100 ha stratification unit (DEC 2004).		
	Spotlight search	Nov- March	30 minute search on two separate nights targeting specific habitat (DEC 2004).		

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Fauna Group	Survey Type	Timing	Guideline Suggested Survey Effort	Survey Method	Justification
Birds	Area search	All year	20 minute, 1 ha (200 m x 500 m) search per stratification unit -time curve approach (DEC 2004). Methods for the Regent Honeyeater involves area searches in suitable habitat, preferably in the morning but other times may also be appropriate. Detection by call is possible when birds are most vocal (outside the breeding season). Otherwise, detection is by sighting. Targeted searches of woodland patches with heavily flowering trees is useful, especially around water points such as dams and creek lines (DEWHA 2010a).	20 minute diurnal bird surveys were undertaken within the proposed modification area during the morning and afternoon on two separate days. One further survey was also completed by a single ecologist. Five locations were surveyed as part of this survey. Total survey effort approximately 13 person hours.	The target woodland species for this survey were the Regent Honeyeater, and the Painted Honeyeater. Other threatened woodland birds and raptors were also covered using this method. No suitable wetland habitat is present.
	Water source census	All year	20 minute survey at dawn or dusk at each water source (DEC 2004).		
	Wetland census	All year	1 hour census for each wetland at dawn or dusk (DEC 2004).		
Terrestrial and Arboreal mammals	Small Elliott traps	All year	100 trap nights over three to four consecutive nights per stratum up to 50 ha (DEC 2004).	Four remote cameras were set up on bait stations for five nights (17 survey nights), targeting the threatened Spotted-tailed Quoll within best available habitat in the study area. Two 1 hour nocturnal spotlighting surveys were conducted targeting suitable habitat for mammals within potential fauna habitat. This method was used to target the Squirrel Glider and Koala. No trapping was undertaken within the survey area due to a lack of potential habitat, scattered nature of vegetation and the site being dominated by grassland (native and exotic).	Targeted species were the Spotted-tailed Quoll, Squirrel Glider and Koala. Remote cameras are being used more readily to replace methods such as pitfall traps and hair tubes as a less invasive survey method. Remote cameras, spotlighting and call-playback were considered the most suitable technique given the limited, open habitat in the study area.
	Large Elliott	All year	100 trap nights over three to four consecutive nights per stratum up to 50 ha (DEC 2004).		
	Arboreal Elliott traps	All year	24 trap nights over three to four consecutive nights per stratum up to 50 ha (DEC 2004).		
	Wire cage traps	All year	24 trap nights over three to four consecutive nights per stratum up to 50 ha (DEC 2004).		
	Pitfall traps with drift nets	All year	24 trap nights over three to four consecutive nights per stratum up to 50 ha (DEC 2004).		
	Hair tubes	All year	10 large and 10 small in pairs for four days and four nights (DEC 2004).		
	Arboreal hair tubes	All year	Three tubes in each of 10 habitat trees up to 100 ha four days and four nights (DEC 2004).		
	Spotlighting on foot	All year	2 x 1 hour and 1 km, up to 200 ha of stratum unit (DEC 2004).		
	Call playback	All year	Two sites per stratum, up to 200 ha, plus additional site per additional 100 ha above 200 ha (DEC 2004).		
	Stag-watching	All year	Potential roost hollows 30 minutes before, and 60 minutes after sunset (DEC 2004).		

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Fauna Group	Survey Type	Timing	Guideline Suggested Survey Effort	Survey Method	Justification
	Search for scats and signs	All year	30 minutes at each relevant habitat (DEC 2004).	Call playback was completed at two sites targeting the Squirrel Glider. Stag watching was also undertaken at one site on one evening.	
	Collection of predator scats	All year	Opportunistic collection.		
	Remote Cameras	All year	Baited camera traps may be of use in confirming the presence and to identity the Spotted-tailed Quoll (SEWPaC 2011a).		
Bats	Harp trapping / Mist Netting	October-March	Effort per 100 ha of preferred habitat – four trap nights over two consecutive nights (DEC 2004). For the Large-eared Pied Bat, it is recommended that harp trapping / mist netting is undertaken for a total survey effort of 16 detector nights over a minimum of four night period (DEWHA 2010b). For the Corben's Long-eared Bat, it is recommended that harp trapping / mist netting be undertaken for a total survey effort of 20 detector nights over a minimum of five night period (DEWHA 2010b).	Four bat call detection devices were placed in potential habitat for threatened microbats (i.e. hollow-bearing trees and flyways) over five consecutive nights (20 bat call detection nights). Two 1 hour nocturnal spotlighting surveys were conducted targeting suitable habitat for mammals within potential fauna habitat.	Bat call detection devices will identify most threatened species that may occur within the Modification area (including the Large-eared Pied Bat), apart from *Nyctophilus* sp. which are hard to identify from bat call detection devices. Threatened bats unable to be positively identified by calls alone will be conservatively assumed to be present, based on its genus being recorded, and subject to expert consideration. Spotlighting targeted the Grey-headed Flying-fox.
	Call recording	October-March	Effort per 100 ha of preferred habitat – two recording devices for two nights (DEC 2004). For the Large-eared Pied Bat, it is recommended that unattended bat detectors are in place for a total survey effort of 16 detector nights over a minimum of four night period (DEWHA 2010b).		
	Habitat search	All year	Search for bats and bat excreta (DEC 2004). For the Grey-headed Flying-fox, daytime searches are the primary method for determining the presence of unrecorded day roosts. Flying-foxes are recognised easily from a distance while they roost or are in flight, and have distinctive audible calls that are heard most frequently in the early morning or under sunny conditions. Other signs include their distinctive odour and droppings. Both the ground and foliage should be examined for flying fox scats. Night time surveys can be undertaken by walking transects (100 m apart) looking for feeding and flying bats (DEWHA 2010b).		
Amphibians	Tadpole search and nocturnal survey	September-May	200 m transect per water body for two hours on two separate nights (DEC 2004).	Not undertaken during survey.	No threatened amphibian species are likely or have the potential to occur in the study area.

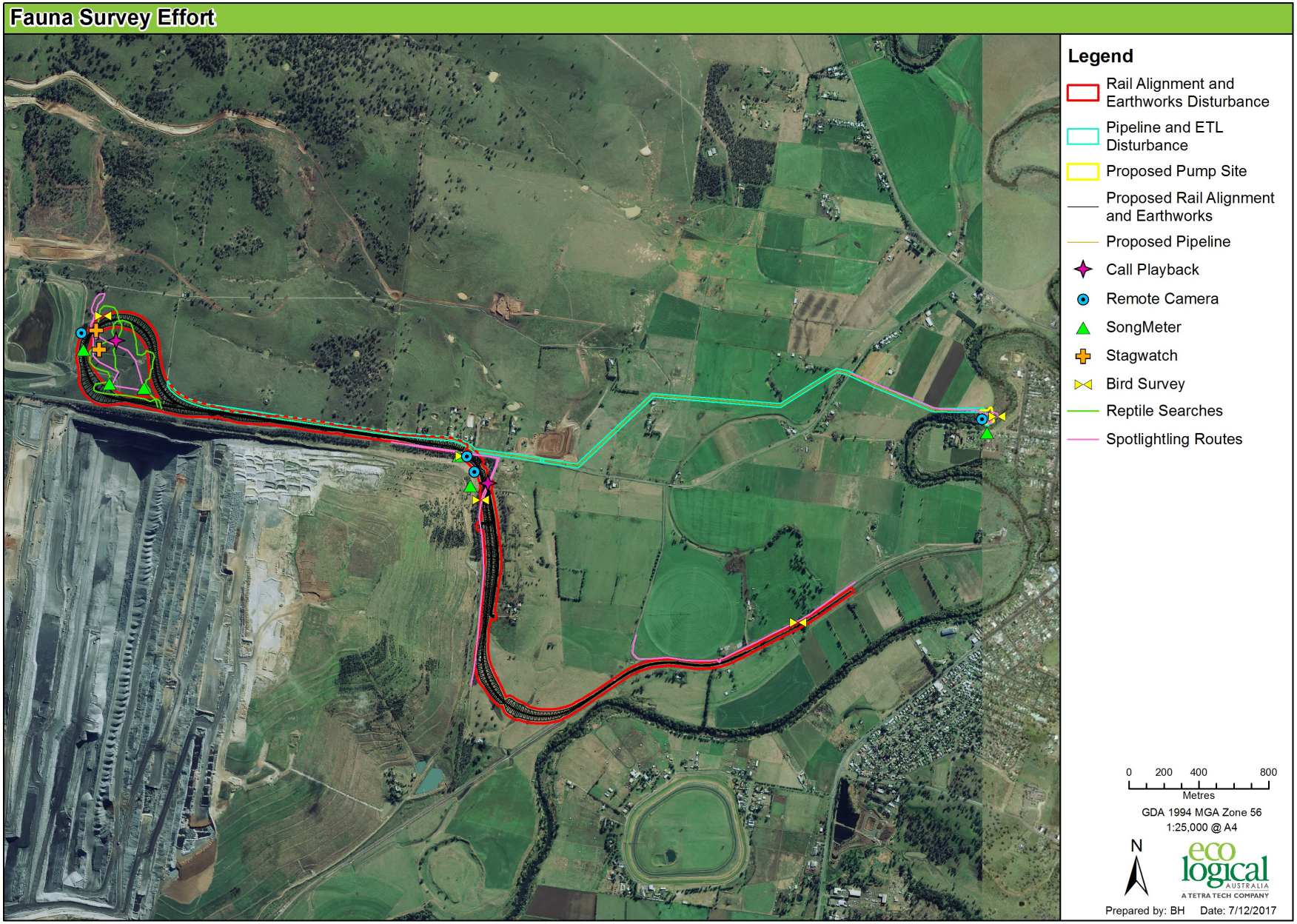

Figure 2: Fauna survey effort

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2.2.1 Diurnal Bird Surveys

Diurnal bird surveys were conducted by performing 20 minute point counts at five different locations across the study area by two ecologists during the morning and afternoon (one further survey was conducted by a single ecologist on 13th November). The survey locations were positioned in a representative sample of fauna habitats present within the study area (see **Figure 2**). All five sites were each surveyed four times on two mornings and two afternoons, resulting in approximately 13 person hours of bird survey in total. Bird species were identified using both visual and acoustic cues. Opportunistic bird observations were conducted while travelling around the study area.

2.2.2 Microbat Surveys

Microbat surveys were conducted using songmeters set to detect ultrasonic bat calls. The songmeters were placed at six separate locations across the study area (see **Figure 2**) targeting potential habitat, in particular hollow-bearing trees and flyways among planted vegetation. At two locations, the songmeter was set for the five nights, and at other locations songmeters were moved after two nights and left in place at other locations for the remaining three nights of the survey. Stag watching (see **Section 2.2.4**) also attempted to identify any microbats exiting from potential roost sites in tree hollows. Calls were analysed by expert Dr Greg Richards, from Greg Richards and Associates.

2.2.3 Reptile Surveys

Reptile surveys consisted of both passive and active searches within the study area. Opportunistic (passive) observations of reptiles were recorded while walking and driving throughout the study area, during both day and night. Active searches involved hand searching of micro-habitat including log, rock and debris turning, as well as searching around grass tussocks. Active searches were undertaken by two ecologists for half an hour (one person hour) during mid-morning (9.00 am – 11.00 am), and opportunistically throughout the survey. Active reptile searches focused on areas of most suitable habitat for target threatened reptiles including the Striped Legless Lizard and Pink-tailed Worm Lizard. Two searches were completed on separate days, and a total of approximately 150 different logs, rocks and pieces of debris were inspected, as well as tussock searches (**Figure 2**).

2.2.4 Terrestrial and Arboreal Mammal Surveys

Remote cameras were positioned at four sites (see **Figure 2**) over five nights for a combined survey effort of 17 nights (one camera, at the Hunter River, was removed after two nights). The remote cameras were baited with a chicken drumstick and tinned tuna with the aim of targeting *Dasyurus maculatus* (Spotted-tailed Quoll).

Spotlighting surveys were conducted for at least one hour by two ecologists on each of the two nights (8th and 9th of November 2017), targeting suitable habitat for nocturnal mammals and reptiles in the study area. Total survey effort for spotlighting was four person hours.

Call playback was completed at two sites. Calls of *Petaurus norfolcensis* (Squirrel Glider) were broadcast using a loud speaker for five minutes, followed by a 15 minute period of quiet listening and spotlighting.

Stag watching was undertaken at one site on one evening. Two observers watched hollows in different trees for approximately half an hour before dusk, until half an hour after dusk, in an attempt to observe nocturnal fauna emerging. Stag watching was followed by spotlighting of the area.

Areas of potential habitat for the Koala were spotlighted and inspected for signs of Koala such as scats and scratch marks on tree trunks.

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3 Results

3.1 Fauna Habitats

The study area is largely cleared, consisting of open paddocks with a mixed native/exotic grassland and some scattered remnant trees, or agricultural land under grazing or cropping. Other habitats in the study area include plantings of both native and exotic trees and shrubs, and disturbed areas dominated by weeds.

3.1.1 Mixed Native/Exotic Derived Grassland

The rail loop in the west of the study area contains derived native grassland with large, scattered remnant trees (mostly Narrow-leaved Ironbark [*Eucalyptus crebra*]), many of which (approximately six trees) contain numerous hollows (**Photograph 1**). A small number of regenerating saplings are present close to some of the isolated paddock trees, however the area is otherwise devoid of shrubs and mid-storey vegetation. The area includes native tussock-forming grasses (*Austrostipa* spp.), with significant weed cover, in particular *Galenia pubescens* (Galenia), *Carthamus lanatu*s (Saffron Thistle) and *Gomphocarpus fruticosus* (Narrow-leaved Cotton Bush).

Ground disturbance associated with both historical and recent construction of contour banks also covers a portion of this area, and *Galenia pubescens* dominates the recently disturbed areas (**Photograph 2**). Surface rock is sparse and usually deeply embedded, with the majority of loose surface rock occurring along disturbed contours. Logs and farm debris (scraps of metal) are also scattered across the area. Significant disturbance from foraging *Sus scrofa* (Feral Pig) covers much of the grassland area, and a group of eight Feral Pigs was regularly observed in this area during surveys (**Photograph 3**).



Photograph 1: Derived native grassland in the study area, with scattered Narrow-leaved Ironbark, including some with hollows.



Photograph 2: Disturbed ground in contour bank dominated by Galenia pubescens.



Photograph 3: Surface disturbance (centre of photograph in inter-tussock spaces) from Feral Pigs in derived native grassland.

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Small farm dams are present in the rail loop area; however, they contain no aquatic or fringing vegetation. The hollow-bearing trees in this area contain potential roosting habitat for hollow-dependent microbat species. No large hollows suitable for owl species or arboreal mammals are present. Poor connectivity and a lack of mid-storey vegetation limit the suitability of the habitat in this area for arboreal mammals such as the Squirrel Glider.

3.1.2 Plantings

Plantings in the study area consist of planted native species associated with mine rehabilitation and screening, and farm plantings of mostly exotic species. An area of Bengalla Mine land in the corner of Wybong and Overton Roads consists of planted native (indigenous and non-indigenous) woodland trees and shrubs, approximately 15 – 20 years old (**Photograph 4**). Flowering Eucalypt species present a foraging resource for nectarivorous birds and the presence of mid-storey vegetation makes this area the only real habitat in the study area for woodland birds. Lack of mature, hollow-bearing trees and limited connectivity to areas of higher quality habitat reduce the likelihood of this area providing important habitat for any threatened fauna species.

Other plantings mostly consist of rows of exotic or non-indigenous trees and shrubs (**Photograph 5**). These areas present limited habitat features suitable to support significant fauna species.



Photograph 4: Planted native vegetation (15-20 years old) adjacent to Wybong and Overton Roads.

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Photograph 5: Other plantings among heavily grazed agricultural land.

3.1.3 Agricultural Land

Areas in the east of the study area are on the Hunter River floodplain and consist mostly of agricultural land that is either heavily grazed or cropped (**Photograph 6**). These areas generally contain no trees with a disturbed ground layer dominated by exotic species. These areas present low quality fauna habitat and are considered unlikely to provide important habitat for any threatened fauna species in the study area.

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Photograph 6: Agricultural land on Hunter River floodplain showing grazed and cropped areas.

3.1.4 Hunter River Riparian Area

The Hunter River riparian area is highly disturbed, consisting mainly of exotic vegetation. Exotic weed trees *Salix* sp. (Willow) dominate the immediate riparian area and overhang the river, with patches of exotic *Populus* sp. (Poplar) present further from the river. Some native *Casuarina cunninghamiana* (River Oak) were regenerating close to the river in this area, however these trees would be avoided by the Modification. The ground layer is dominated by exotic grasses and herbs, with limited habitat features for fauna such as fallen timber and log (**Photograph 7**).

The riparian habitat in the study area does not contain other significant features such as hollow-bearing trees or nectar resources and is considered low quality habitat for other threatened fauna species.

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Photograph 7: Hunter River riparian area with disturbed ground layer, exotic Willow and Poplar, and a regenerating native *Casuarina cunninghamiana* (River Oak).

3.1.5 Disturbed Areas

Portions of the study area within the existing rail corridor mostly consist of highly disturbed land with much of the ground impacted by emplaced ballast rock and vegetation dominated by weed species (**Photograph 8**). These areas present low quality fauna habitat and are considered unlikely to provide important habitat for any threatened fauna species in the study area.

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Photograph 8: Disturbed rail corridor dominated by exotic ground layer.

3.1.6 Koala Habitat

The areas containing designated Koala 'Feed tree species' as listed under Schedule 2 of SEPP 44 have been identified within the study area. The scheduled Koala 'Feed tree species' present within the study area is *E. camaldulensis* (River Red Gum).

Potential Koala habitat is defined in Section 4 of SEPP 44 as being 'Feed tree species' that constitute at least 15% of the total number of trees. River Red Gum occurs in the rail corridor in the south east of the study area (**Photograph 9**), although trees in this area will not be removed. No evidence of Koalas (sightings, scratches or scats) was recorded in the study area, and no part of the study area qualifies as core Koala habitat due to the absence of evidence of attributes such as breeding females, or recent sightings, as per the definition in Section 4 of SEPP 44.

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Photograph 9: *E. camaldulensis* in rail corridor (trees will not be removed in this area, proposed works involve signal trenching only).

3.2 Fauna Species

A total of 93 fauna species were recorded within the study area during the field survey period. This consisted of 65 birds (60 native, five introduced), 10 non-flying mammals (four native and six introduced), 15 native microbats (not listed in Appendix B), and three native reptiles (**Appendix B**).

Three threatened species were recorded during the field survey (**Figure 3)**:

- *Chthonicola sagittata* (Speckled Warbler) – vulnerable (BC Act);
- *Miniopterus schreibersii (orianae) oceanensis* (Eastern Bentwing Bat) – vulnerable (BC Act); and
- *Mormopterus norfolkensis* (East Coast Freetail Bat) – vulnerable (BC Act)[1].

Surveys also conservatively identified possible records of three other threatened bats, although the records were not able to be confidently confirmed as these species. These bats include *Falsistrellus tasmaniensis* (False Pipistrelle), *Saccolaimus flaviventris* (Yellow-bellied Sheathtail-bat) and *Scoteanax rueppellii* (Greater Broad-Nosed Bat) (all listed as vulnerable under the BC Act).

Threatened species previously recorded within 10 km of the study area are shown in **Figure 4**.

[1] This species is listed as *Mormopterus norfolkensis* (Eastern Freetail-bat) in the BC Act.

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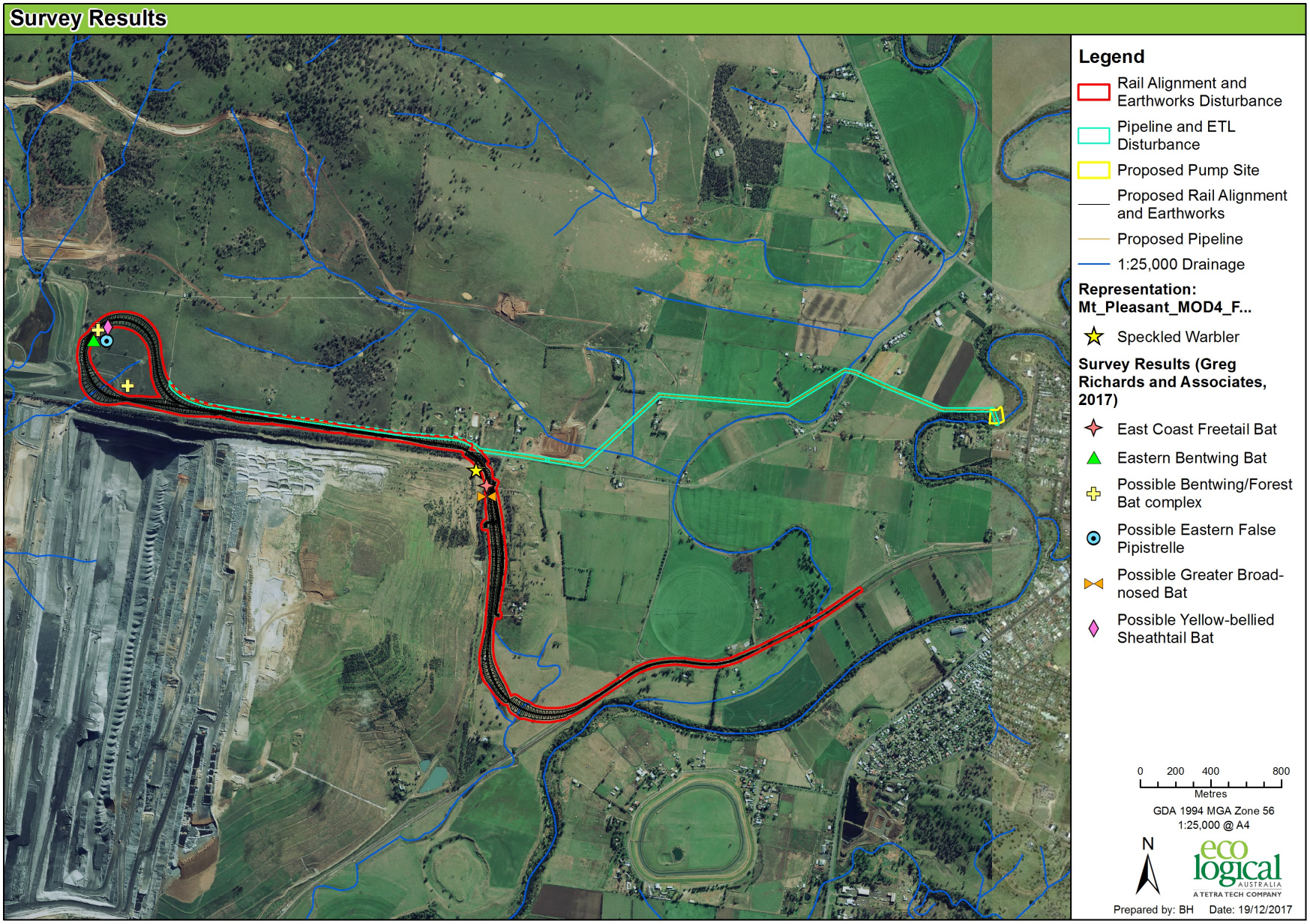

Figure 3: Fauna survey results

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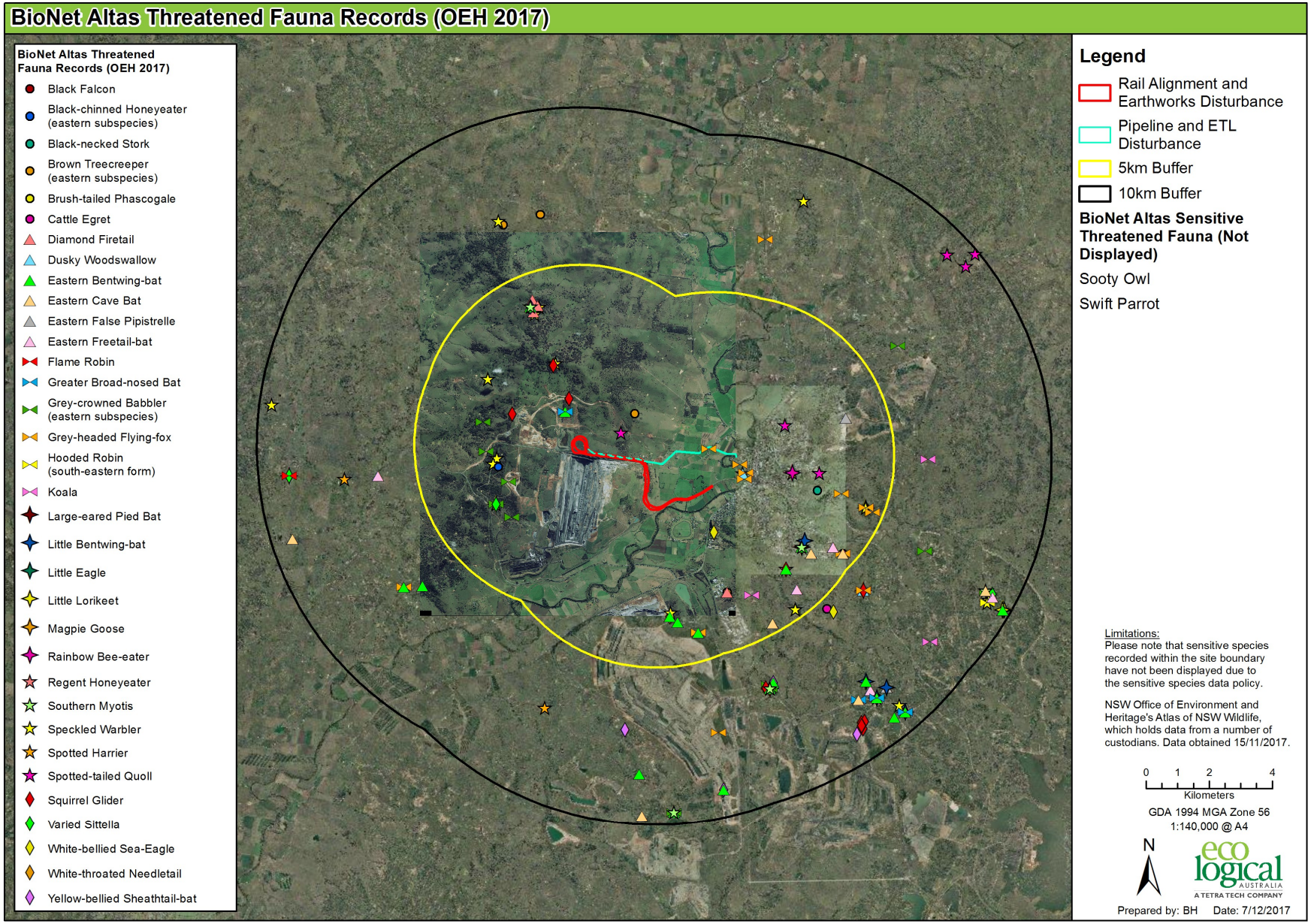

Figure 4: Threatened Species Database Records (OEH 2017a)

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No further threatened species were recorded. A further 26 species listed under the BC Act and/or EPBC Act were considered potential (24) or likely (two) to occur in the study area as a result of the data audit (**Appendix A**). Most species assessed as having potential to occur in the study area are mobile species such as woodland birds and raptors, which are considered unlikely to regularly use the study area however may occur in marginal habitats present on occasion while moving between higher quality habitats in the region. *Circus assimilis* (Spotted Harrier) and *Glossopsitta pusilla* (Little Lorikeet) were assessed as likely to occur in the study area (**Appendix A**) and are discussed below.

3.2.1 Diurnal Birds

Sixty-three (63) diurnal bird species were recorded during the field survey, including one threatened species - *Chthonicola sagittata* (Speckled Warbler), listed as vulnerable under the BC Act. Speckled Warbler was recorded from within planted woodland vegetation (**Figure 3**), with a maximum of two individuals recorded. It is considered likely that this species breeds in the study area as the Speckled Warbler is a sedentary species, and a pair was regularly recorded in the same territory among suitable breeding habitat during the survey which took place during the breeding season (August - January) (OEH 2017b).

Target threatened species *Anthochaera phrygia* (Regent Honeyeater) and *Grantiella picta* (Painted Honeyeater) were not recorded during the field survey. A small amount of low quality habitat is present for these species in the study area and although these mobile species have the potential to occur in the study area, it is considered unlikely they would regularly visit the study area or be reliant on its resources for breeding. A number of other threatened bird species, mostly woodland birds and raptors, are considered to have the potential to occur in the study area on occasion (**Appendix A**).

Circus assimilis (Spotted Harrier) is a mobile raptor that occupies a variety of habitats including open woodland and agricultural land and is considered likely to occur in the study area as part of a wide home range, as this species is highly mobile and the study area contains suitable habitat for the species (OEH 2017b). *Glossopsita pusilla* (Little Lorikeet) is a nomadic, nectar forager that utilises flowering Eucalypts (OEH 2017b). The species is considered likely to occur in the study area when eucalypts are in flower as suitable foraging habitat is present in both remnant *Eucalyptus crebra* and planted vegetation and the species is mobile and known to occur in the region. Little Lorikeet typically nests in hollows of smooth-barked Eucalypts, of which none are present in the study area.

Ardea ibis (Cattle Egret) and *Merops ornatus* (Rainbow Bee-eater), both listed as a Marine species under the EPBC Act, were recorded in the study area during the survey. Both species are common and widespread occupying a variety of habitats including cleared areas and farmlands.

3.2.2 Nocturnal Birds

Two (2) nocturnal bird species, *Podargus strigoides* (Tawny Frogmouth) and *Tyto alba* (Barn Owl) were recorded during the field survey. No threatened nocturnal bird species were recorded during the current survey and no large hollows suitable for nesting by threatened large forest owls *Ninox connivens* (Barking Owl) and *Ninox strenua* (Powerful Owl) are present in the study area.

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3.2.3 Reptiles

Three (3) native reptile species were recorded in the study area. No listed threatened reptile species were recorded.

Suitable habitat for Striped Legless Lizard is present in derived native grassland of the study area (rail loop area). This area contains key habitat requirements including tussock grasslands and some surface debris (DoEE 2017b; OEH 2017b), however existing disturbance reduces the quality of the habitat and the likelihood of occurrence. Historic earthworks occurred over much of this area in the late 1960's (evidenced by historic aerial photography), and recent earthworks for contour banks have also impacted some of this habitat. Current foraging activity of Feral Pigs is causing significant ground disturbance in much of the study area, reducing the quality of potential habitat for reptiles such as Striped Legless Lizard. Targeted active searches focused on areas of most suitable habitat and did not record the species, as such, Striped Legless Lizard is considered unlikely in the study area.

Pink-tailed Worm-lizard was targeted during the survey based on the results of the data audit. No suitable habitat for Pink-tailed Worm-lizard is present in the study area due to the absence of naturally occurring loose surface rock.

3.2.4 Bats

Microbat calls recorded during the surveys undertaken across the study area were analysed by Dr Greg Richards of Greg Richards and Associates. The microbat surveys recorded a total of 3,271 call sequences, of which 2,979 (91%) were able to be analysed. Definite calls for two threatened species listed under the BC Act were recorded species as follows (Greg Richards and Associates 2017):

- *Miniopterus schreibersii (orianae) oceanensis* (Eastern Bentwing Bat) – vulnerable (BC Act); and
- *Mormopterus norfolkensis* (East Coast Freetail Bat) – vulnerable (BC Act).

Surveys also conservatively identified possible records of three other threatened bats, although the records were not able to be confidently confirmed as these species. These bats include *Falsistrellus tasmaniensis* (False Pipistrelle), *Saccolaimus flaviventris* (Yellow-bellied Sheathtail-bat) and *Scoteanax rueppellii* (Greater Broad-Nosed Bat) (all listed as vulnerable under the BC Act) (Greg Richards and Associates 2017).

While microbats were observed flying during stag watching (**Figure 3**), it was unclear whether these bats emerged from hollows within the study area. Nevertheless, it is considered likely that hollows within this area are used by hollow-dependent microbat species.

No *Chalinolobus dwyeri* (Large-eared Pied Bat) were recorded in the study area. This species is found mainly in areas containing extensive cliffs and caves, among well-timbered areas with gullies, and its morphology suggests it forages below the forest canopy (OEH 2017b). Habitat for this species in the study area is therefore considered to be marginal at best and only one record exists from within 10 km of the study area. The majority of records for this species occur south and west of the study area in high quality habitats associated with remnant forests and sandstone escarpments (ALA 2017). This species is considered unlikely to occur in the study area based on the paucity of suitable habitat and distribution of records.

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No Grey-headed Flying-fox were recorded during spotlighting. A Flying-fox camp is known adjacent to the Hunter River in Muswellbrook, within 1 km of the study area (DoEE 2017c). It is likely that some Grey-headed Flying-fox from this camp would visit the study area for foraging resources on occasions when Eucalypts are in flower, including those located in planted vegetation and remnant *Eucalyptus crebra* in the rail loop area. Potential roosting habitat for this species is limited to trees in the Hunter River riparian area, although none of this habitat will be removed for the Modification.

3.2.5 Terrestrial and Arboreal Mammals

Four native mammal species (excluding bats) were recorded; *Macropus giganteus* (Eastern Grey Kangaroo), *Macropus rufogriseus* (Red-neck Wallaby), *Wallabia bicolor* (Swamp Wallaby), and *Trichosurus vulpecula* (Brushtail Possum). Six introduced mammal species were recorded. No threatened mammal species (excluding bats) were recorded during the targeted fauna survey.

Targeted spotlighting and call-playback did not detect any Squirrel Gliders in the study area. The Squirrel Glider is considered unlikely to occur in the study area based on the poor connectivity of the hollow-bearing trees that are present, and an absence of any habitat areas with both hollow-bearing trees and suitable midstorey foraging resources.

Targeted survey using baited remote cameras did not record Spotted-tailed Quoll in the study area. The open habitat in the study area is unlikely to provide important habitat for Spotted-tailed Quoll which prefers wooded areas, however the species does occupy large home ranges, up to 3,500 ha (OEH 2017b), and may utilise parts of the study area on occasion as part of a large home range centred on higher quality habitats to the north and west of the study area. The study area contains no suitable den site habitat for Spotted-tailed Quoll.

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Appendix A Likelihood of Occurrence – Fauna Species

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution	Distribution* overlaps (yes/no)	Habitat quality present (good, marginal, none)	Species known to occur in region (yes/no)	Species known to occur on site (yes/no)	# of records within 5 km of study area	# of records within 10 km of study area	Likelihood of occurrence, and potential habitat
Botaurus poiciloptilus	Australasian Bittern	E	E	Found over most of NSW except for the far north-west.	Yes	None	Yes	No	0	0	No
Rostratula australis	Australian Painted Snipe	E	E	In NSW, most records are from the Murray-Darling Basin. Other recent records include wetlands on the Hawkesbury River and the Clarence and lower Hunter Valleys.	Yes	None	Yes	No	0	0	No
Ninox connivens	Barking Owl	V	-	Wide but sparse distribution in NSW, avoiding the most central arid regions. Core populations exist on the western slopes and plains and in some north-east coastal and escarpment forests.	Yes	Marginal	Yes	No	0	0	Potential, paddock trees and planted vegetation.
Falco subniger	Black Falcon	V	-	Sparsely distributed in NSW, occurring mostly in inland regions.	Yes	Good	Yes	No	1	1	Potential, open grasslands.
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	V	-	Widespread in NSW from the tablelands and western slopes of the Great Dividing Range to the north-west and central-west plains and the Riverina. Also, Richmond and Clarence River areas and a few scattered sites in the Hunter, Central Coast and Illawarra regions.	Yes	Marginal	Yes	No	1	1	Potential, planted vegetation and paddock trees.

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Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution	Distribution* overlaps (yes/no)	Habitat quality present (good, marginal, none)	Species known to occur in region (yes/no)	Species known to occur on site (yes/no)	# of records within 5 km of study area	# of records within 10 km of study area	Likelihood of occurrence, and potential habitat
Monarcha melanopsis	Black-faced Monarch	-	M	In NSW, occurs around the eastern slopes and tablelands of the Great Divide, inland to Coutts Crossing, Armidale, Widden Valley, Wollemi National Park and Wombeyan Caves. It is rarely recorded farther inland.	Yes	Marginal	Yes	No	0	0	Potential, riparian habitat or planted vegetation.
Ephippiorhynchus asiaticus	Black-necked Stork	E	-	Coastal and subcoastal northern and eastern Australia, south to central-eastern NSW and with vagrants recorded further south and inland.	Yes	None	Yes	No	1	1	No
Litoria booroolongensis	Booroolong Frog	E	E	Restricted to NSW and north-eastern Victoria, predominantly along the western-flowing streams of the Great Dividing Range. Several populations have recently been recorded in the Namoi catchment.	Yes	None	No	No	0	0	No
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V	-	From eastern through central NSW, west to Corowa, Wagga Wagga, Temora, Forbes, Dubbo and Inverell.	Yes	Marginal	Yes	No	5	9	Potential, planted vegetation or paddock trees when moving between higher quality habitats.
Phascogale tapoatafa	Brush-tailed Phascogale	V	-	In NSW it is mainly found east of the Great Dividing Range although there are occasional records west of the divide.	Yes	None	Yes	No	0	1	Unlikely

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Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution	Distribution* overlaps (yes/no)	Habitat quality present (good, marginal, none)	Species known to occur in region (yes/no)	Species known to occur on site (yes/no)	# of records within 5 km of study area	# of records within 10 km of study area	Likelihood of occurrence, and potential habitat
Petrogale penicillata	Brush-tailed Rock-wallaby	E	V	In NSW they occur from the QLD border in the north to Shoalhaven in the south, with the population in the Warrumbungle Ranges being the western limit.	Yes	None	Yes	No	0	0	No
Burhinus grallarius	Bush Stone-curlew	E	-	In NSW, found sporadically in coastal areas, and west of the divide throughout the sheep-wheat belt.	Yes	Marginal	Yes	No	0	0	Unlikely
Ardea ibis	Cattle Egret	-	M	Widespread and common across NSW.	Yes	Good	Yes	Yes	2	4	Yes, in grassland, agricultural lands.
Planigale maculata	Common Planigale	V	-	Occurs in coastal north-eastern NSW, and reported from as far south as the central NSW coast west of Sydney.	Yes	Marginal	No	No	0	0	Unlikely
Nyctophilus corbeni	Corben's Long-eared Bat	V	V	Distribution coincides approximately with the Murray Darling Basin; the Pilliga Scrub region is the distinct stronghold for this species.	Yes	None	Yes	No	0	0	Unlikely
Calidris ferruginea	Curlew Sandpiper	E	CE, M	Occurs along the entire coast of NSW, and sometimes in freshwater wetlands in the Murray-Darling Basin.	Yes	None	Yes	No	0	0	No
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V	-	Widespread in NSW from coast to inland including the western slopes of the Great Dividing Range and farther west. Species have also been recorded in southern and southwestern Australia.	Yes	Marginal	Yes	No	2	4	Potential, paddock trees, riparian area, and planted vegetation.

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Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution	Distribution* overlaps (yes/no)	Habitat quality present (good, marginal, none)	Species known to occur in region (yes/no)	Species known to occur on site (yes/no)	# of records within 5 km of study area	# of records within 10 km of study area	Likelihood of occurrence, and potential habitat
Stagonopleura guttata	Diamond Firetail	V	-	Widely distributed in NSW, mainly recorded in the Northern, Central and Southern Tablelands, the Northern, Central and South Western Slopes and the North West Plains and Riverina, and less commonly found in coastal areas and further inland.	Yes	Marginal	Yes	No	5	5	Potential, grassland, paddock trees and planted vegetation.
Miniopterus schreibersii oceanensis	Eastern Bentwing-bat	V	-	In NSW it occurs on both sides of the Great Dividing Range, from the coast inland to Moree, Dubbo and Wagga Wagga.	Yes	Good	Yes	Yes	8	24	Yes, wide-ranging species recorded from most habitats including open areas.
Vespadelus troughtoni	Eastern Cave Bat	V	-	Found in a broad band on both sides of the Great Dividing Range south to Kempsey, with records from the New England Tablelands and the upper north coast of NSW. The western limit appears to be the Warrumbungle Range, and there is a single record from southern NSW, east of the ACT.	Yes	Marginal	Yes	No	3	7	Potential, riparian area, paddock trees and planted vegetation. Foraging only.
Numenius madagascariensis	Eastern Curlew	-	CE, M	Summer migrant to Australia. Primarily coastal distribution in NSW, with some scattered inland records.	Yes	None	Yes	No	0	0	No

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Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution	Distribution* overlaps (yes/no)	Habitat quality present (good, marginal, none)	Species known to occur in region (yes/no)	Species known to occur on site (yes/no)	# of records within 5 km of study area	# of records within 10 km of study area	Likelihood of occurrence, and potential habitat
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V	-	South-east coast and ranges of Australia, from southern QLD to Victoria and Tasmania. In NSW, records extend to the western slopes of the Great Dividing Range.	Yes	None	Yes	No	1	6	Potential
Mormopterus norfolkensis	East Coast Freetail-bat	V	-	Found along the east coast from southern QLD to southern NSW.	Yes	Marginal	Yes	No	4	14	Yes, riparian area, paddock trees and planted vegetation.
Cercartetus nanus	Eastern Pygmy-possum	V	-	In NSW it extends from the coast inland as far as the Pilliga, Dubbo, Parkes and Wagga Wagga on the western slopes.	Yes	None	Yes	No	0	0	No
Petroica phoenicea	Flame Robin	V	-	In NSW, breeds in upland areas, and in winter many birds move to the inland slopes and plains, or occasionally to coastal areas. Likely that there are two separate populations in NSW, one in the Northern Tablelands, and another ranging from the Central to Southern Tablelands.	Yes	None	Yes	No	0	1	Unlikely
Stictonetta naevosa	Freckled Duck	V	-	Inland river systems, occurring as far as coastal NSW in times of drought.	Yes	None	Yes	No	0	0	No

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Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution	Distribution* overlaps (yes/no)	Habitat quality present (good, marginal, none)	Species known to occur in region (yes/no)	Species known to occur on site (yes/no)	# of records within 5 km of study area	# of records within 10 km of study area	Likelihood of occurrence, and potential habitat
Callocephalon fimbriatum	Gang-gang Cockatoo	V	-	In NSW, distributed from the south-east coast to the Hunter region, and inland to the Central Tablelands and south-west slopes. Isolated records known from as far north as Coffs Harbour and as far west as Mudgee.	Yes	None	Yes	No	0	0	No
Heleioporus australiacus	Giant Burrowing Frog	V	V	South eastern NSW and Victoria, in two distinct populations: a northern population in the sandstone geology of the Sydney Basin as far south as Ulladulla, and a southern population occurring from north of Narooma through to Walhalla, Victoria.	No	None	Yes	No	0	0	No
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	-	In NSW, widespread along coast and inland to the southern tablelands and central western plains, with a small population in the Riverina.	Yes	None	Yes	No	0	0	No
Scoteanax rueppellii	Greater Broad-nosed Bat	V	-	Both sides of the great divide, from the Atherton Tableland in QLD to north-eastern Victoria, mainly along river systems and gullies. In NSW it is widespread on the New England Tablelands.	Yes	Marginal	Yes	No	1	4	Potential, riparian area, paddock trees and planted vegetation.

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Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution	Distribution* overlaps (yes/no)	Habitat quality present (good, marginal, none)	Species known to occur in region (yes/no)	Species known to occur on site (yes/no)	# of records within 5 km of study area	# of records within 10 km of study area	Likelihood of occurrence, and potential habitat
Litoria aurea	Green and Golden Bell Frog	E	V	Since 1990, recorded from ~50 scattered sites within its former range in NSW, from the north coast near Brunswick Heads, south along the coast to Victoria. Records exist west to Bathurst, Tumut and the ACT region.	Yes	Marginal	Yes	No	0	0	Unlikely
Litoria brevipalmata	Green-thighed Frog	V	-	Isolated localities along the coast and ranges from just north of Wollongong to south-east QLD.	Yes	None	Yes	No	0	0	No
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V	-	In NSW, occurs on the western slopes of the Great Dividing Range, and as far as Louth and Balranald on the western plains. Also occurs in woodlands in the Hunter Valley and in some locations on the north coast.	Yes	Marginal	Yes	No	5	12	Potential, paddock trees and planted vegetation.
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	Along the eastern coast of Australia, from Bundaberg in QLD to Melbourne in Victoria.	Yes	Marginal	Yes	No	9	13	Potential foraging. No Roosting.
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	V	-	Found throughout much of inland NSW, with the exception of the extreme north-west, where it is replaced by subspecies *picata.*	Yes	Marginal	Yes	No	0	1	Potential, planted vegetation and paddock trees.

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Phascolarctos cinereus	Koala	V	V	In NSW it mainly occurs on the central and north coasts with some populations in the west of the Great Dividing Range. There are sparse and possibly disjunct populations in the Bega District, and at several sites on the southern tablelands.	Yes	Marginal	Yes	No	1	3	Unlikely
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	Recorded from Rockhampton in QLD south to Ulladulla in NSW. Largest concentrations of populations occur in the sandstone escarpments of the Sydney basin and the NSW north-west slopes.	Yes	Marginal	Yes	No	1	1	Unlikely
Miniopterus australis	Little Bentwing-bat	V	-	East coast and ranges south to Wollongong in NSW.	Yes	Marginal	Yes	No	1	5	Potential, riparian area and planted vegetation.
Hieraaetus morphnoides	Little Eagle	V	-	Throughout the Australian mainland, with the exception of the most densely-forested parts of the Dividing Range escarpment.	Yes	Marginal	Yes	No	0	1	Potential, may forage over all habitats in study area.
Glossopsitta pusilla	Little Lorikeet	V	-	In NSW, found from the coast westward as far as Dubbo and Albury.	Yes	Marginal	Yes	No	2	8	Likely, paddock trees and planted vegetation.
Anseranas semipalmata	Magpie Goose	V	-	In NSW, found in central and northern parts of the state, with vagrants as far as south-eastern NSW.	Yes	None	Yes	No	0	1	Unlikely

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Tyto novaehollandiae	Masked Owl	V	-	Recorded over approximately 90% of NSW, excluding the most arid north-western corner. Most abundant on the coast but extends to the western plains.	Yes	Marginal	Yes	No	0	0	Potential, paddock trees, planted vegetation and riparian areas.
Pseudomys novaehollandiae	New Holland Mouse	-	V	Fragmented distribution across eastern NSW.	Yes	None	Yes	No	0	0	No
Grantiella picta	Painted Honeyeater	V	V	Widely distributed in NSW, predominantly on the inland side of the Great Dividing Range but avoiding arid areas.	Yes	Marginal	Yes	No	0	0	Potential, planted vegetation and paddock trees.
Hoplocephalus bitorquatus	Pale-headed Snake	V	-	In NSW, it occurs from the coast to the western side of the Great Divide as far south as Tuggerah. Historically recorded west to Mungindi and Quambone on the Darling Riverine Plains, across the North West Slopes, and the New England Tablelands.	Yes	None	Yes	No	0	0	No
Aprasia parapulchella	Pink-tailed Legless Lizard	V	V	In NSW, only known from the Central and Southern Tablelands, and the South Western Slopes.	Yes	None	No	No	0	0	No
Ninox strenua	Powerful Owl	V	-	In NSW, it is widely distributed throughout the eastern forests from the coast inland to tablelands, with scattered records on the western slopes and plains.	Yes	Marginal	Yes	No	0	0	Potential, paddock trees, planted vegetation and riparian areas.

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Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution	Distribution* overlaps (yes/no)	Habitat quality present (good, marginal, none)	Species known to occur in region (yes/no)	Species known to occur on site (yes/no)	# of records within 5 km of study area	# of records within 10 km of study area	Likelihood of occurrence, and potential habitat
Merops ornatus	Rainbow Bee-eater	-	M	Distributed across much of mainland Australia, including NSW.	Yes	Good	Yes	Yes	1	2	Yes, may forage over vegetated areas and open country.
Erythrotriorchis radiatus	Red Goshawk	CE	V	In NSW, extends to ~30°S. Recent records confined to the Northern Rivers region north of the Clarence River.	No	None	No	No	0	0	No
Anthochaera phrygia	Regent Honeyeater	CE	CE	Inland slopes of south-east Australia, and less frequently in coastal areas. In NSW, most records are from the North-West Plains, North-West and South-West Slopes, Northern Tablelands, Central Tablelands and Southern Tablelands regions. The Lower Hunter and Central Coast have also seen many records in recent years.	Yes	Marginal	Yes	No	1	1	Potential, planted vegetation and paddock trees.
Rhipidura rufifrons	Rufous Fantail	-	M	Coastal and near coastal districts of northern and eastern Australia, including on and east of the Great Divide in NSW.	Yes	Marginal	Yes	No	0	0	Potential, riparian area and planted vegetation.
Myiagra cyanoleuca	Satin Flycatcher	-	M	In NSW, widespread on and east of the Great Divide and sparsely scattered on the western slopes, with very occasional records on the western plains.	Yes	Marginal	Yes	No	0	0	Potential, riparian area and planted vegetation.

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Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution	Distribution* overlaps (yes/no)	Habitat quality present (good, marginal, none)	Species known to occur in region (yes/no)	Species known to occur on site (yes/no)	# of records within 5 km of study area	# of records within 10 km of study area	Likelihood of occurrence, and potential habitat
Petroica boodang	Scarlet Robin	V	-	In NSW, it occurs from the coast to the inland slopes.	Yes	Marginal	Yes	No	0	0	Potential, paddock trees, riparian area and planted vegetation.
Tyto tenebricosa	Sooty Owl	V	-	Occupies the easternmost one-eighth of NSW, occurring on the coast, coastal escarpment and eastern tablelands.	Yes	None	Yes	No	0	1	No
Myotis macropus	Large-footed Myotis	V	-	In NSW, found in the coastal band. It is rarely found more than 100 km inland, except along major rivers.	Yes	Marginal	Yes	Yes	2	5	Potential, riparian area.
Chthonicola sagittata	Speckled Warbler	V	-	From south-eastern QLD, the eastern half of NSW and into Victoria, as far west as the Grampians, mostly on hills and tablelands of the Great Dividing Range and rarely on the coast.	Yes	Good	Yes	Yes	13	22	Yes, planted vegetation.
Circus assimilis	Spotted Harrier	V	-	Found throughout the Australian mainland, except in densely forested or wooded habitats, and rarely in Tasmania.	Yes	Good	Yes	No	2	4	Likely, forages over open grasslands.
Dasyurus maculatus	Spotted-tailed Quoll	V	E	Found on the east coast of NSW, Tasmania, eastern Victoria and north-eastern QLD.	Yes	Marginal	Yes	No	3	6	Potential, grasslands and planted vegetation.

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Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution	Distribution* overlaps (yes/no)	Habitat quality present (good, marginal, none)	Species known to occur in region (yes/no)	Species known to occur on site (yes/no)	# of records within 5 km of study area	# of records within 10 km of study area	Likelihood of occurrence, and potential habitat
Lophoictinia isura	Square-tailed Kite	V	-	In NSW, it is a regular resident in the north, north-east and along the major west-flowing river systems. It is a summer breeding migrant to the south-east, including the NSW south coast.	Yes	Marginal	Yes	No	0	0	Unlikely
Petaurus norfolcensis	Squirrel Glider	V	-	Widely though sparsely distributed on both sides of the Great Dividing Range in eastern Australia, from northern QLD to western Victoria.	Yes	Marginal	Yes	No	4	15	Unlikely
Hoplocephalus stephensii	Stephens' Banded Snake	V	-	Coast and ranges from Southern QLD to Gosford in NSW.	Yes	None	Yes	No	0	0	No
Delma impar	Striped Legless Lizard	V	V	In NSW, occurs in the Southern Tablelands, the South West Slopes and possibly on the Riverina.	Yes	Marginal	Yes	No	0	0	Unlikely
Ptilinopus superbus	Superb Fruit-Dove	V	-	Principally from north-eastern QLD to north-eastern NSW. Further south, it is confined to pockets of suitable habitat, and occurs as far south as Moruya.	Yes	None	Yes	No	0	0	No
Lathamus discolor	Swift Parrot	E	CE	Migrates from Tasmania to mainland in Autumn-Winter. In NSW, the species mostly occurs on the coast and South West Slopes.	Yes	Marginal	Yes	No	0	4	Potential, paddock trees and planted vegetation.
Neophema pulchella	Turquoise Parrot	V	-	Occurs along the length of NSW from the coastal plains to the western slopes of the Great Dividing Range.	Yes	Marginal	Yes	No	0	0	Potential, paddock trees and planted vegetation.

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Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution	Distribution* overlaps (yes/no)	Habitat quality present (good, marginal, none)	Species known to occur in region (yes/no)	Species known to occur on site (yes/no)	# of records within 5 km of study area	# of records within 10 km of study area	Likelihood of occurrence, and potential habitat
Daphoenositta chrysoptera	Varied Sittella	V	-	Distribution in NSW is nearly continuous from the coast to the far west.	Yes	Marginal	Yes	No	1	4	Potential, paddock trees and planted vegetation.
Haliaeetus leucogaster	White-bellied Sea-Eagle	V	-	Distributed along the coastline of mainland Australia and Tasmania, extending inland along some of the larger waterways, especially in eastern Australia.	Yes	None	Yes	No	2	4	Unlikely
Hirundapus caudacutus	White-throated Needletail	-	M	All coastal regions of NSW, inland to the western slopes and inland plains of the Great Divide.	Yes	Marginal	Yes	No	1	3	Unlikely
Motacilla flava	Yellow Wagtail	-	M	Regular summer migrant to mostly coastal Australia. In NSW recorded Sydney to Newcastle, the Hawkesbury and inland in the Bogan LGA.	Yes	Marginal	Yes	No	0	0	Unlikely
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V	-	There are scattered records of this species across the New England Tablelands and North West Slopes. Rare visitor in late summer and autumn to south-western NSW.	Yes	Good	Yes	Yes	1	5	Potential, occurs in most habitats with and without trees.

Note: * - distributions for threatened species gathered from threatened species profiles (OEH 2017b) and Atlas of Living Australia records (ALA 2017).

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Appendix B Fauna Species Recorded During Field Survey of Study Area between 8 and 13 November 2017

Common Name	Scientific Name	Status		Diurnal Bird Census	Remote Camera	SongMeter	Spotlighting	Reptile Search	Incidental
		BC Act	EPBC Act						
Birds									
Australasian Pipit	*Anthus novaeseelandiae*			x					
Australian Magpie	*Cracticus tibicen*			x	x				
Australian Raven	*Corvus coronoides*			x	x				
Bar-shouldered Dove	*Geopelia humeralis*			x					
Barn Owl	*Tyto alba*								x
Black Kite	*Milvus migrans*			x					
Black-faced Cuckoo-shrike	*Coracina novaehollandiae*			x					
Black-shouldered Kite	*Elanus axillaris*			x					
Brown Falcon	*Falco berigora*			x					
Brown Quail	*Coturnix ypsilophora*			x					
Brown Songlark	*Megalurus cruralis*			x					
Buff-rumped Thornbill	*Acanthiza reguloides*			x					
Cattle Egret	*Bubulcus ibis*			x					
Common Blackbird*	*Turdus merula*			x					
Common Myna*	*Acridotheres tristis*			x					
Common Starling*	*Sturnus vulgaris*			x					
Crested Pigeon	*Ocyphaps lophotes*			x					
Crimson Rosella	*Platycercus elegans*			x					
Dollarbird	*Eurystomus orientalis*			x					
Double-barred Finch	*Taeniopygia bichenovii*			x					
Eastern Koel	*Eudynamys orientalis*			x					
Eastern Rosella	*Platycercus eximius*			x					
Fairy Martin	*Petrochelidon ariel*			x					

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Common Name	Scientific Name	Status		Diurnal Bird Census	Remote Camera	SongMeter	Spotlighting	Reptile Search	Incidental
		BC Act	EPBC Act						
Galah	*Eolophus roseicapilla*			x					
Golden-headed Cisticola	*Cisticola exilis*			x					
Great Cormorant	*Phalacrocorax carbo*			x					
Grey Fantail	*Rhipidura albiscapa*			x					
House Sparrow*	*Passer domesticus*			x					
King Parrot	*Alisterus scapularis*			x					
Laughing Kookaburra	*Dacelo novaeguineae*			x					
Little Corella	*Cacatua sanguinea*			x					
Magpie-lark	*Grallina cyanoleuca*			x					
Nankeen Kestrel	*Falco cenchroides*			x					
Noisy Friarbird	*Philemon corniculatus*			x					
Noisy Miner	*Manorina melanocephala*			x					
Olive-backed Oriole	*Oriolus sagittatus*			x					
Pied Butcherbird	*Cracticus nigrogularis*			x					
Pied Currawong	*Strepera graculina*			x					
Rainbow Bee-eater	*Merops ornatus*			x					
Rainbow Lorikeet	*Trichoglossus moluccanus*			x					
Red Wattlebird	*Anthochaera carunculata*			x					
Red-browed Finch	*Neochmia temporalis*			x					
Red-rumped Parrot	*Psephotus haematonotus*			x					
Rufouse Whistler	*Pachycephala rufiventris*			x					
Sacred Kingfisher	*Todiramphus sanctus*			x					
Scarlet Honeyeater	*Myzomela sanguinolenta*			x					
Silvereye	*Zosterops lateralis*			x					
Speckled Warbler	*Chthonicola sagittata*	V		x					
Spiny-cheeked Honeyeater	*Acanthagenys rufogularis*			x					
Spotted Dove*	*Spilopelia chinensis*			x					
Straw-necked Ibis	*Threskiornis spinicollis*			x					
Sulphur-crested Cockatoo	*Cacatua galerita*			x					

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Common Name	Scientific Name	Status		Diurnal Bird Census	Remote Camera	SongMeter	Spotlighting	Reptile Search	Incidental
		BC Act	EPBC Act						
Superb Fairy-wren	*Malurus cyaneus*			x					
Tawny Frogmouth	*Podargus strigoides*						x		
Tree Martin	*Petrochelidon nigricans*			x					
Wedge-tailed Eagle	*Aquila audax*			x					
Welcome Swallow	*Hirundo neoxena*			x					
White-browed Scrubwren	*Sericornis frontalis*			x					
White-plumed Honeyeater	*Lichenostomus penicillatus*			x					
White-winged Chough	*Corcorax melanorhamphos*			x					
Willie Wagtail	*Rhipidura leucophrys*			x					
Yellow Thornbill	*Acanthiza nana*			x					
Yellow-faced Honeyeater	*Lichenostomus chrysops*			x					
Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*			x					
Zebra Finch	*Taeniopygia guttata*			x					
Mammals									
Black Rat*	*Rattus rattus*				x		x		
Common Brushtail Possum	*Trichosurus vulpecula*				x		x		
Eastern Grey Kangaroo	*Macropus giganteus*				x		x		x
European Hare*	*Lepus europaeus*				x		x		x
European Rabbit*	*Oryctolagus cuniculus*				x		x		x
Feral Cat*	*Felis catus*				x				x
Feral Pig*	*Sus scrofa*				x				x
Red Fox*	*Vulpes vulpes*				x		x		
Red-necked Wallaby	*Macropus rufogriseus*						x		x
Swamp Wallaby	*Wallabia bicolor*				x				
Reptiles									
Eastern Brown Snake	*Pseudonaja textilis*							x	
Tree Skink	*Egernia striolata*							x	
Wood Gecko	*Diplodactylus vittatus*						x		

*introduced species

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APPENDIX 5

Mount Pleasant Operation Rail Modification – Portion of South West Out of Pit Emplacement – Terrestrial Fauna Survey Report (Eco Logical Australia, 2017b)

Mount Pleasant Operation Rail Modification – Portion of South West Out of Pit Emplacement

Terrestrial Fauna Survey Report

Prepared for
MACH Energy Australia Pty Ltd

18 December 2017



DOCUMENT TRACKING

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Prepared by	Tom Schmidt, Kalya Abbey
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Approved by	Daniel Magdi
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Contents

1 Introduction 1
1.1 Study Area 1
1.2 Objectives 1

2 Methods 3
2.1 Target Species 3
2.2 Field Survey 4
2.2.1 Diurnal Bird Surveys 6
2.2.2 Microbat Surveys 6
2.2.3 Terrestrial and Arboreal Mammal Surveys 6

3 Results 7
3.1 Fauna Habitats 7
3.1.1 Native Spotted Gum and White Box Forests 7
3.1.2 Mixed Native/Exotic Derived Grassland 8
3.1.3 Paddock Trees and Stags 10
3.1.4 Koala Habitat 11
3.2 Fauna Species 11
3.2.1 Diurnal Birds 12
3.2.2 Nocturnal Birds 13
3.2.3 Reptiles 13
3.2.4 Bats 13
3.2.5 Terrestrial and Arboreal Mammals 14

4 References 17

Appendix A Likelihood of Occurrence – Fauna Species A-1

Appendix B Fauna Species Recorded During Field Survey of Study Area between 5 and 11 December 2017 ..... B-1

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List of Figures

Figure 1: Study area 2

Figure 2: Fauna survey effort 5

Figure 3: Fauna survey results 15

Figure 4: Threatened Species Database Records (OEH 2017a) 16

List of Tables

Table 1: Weather conditions during the field survey* 4

List of Photographs

Photograph 1. Spotted Gum Forest in the north east of the study area 7

Photograph 2. White Box Forest in the north west of the study area 8

Photograph 3. Mixed native/exotic grassland in the study area with scattered paddock trees 9

Photograph 4. Saplings indicating regeneration around some of the paddock trees 9

Photograph 5. Patch of paddock trees (White Box) and stag with hollows 10

Photograph 6. Patch of paddock trees including some with hollows 11

Photograph 7. Squirrel Glider in the study area 14

Abbreviations

Abbreviation	Description
BC Act	NSW Biodiversity Conservation Act 2016
DEC	NSW Department of Environment and Conservation
DoEE	Commonwealth Department of the Environment and Energy
ELA	Eco Logical Australia Pty Ltd
EPBC Act	Commonwealth Environment Protection and Biodiversity Conservation Act 1999
MACH Energy	MACH Energy Australia Pty Ltd
OEH	NSW Office of Environment and Heritage
SEPP 44	State Environmental Planning Policy No. 44 - Koala Habitat Protection

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1 INTRODUCTION

Eco Logical Australia Pty Ltd (ELA) was engaged by MACH Energy Australia Pty Ltd (MACH Energy) to undertake terrestrial fauna surveys at the Mount Pleasant Operation. The surveys were undertaken in a currently approved infrastructure area, which although approved, has not yet been constructed. MACH Energy are seeking to relinquish a portion of the area as part of the Rail Modification.

The fauna surveys have been undertaken to inform the potential presence of threatened fauna listed under the New South Wales (NSW) *Biodiversity Conservation Act 2016* (BC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), and habitat in the vicinity of the Rail Modification.

1.1 Study Area

The study area for the field survey component of the fauna assessment covers approximately 35 hectares (ha) and is shown in **Figure 1**.

1.2 Objectives

The fauna survey has been undertaken to provide the following information:

- a description of the fauna habitat characteristics of the study area and surrounds;
- identification of threatened fauna species within the study area;
- identification of habitat corridors and linkages between areas of remnant native vegetation that assist fauna movement through the area; and
- an assessment against the *State Environmental Planning Policy No. 44 - Koala Habitat Protection* (SEPP 44).

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Figure 1: Study area

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2 METHODS

2.1 Target Species

The field survey was designed to target threatened species identified as potentially occurring in the study area, with a focus on those species identified during fauna surveys undertaken for the Rail Modification (ELA 2017):

- *Chthonicola sagittata* (Speckled Warbler) – vulnerable (BC Act);
- *Mormopterus norfolkensis* (East Coast Freetail Bat)[1] – vulnerable (BC Act); and
- *Miniopterus schreibersii (orianae) oceanensis* (Eastern Bentwing Bat) – vulnerable (BC Act).

Searches of the following databases were undertaken for the study area:

- BioNet Atlas of NSW Wildlife (Office of Environment and Heritage [OEH] 2017a) for the area bound by coordinates North: -32.14 West: 150.71 East: 150.93 South: -32.30 (Datum GDA94), a buffer of 10 kilometres (km) from the study area.
- EPBC Protected Matters Search Tool (Department of the Environment and Energy [DoEE] 2017a) using a 10 km buffer around the approximate centre point of the study area at -32.23751 150.82158 (Datum GDA94).
- The Species Credit Species list generated from the BioBanking Credit Calculator (OEH 2017b) for the Mount Pleasant Operation Rail Modification study area.

Threatened species identified in the database searches together with an assessment of the likelihood of occurrence for each species is provided in **Appendix A**. Each species' likelihood of occurrence was determined by reviewing records in the area, considering the habitat available and using knowledge of the species ecology.

Five terms for the likelihood of occurrence of species are used in this report, as defined below:

- "yes" = the species was or has been recorded on the site (i.e. the species is known to occur);
- "likely" = a medium to high probability that a species uses the site;
- "potential" = suitable habitat for a species occurs on the site, but there is insufficient information to categorise the species as likely, or unlikely to occur;
- "unlikely" = a very low to low probability that a species uses the site; and
- "no" = habitat on site and in the vicinity is unsuitable for the species.

[1] This species is listed as Eastern Freetail-bat (*Mormopterus norfolkensis*) in the BC Act.

2.2 Field Survey

The study area was surveyed over six days (5th to the 11th December 2017) by ELA ecologists Tom Schmidt and Mitchell Scott. Temperatures were mild to hot, ranging from 11.7 degrees Celsius (°C) to 36.4 °C, with light to moderate winds, and some rainfall during the survey. Weather records were collected from the nearest public weather station in Scone (Bureau of Meteorology 2017) (**Table 1**).

Table 1: Weather conditions during the field survey*

Date	Minimum Temperature (°C)	Maximum Temperature (°C)	Rainfall (mm)	Wind speed (3pm) (km/h)
5 December 2017	16.7	27.6	0	30
6 December 2017	13.2	29.4	5.4	31
7 December 2017	12.4	34.1	0	24
8 December 2017	13.7	36.4	0	33
9 December 2017	17.5	28.4	1	24
10 December 2017	12.3	30.9	0	13
11 December 2017	11.7	33.6	0	15

*Weather observations were taken from www.bom.gov.au, for Scone (station 061363).

mm = millimetres, km/h = kilometres per hour.

The survey design was informed by the relevant NSW and Commonwealth survey guidelines, including the *NSW Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities (Working Draft)* (Department of Environment and Conservation 2004), *Survey Guidelines for Australia's Threatened Birds* (Department of Environment, Water, Heritage and the Arts [DEWHA] 2010a), *Survey Guidelines for Australia's Threatened Bats* (DEWHA 2010b), *Survey Guidelines for Australia's Threatened Mammals* (Department of Sustainability, Environment, Water, Populations and Communities [SEWPaC] 2011a) and *Survey Guidelines for Australia's Threatened Reptiles* (SEWPaC 2011b). The survey consisted of:

- fauna habitat mapping and recording of habitat values (including a Koala habitat assessment infomed by SEPP 44);
- diurnal bird surveys;
- microbat detection devices (Song Meter SM2) and harp trapping;
- remote camera surveys (Reconyx Hyperfire HC600);
- nocturnal mammal surveys (spotlighting and stag watching); and
- opportunistic fauna sightings recorded throughout the study area.

Figure 2 shows the field survey locations.

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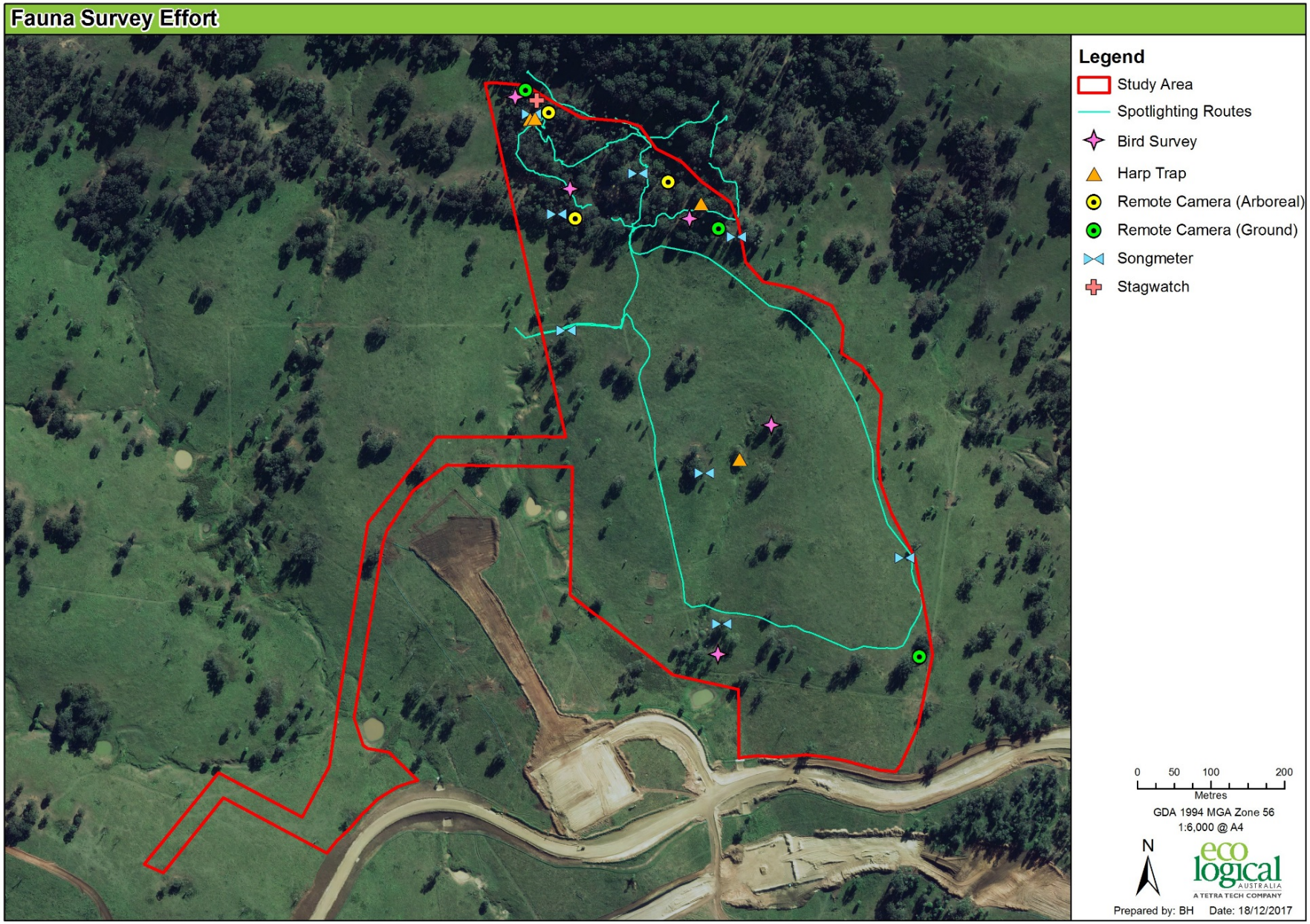

Figure 2: Fauna survey effort

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2.2.1 Diurnal Bird Surveys

Diurnal bird surveys were conducted by performing 20 minute point counts at five different locations across the study area by two ecologists during the morning and afternoon. The survey locations were positioned in a representative sample of fauna habitats present within the study area (see **Figure 2**). All five sites were each surveyed four times on two mornings and two afternoons, resulting in approximately 13 person hours of bird survey in total. Bird species were identified using both visual and acoustic cues. Opportunistic bird observations were conducted while travelling around the study area.

2.2.2 Microbat Surveys

Microbat surveys were conducted using song meters set to detect ultrasonic bat calls. The song meters were placed at eight separate locations across the study area for four nights (**Figure 2**) targeting potential habitat, in particular hollow-bearing trees and flyways in native vegetation. Call data was downloaded and provided for analysis by Dr Greg Richards, from Greg Richards and Associates. This report does not include the results of the analysis.

Harp trapping was conducted using four harp traps on two nights resulting in a survey effort of eight trap nights. Harp traps were set in flyways among suitable habitat to target the greatest number of bat captures (**Figure 2**).

2.2.3 Terrestrial and Arboreal Mammal Surveys

Remote cameras were positioned at six sites (see **Figure 2**) over six nights for a combined survey effort of 36 nights. To target *Dasyurus maculatus* (Spotted-tailed Quoll), three remote cameras were set near ground level and baited with chicken necks and sardines. To target Squirrel Glider (*Petaurus norfolcensis*), three remote cameras were set in trees and baited with a peanut butter, oats and honey mixture and the tree bait sprayed with a honey water solution

Spotlighting surveys were conducted for at least one hour by two ecologists on each of the two nights (5th and 6th of December 2017), targeting suitable habitat for nocturnal mammals in the study area. Total survey effort for spotlighting was four person hours.

Stag watching was undertaken at one site on one evening. Two observers watched a hollow for approximately half an hour before dusk, until half an hour after dusk, in an attempt to observe nocturnal fauna emerging. Stag watching was followed by spotlighting of the area.

Areas of potential habitat for the Koala were spotlighted and inspected for signs of Koala such as scats and scratch marks on tree trunks.

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3 RESULTS

3.1 Fauna Habitats

The southern part of the study area is largely cleared, consisting of open paddocks with a mixed native/exotic grassland and occasional scattered remnant trees and stags. In the north of the study area an area of forest is present, and this area has connectivity with a larger mosaic of forest and woodland further to the north. The study area ranges from approximately 230 metres (m) to 300 m above sea level, and slopes moderately from north to south. Ephemeral drainage lines are present and there is evidence of erosion.

3.1.1 Native Spotted Gum and White Box Forests

The northern portion of the study area contains remnant forest communities. The canopy is dominated by *Corymbia maculata* (Spotted Gum) in the east (**Photograph 1**) and *Eucalyptus albens* (White Box) in the west (**Photograph 2**), with *Brachychiton populneus* (Kurrajong) and *Eucalyptus crebra* (Narrow-leaved Ironbark) also present. The sparse midstorey includes *Notelaea longifolia* (Large Mock-olive), *Bursaria spinosa* (Blackthorn), *Acacia paradoxa* (Kangaroo Thorn) and regenerating canopy species. The grassy understorey contains native (Speargrasses) *Austrostipa* spp. and *Cymbopogon refractus* (Barbed-wire Grass). Mistletoes are also present in the canopy. One small dam is present within the forest area, although it was dry during the current survey.

The native forest within the study area provides high quality habitat for a variety of native species, including threatened species. This area contains large amounts of fallen timber and woody debris, many hollow bearing trees and foraging resources.



Photograph 1. Spotted Gum Forest in the north east of the study area.



Photograph 2. White Box Forest in the north west of the study area.

3.1.2 Mixed Native/Exotic Derived Grassland

The majority of the study area consists of derived native grassland with large, scattered remnant trees (**Photograph 3**). A small number of regenerating saplings are present close to isolated paddock trees (**Photograph 4**), however the area is generally devoid of shrubs and mid-storey vegetation. The area includes native *Austrostipa* spp. with weed cover, in particular *Carthamus lanatu*s (Saffron Thistle), *Gomphocarpus fruticosus* (Narrow-leaved Cotton Bush), *Lycium ferocissimum* (African Boxthorn) and *Galenia pubescens* (Galenia). The area contains limited other habitat features such as surface rock, and fallen timber is restricted to areas around paddock trees. Notwithstanding, the habitat value of this area is significantly greater than the majority of the area to be disturbed by the Rail Modification.

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Photograph 3. Mixed native/exotic grassland in the study area with scattered paddock trees.



Photograph 4. Saplings indicating regeneration around some of the paddock trees.

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3.1.3 Paddock Trees and Stags

Paddock trees are scattered throughout the grassland of the study area. These include isolated trees, patches with multiple trees and dead stags. Many of the paddock trees and stags are large, containing numerous hollows (**Photographs 5 and 6**), providing potential habitat for hollow dependent threatened bird and bat species in particular.



Photograph 5. Patch of paddock trees (White Box) and stag with hollows.



Photograph 7. Patch of paddock trees including some with hollows.

3.1.4 Koala Habitat

The areas containing designated Koala 'Feed tree species' as listed under Schedule 2 of SEPP 44 have been mapped across the study area (**Figure 3**). The scheduled Koala 'Feed tree species' *Eucalyptus albens* (White Box) is present in the study area.

Potential Koala habitat is defined in Section 4 of SEPP 44 as being that 'Feed tree species' constitute at least 15% of the total number of trees. Within the study area (including consideration of the land surrounding), potential Koala habitat is present in White Box forest in the north west of the study area (**Photograph 2**), scattered White Box also occur as paddock trees throughout the rest of the study area. No evidence of Koalas (sightings, scratches or scats) was recorded in the study area, and the study area does not qualify as core Koala habitat due to the absence of evidence of attributes such as breeding females, and recent sightings, as per the definition in Section 4 of SEPP 44.

3.2 Fauna Species

A total of 61 fauna species were recorded within the study area during the field survey period. This consisted of 46 birds (45 native, one introduced), nine non-flying mammals (seven native and two introduced), four native microbats, and two native reptiles (**Appendix B**).

Two threatened species were recorded during the field survey (**Figure 3)**:

- *Chthonicola sagittata* (Speckled Warbler) – vulnerable (BC Act); and
- *Petaurus norfolcensis* (Squirrel Glider) – vulnerable (BC Act).

Threatened bat species recorded (Greg Richards and Associates, 2017) in the Study Area included:

- *Falsistrellus tasmaniensis* (Eastern False Pipistrelle) – vulnerable (BC Act) (possible record);
- *Saccolaimus flaviventris* (Yellow-bellied Sheathtail Bat) – vulnerable (BC Act);
- *Scoteanax rueppellii* (Greater Broad-nosed Bat) – vulnerable (BC Act) (possible record); and
- *Vespadelus troughtoni* (Eastern Cave Bat) (vulnerable - BC Act).

A further 31 species listed under the BC Act and/or EPBC Act were considered potential (26) or likely (five) (with one foraging only) to occur in the study area as a result of the data audit, habitat assessment and survey results (**Appendix A**). Most species assessed as having potential to occur in the study area are mobile species such as birds and bats, which may occur seasonally in forest areas when resources are abundant such as blossoming Eucalypts, or pass through marginal habitats such as paddock trees when moving between higher quality habitats in the region. *Miniopterus schreibersii oceanensis* (Eastern Bentwing Bat), *Pteropus poliocephalus* (Grey-headed Flying-fox) (foraging only), *Circus assimilis* (Spotted Harrier); *Glossopsitta pusilla* (Little Lorikeet) and (*Merops ornatus*) Rainbow Bee-eater were assessed as likely to occur in the study area (**Appendix A**) and are discussed below.

3.2.1 Diurnal Birds

Forty-four (44) diurnal bird species were recorded during the field survey, including one threatened species - *Chthonicola sagittata* (Speckled Warbler), listed as vulnerable under the BC Act. Speckled Warbler was recorded from within White Box Woodland vegetation in the north west of the study area (**Figure 3**), with a maximum of three individuals recorded. It is considered likely that this species breeds in or adjacent the study area as the Speckled Warbler is a sedentary species, and the group was regularly recorded in the same territory among suitable breeding habitat during the survey which took place during the breeding season (August - January) (OEH 2017c).

Anthochaera phrygia (Regent Honeyeater) and *Grantiella picta* (Painted Honeyeater) were not recorded during the field survey. Suitable habitat for these species is present in the study area, primarily in the forest area and in paddock trees to a lesser extent. Although not recorded during targeted surveys, both species are highly mobile and are considered to have potential to occur in the study area, however it is unlikely they would regularly visit the study area or be reliant on its resources for breeding. Several other threatened bird species, mostly woodland birds and raptors, are considered to have the potential to occur in the study area on occasion (**Appendix A**).

Spotted Harrier is a mobile raptor that occupies a variety of habitats including open woodland, grasslands and agricultural land (OEH 2017c), and is considered likely to occur in the study area as part of a wide home range, as this species is highly mobile and the study area contains suitable habitat for the species. Little Lorikeet is a nomadic, nectar forager that utilises flowering Eucalypts (OEH 2017c). The species is considered likely to occur in the study area when eucalypts are in flower as suitable foraging habitat is present in both forest areas and paddock trees and the species is mobile and known to occur in the region. Spotted Gum Forest in the study area also provides potential breeding habitat for Little Lorikeet within hollow-bearing Spotted Gums.

Hirundapus caudacutus (White-throated Needletail), listed as a Migratory and Marine species under the EPBC Act, was recorded flying over the study area during the survey (**Figure 3**). This species is a non-breeding migrant, widespread in eastern Australia occupying a variety of habitats including cleared areas and farmlands (DoEE 2017b). Rainbow Bee-eater, listed as a Marine species under the EPBC Act, is a common and wide spread species occupying a variety of habitats including cleared areas and farmlands, and is also considered likely to occur in the study area (**Appendix A**).

3.2.2 Nocturnal Birds

Two (2) nocturnal bird species, *Aegotheles cristatus* (Australian Owlet-nightjar) and *Eurostopodus mystacalis* (White-throated Nightjar) were recorded during the field survey. Targeted surveys (call-playback) for threatened nocturnal bird species were not undertaken during the assessment and no threatened nocturnal birds were recorded during spotlighting. Large hollows suitable for nesting by threatened large forest owls *Ninox connivens* (Barking Owl), *Ninox strenua* (Powerful Owl) and *Tyto novaehollandiae* (Masked Owl) are present in the forest area of the study area, and these species are therefore considered to have potential to occur in the study area.

3.2.3 Reptiles

Two (2) native reptile species were recorded in the study area *Pogona barbata* (Bearded Dragon) and *Varanus varius* (Lace Monitor). No threatened reptile species were recorded. Based on condition of available habitat in the study area and species distributions, threatened reptile species are considered unlikely to occur.

3.2.4 Bats

Microbat surveys consisted of ultrasonic call recording using song meters and harp trapping.

A total of 15 bats were captured in harp traps representing four species, none of which are listed as threatened species. These consisted of ten *Nyctophilus geoffroyi* (Lesser Long-eared Bat), three *Vespadelus vulturnus* (Little Forest Bat), one *Scotorepens balstoni* (Inland Broad-nosed Bat), and one *Mormopterus* (Ozimops) *planiceps* (Southern Freetail Bat).

Large hollow bearing trees and stags are present throughout the study area in both the forest area and in scattered paddock trees. It is considered likely that some hollows within the study area are regularly used by hollow-dependent microbat species.

Call data recorded during the surveys has been provided for analysis by Dr Greg Richards, of Greg Richards and Associates. Threatened bat species recorded in the Study Area included:

- *Falsistrellus tasmaniensis* (Eastern False Pipistrelle) – vulnerable (BC Act) (possible record);
- *Saccolaimus flaviventris* (Yellow-bellied Sheathtail Bat) – vulnerable (BC Act);
- *Scoteanax rueppellii* (Greater Broad-nosed Bat) – vulnerable (BC Act) (possible record); and
- *Vespadelus troughtoni* (Eastern Cave Bat) (vulnerable - BC Act).

The study area contains suitable habitat for all of the targeted threatened bats, which occupy a variety of habitats including open woodlands and grasslands (Churchill 2009).

No Grey-headed Flying-fox were recorded during spotlighting. A Flying-fox camp is known adjacent to the Hunter River in Muswellbrook, approximately 6 km south east of the study area (DoEE 2017c). The study area does not provide roosting habitat for Grey-headed Flying-fox, however forest areas and paddock trees provide potential foraging resources for this species.

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3.2.5 Terrestrial and Arboreal Mammals

Seven native and two introduced mammal species (excluding bats) were recorded in the study area (**Appendix B**). One threatened mammal species, Squirrel Glider, was recorded.

Squirrel Glider was recorded in forest areas in the north of the study area (**Photograph 7**; **Figure 3**). This forest area provides high quality habitat for the Squirrel Glider, with abundant hollows, foraging resources and habitat connectivity. Scattered paddock trees in the remainder of the study area are unlikely to support Squirrel Glider due to poor connectivity and are considered unsuitable habitat.



Photograph 7. Squirrel Glider in the study area.

Squirrel Glider can potentially be confused with the similar non-threatened *Petaurus breviceps* (Sugar Glider). Gliders recorded during the spotlighting survey were identified as Squirrel Glider based on their large size, and thick, bushy tails. Squirrel Glider have been previously recorded in close proximity to the study area (**Figure 4**).

Targeted survey using baited remote cameras did not record Spotted-tailed Quoll (*Dasyurus maculatus)* in the study area. The Spotted-tailed Quoll prefers wooded areas, and can occupy large home ranges, up to 3,500 ha (OEH 2017c). Forest habitat in the north is considered the most suitable area for the species in the study area, and although the species was not recorded during the targeted survey, it is considered that the study area could potentially form part of a large home range for a Spotted-tailed Quoll in the area.

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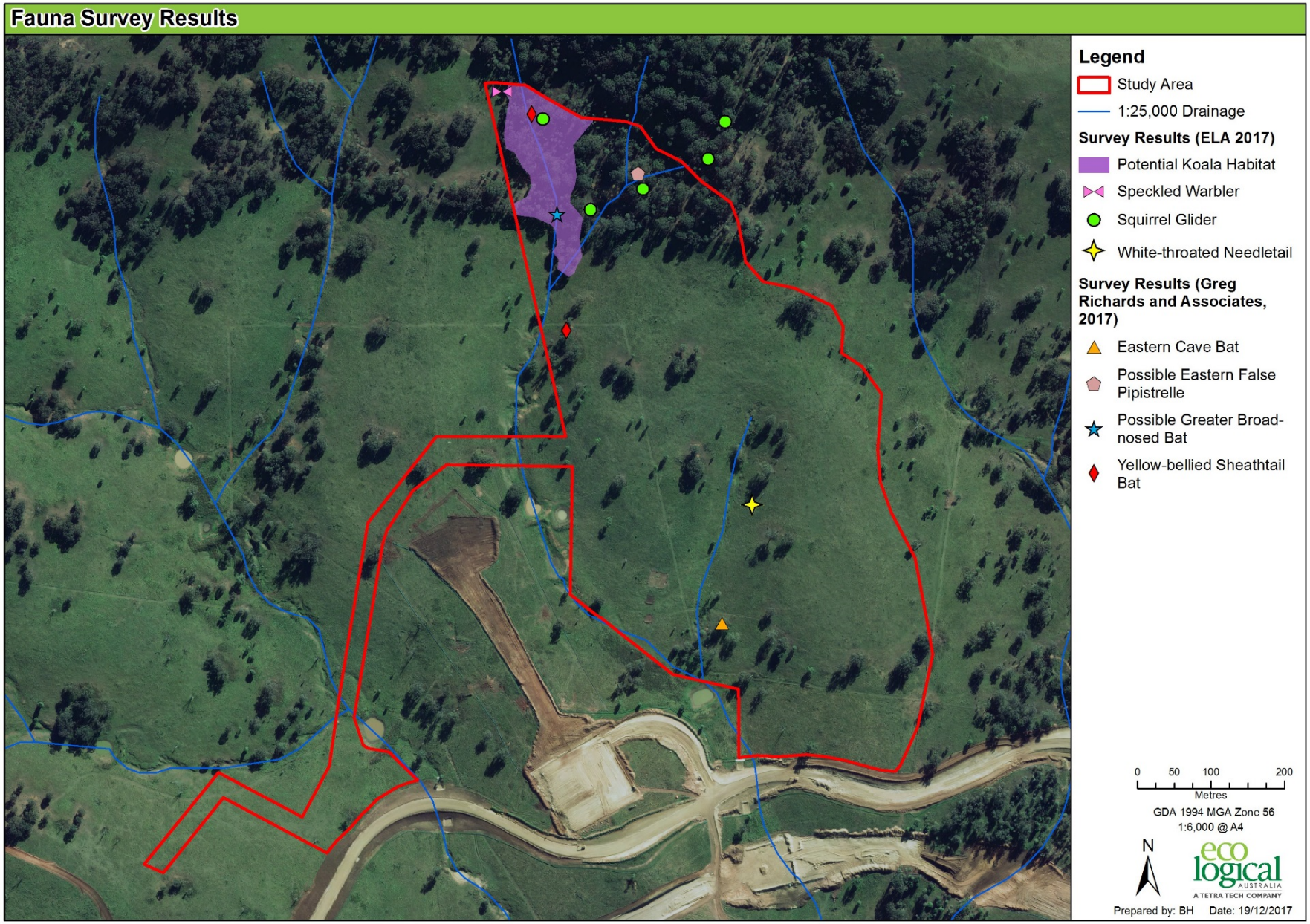

Figure 3: Fauna survey results

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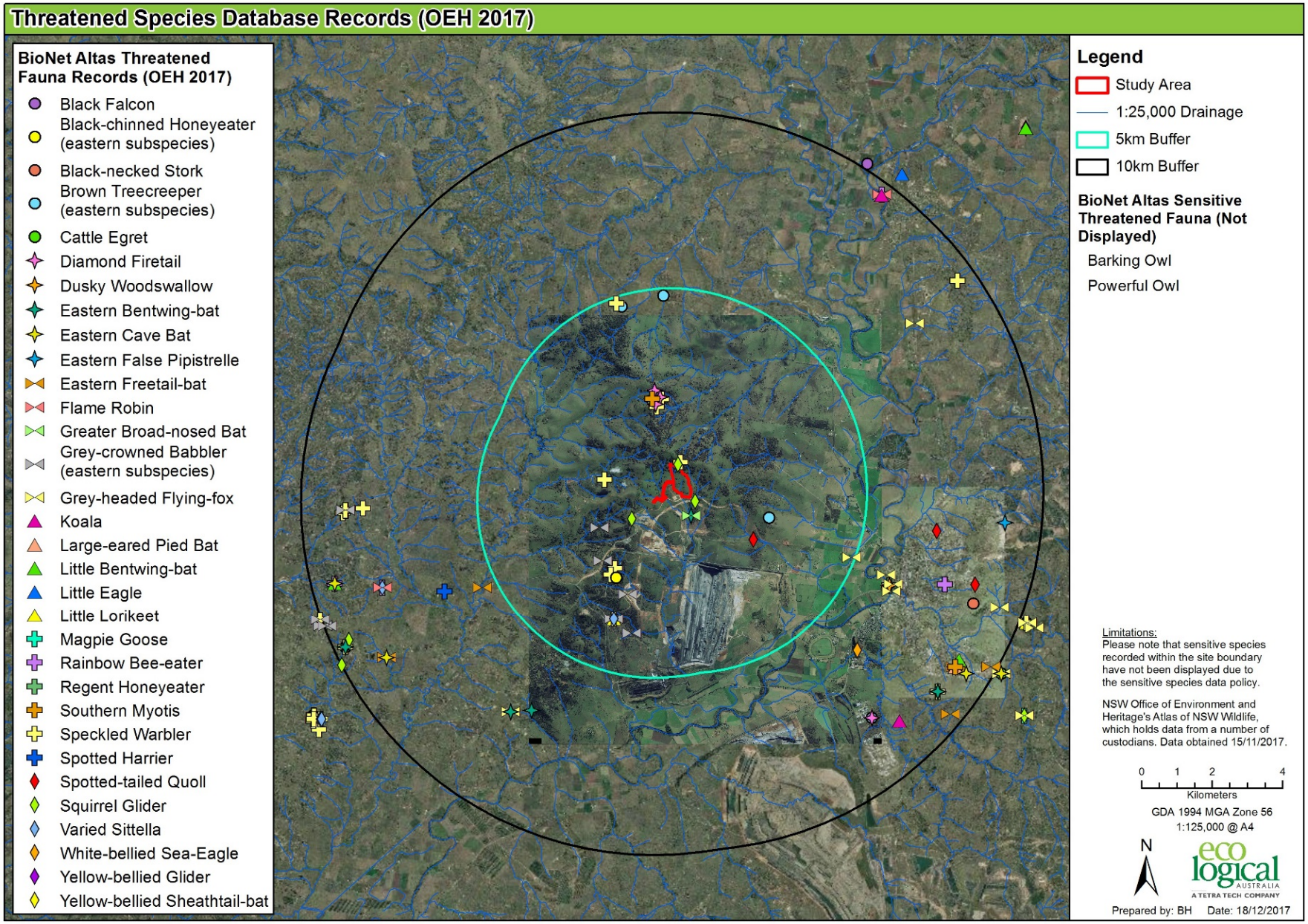

Figure 4: Threatened Species Database Records (OEH 2017a)

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APPENDIX A LIKELIHOOD OF OCCURRENCE – FAUNA SPECIES

Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution	Distribution overlaps (yes/no)	Habitat quality present (good, marginal, none)	Species known to occur in region (yes/no)	Species known to occur on site (yes/no)	Likelihood of occurrence, and potential habitat
Botaurus poiciloptilus	Australasian Bittern	E	E	Found over most of NSW except for the far north-west.	Yes	None	Yes	No	No
Rostratula australis	Australian Painted Snipe	E	E	In NSW most records are from the Murray-Darling Basin. Other recent records include wetlands on the Hawkesbury River and the Clarence and lower Hunter Valleys.	Yes	None	Yes	No	No
Ninox connivens	Barking Owl	V	-	Wide but sparse distribution in NSW, avoiding the most central arid regions. Core populations exist on the western slopes and plains and in some northeast coastal and escarpment forests.	Yes	Good	Yes	No	Potential, forest areas.
Falco subniger	Black Falcon	V	-	Sparsely distributed in NSW, occurring mostly in inland regions.	Yes	Marginal	Yes	No	Potential, all areas.
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	V	-	Widespread in NSW from the tablelands and western slopes of the Great Dividing Range to the north-west and central-west plains and the Riverina. Also Richmond and Clarence River areas and a few scattered sites in the Hunter, Central Coast and Illawarra regions.	Yes	Marginal	Yes	No	Potential, forest and paddock trees.

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Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution	Distribution overlaps (yes/no)	Habitat quality present (good, marginal, none)	Species known to occur in region (yes/no)	Species known to occur on site (yes/no)	Likelihood of occurrence, and potential habitat
Monarcha melanopsis	Black-faced Monarch	-	M	In NSW, occurs around the eastern slopes and tablelands of the Great Divide, inland to Coutts Crossing, Armidale, Widden Valley, Wollemi National Park and Wombeyan Caves. It is rarely recorded farther inland.	Yes	Marginal	Yes	No	Potential, forest areas.
Ephippiorhynchus asiaticus	Black-necked Stork	E	-	Coastal and subcoastal northern and eastern Australia, south to central-eastern NSW and with vagrants recorded further south and inland.	Yes	None	Yes	No	No
Litoria booroolongensis	Booroolong Frog	E	E	Restricted to NSW and north-eastern Victoria, predominantly along the western-flowing streams of the Great Dividing Range. Several populations have recently been recorded in the Namoi catchment.	Yes	None	Yes	No	No
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V	-	From eastern through central NSW, west to Corowa, Wagga Wagga, Temora, Forbes, Dubbo and Inverell.	Yes	Good	Yes	No	Potential, forest area.
Phascogale tapoatafa	Brush-tailed Phascogale	V	-	In NSW it is mainly found east of the Great Dividing Range although there are occasional records west of the divide.	Yes	Good	Yes	No	Potential, forest area.
Petrogale penicillata	Brush-tailed Rock-wallaby	E	V	In NSW they occur from the QLD border in the north to the Shoalhaven in the south, with the population in the Warrumbungle Ranges being the western limit.	Yes	None	Yes	No	No

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Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution	Distribution overlaps (yes/no)	Habitat quality present (good, marginal, none)	Species known to occur in region (yes/no)	Species known to occur on site (yes/no)	Likelihood of occurrence, and potential habitat
Burhinus grallarius	Bush Stone-curlew	E	-	In NSW, found sporadically in coastal areas, and west of the divide throughout the sheep-wheat belt.	Yes	Marginal	Yes	No	Unlikely
Ardea ibis	Cattle Egret	-	M	Widespread and common across NSW.	Yes	Marginal	Yes	No	Potential
Planigale maculata	Common Planigale	V	-	Occurs in coastal north-eastern NSW, and reported from as far south as the central NSW coast west of Sydney.	Yes	Marginal	No	No	Unlikely
Nyctophilus corbeni	Corben's Long-eared Bat	V	V	Distribution coincides approximately with the Murray Darling Basin; the Pilliga Scrub region is the distinct stronghold for this species.	Yes	Marginal	Yes	No	Unlikely
Calidris ferruginea	Curlew Sandpiper	E	CE, M	Occurs along the entire coast of NSW, and sometimes in freshwater wetlands in the Murray-Darling Basin.	Yes	None	Yes	No	No
Stagonopleura guttata	Diamond Firetail	V	-	Widely distributed in NSW, mainly recorded in the Northern, Central and Southern Tablelands, the Northern, Central and South Western Slopes and the North West Plains and Riverina, and less commonly found in coastal areas and further inland.	Yes	Good	Yes	No	Potential, forest areas and paddock trees.
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V	-	Widespread in NSW from coast to inland including the western slopes of the Great Dividing Range and farther west. Species have also been recorded in southern and southwestern Australia.	Yes	Good	Yes	No	Potential, forest areas and paddock trees.

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Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution	Distribution overlaps (yes/no)	Habitat quality present (good, marginal, none)	Species known to occur in region (yes/no)	Species known to occur on site (yes/no)	Likelihood of occurrence, and potential habitat
Miniopterus schreibersii oceanensis	Eastern Bentwing-bat	V	-	In NSW it occurs on both sides of the Great Dividing Range, from the coast inland to Moree, Dubbo and Wagga Wagga.	Yes	Good	Yes	No	Likely, all areas.
Vespadelus troughtoni	Eastern Cave Bat	V	-	Found in a broad band on both sides of the Great Dividing Range south to Kempsey, with records from the New England Tablelands and the upper north coast of NSW. The western limit appears to be the Warrumbungle Range, and there is a single record from southern NSW, east of the ACT.	Yes	Marginal	Yes	Yes	Yes, forest areas and paddock trees. Foraging only.
Numenius madagascariensis	Eastern Curlew	-	CE, M	Summer migrant to Australia. Primarily coastal distribution in NSW, with some scattered inland records.	Yes	None	Yes	No	No
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V	-	South-east coast and ranges of Australia, from southern QLD to Victoria and Tasmania. In NSW, records extend to the western slopes of the Great Dividing Range.	Yes	Marginal	Yes	Yes	Yes, forest areas
Mormopterus norfolkensis	East Coast Freetail-bat	V	-	Found along the east coast from south QLD to southern NSW.	Yes	Marginal	Yes	No	Potential, forest areas.
Cercartetus nanus	Eastern Pygmy-possum	V	-	In NSW it extends from the coast inland as far as the Pilliga, Dubbo, Parkes and Wagga Wagga on the western slopes.	Yes	Marginal	Yes	No	Unlikely

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Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution	Distribution overlaps (yes/no)	Habitat quality present (good, marginal, none)	Species known to occur in region (yes/no)	Species known to occur on site (yes/no)	Likelihood of occurrence, and potential habitat
Petroica phoenicea	Flame Robin	V	-	In NSW, breeds in upland areas, and in winter many birds move to the inland slopes and plains, or occasionally to coastal areas. Likely that there are two separate populations in NSW, one in the Northern Tablelands, and another ranging from the Central to Southern Tablelands.	Yes	Marginal	Yes	No	Potential, forest areas.
Callocephalon fimbriatum	Gang-gang Cockatoo	V	-	In NSW, distributed from the south-east coast to the Hunter region, and inland to the Central Tablelands and south-west slopes. Isolated records known from as far north as Coffs Harbour and as far west as Mudgee.	Yes	None	Yes	No	No
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	-	In NSW, widespread along coast and inland to the southern tablelands and central western plains, with a small population in the Riverina.	Yes	None	Yes	No	No
Scoteanax rueppellii	Greater Broad-nosed Bat	V	-	Both sides of the great divide, from the Atherton Tableland in QLD to north-eastern Victoria, mainly along river systems and gullies. In NSW it is widespread on the New England Tablelands.	Yes	Marginal	Yes	Yes	Yes, all habitats.
Petauroides volans	Greater Glider	-	V	Along the eastern coast to the western slopes of the Great Dividing Range, from northern QLD to western Victoria.	Yes	None	Yes	No	No

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Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution	Distribution overlaps (yes/no)	Habitat quality present (good, marginal, none)	Species known to occur in region (yes/no)	Species known to occur on site (yes/no)	Likelihood of occurrence, and potential habitat
Litoria aurea	Green and Golden Bell Frog	E	V	Since 1990, recorded from ~50 scattered sites within its former range in NSW, from the north coast near Brunswick Heads, south along the coast to Victoria. Records exist west to Bathurst, Tumut and the ACT region.	Yes	None	Yes	No	No
Litoria brevipalmata	Green-thighed Frog	V	-	Isolated localities along the coast and ranges from just north of Wollongong to south-east QLD.	Yes	None	Yes	No	No
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	V	-	In NSW, occurs on the western slopes of the Great Dividing Range, and as far as Louth and Balranald on the western plains. Also occurs in woodlands in the Hunter Valley and in some locations on the north coast.	Yes	Good	Yes	No	Potential, forest areas.
Pteropus poliocephalus	Grey-headed Flying-fox	V	V	Along the eastern coast of Australia, from Bundaberg in QLD to Melbourne in Victoria.	Yes	Marginal	Yes	No	Likely, foraging habitat in forest areas and forest trees. No roosting habitat.
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	V	-	Found throughout much of inland NSW, with the exception of the extreme north-west, where it is replaced by subspecies *picata*.	Yes	Marginal	Yes	No	Potential, forest areas and paddock trees.

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Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution	Distribution overlaps (yes/no)	Habitat quality present (good, marginal, none)	Species known to occur in region (yes/no)	Species known to occur on site (yes/no)	Likelihood of occurrence, and potential habitat
Phascolarctos cinereus	Koala	V	V	In NSW it mainly occurs on the central and north coasts with some populations in the west of the Great Dividing Range. There are sparse and possibly disjunct populations in the Bega District, and at several sites on the southern tablelands.	Yes	Marginal	Yes	No	Potential, White Box forest.
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	Recorded from Rockhampton in QLD south to Ulladulla in NSW. Largest concentrations of populations occur in the sandstone escarpments of the Sydney basin and the NSW north-west slopes.	Yes	Marginal	Yes	No	Unlikely
Miniopterus australis	Little Bentwing-bat	V	-	East coast and ranges south to Wollongong in NSW.	Yes	Marginal	Yes	No	Potential, forest areas.
Hieraaetus morphnoides	Little Eagle	V	-	Throughout the Australian mainland, with the exception of the most densely-forested parts of the Dividing Range escarpment.	Yes	Marginal	Yes	No	Potential, all areas.
Glossopsitta pusilla	Little Lorikeet	V	-	In NSW, found from the coast westward as far as Dubbo and Albury.	Yes	Good	Yes	No	Likely, forest and paddock trees.
Anseranas semipalmata	Magpie Goose	V	-	In NSW, found in central and northern parts of the state, with vagrants as far as south-eastern NSW.	Yes	None	Yes	No	No

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Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution	Distribution overlaps (yes/no)	Habitat quality present (good, marginal, none)	Species known to occur in region (yes/no)	Species known to occur on site (yes/no)	Likelihood of occurrence, and potential habitat
Tyto novaehollandiae	Masked Owl	V	-	Recorded over approximately 90% of NSW, excluding the most arid north-western corner. Most abundant on the coast but extends to the western plains.	Yes	Marginal	Yes	No	Potential, forest area and paddock trees.
Pseudomys novaehollandiae	New Holland Mouse	-	V	Fragmented distribution across eastern NSW.	Yes	None	Yes	No	No
Grantiella picta	Painted Honeyeater	V	V	Widely distributed in NSW, predominantly on the inland side of the Great Dividing Range but avoiding arid areas.	Yes	Marginal	Yes	No	Potential, forest area.
Hoplocephalus bitorquatus	Pale-headed Snake	V	-	In NSW, it occurs from the coast to the western side of the Great Divide as far south as Tuggerah. Historically recorded west to Mungindi and Quambone on the Darling Riverine Plains, across the North West Slopes, and the New England Tablelands.	Yes	None	Yes	No	No
Aprasia parapulchella	Pink-tailed Legless Lizard	V	V	In NSW, only known from the Central and Southern Tablelands, and the South Western Slopes.	Yes	None	Yes	No	No
Ninox strenua	Powerful Owl	V	-	In NSW, it is widely distributed throughout the eastern forests from the coast inland to tablelands, with scattered records on the western slopes and plains.	Yes	Good	Yes	No	Potential, forest areas.
Merops ornatus	Rainbow Bee-eater	-	M	Distributed across much of mainland Australia, including NSW.	Yes	Good	Yes	No	Likely, forest areas, paddock trees and open areas.

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Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution	Distribution overlaps (yes/no)	Habitat quality present (good, marginal, none)	Species known to occur in region (yes/no)	Species known to occur on site (yes/no)	Likelihood of occurrence, and potential habitat
Erythrotriorchis radiatus	Red Goshawk	CE	V	In NSW, extends to ~30°S. Recent records confined to the Northern Rivers region north of the Clarence River.	No	None	No	No	No
Anthochaera phrygia	Regent Honeyeater	CE	CE	Inland slopes of south-east Australia, and less frequently in coastal areas. In NSW, most records are from the North-West Plains, North-West and South-West Slopes, Northern Tablelands, Central Tablelands and Southern Tablelands regions. The Lower Hunter and Central Coast have also seen many records in recent years.	Yes	Good	Yes	No	Potential, forest and paddock trees.
Rhipidura rufifrons	Rufous Fantail	-	M	Coastal and near coastal districts of northern and eastern Australia, including on and east of the Great Divide in NSW.	Yes	Marginal	Yes	No	Potential, forest area.
Myiagra cyanoleuca	Satin Flycatcher	-	M	In NSW, widespread on and east of the Great Divide and sparsely scattered on the western slopes, with very occasional records on the western plains.	Yes	Marginal	Yes	No	Potential, forest area.
Petroica boondang	Scarlet Robin	V	-	In NSW, it occurs from the coast to the inland slopes.	Yes	Marginal	Yes	No	Potential, forest and paddock trees.
Myotis macropus	Southern Myotis	V	-	In NSW, found in the coastal band. It is rarely found more than 100 km inland, except along major rivers.	Yes	None	Yes	No	No

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Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution	Distribution overlaps (yes/no)	Habitat quality present (good, marginal, none)	Species known to occur in region (yes/no)	Species known to occur on site (yes/no)	Likelihood of occurrence, and potential habitat
Chthonicola sagittata	Speckled Warbler	V	-	From south-eastern QLD, the eastern half of NSW and into Victoria, as far west as the Grampians, mostly on hills and tablelands of the Great Dividing Range and rarely on coast.	Yes	Good	Yes	Yes	Yes, forest areas.
Circus assimilis	Spotted Harrier	V	-	Found throughout the Australian mainland, except in densely forested or wooded habitats, and rarely in Tasmania.	Yes	Good	Yes	No	Likely, grassland areas.
Dasyurus maculatus	Spotted-tailed Quoll	V	E	Found on the east coast of NSW, Tasmania, eastern Victoria and north-eastern QLD.	Yes	Good	Yes	No	Potential, all areas.
Lophoictinia isura	Square-tailed Kite	V	-	In NSW, it is a regular resident in the north, north-east and along the major west-flowing river systems. It is a summer breeding migrant to the south-east, including the NSW south coast.	Yes	Marginal	Yes	No	Unlikely
Petaurus norfolcensis	Squirrel Glider	V	-	Widely though sparsely distributed on both sides of the Great Dividing Range in eastern Australia, from northern QLD to western Victoria.	Yes	Good	Yes	Yes	Yes, forest areas.
Hoplocephalus stephensii	Stephens' Banded Snake	V	-	Coast and ranges from Southern QLD to Gosford in NSW.	Yes	None	Yes	No	No
Delma impar	Striped Legless Lizard	V	V	In NSW, occurs in the Southern Tablelands, the South West Slopes and possibly on the Riverina.	Yes	None	Yes	No	No

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Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution	Distribution overlaps (yes/no)	Habitat quality present (good, marginal, none)	Species known to occur in region (yes/no)	Species known to occur on site (yes/no)	Likelihood of occurrence, and potential habitat
Lathamus discolor	Swift Parrot	E	CE	Migrates from Tasmania to mainland in Autumn-Winter. In NSW, the species mostly occurs on the coast and south west slopes.	Yes	Good	Yes	No	Potential, forest and paddock trees.
Neophema pulchella	Turquoise Parrot	V	-	Occurs along the length of NSW from the coastal plains to the western slopes of the Great Dividing Range.	Yes	Marginal	Yes	No	Potential, forest and paddock trees.
Daphoenositta chrysoptera	Varied Sittella	V	-	Distribution in NSW is nearly continuous from the coast to the far west.	Yes	Good	Yes	No	Potential, forest and paddock trees.
Haliaeetus leucogaster	White-bellied Sea-Eagle	V	-	Distributed along the coastline of mainland Australia and Tasmania, extending inland along some of the larger waterways, especially in eastern Australia.	Yes	None	Yes	No	Unlikely
Hirundapus caudacutus	White-throated Needletail	-	M	All coastal regions of NSW, inland to the western slopes and inland plains of the Great Divide.	Yes	Marginal	Yes	Yes	Yes, all areas.
Motacilla flava	Yellow Wagtail	-	M	Regular summer migrant to mostly coastal Australia. In NSW recorded Sydney to Newcastle, the Hawkesbury and inland in the Bogan LGA.	Yes	Marginal	Yes	No	Unlikely
Petaurus australis	Yellow-bellied Glider	V	-	Along the eastern coast to the western slopes of the Great Dividing Range, from southern QLD to Victoria.	Yes	None	Yes	No	No

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Scientific Name	Common Name	BC Act Status	EPBC Act Status	Distribution	Distribution overlaps (yes/no)	Habitat quality present (good, marginal, none)	Species known to occur in region (yes/no)	Species known to occur on site (yes/no)	Likelihood of occurrence, and potential habitat
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V	-	There are scattered records of this species across the New England Tablelands and North West Slopes. Rare visitor in late summer and autumn to south-western NSW.	Yes	Good	Yes	Yes	Yes, all habitats.

Note: * - distributions for threatened species gathered from threatened species profiles (OEH 2017b) and Atlas of Living Australia records (ALA 2017).

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APPENDIX B FAUNA SPECIES RECORDED DURING FIELD SURVEY OF STUDY AREA BETWEEN 5 AND 11 DECEMBER 2017

Common Name	Scientific Name	Status		Diurnal Bird Census	Remote Camera	SongMeter	Spotlighting	Harp Trap	Incidental
		BC Act	EPBC Act						
Bats									
Lesser Long-eared Bat	*Nyctophilus geoffroyi*							x	
South-eastern/Southern Freetail Bat	*Mormopterus (Ozimops) planiceps*							x	
Inland Broad-nosed Bat	*Scotorepens balstoni*							x	
Little Forest Bat	*Vespadelus vulturnus*							x	
Birds									
Australian Magpie	*Cracticus tibicen*			x					
Australian Owlet-nightjar	*Aegotheles chrisoptus*						x		
Australian Raven	*Corvus coronoides*			x	x				
Black-faced Cuckoo-shrike	*Coracina novaehollandiae*			x					
Brown-headed Honeyeater	*Melithreptus brevirostris*			x					
Channel-billed Cuckoo	*Scythrops novaehollandiae*			x					
Common Starling*	*Sturnus vulgaris*			x					
Crested Pigeon	*Ocyphaps lophotes*			x					
Eastern Rosella	*Platycercus eximius*			x					
Fairy Martin	*Petrochelidon ariel*			x					
Fan-tailed Cuckoo	*Cacomantis flabelliformis*			x					
Galah	*Eolophus roseicapilla*			x					
Golden Whistler	*Pachycephala pectoralis*			x					
Grey Butcherbird	*Cracticus torquatus*			x					

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Common Name	Scientific Name	Status		Diurnal Bird Census	Remote Camera	SongMeter	Spotlighting	Harp Trap	Incidental
		BC Act	EPBC Act						
Grey Fantail	*Rhipidura albiscapa*			x					
King Parrot	*Alisterus scapularis*			x					
Laughing Kookaburra	*Dacelo novaeguineae*			x					
Leaden Flycatcher	*Myiagra rubecula*			x					
Little Corella	*Cacatua sanguinea*			x					
Magpie-lark	*Grallina cyanoleuca*			x					
Mistletoebird	*Dicaeum hirundinaceum*			x					
Nankeen Kestrel	*Falco cenchroides*			x					
Noisy Friarbird	*Philemon corniculatus*			x					
Noisy Miner	*Manorina melanocephala*			x					
Pied Butcherbird	*Cracticus nigrogularis*			x					
Pied Currawong	*Strepera graculina*			x					
Rufous Whistler	*Pachycephala rufiventris*			x					
Sacred Kingfisher	*Todiramphus sanctus*			x					
Speckled Warbler	*Chthonicola sagittata*	V		x					
Spotted Pardalote	*Pardalotus punctata*			x					
Striated Pardalote	*Pardalotus striata*			x					
Striated Thornbill	*Acanthiza lineata*			x					
Sulphur-crested Cockatoo	*Cacatua galerita*			x					
Superb Fairy-wren	*Malurus cyaneus*			x					
Tree Martin	*Petrochelidon nigricans*			x					
Wedge-tailed Eagle	*Aquila audax*			x					
Weebill	*Smicrornis brevirostris*			x					
Welcome Swallow	*Hirundo neoxena*			x					
White-winged Chough	*Corcorax melanorhamphos*			x					
White-throated Gerygone	*Gerygone olivacea*			x					
White-throated Needletail	*Hirundapus caudacutus*			x					
White-throated Nightjar	*Eurostopodus mystacalis*						x		

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Common Name	Scientific Name	Status		Diurnal Bird Census	Remote Camera	SongMeter	Spotlighting	Harp Trap	Incidental
		BC Act	EPBC Act						
White-throated Treecreeper	*Cormobates leucophaea*			x					
Willie Wagtail	*Rhipidura leucophrys*			x					
Yellow Thornbill	*Acanthiza nana*			x					
Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*			x					
Mammals									
Common Wallaroo	*Macropus robustus*								x
Common Brushtail Possum	*Trichosurus vulpecula*				x		x		
Eastern Grey Kangaroo	*Macropus giganteus*				x		x		x
Squirrel Glider	*Petaurus norfolcensis*	V					x		
Short-beaked Echidna	*Tachyglossus aculeatus*								x
Feral Pig*	*Sus scrofa*								x
Red Fox*	*Vulpes vulpes*				x		x		
Red-necked Wallaby	*Macropus rufogriseus*						x		x
Swamp Wallaby	*Wallabia bicolor*				x				
Reptiles									
Bearded Dragon	*Pogona barbata*								x
Lace Monitor	*Varanus varius*				x				x

*Introduced species

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APPENDIX 6

Threatened Bat Call Analysis Results (Greg Richards and Associates, 2017)

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18 December 2017

RE: Mount Pleasant Operation Rail Modification – Analysis of Bat Calls

The following provides summary results of analysing two sets of ball calls collected by Ecological Australia. This summary is limited to threatened species and can be expanded on if requested.

Call Set 1: Disturbance Area.

- Data collected November 2017.

- Data collected at four sites.

- Total number of calls 2979.

Threatened Species Identified:

- *Miniopterus orianae* (*schreibersii*) *oceanensis* (Eastern Bentwing-Bat) – vulnerable (Biodiversity Conservation Act).
- *Mormopterus norfolkensis* (East Coast Freetail Bat) – vulnerable (Biodiversity Conservation Act Act). There appears to be an error in the listing Act whereby the common name for *M. norfolkensis* is listed as the Eastern Freetail Bat, which is actually *M. petersi*.

Possible records of other threatened bats (vulnerable).

- *Falsistrellus tasmaniensis* (Eastern False Pipistrelle).
- *Saccolaimus flaviventris* (Yellow-bellied Sheath-tailed Bat).
- *Scoteanax rueppellii* (Greater Broad-Nosed Bat).

Several additional bat calls were not identifiable between bentwing and forest bats. These calls could belong to one of a few different species (*Miniopterus/Vespadelus* complex) however given the definite records of the Eastern Bentwing-Bat they are assumed to belong to that species

Call Set 2: Potential Relinquishment Area and Surrounds.

- Data collected December 2017.

- Data collected at eight sites.

- Total number of calls 6244.

Threatened Species Identified:

- *Saccolaimus flaviventris* (Yellow-bellied Sheathtail Bat) – vulnerable (Biodiversity Conservation Act Act).
- *Vespadelus troughtoni* (Eastern Cave Bat) – vulnerable (Biodiversity Conservation Act Act).

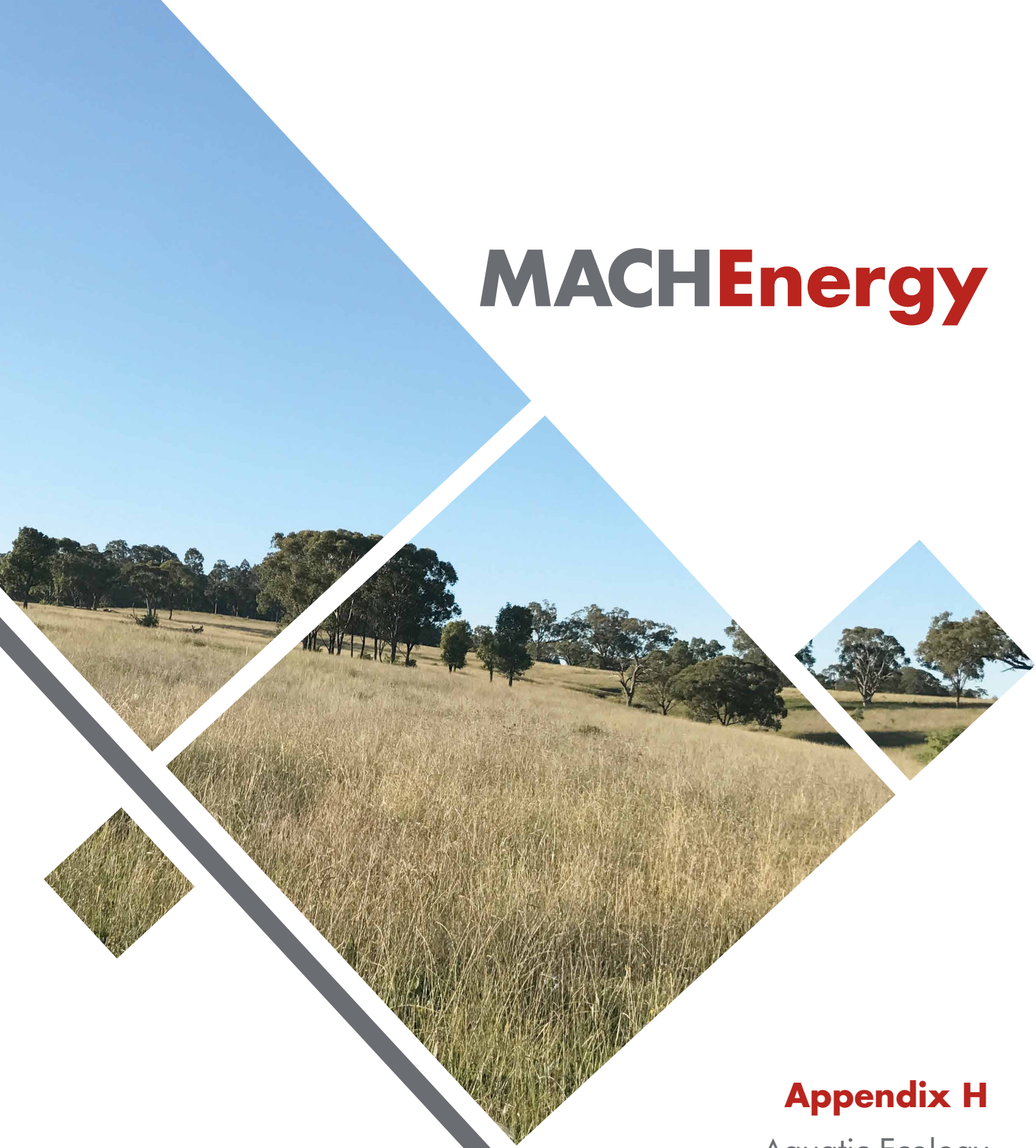
Possible records of other threatened bats.

- *Falsistrellus tasmaniensis* (Eastern False Pipistrelle) – vulnerable (Biodiversity Conservation Act Act) (possible record).
- *Scoteanax rueppellii* (Greater Broad-nosed Bat) – vulnerable (Biodiversity Conservation Act Act) (possible record).

per .....
(G.C. Richards, Director)

Greg Richards and Associates Pty Ltd

MACHEnergy



Appendix H

Aquatic Ecology Assessment

Final Report

MOUNT PLEASANT OPERATION
AQUATIC ECOLOGY ASSESSMENT



PREPARED FOR
MACH Energy Australia Pty Ltd

19 December 2017

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EXECUTIVE SUMMARY

The approved Mount Pleasant Operation (MPO) is owned and operated by MACH Energy Australia Pty Ltd. The approved operation includes the construction and operation of an open cut coal mine and associated infrastructure.

MACH Energy is seeking approval from the New South Wales Minister for Planning to modify the Mount Pleasant Operation Development Consent DA 92/97. The Modification (the Rail Modification) would involve construction of a private rail spur and loop and a new water pipeline (buried where located in the floodplain of the Hunter River) and pump station facility located on the Hunter River.

BIO-ANALYSIS Pty Ltd has been commissioned to prepare an aquatic ecology assessment for the Rail Modification. The drainage network in the vicinity of the MPO is generally characterised by steep gullies which drain from the surrounding hills into the flat alluvial plains adjacent to the Hunter River.

No permanently flowing waterways are present within the Modification Area. During the site inspection there was no surface water and the drainage lines were extremely degraded. Riparian and instream habitats within the Study Area appeared to have been substantially altered by historical and agricultural land use practices.

Surface water in the vicinity of the Study Area has moderate to high electrical conductivity, which reflects natural high salinity in soils and groundwater and the anthropogenic effects of numerous land use practices within the region.

River regulation and water extraction have had a substantial effect on flows within the Hunter River catchment. The ‘barrier effect’ of the Glenbawn Dam (situated approximately 16 kilometres upstream of the Study Area) prevents the movement of migratory species and flow of sediments and nutrients.

No aquatic species of conservation significance listed under the *Environment Protection and Biodiversity Conservation Act, 1999, Biodiversity Conservation Act, 2016* or *Fisheries Management Act, 1994* have been recorded within the Study Area.

One endangered species, the Southern Purple-Spotted Gudgeon (*Mogurnda aspersa*), and one endangered population, the Darling River Hardyhead (*Craterocephalus amniculus*) are predicted to occur in the Hunter River drainage system.

The Rail Modification would involve construction of a rail spur across a section of the Hunter River floodplain and an unnamed tributary, which is an ephemeral drainage line that was assessed as providing poor aquatic habitat (there was no flow, free standing water or pools, its channel was poorly defined and mostly colonised by pasture grasses).

Construction of the water supply infrastructure would occur across existing drainage channels (including the ephemeral Rosebrook Creek) and on the bank of the Hunter River. There would be no material impact to the volume of water entering the Hunter River from the Modification Area. Dewatering of the alluvial floodplain is not likely because no material excision of alluvial material is proposed.

Construction of the pump station facility and supporting infrastructure are expected to take approximately 1 – 2 months. Thus, any impacts associated with installation of the pump facility are expected to be short-term and localised. Notwithstanding that, erosion and sediment controls will be in place for the duration in any case.

The Rail Modification incorporates features designed to remove or minimise environmental impacts to watercourses within the Study Area and downstream environments. It is considered unlikely that the Rail Modification will cause a measurable effect to any threatened aquatic species or key threatening processes. Moreover, the Rail Modification is unlikely to affect aquatic biodiversity or ecological processes within the Hunter River.

TABLE OF CONTENTS

EXECUTIVE SUMMARY 1

1.0 INTRODUCTION 1
- 1.1 Background 1
- 1.2 Overview of the Rail Modification 3
  - 1.2.1 Proposed Rail Spur and Loop 7
  - 1.2.2 Water Pipeline and Hunter River Pump Station 8
- 1.3 Purpose and Scope 9

2.0 DESCRIPTION OF THE AQUATIC ENVIRONMENT 10
- 2.1 Review of Existing Information 10
  - 2.1.1 Physical Setting, Land Use and Climate 10
  - 2.1.2 Surface Waters 11
  - 2.1.3 Groundwaters 12
  - 2.1.4 Aquatic Habitats and Biota 13
- 2.2 Site Inspection 16

3.0 THREATENED SPECIES ISSUES FOR AQUATIC ECOSYSTEMS 19
- 3.1 Listings Under the EPBC Act 19
  - 3.1.1 Threatened Species 19
  - 3.1.2 Invasive Species 20
- 3.2 Listings Under the BC Act 20
  - 3.2.1 Threatened Species 20
  - 3.2.2 Key Threatening Processes 20
- 3.3 Listings Under the FM Act 21
  - 3.3.1 Threatened Species, Populations and Endangered Ecological Communities 21
  - 3.3.2 Key Threatening Processes 24

4.0 ASSESSMENT OF IMPACTS 26
- 4.1 Rail Spur and Loop 26
  - 4.1.1 Loss of On-Site Aquatic Habitat 26
  - 4.1.2 Surface Water Flow and Aquatic Biota 27
  - 4.1.3 Surface Water Quality and Aquatic Biota 28
  - 4.1.4 Barriers to Fish Movement 29
  - 4.1.5 Groundwater and Aquatic Biota 29
- 4.2 Water Pipeline/ETL and Hunter River Pump Station 30
  - 4.2.1 Loss of Aquatic Habitat 30
  - 4.2.2 Surface Water Flow and Aquatic Biota 31
  - 4.2.3 Surface Water Quality and Aquatic Biota 32
  - 4.2.4 Barriers to Fish Movement 33
  - 4.2.5 Groundwater and Aquatic Biota 34
- 4.3 Cumulative Impacts 35

4.4 Threatened Species Under the EPBC Act, BC Act and FM Act 36
4.5 Conclusions & Recommendations 36
5.0 ACKNOWLEDGEMENTS 37
6.0 REFERENCES 37
7.0 APPENDICES 41
APPENDIX 1: THREATENED SPECIES ASSESSMENTS 41

TABLES

Table 1 Species of Fish that may occur, or Suitable Habitat may occur, within the Hunter – Central Rivers Region.

FIGURES

Figure 1 Project Location
Figure 2 Modification General Arrangement
Figure 3 Topography and Drainage

PLATES

Plate 1 Aquatic Habitats within the Modification Area
Plate 2 The Hunter River

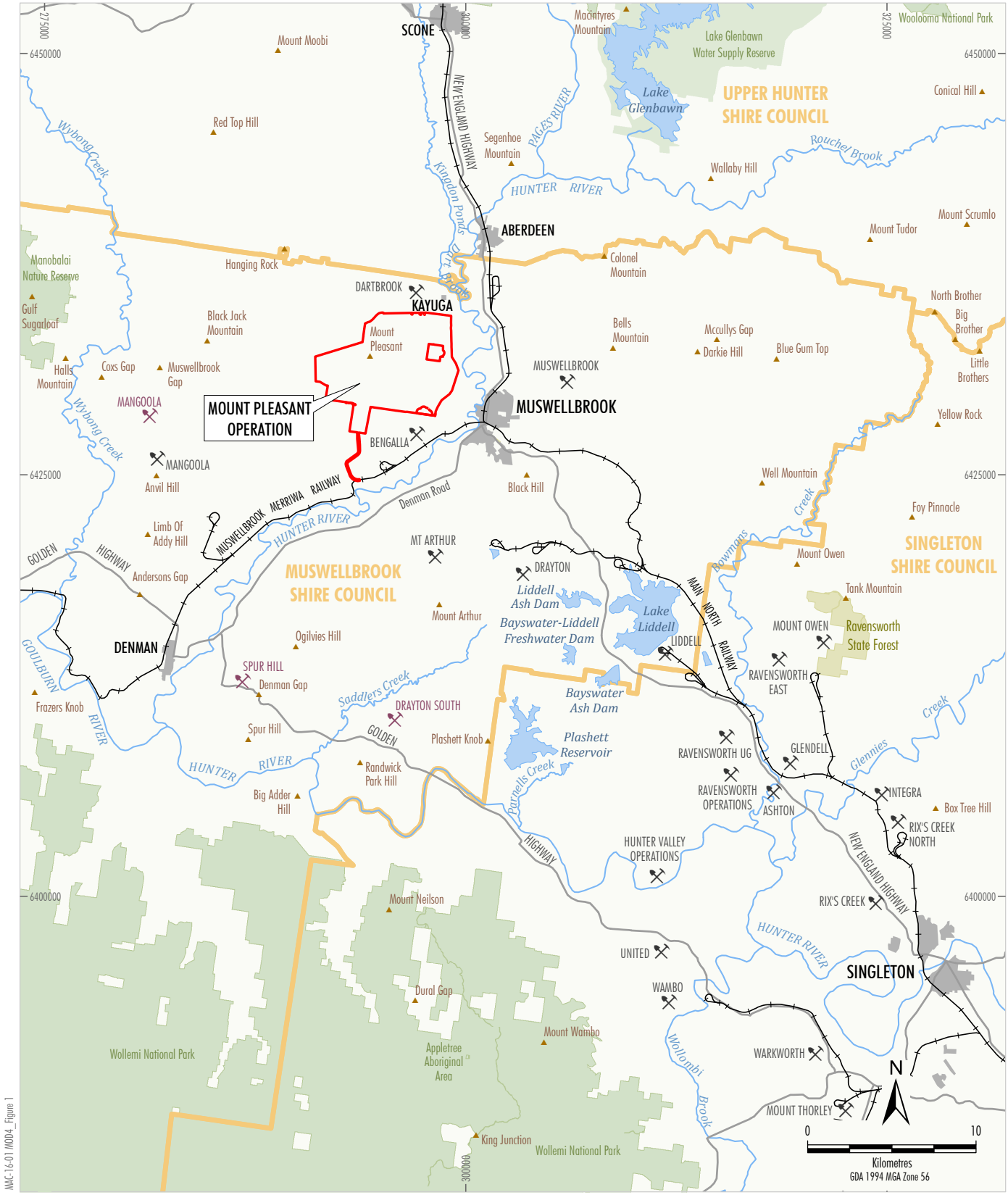
1.0 INTRODUCTION

1.1 Background

The approved Mount Pleasant Operation (MPO) is owned and operated by MACH Energy Australia Pty Ltd. The approved operation includes the construction and operation of an open cut coal mine and associated infrastructure. The MPO area is located in the Upper Hunter Valley of New South Wales (NSW), approximately four kilometres (km) north-west of Muswellbrook (Figure 1).

MACH Energy is seeking approval from the NSW Minister for Planning to modify the Mount Pleasant Operation Development Consent DA 92/97 under section 75W of the NSW *Environmental Planning and Assessment Act, 1979* (EP&A Act). A description of the Rail Modification is provided in Section 1.2

BIO-ANALYSIS Pty Ltd (BA) has been commissioned by MACH Energy to prepare an aquatic ecology assessment for the Rail Modification. The purpose of the aquatic ecology assessment is to identify and describe the conservation significance of aquatic biota and habitat within the Study Area and assess the potential for the Rail Modification to impact aquatic ecology, with particular regard to matters of Federal Environmental Significance listed on the *Environment Protection and Biodiversity Conservation Act, 1999* (EPBC Act) and state environmental significance listed on the *Biodiversity Conservation Act, 2016* (BC Act) and *Fisheries Management Act, 1994* (FM Act).





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 & Geoscience (2017); Office of Environment and Heritage NSW (2017); Land and Property Information (2017)

MACHEnergy

MOUNT PLEASANT OPERATION

Project Location

Figure 1

MAC-16-01 MOD4_Figure 1

The Study Area for the aquatic ecology assessment incorporates the Rail Modification component, and associated disturbance (Modification Area), and the Hunter River, given its downstream proximity to the Modification Area and the proposed relocation of the raw water extraction point from the river. The eastern portion of the Modification Area drains via Rosebrook Creek, as well as via other unnamed drainages. Areas in the south of the Modification Area drain via an unnamed drainage line, which is a tributary of the Hunter River.

The Modification Area is shown on Figures 2 and 3.

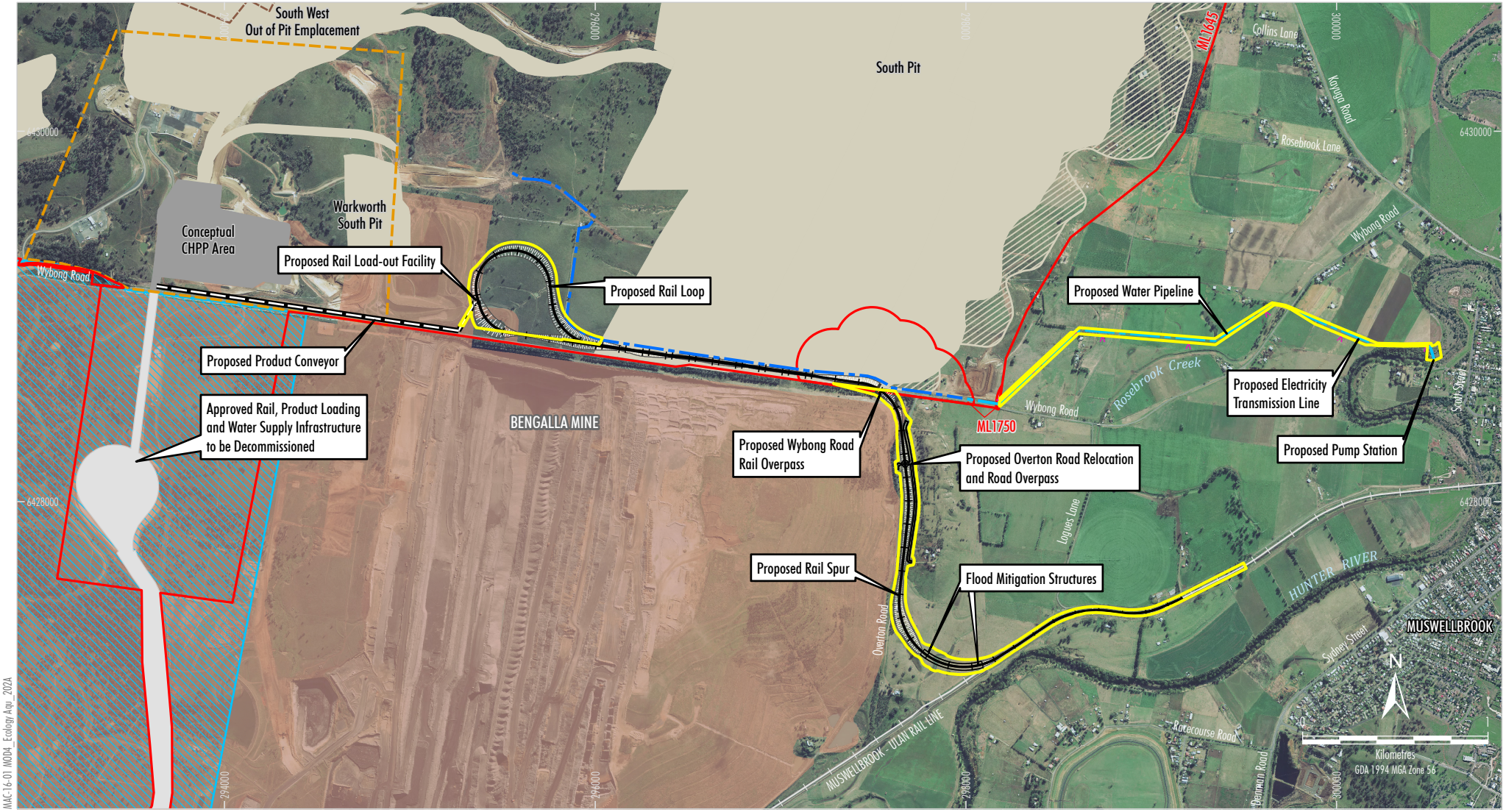
1.2 Overview of the Rail Modification

The ultimate extent of the approved Bengalla Mine open cut intersects the approved MPO rail spur.

While the intersection of the Bengalla Mine open cut with the approved MPO rail infrastructure is still some years away, MACH Energy is proposing a Rail Modification to obtain approval for alternative product transport facilities for the Mount Pleasant Operation.

The Rail Modification would involve construction of:

- Approximately 5 km of private rail spur;
- A rail loop to the east of the coal handling and preparation plant (CHPP);
- A new rail load-out facility and associated services, and water management infrastructure located on the rail loop;
- A new product conveyor and associated services, and water management infrastructure linking the product stockpiles located at the CHPP and the rail load-out facility;



MAC-16-01 MOD4_Ecology Aqu_202A

LEGEND

- Mining Lease Boundary
- Infrastructure Area Envelope
- Indicative Offsite 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
- Modification Area

Notes: * Excludes some project components such as water management infrastructure, infrastructure within the Infrastructure Area Envelope, offsite 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.

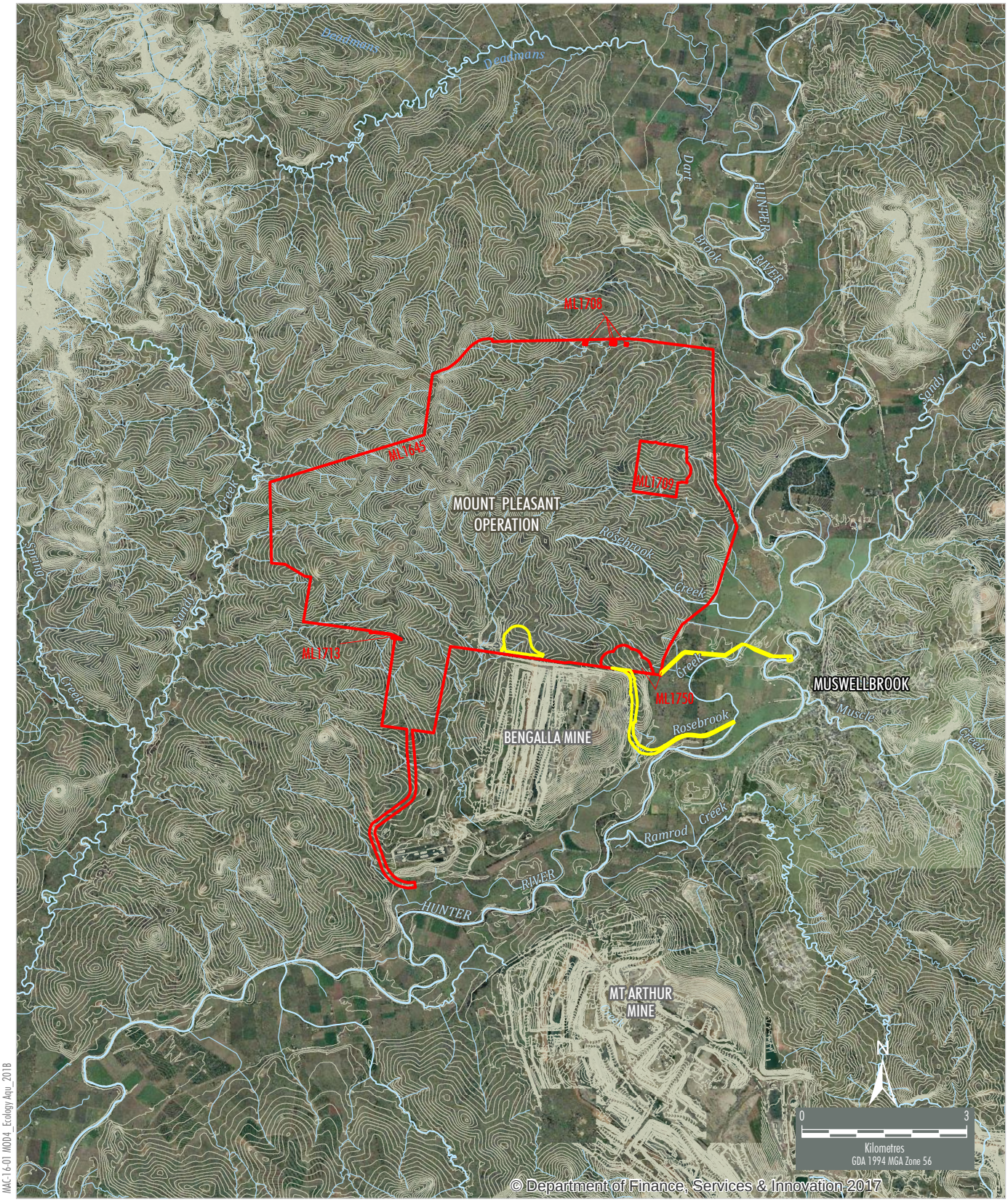
Source: NSW Land & Property Information (2017); NSW Division of Resources & Geoscience (2017); Department of Planning and Environment (2016); MACH Energy (2017)
Orthophoto: MACH Energy (July 2017)

MACHEnergy

MOUNT PLEASANT OPERATION

Modification General Arrangement

Figure 2



MAC-16-01 MOD4_Ecology Aqu_201B

LEGEND
Mining Lease Boundary
Contour (5 m Intervals)
Modification Area

Source: NSW Land & Property Information (2017); NSW Division of Resources & Geoscience (2017)

MACHEnergy
MOUNT PLEASANT OPERATION

Topography and Drainage

Figure 3

- A new water pipeline (buried where located in the floodplain of the Hunter River), associated electricity supply and pump station facility located on the Hunter River;
- A rail overpass of Wybong Road and road overpass at Overton Road to maintain uninterrupted public road access and avoid the need for rail level crossings;
- Some relocation of internal property access and farm tracks, electrical infrastructure and services to accommodate the new rail spur;
- Suitable flood mitigation infrastructure, including culverts in the new rail spur;
- Removal of redundant infrastructure associated with the current approved rail spur, loop, conveyors, rail loading and water pipeline; and
- Access tracks, hardstands and minor supplementary works that may be required to facilitate the proposed construction activities.

The provisional location[1] of the key elements to be constructed are shown on Figure 2.

It is anticipated that the construction of the new infrastructure would occur over a period of approximately 12 months and the removal of redundant rail infrastructure would then occur approximately over the subsequent 6 month period.

Further description of the Rail Modification is provided in the Main Text of the Environmental Assessment.

[1] The location is provisional subject to detailed engineering design being completed prior to construction.

1.2.1 Proposed Rail Spur and Loop

The private rail spur construction will primarily comprise earthworks (i.e. cut and fill), provision of rail ballast (gravel material) to support rail sleepers, rail track, rail fixings and signalling.

Sections of the new rail spur would also require flood mitigation works (e.g. series of box culverts) and signalling/switching facilities.

Limited short-term truck haulage of some fill material along the corridor or between the rail corridor and the MPO mining or temporary borrow pit areas authorised in the Mining Operations Plan (MOP) may be required to manage the cut and fill materials balance or geotechnical requirements.

The new rail turnout associated with the Rail Modification would require the construction of new supporting infrastructure within the Australian Rail Track Corporation (ARTC) controlled rail corridor on the Muswellbrook – Ulan Rail Line.

This infrastructure is anticipated to comprise rail interlocking systems, trenching beside the existing rail line to establish electrical connections to an existing Signal Equipment Room (signal hut), establishment of new location cases and train signals located up to approximately 400 m up-rail or down-rail of the rail spur turnout.

If required, works in the ARTC rail corridor may also involve upgrades to, or relocation of, an existing passive level crossing that provides property access across the Muswellbrook – Ulan Rail Line to two residences in the vicinity of the new rail turnout.

1.2.2 Water Pipeline and Hunter River Pump Station

Approximately 6.4 km of new water supply pipeline would be constructed between the Hunter River and the Mine Water Dam (MWD). Construction of the replacement water supply infrastructure would occur across existing drainage channels (including the ephemeral Rosebrook Creek) and on the bank of the Hunter River.

The pipeline would comprise a high density polyethylene pipe with a series of concrete pipe supports where above ground (approximately 3.4 km) or alternatively will be buried at approximately 600 mm depth within the Hunter River floodplain (approximately 2.8 km). The pipeline diameter would be subject to detailed design but would nominally be between 650 mm and 850 mm in diameter.

The pump station would be supplied with electricity by a 22 kV electricity transmission line from the MPO substation. A transfer pump station would be required to efficiently address the head difference between the Hunter River and the MWD. The main transfer pumps would nominally comprise two 400 kilowatt electrical 200 litres per second centrifugal pumps and associated electrical supply and enclosures/hardstands.

The pump station facility would largely be above ground, however, would also include submerged pumps and a water inlet system adjacent to the Hunter River. The pump station would be designed and operated to minimise potential impacts on fish in the vicinity of the inlet (Section 4.2).

The transfer pump station would be located following detailed design and would comprise the pump infrastructure and any necessary noise attenuation enclosure (e.g. insulated cladding) on a concrete pad.

1.3 Purpose and Scope

The primary objectives of this aquatic ecology assessment are to:

- Review existing literature relevant to the aquatic ecology in the vicinity of the Study Area;
- Assess the potential impacts of the Rail Modification on aquatic habitats and native biota, including any threatened species, endangered populations or endangered ecological communities recorded or likely to occur within the Study Area; and
- Recommend mitigation measures that can be undertaken to minimise potential impacts associated with the Rail Modification.

2.0 DESCRIPTION OF THE AQUATIC ENVIRONMENT

2.1 Review of Existing Information

Existing information on aquatic habitats and associated biota within and surrounding the Study Area was obtained by a review of aquatic surveys, monitoring reports and assessments that have been undertaken across the MPO area and surrounds, as well as search for relevant literature using the internet.

2.1.1 Physical Setting, Land Use and Climate

The MPO is located within the Muswellbrook Local Government Area (LGA). Kayuga is located immediately to the north of the mine and the town of Aberdeen is located further north east, on the eastern side of the Hunter River. Muswellbrook is located 4 km south-east of the MPO (Figure 1).

The town of Denman is also located some 18 km to the south west near the confluence of the Hunter and Goulburn Rivers (Figure 1).

The drainage network in the vicinity of the MPO is generally characterised by steep gullies which drain from the surrounding hills into the flat alluvial plains adjacent to the Hunter River. The river, which flows in a southerly direction approximately 1 km to the east of the MPO Mining Lease boundary, is the largest drainage feature within the catchment (Figure 3).

A number of ephemeral drainage lines traverse the MPO area and drain into the Hunter River. The eastern portion of the MPO area drains via Rosebrook Creek (Figure 2), as well as other ephemeral, unnamed drainages. Areas in the south and west of the MPO boundary drain to an ephemeral drainage line (commonly referred to as Dry Creek) and Sandy Creek, respectively, both of which flow into the Hunter River (Figure 3). No permanently flowing waterways are present within the Modification Area.

Surrounding land uses include agriculture (grazing, dairy, vineyards, horse and cattle studs, turf, flower and market gardens) and mining. As such, the catchment area has been cleared extensively. The Bengalla Mine adjoins the southern boundary of the MPO area, with Mount Arthur Coal Mine further south (Figure 1). Mangoola Coal is located west of the MPO area and surface facilities for the Dartbrook Mine are to the north.

Climate within the vicinity of Muswellbrook is warm temperate with an average annual rainfall of approximately 600 mm (BOM, 2017).

2.1.2 Surface Waters

River regulation and water extraction have had a substantial effect on flows within the Hunter River catchment (WMAwater, 2013).

The natural flow regime of the Hunter River system has been heavily disrupted by construction of the Glenbawn Dam, situated approximately 16 km upstream of the Study Area, which has the largest water storage capacity (750,000 ML) in the catchment (Kingsford and Hankin, 2010).

Impacts from regulation and water extraction from the Hunter River have resulted in alteration of its natural geomorphology, characterised by old alluvial or floodplain terraces and disrupted flood regimes (WMAwater, 2013). The ‘barrier effect’ of the dam prevents the movement of migratory species and flow of sediments and nutrients (Morita and Yamamoto, 2002).

Under current catchment conditions (i.e. since the Glenbawn Dam was completed), flow records show that base flow tends to persist over long periods, with the exception of prolonged dry spells. Flow at Muswellbrook generally exceeds 348.5 ML/day. The relative low frequency of zero flow-days has been attributed to groundwater inflow from the alluvial groundwater systems adjacent to the Hunter River and its tributaries.

The Hunter River catchment includes a large proportion of salt bearing sedimentary rocks and soils and surface and underground drainage from this contributes natural salinity to the river. Salinity levels within the Hunter River are typically in the range of 400-800 µS/cm, with occasional spikes above 1,000 µS/cm (DPI NSW, 2014a). The recommended ANZECC/ARMCANZ (2000) guideline values for the protection of aquatic ecosystems in lowland rivers are 125 – 2,200 µS/cm.

Median pH values at creek sites show that surface water within the Modification Area ranged between 6.2 and 7.6, while values at the Hunter River sites ranged between 8.0 and 8.1 (MACH, 2017). Median total suspended solids ranged between 6 and 292 mg/L at the creek sites and 8 mg/L at the Hunter River sites (MACH, 2017).

Water Quality sampling has been attempted within Rosebrook Creek on several occasions. On each occasion the creek has been dry and sampling was not possible (Scott McDonald pers. Com., 7 December 2017). Given the highly ephemeral and disturbed nature of the creek alignment and surrounds, it is expected that the water quality of any water present within the creek (other than during high flow events such as floods) would be poor.

2.1.3 Groundwaters

Two distinct water-bearing geological units occur within the Study Area. A thin layer of alluvial sediments occurs along the Hunter River and other creek valleys, with the underlying and surrounding rock strata consisting of Permian Coal sequence (MACH Energy, 2017).

2.1.4 Aquatic Habitats and Biota

Within the Study Area, the Hunter River, Rosebrook Creek, Muscle Creek, Ramrod Creek and Sandy Creek (which joins the Hunter River just north of Muswellbrook) are considered "Key Fish Habitat" under NSW Department of Primary Industries (DPI) guidelines for aquatic habitats (DPI NSW, 2017a).

The majority of watercourses within the Study Area have been cleared to the bank, with the few remaining strips of native vegetation restricted to the Hunter River. River Oak (*Casuarina cunninghamiana*) and River Red Gum (*Eucalyptus camaldulensis*) commonly occur. Remaining riparian habitat has been heavily infested by weeds including *Ipomoea indica* (Morning Glory), Privet (*Ligustrum* species) and Willow (*Salix* sp.). Within the Modification Area, exotic grasses mostly associated with agriculture boarder the riparian zone.

Numerous studies of aquatic habitat and biota have been carried out within the Hunter River.

In 2002, the Healthy Rivers Commission determined that water quality within the river was variable and almost two thirds of streams were in a degraded condition. Approximately 30 % of native fish species were estimated to have been lost from the river and between 40 and 70 % of sites sampled for macroinvertebrates were assessed as being in poor condition (Healthy Rivers Commission, 2002).

In a later study of stream health at four sites[2] within the vicinity of the Study Area using the Australian River Systems (AUSRIVAS) protocol, one site (Hunt854) was rated as being similar to reference condition while three (Hunt571, Hunt585 and Hunt506) were rated 'significantly impaired' (Hose and Turak, 2004).

[2] Site's Hunt854 (Hunter River, ~ 3 km upstream of Muswellbrook), Hunt571 (Hunter River @ Muswellbrook), Hunt585 (Dart Brook) and Hunt506 (Muscle Creek @ Muswellbrook)

Previous surveys and published distributions indicate up to 26 species of fish may be present within the Hunter River, including 21 native species (Table 1). The Eastern Snake-necked Tortoise (*Chelodina longicollis*) has also been recorded in the river (Howell and Creese, 2010) and is likely to be found in farm dams and pools in creeks.

No aquatic species of conservation significance listed under the EPBC Act, BC Act or FM Act have been recorded within the Study Area.

Table 1. Species of Fish that may occur, or Suitable Habitat may occur, within the Hunter – Central Rivers Region.

Family	Species	Common Name	McDowall 1996	DPI 2006a	Howell & Creese 2010
Anguillidae	*Anguilla australis*	Short-finned Eel			
Anguillidae	*Anguilla reinhardtii*	Speckled Longfin			
Ariidae	*Neoarius graeffei*	Blue Catfish			
Clupeidae	*Potamalosa richmondia*	Freshwater Herring			
Galaxiidae	*Galaxias brevipinnis*	Climbing Galaxias			
Galaxiidae	*Galaxias olidus*	Mountain Galaxias			
Galaxiidae	*Galaxias maculatus*	Common Jollytail			
Salmonidae	*Oncorhynchus mykiss*	Rainbow Trout*			
Salmonidae	*Salmo trutta*	Brown Trout*			
Retropinnidae	*Retropinna semoni*	Australian Smelt			
Cyprinidae	*Carassius auratus*	Goldfish*			
Cyprinidae	*Cyprinus carpio*	Common Carp*			
Plotosidae	*Tandanus tandanus*	Freshwater Catfish			
Poeciliidae	*Gambusia holbrooki*	Eastern Mosquito Fish*			
Scorpaenidae	*Notesthes robusta*	Bullrout			
Percichthyidae	*Macquaria novemaculeata*	Australian Bass			
Terapontidae	*Leiopotherapon unicolor*	Spangled Perch			
Mugilidae	*Mugil cephalus*	Sea Mullet			
Mugilidae	*Trachystoma petardi*	Freshwater Mullet			
Gobiidae	*Gobiomorphus australis*	Striped Gudgeon			
Gobiidae	*Gobiomorphus coxii*	Cox's Gudgeon			
Gobiidae	*Hypseleotris compressa*	Empire Gudgeon			
Gobiidae	*Hypseleotris galii*	Firetail Gudgeon			
Gobiidae	*Philypnodon macrostomus*	Dwarf Flathead Gudgeon			
Gobiidae	*Philypnodon grandiceps*	Flathead Gudgeon			
Gobiidae	*Hypseleotris klunzingeri*	Western Carp Gudgeon			

*Introduced species

2.2 Site Inspection

A site inspection of aquatic habitat within the Modification Area and nearby reaches of the Hunter River was carried out on 6 September 2017 with further relevant work undertaken in November 2017[3].

In general, aquatic habitat within the Modification Area was extremely limited and restricted to a small ephemeral drainage line (referred to as the unnamed tributary) and its tributary gullies and Rosebrook Creek[4].

At the time of the site inspection, the unnamed tributary and its tributary gullies were completely dry and their channels had been colonised by pasture grasses (Plate 1). Temporary pools would form along the tributary after periods of high rainfall.

Plate 1. Aquatic Habitats within the Modification Area



1a) View across the Hunter River floodplain, towards Muswellbrook



1b) Upper reaches of the unnamed tributary (looking downstream), with the Hunter River and Mt Arthur Coal Mine in the background

3 Stream Health monitoring using the AUSRIVAS protocol was undertaken by BA at nine sites within the Study Area (6 sites along the Hunter River and 1 site on each of Dart Brook, Muscle Creek and Sandy Creek) on 28 November 2017. Results will be presented in the 'Assessment of Stream Health (Spring 2017) Report' prepared for the MPO by BA.

4 Surface water quality monitoring of Rosebrook Creek (Site W14) commenced in October 2017, in accordance with the requirements of MACH's Surface Water Management Plan. To date, samples were not able to be collected because the creek was dry (Scott McDonald pers. comm., 7 December 2017).



1c) A dry gully tributary of the unnamed tributary



1d) The unnamed tributary, looking downstream

The banks of the tributary were almost entirely cleared of trees and riparian vegetation and there was evidence that livestock regularly grazed and trampled the stream bank and channel (Plate 1). Habitat for aquatic fauna, such as rocks, snags and aquatic macrophytes, were largely absent. Therefore, drainage lines within the Modification Area were considered unlikely to provide fish habitat.

The unnamed tributary drains in a south west direction through the southern part of the Modification Area, before joining the Hunter River. In the vicinity of the Study Area, the riparian vegetation of the Hunter River is a relatively narrow band (approximately < 10 m wide) mostly dominated by exotic trees and vines.

The Hunter River represents major fish habitat (Class 1 Waterway) [5] and functions as a significant environmental corridor (Category 1 waterway and riparian zone).

Within the vicinity of the proposed water intake site, the river was up to about 30 m wide and 1.5 m deep near the middle of the channel (Plate 2). The channel substratum was composed primarily of silty sand and had a considerable cover of detritus. Large woody debris were present in places (Plate 2).

---

5 Four species of fish were collected at the Hunter River sites sampled by the Stream Health Monitoring survey undertaken by BA on 28 November 2017: Sea Mullet (*Mugil cephalus*), Speckled Longfin Eel (*Anguilla reinhardtii*), Common Carp (*Cyprinus carpio*) and Eastern Mosquito Fish (*Gambusia holbrooki)*. Results will be presented in the 'Assessment of Stream Health (Spring 2017) Report' prepared for the MPO by BA.

The river banks were relatively degraded due to weed invasion (including Morning Glory, Privet and Willow Trees) and grazing by animals in some areas (Plate 2). River Oak and River Red Gum were common (Plate 2).

Plate 2. The Hunter River



2a) Hunter River, ~ 2 km downstream of Muswellbrook



2b) Hunter River, within the vicinity of the proposed water intake, looking upstream



2c) Hunter River, within the vicinity of the proposed water intake, looking downstream



2d) Hunter River, within the vicinity of the proposed water intake

3.0 THREATENED SPECIES ISSUES FOR AQUATIC ECOSYSTEMS

No aquatic species of conservation significance listed under the EPBC Act, BC Act or FM Act have been recorded within the Study Area (after Section 2.0).

Relevant threatened species or populations and their habitats that do, or may, occur within the area were identified by reviewing current listings on databases maintained by the Department of the Environment and Energy (DOEE), NSW DPI and the Office of Environment and Heritage (OEH) and NSW Government database BioNet.

3.1 Listings Under the EPBC Act

3.1.1 Threatened Species

The DOEE Protected Matters Search Tool indicated that no relevant threatened species or suitable habitat occurred within the vicinity (i.e. a 10 km radius) of the Study Area.

The Flathead Galaxais (*Galaxias rostratus*), Murray Cod (*Maccullochella peelii*), Macquarie Perch (*Macquaria australasica*) and Australian Grayling (*Prototroctes maraena*) may either occur, or suitable habitat may occur within the Muswellbrook Shire LGA, which is an area substantially larger than the Study Area.

Murray Cod are generally found in the Murray-Darling Basin but overfishing and changes in the environment have drastically reduced its numbers (Morris et al., 2001). Murray Cod have also been translocated into a number of river systems in NSW, Victoria and Western Australia, but has generally failed to establish in those areas.

It is unlikely that Flathead Galaxais, Murray Cod, Macquarie Perch or Australian Grayling occur within the Study Area, therefore these species will not be considered further.

3.1.2 Invasive Species

The DOEE search tool indicated that the invasive aquatic weed Salvinia (*Salvinia molesta*) may either occur or suitable habitat for it may occur in the vicinity of the Study Area. Salvinia has been declared a Class 3 Noxious Weed in the Muswellbrook Shire Local Government Area (LGA) and as such *"the plant must be fully and continuously suppressed and destroyed"*.

3.2 Listings Under the BC Act

3.2.1 Threatened Species

The OEH and the NSW Government database, BioNet, indicated that no relevant threatened species or suitable habitat occurred within the vicinity (i.e. a 10 km radius) of the Study Area. No relevant Endangered Ecological Communities (EECs) were listed.

The Giant Dragonfly (*Petalura gigantea*), which is listed as Endangered under Schedule 1 of the NSW BC Act, or suitable habitat for it is predicted to occur within the Muswellbrook LGA, but in the Wollemi sub-region, not within the Hunter sub-region of the Hunter/Central Rivers Catchment Management Authority (CMA) Region.

It is unlikely that Giant Dragonfly occurs within the Study Area, therefore this species will not be considered further.

3.2.2 Key Threatening Processes

One key threatening process listed under Schedule 4 of the BC Act is relevant to the Rail Modification: *Alteration to the natural flow regime of rivers and streams and their floodplains and wetlands.*

The flow regime is the key driver of river ecology. Impacts on aquatic habitats and biota associated with altering natural flow regimes include:

- Increased erosion causing degradation of the riparian zone, restricted access to habitat for foraging, refuge or reproduction and sedimentation impacts such as smothering;
- Changes in the amount of organic material on which many aquatic biota depend upon;
- Changes in patterns of natural environmental cues necessary for reproductive cycles;
- Altered water quality variables such as dissolved oxygen, turbidity and temperature and concomitant effects on biota; and
- Deeper and more permanent standing water, which can enhance establishment and spread of exotic species (Walker, 1985; Kingsford, 2000; Gehrke and Harris, 2001).

These alterations can cause a large number of species, populations or ecological communities that rely on flows for their short term and long term survival to become threatened. Potential effects of the Rail Modification on this process are assessed in Section 4.0 of this report.

3.3 Listings Under the FM Act

3.3.1 Threatened Species, Populations and Endangered Ecological Communities

One endangered species, the Southern Purple-Spotted Gudgeon (*Mogurnda adspersa*), and one endangered population, the Darling River Hardyhead (*Craterocephalus amniculus*) population in the Hunter catchment, listed currently under the FM Act are predicted to occur in the Hunter River drainage system (DPI NSW, 2014b; 2017a). There are no aquatic EECs listed under the FM Act within the Hunter sub-region of the Hunter/Central Rivers CMA Region.

Southern Purple-Spotted Gudgeon

Two populations of Southern Purple-Spotted Gudgeon occur in NSW: an eastern population found in coastal catchments north of the Clarence River and a western population found throughout Murray-Darling Basin (DPI NSW, 2017a). Despite targeted sampling, there have been few recent records of the eastern population. Only two extant populations are known, one in the Richmond catchment and the other in the Hunter Valley. However, the population in the Hunter Valley (in Goorangoola Creek) is outside what was previously considered the natural range of the species, so there is some uncertainty as to whether the population is endemic or recently introduced (DPI NSW, 2017a).

Most remnant populations of Southern Purple-Spotted Gudgeon in NSW occur in small to medium streams although they have been found in a variety of habitats such as rivers, creeks and billabongs with slow-moving waters or in streams with low turbidity. Cover provided by aquatic and riparian vegetation, leaf litter, rocks or snags are important for this species (Lintermans, 2007; DPI NSW, 2017a).

They are a benthic species that mostly feed on terrestrial insects and their larvae, worms, small fish, tadpoles and some plant material. Southern Purple-Spotted Gudgeon spawn during summer when water temperatures exceed 20 ºC and food is abundant. Adhesive eggs are attached to hard substrata. The species can reach 120 mm but is more commonly found at 70 mm and reaches maturity at 45-50 mm (DPI NSW, 2017a).

Threats to the Southern Purple-Spotted Gudgeon include:

- Predation by introduced fish such as Eastern Gambusia (*Gambusia holbrooki*) and Redfin Perch (*Perca fluviatilis*);
- Habitat degradation, particularly loss of aquatic plants;

- Fluctuation in water levels as a result of river regulation, causing impacts on reproduction and recruitment;
- Increased turbidity and damage to stream banks by livestock access; and
- Decreased water quality due to agricultural runoff and siltation (DPI NSW, 2017a).

Potential effects of the Rail Modification on this species are assessed in Section 4.0 of this report.

Darling River Hardyhead

The Darling River Hardyhead is found in the upper tributaries of the Darling River including the Border Rivers and the Gwydir and Naomi catchments. It is also found in the headwaters of the Hunter System in NSW (DPI NSW, 2014b). However, despite extensive sampling, no individuals have been detected from the Hunter River catchment since 2003 (DPI NSW, 2014b).

This species is usually found in slow flowing, clear, shallow waters or in aquatic vegetation near the stream bank although they have also been recorded from the edge of fast-flowing habitats such as the runs at the head of pools. It primarily eats algae and fly larvae and has been seen to eat small insects (DPI NSW, 2014b).

The Darling River Hardyhead is a small species of fish that grows up to 80 mm in length but is generally around 42 mm in length. Little is known about the reproductive biology of this species however, it is closely related to the Murray Hardyhead (*Craterocephalus fluviatilis*), which is considered a short lived (annual) species with an extended breeding season from spring through to autumn. The eggs are usually deposited amongst aquatic vegetation (DPI NSW, 2014b).

Potential effects of the Rail Modification on this species are assessed in Section 4.0 of this report.

3.3.2 Key Threatening Processes

Three of the key threatening processes listed under the FM Act are likely to be relevant to the Rail Modification:

- *Degradation of Native Riparian Vegetation along NSW Water Courses* (DPI NSW, 2005a);
- *Removal of Large Woody Debris from NSW Rivers and Streams* (DPI NSW, 2005b); and
- *Installation and Operation of Instream Structures and Mechanisms that Alter Natural Flows* (DPI NSW, 2005c);

Degradation of Native Riparian Vegetation

Riparian vegetation has several primary physical and biological functions, which are important in maintaining the health of aquatic systems (Turak and Bickel, 1994; Pusey and Arthington, 2003, DPI NSW, 2005a). Riparian vegetation:

- Stabilises river beds and banks, binds soil and protects against erosion and slumping;
- Provides a source of organic matter, which is an important source of energy for aquatic ecosystems;
- Provides shade and shelter, buffers temperature and creates habitat for aquatic biota;
- Provides a supply of large woody debris, which is used as habitat and spawning sites by many native species of fish; and
- Acts as a filter for sediments, phosphorous and organic nitrogen thus improving the quality of water entering watercourses.

Removal of Large Woody Debris

Snags consisting of trees, limbs and root masses that are partly or wholly submerged are one of the most important habitat components for macroinvertebrates and fish within a stream (DPI NSW, 2005b). Snags not only provide fish with shelter and a substratum for food but also facilitate oxygenation of water, slow and alter stream flow and are used as breeding sites by some species (DPI NSW, 2005b).

Instream Structures and other Mechanisms that Alter Natural Flow

The installation and operation of instream structures (including dams, weirs, canals, flow regulators, erosion control structures and causeways, among others) and other mechanisms (e.g. pumping and diversion of water) can alter natural flow regimes (Walker, 1985; Kingsford, 2000; Gehrke and Harris, 2001).

Potential effects of the Rail Modification on these processes are assessed in Section 4.0 of this report.

4.0 ASSESSMENT OF IMPACTS

Potential impacts of the Rail Modification associated with aquatic habitat and biota within the Study Area were identified as:

- Potential obstruction of flow impacts associated with construction of new rail spur infrastructure within the floodplain of the Hunter River; and
- Land disturbance activities associated with construction of the new infrastructure.

Key aspects would include:

- Loss of on-site aquatic habitat;
- Surface water flow and aquatic biota;
- Surface water quality and aquatic biota;
- Barriers to fish movement; and
- Groundwater and aquatic biota.

4.1 Rail Spur and Loop

4.1.1 Loss of On-Site Aquatic Habitat

The majority of the Rail Modification would be located on MPO and Bengalla Mine owned land and the ARTC rail corridor.

However, the Rail Modification would involve construction of a rail spur across a section of the Hunter River floodplain and the unnamed tributary, which is an ephemeral drainage line that was assessed as providing poor aquatic habitat because there was no flow, free standing water or pools, its channel was poorly defined and mostly colonised by pasture grasses (Section 2.2).

The rail spur and loop is unlikely to involve removal of riparian vegetation or large woody debris from within the Modification Area.

Based on the above, that unnamed tributaries within the Modification Area are not classified as "Key Fish Habitat" under DPI guidelines for aquatic habitats (DPI NSW, 2017a) and that much of the disturbance area is existing cleared agricultural land associated with farming enterprises on the highly disturbed Hunter River floodplain and surrounds, it is considered unlikely that construction of the rail spur and rail line would have a negative effect on the aquatic ecology within the Study Area.

4.1.2 Surface Water Flow and Aquatic Biota

Changes to the flood regime, and the timing and magnitude of flows in watercourses have the potential to impact on aquatic ecology.

Modelling done by WRM Water and Environment (2017) led to the prediction that the Rail Modification may result in increased flood depths in flood plain areas immediately upstream and downstream of the proposed rail spur.

Various culverts and bridge crossings have been included in the indicative design of the proposed rail embankment to mitigate potential flood impacts and potential impacts to flow. These mitigation measures would be reviewed and developed further as part of the detailed design process to comply with the predicted changes in flood level and velocity described by WRM Water and Environment (2017).

Whilst it may take marginally longer for flood water upstream of the rail spur to drain to the Hunter River, the Modification would not restrict water from flowing down the Hunter River, including flood flows (WRM Water and Environment, 2017).

Based on the above, in consideration that a change to flooding during a 1:100 year event would not result in a material change to water availability or water reporting to the Hunter River and given the poor habitat rating for ephemeral drainage lines within the Modification Area, there would be nil or negligible change to the aquatic ecology within the Study Area as a result of predicted changes to surface water flow.

4.1.3 Surface Water Quality and Aquatic Biota

Alteration of the surface water quality in aquatic ecosystems can cause loss of biodiversity and a shift towards more pollution-tolerant taxa. Changes to surface water quality can generally occur due to soil disturbance (sedimentation and mobilisation of nutrients and saline materials), nutrient leachates and pollution leaks (e.g. associated with heavy vehicles and machinery).

Deterioration in surface water quality is considered a threat to Southern Purple-Spotted Gudgeon, Darling River Hardyhead and the Hunter River aquatic ecological community.

An Erosion Sediment Control Plan (ESCP) has been developed at the MPO to manage potential erosion impacts and to monitor the effectiveness of erosion and sediment controls and is included in the Water Management Plan.

The ESCP would be updated if required for the Rail Modification, and the following measures would be adhered to in areas where disturbance from construction occurs:

- Relevant internal approvals and permits would be obtained before commencement of surface disturbance (e.g. Ground Disturbance Permits);
- The extent of disturbance (including trafficable areas) would be minimised and identified using appropriate pegging, barriers or signage;
- Appropriate erosion and sediment controls would be approved and established prior to land disturbance and would remain in place until exposed areas are stabilised;

- Clean water runoff from undisturbed catchments would be diverted around the disturbance areas via diversion drains and banks to discharge into natural watercourses, where practical;
- Runoff from disturbed areas would be diverted into sediment dams;
- Drains, diversion banks and channels would be stabilised and scour protection would be provided as necessary; and
- Temporary erosion and sediment control measures would be used and may include silt fences, hay bales, jute mesh, check dams, cross banks, contour banks, armouring and straw mulching.

Providing sufficient erosion and sediment controls and control of potential pollutants, it is considered unlikely that water quality associated with the Rail Modification would affect the ecology of surface waters.

4.1.4 Barriers to Fish Movement

The Rail Modification would not involve construction (nor result in the creation) of physical barriers within watercourses in the Study Area that might impede fish passage. Various culverts and bridge crossings have been included in the indicative design of the proposed rail embankment to mitigate potential flood impacts and potential impacts to flow. Furthermore, the Modification would not restrict water from flowing down the Hunter River, including flood flows (WRM Water and Environment, 2017).

4.1.5 Groundwater and Aquatic Biota

The National Atlas of Groundwater Dependent Ecosystems (GDEs) (BOM, 2017) does not identify any potential GDEs in the vicinity of the Rail Modification. However, the Hunter River is considered to be a GDE (i.e. the river and associated riparian vegetation) and is known to be augmented by groundwater.

Dewatering of the alluvial floodplain is not likely because no material excision of alluvial material is proposed. For this reason, it is considered unlikely that the Rail Modification would have a measurable impact on aquatic habitat and biota within the Study Area.

4.2 Water Pipeline/ETL and Hunter River Pump Station

4.2.1 Loss of Aquatic Habitat

Vegetation clearing and earthworks near and within waterways of the Modification Area may decrease the amount of habitat for aquatic fauna.

Construction of the water supply infrastructure would occur across existing drainage channels (including the ephemeral Rosebrook Creek) and on the bank of the Hunter River.
Proposed construction of the water pipeline, Electricity Transmission Line (ETL) and river pump station is likely to result in disturbance of up to 0.5 ha in the vicinity of the Hunter River (including some disturbance of exotic vegetation in the riparian zone), which is classified as "Key Fish Habitat" under DPI guidelines for aquatic habitats (DPI NSW, 2017a). The water pipeline and ETL have been designed to avoid the planted trees along Rosebrook Creek.

Typically, riparian vegetation was degraded along this reach of the Hunter River and at Rosebrook Creek, due to weed invasion and extensive farming enterprises on the Hunter River floodplain.

Providing that native endemic riparian plant species are used to rehabilitate areas where riparian vegetation is disturbed, with erosion controls (e.g. sediment traps) remaining in place until vegetation cover has been re-established and fences erected to exclude stock access, it is considered unlikely that the proposed works could further degrade riparian vegetation such that there would be a significant impact on aquatic ecology within Rosebrook Creek and the Hunter River.

Excavation around the water intake within the river could require removal of woody debris from the flow channel.

Where removal of large woody debris from within the river channel or banks is unavoidable, the debris should be replaced after construction works. Plans to re-introduce large woody debris should consider factors such as the use of native trees rather than introduced species (willows), spread of invasive aquatic weeds, stream width, bank slope, flow regime and the long-term stability of the reused trees.

Providing the recommended management for disturbance to riparian vegetation and removal of large woody debris are implemented, where appropriate, it is considered that the proposed works would result in nil or negligible loss of aquatic habitat within the Study Area.

4.2.2 Surface Water Flow and Aquatic Biota

The installation and operation of instream structures (e.g. pumping and diversion of water) can alter natural flow regimes

The Rail Modification water supply pipeline would be buried and the pump station facility would largely be above ground. However, the design would include submerged pumps and a water inlet system adjacent to the Hunter River.

Nevertheless, it is considered unlikely that the pump station infrastructure would cause measurable effects on surface water flow and aquatic biota within the Hunter River. This is further mitigated by the fact that the Rail Modification is for the relocation of an existing approved/operating extraction point, not an additional extraction point.

4.2.3 Surface Water Quality and Aquatic Biota

In the absence of mitigation measures, vegetation clearing and earthworks have the potential to increase runoff to watercourses, resulting in increased turbidity, nutrients and other contaminants.

Turbid waters reduce light available for photosynthesis by algae and aquatic plants, decrease the ability of fish to find food or to detect predators and prey and smother aquatic habitat, fish gills and filter feeding apparatus of macroinvertebrates, among others.

Nutrient inputs can lead to blooms of algal and/or aquatic macrophytes and associated effects on aquatic biota (e.g. reduced light availability, fluctuations in levels of dissolved oxygen, production of harmful toxins, among others.

Rosebrook Creek is mostly ephemeral. Providing appropriate erosion and sedimentation control measures are implemented, it is predicted that burial of the pipe across the creeks channel will contribute negligible sediments, nutrients and contaminants to downstream environments.

At the Hunter site, construction of the pump station facility and supporting infrastructure are expected to take approximately 1 – 2 months. Thus, any impacts associated with installation of the pump facility are expected to be short-term and localised. Notwithstanding that erosion and sediment controls will be in place for the duration in any case.

Providing sufficient erosion and sediment controls and control of potential pollutants, it is considered unlikely that any impacts to water quality associated with the Water Pipeline and Hunter River Pump Station would significantly affect the aquatic ecology of surface waters.

4.2.4 Barriers to Fish Movement

Early life-history (eggs and larvae) stages of fish are particularly susceptible to diversion or extraction from main river channels by water extraction practices. Water intake can also cause injury and mortality on screens (impingement) and pumps and increase the risk of predation by increasing levels of stress in fish and/or providing habitat for predators (Blackley, 2003).

Pumps with rotating impellors are commonly used but can physically injure or kill fish during operation, with certain species and size classes particularly susceptible to injury. High-volume pump systems (150 ML/d) have been shown to cause greater injury and mortality than lower volume (36 ML/day) pump systems (Baumgartner et al., 2009).

Currently, the water intake is covered by a mesh that is 8 mm bars at 100 mm centres in both directions. The intake on the river, which is orientated parallel to river flow, flows (at approximately 0.08 m/s through the mesh) to a wet well away from the river. This should limit fish intake when the wet well pump starts as it would only potentially collect fish in the wet well (that have passed through the mesh) and not directly from the Hunter River. In addition, it is recommended that the pumps are operated or designed to achieve a slow ramp up and slow stop. This should further limit the potential for fish getting collected.

Several species of native fish exhibit migrations at specific times of the year, thus restricting water diversions to periods where fish are unlikely to be migrating could represent an effective method to limit their extraction. However, water requirements at the MPO do not allow for seasonal restrictions. Notwithstanding, in practise, the pumps are only run for a small percentage of the year. For example, Hydro Engineering and Consulting (2017) indicate that in the majority of years of the MPO at least 700 ML would need to be sourced from the Hunter River. Using a 200 L/s pump it would take approximately 40 days total (regardless of how many campaigns are needed) to pump 700 ML. Therefore the pumps would not be operating for the majority of any given year, thereby reducing the potential for fish and eggs to be entrained in the system.

If unmitigated, extraction of water from the Hunter River for use in the mine could reduce the population of native (and introduced) fish in the river. If appropriate designs for screens and operational procedures are implemented, the impact of water extraction on fish populations in the Hunter River could be minimised.

MACH Energy has already implemented a number of mitigation strategies to reduce the incidence of entrainment and impingement of fish associated with pumping water from the river. In addition, the Rail Modification pump station is a replacement system that when constructed and operational would replace the existing pump station (which would be decommissioned). Thereby resulting in not net increase in potential impacts to fish from pumping.

4.2.5 Groundwater and Aquatic Biota

The Hunter River alluvial aquifer is not likely to be impacted because no drawdown effects are expected. For this reason, it is considered unlikely that the Rail Modification would have a measurable impact on groundwater habitat and stygofauna within the Study Area.

4.3 Cumulative Impacts

Cumulative impacts include the effects from concurrent operations that are close enough to cause additive effect on the receiving environment. Relevant approved or proposed mining operations near the Rail Modification include:

- Bengalla Mining Company owns the existing Bengalla Mine, which is an open cut coal mine located immediately south of the MPO;
- Hunter Valley Energy Coal (a wholly owned subsidiary of BHP) owns the existing Mt Arthur Coal Mine, which is an open cut coal mine located approximately 8 km south of the MPO;
- Mangoola Coal Operations Pty Limited owns and operates Mangoola Coal, which is an open cut coal mine located approximately 8 km west of the MPO;
- Australian Pacific Coal Limited owns the Dartbrook Mine, which is an approved underground coal mine located immediately north of the MPO; and
- Muswellbrook Coal Company (a wholly owned subsidiary of Idemitsu) owns the Muswellbrook Coal Mine which is an open cut and underground coal mine located north east of Muswellbrook.

Potential interactions with these mines are typically limited to shared use of the Main Northern Railway, shared use of supporting contractors, contributions to regional background air quality and traffic movements and socio-economic effects on the area (e.g. support industries based in Muswellbrook and other centres in the Hunter Valley).

Cumulative impacts need to also consider existing and historic impacts from other industries and land practises. The significant existing disturbance to the flow regime and aquatic environment from past damming and regulation of the Hunter River is described in Section 2.1.

Considering the limited impacts of the Rail Modification on aquatic ecology and also the existing significant number of extraction points along the Hunter River, it is not considered that there would be a material increase in cumulative impacts.

4.4 Threatened Species Under the EPBC Act, BC Act and FM Act

As stated in Section's 2 & 3, no aquatic species of conservation significance listed under the EPBC Act, BC Act or FM Act have been recorded within the Study Area.

Assessments of significance using the Seven Part Test in accordance with section 220ZZ of the FM Act have been undertaken and it is concluded that the Rail Modification would not result in a significant impact to any listed threatened aquatic species or ecological communities (Appendix 1).

4.5 Conclusions & Recommendations

In conclusion, the design of the proposed Rail Modification, particularly those components related to water management, address many of the potential impacts that might otherwise occur. Consequently, the direct impacts of the Rail Modification on aquatic ecology would likely be minimal and the potential indirect impacts on aquatic ecology downstream of the Rail Modification would be minimised with the continuation of a number of existing mitigation measures currently implemented at the MPO.

While the design of the Rail Modification indicates that impacts to aquatic habitats and biota can generally be managed by implementation of MACH Energy's Water Management Plan, it is recommended that surface water and stream health monitoring programs continue to monitor potential changes in the Hunter River, Rosebrook Creek and suitable control systems within the region.

5.0 ACKNOWLEDGEMENTS

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7.0 APPENDICES

APPENDIX 1: THREATENED SPECIES ASSESSMENTS

The NSW Department of Primary Industries (DPI) Fisheries indicated one endangered species of fish, Southern Purple-Spotted Gudgeon (*Mogurnda adspersa*), and one endangered population, Darling River Hardyhead (*Craterocephalus amniculus*), may occur within the Study Area. Potential impacts on the Southern Purple-Spotted Gudgeon and the Darling River Hardyhead are assessed below in accordance with the relevant Seven Part Test, section 220ZZ of the FM Act (questions below are paraphrased).

The assessments of the significance of impacts have been prepared based on the Rail Modification Description and BIO-ANALYSIS Pty Ltd's understanding of the likely impacts of the Rail Modification on instream ecology. Each assessment considers the potential direct and indirect impacts of the construction and operational phases of the proposed rail spur and rail loop and the Water Pipeline and Hunter River Pump Station on the Southern Purple-Spotted Gudgeon and the Darling River Hardyhead.

Southern Purple-Spotted Gudgeon

Although Southern Purple-Spotted Gudgeon has not been recorded from within the Study Area, DPI NSW (2017a) consider that the Hunter River and Rosebrook Creek provide suitable habitat for this species. Ephemeral drainage lines within the Modification Area are not expected to provide suitable habitat for this species.

Is the Project likely to have an adverse effect on the lifecycle of the threatened species?
The potential for adverse effects on the life-cycle of threatened species of fish depends on whether the Rail Modification is likely to remove or modify habitat or change the nature of periodic disturbances such as flood.

Southern Purple-Spotted Gudgeon spawn during summer when water temperatures exceed 20 ºC and food is abundant (DPI NSW, 2017a). Adhesive eggs are attached to hard substrata, such as rocks or submerged woody debris.

If this species is present within the Study Area, it is possible that any increase in turbidity and siltation or removal of riparian vegetation and large woody debris associated with construction activities could adversely affect the life-cycle of Southern Purple-Spotted Gudgeon.

Entrainment of eggs and larvae associated with water abstraction could also have an adverse effect on the lifecycle of this species.

Implementation of erosion and sediment controls and recommendations relating to removal of riparian vegetation and large woody debris should mitigate these potential threats. Implementation of controls to avoid entrainment of fish eggs and larvae would minimise effects of water extraction, assuming that a viable population of this species is present within the Study Area.

How is the Project likely to affect the habitat of a threatened species, population or ecological community?

Most remnant populations of Southern Purple-Spotted Gudgeon in NSW occur in permanent water such as slow-flowing streams and wetlands with low turbidity (DPI NSW, 2017a). Cover provided by aquatic and riparian vegetation, leaf litter, rocks or snags are important for this species (Lintermans, 2009; DPI NSW, 2017a). They are a benthic species that mostly feed on terrestrial insects and their larvae, worms, small fish, tadpoles and some plant material.

Threats that the Rail Modification poses to potential habitat of Southern Purple-Spotted Gudgeon are reduced flows, increased turbidity, poor water quality and loss of aquatic plants.

Various culverts and bridge crossings have been included in the indicative design of the proposed rail embankment to mitigate potential flood impacts and potential impacts to flow. Furthermore, the Modification would not restrict water from flowing down the Hunter River, including flood flows (WRM Water and Environment, 2017). Therefore, the Modification is not expected to alter the number of pools that connect to habitats upstream.

Proposed construction of the water pipeline, Electricity Transmission Line (ETL) and river pump station is likely to result in disturbance of up to 0.5 ha in the vicinity of the Hunter River (including some disturbance of exotic vegetation in the riparian zone). The water pipeline and ETL have been designed to avoid the planted trees along Rosebrook Creek.

Providing that native endemic riparian plant species are used to rehabilitate areas where riparian vegetation is disturbed and that adequate erosion/sediment controls are implemented, it is considered unlikely that the proposed works could further degrade, fragment or isolate areas of riparian or instream habitat within the Hunter River.

Is the proposal likely to have an adverse effect on critical habitat for the threatened species?
There are no critical habitats listed for the Southern Purple-Spotted Gudgeon.

Is the Proposal consistent with the objectives or actions of a recovery plan or a threat abatement plan?
There is currently no recovery plan or a threat abatement plan for the Southern Purple-Spotted Gudgeon.

Erosion/sediment controls and replanting of disturbed riparian vegetation with native endemic species are proposed under the Rail Modification.

Conclusion

It is unlikely that the Rail Modification will significantly impact a local or regional population of the Southern Purple-Spotted Gudgeon.

Darling River Hardyhead

DPI NSW (2017a) consider that the headwaters of the Hunter River provide suitable habitat for this species.

The Study Area is a considerable distance from the distribution limits of this species.

Is the Project likely to have an adverse effect on the lifecycle of an endangered population?

Little is known about the reproductive biology of this species however, it is closely related to the Murray Hardyhead (*Craterocephalus fluviatilis*), which is considered a short lived (annual) species with an extended breeding season from spring through to autumn. The eggs are usually deposited amongst aquatic vegetation (DPI NSW, 2014b).

If this species is present within the Study Area, it is possible that increased turbidity and siltation, smothering of beds of aquatic macrophytes, removal of riparian habitat or large woody debris associated with construction activities could adversely affect the life-cycle of Darling River Hardyhead.

Entrainment of eggs and larvae associated with water abstraction could also have an adverse effect on the lifecycle of this species.

Implementation of erosion and sediment controls and recommendations relating to removal of riparian vegetation and large woody debris should mitigate these potential threats. Implementation of controls to avoid entrainment of fish eggs and larvae would minimise effects of water extraction, assuming that a viable population of this species is present within the Study Area.

How is the Project likely to affect the habitat of a threatened species, population or ecological community?

The Darling River Hardyhead is found in the upper tributaries of the Darling River including the Border Rivers and the Gwydir and Naomi catchments. It is also found in the headwaters of the Hunter System in NSW (DPI NSW, 2014b). However, despite extensive sampling, no individuals have been detected from the Hunter River catchment since 2003 (DPI NSW, 2014b).

Key threats that the Rail Modification poses to potential habitat of Darling River Hardyhead are reduced flows, increased turbidity, poor water quality, loss of aquatic plants and predation by introduced fish, particularly Gambusia.

Modelling indicated that there would be no material impact to the volume of water entering the Hunter River from the Modification Area, thus altering the number of pools that connect to habitats upstream.

Proposed construction of the water pipeline, ETL and river pump station is likely to result in disturbance of up to 0.5 ha in the vicinity of the Hunter River (including some disturbance of exotic vegetation in the riparian zone). The water pipeline and ETL have been designed to avoid the planted trees along Rosebrook Creek.

Providing that native endemic riparian plant species are used to rehabilitate areas where riparian vegetation is disturbed and that adequate erosion/sediment controls are implemented, it is considered unlikely that the proposed works could further degrade, fragment or isolate areas of riparian or instream habitat within the Hunter River.

How is the Project likely to affect critical habitat?
There are no critical habitats listed for the Darling River Hardyhead.

Is the Proposal consistent with the objectives or actions of a recovery plan or a threat abatement plan?
There is currently no recovery plan or a threat abatement plan for the Darling River Hardyhead.

Erosion/sediment controls and replanting of disturbed riparian vegetation with native endemic species are proposed under the Rail Modification.

Conclusion

It is unlikely that the Rail Modification will impact on a local or regional population of the Darling River Hardyhead.

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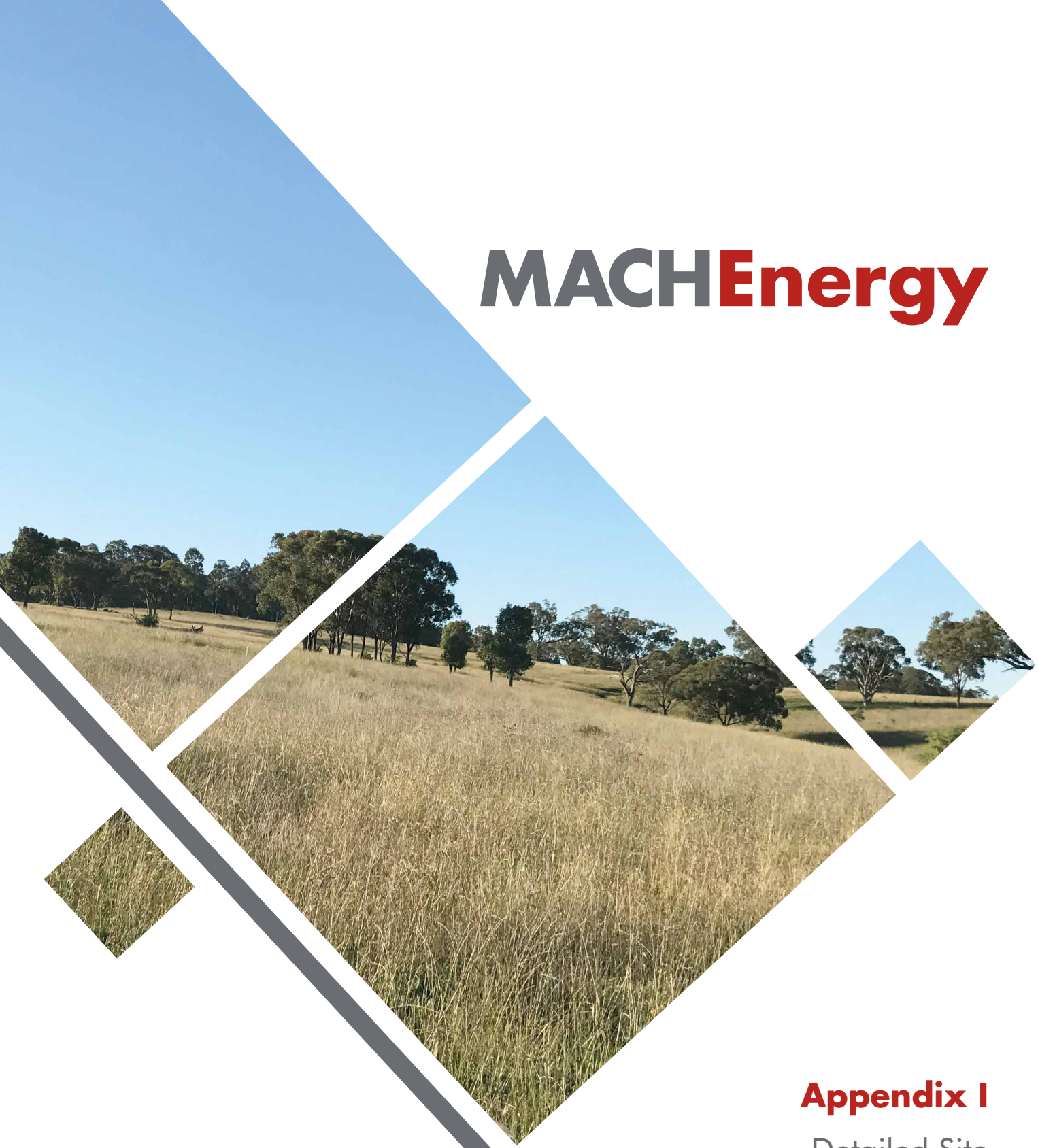

Appendix I

Detailed Site Investigation

SESL AUSTRALIA
Environment & Soil Sciences

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)



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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

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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.*

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TABLE OF CONTENTS

DOCUMENT RECORD I

EXECUTIVE SUMMARY I

1 INTRODUCTION 1

1.1 Background 3
1.2 Objectives 3
1.3 Regulatory Guidelines 4
1.4 Scope of Works 5
1.5 Personnel 6

2 SITE DESCRIPTION 7

2.1 Site Location and Access 7
2.2 Site Identification 7
2.3 Site Layout and Infrastructure 8
2.4 Surrounding Land Use 8

3 ENVIRONMENTAL SETTING 9

3.1 Topography 9
3.2 Geology and Soil Landscapes 9
3.3 Surface Water 9
3.4 Acid Sulfate Soil 9
3.5 Proximity to Local Sensitive Environments 10

4 SITE HISTORY 11

4.1 Historical Title Search 11
4.2 Historical Aerial Photographs 11
4.3 Site Zoning and Council Records 14
4.4 EPA Contaminated Sites Database 14
4.5 Dangerous Goods Licence Search 15
4.6 Previous Environmental Investigations 15
4.7 Current Land Use and Associated Practices 15
4.8 Integrity Assessment 15

5 FEATURES OF INTEREST 16

5.1 Site Reconnaissance 16
5.1.1 Feature of Interest Two 16
5.1.2 Feature of Interest Three 16
5.1.3 Feature of Interest Five 17
5.1.4 Feature of Interest Six 17
5.1.5 Feature of Interest Seven 17

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5.1.6 Feature of Interest Sixteen 17
5.1.7 Feature of Interest Seventeen 18
5.1.8 Feature of Interest Eighteen 18
5.1.9 Feature of Interest Nineteen 18
5.1.10 Feature of Interest Twenty 18
5.1.11 Feature of Interest Twenty-one 18
5.1.12 Feature of Interest Twenty-two 19

6 RELEVANT GUIDELINES FOR CONTAMINATION ASSESSMENT AND MANAGEMENT 20
6.1 Relevant Guidelines 20
6.2 Proposed Development 20
6.3 National Environmental Protection (Assessment of Site Contamination) Measure 1999 20
6.3.1 Health Investigation Levels (HILs) 21
6.3.2 Health Screening Levels (HSLs) 22
6.3.3 Ecological Investigation Levels (EILs) 24
6.3.4 Ecological Screening Levels (ESLs) 25
6.4 Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites (ANZECC/NHMRC, 2000) 25
6.5 SEPP 55 Guidelines 26
6.6 Relevant Legislation 27

7 PRELIMINARY CONCEPTUAL SITE MODEL 28
7.1 Sources of Impact 28
7.2 Contaminants of Concern 28
7.3 Fate and Transport 29
7.3.1 Transport Medium and Control 29
7.3.2 Potential Exposure Pathways 29
7.4 Potential Receptors 29

8 SOIL SAMPLING, ANALYSIS PLAN AND SAMPLING METHODOLOGY 30
8.1 Sampling Team 30
8.2 Sampling Regime – Soil 30
8.3 Sample Collection – Soil 33

9 QUALITY ASSURANCE & QUALITY CONTROL PLAN 34
9.1 Data Quality Objectives 34
9.2 Data Quality Indicators and Data Evaluation 35
9.2.1 Documentation and Data Completeness 35
9.2.2 Data Comparability 35
9.2.3 Data Representativeness 35
9.2.4 Precision and Accuracy for Sampling and Analysis 36

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9.3 Field and Laboratory Quality Assurance Program 36
9.3.1 Quality Assurance 36
9.3.2 Quality Control Results 36
9.3.3 Field QC 37
9.3.4 Laboratory Quality Control 37
9.3.5 Laboratory Blanks 38
9.4 QA/QC Results 38
9.4.1 Field Duplicate Samples and Rinsate Sample 38
9.5 Laboratory QA/QC 39
9.6 Statement on Data Quality 39
9.7 Reporting 40

10 ASSESSMENT CRITERIA 41
10.1 Health Investigation Levels 41
10.2 Health Screening Levels 41
10.3 Ecological Investigation/Screening Levels 41
10.4 Waste Classification Guidelines 42

11 SUMMARY OF RESULTS 43
11.1 Site Conditions 43
11.2 Identified Fill Material 43
11.3 Schedule of Laboratory Analysis 44
11.4 Laboratory Results 44

12 UPDATED CONCEPTUAL SITE MODEL 45
12.1 Sources of Impact 45
12.2 Contaminants of Concern 45

13 CONCLUSION 46
13.1 Site Characterisation 46
13.2 Summary 46

14 LIMITATIONS 48

15 REFERENCES 49

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DOCUMENT TABLES

Table 1 – Land Parcel Summary.....1

Table 2 – Report Personnel 6

Table 3 – Site Identification 7

Table 4 - Summary of Aerial Photographs Review.....11

Table 5 - HSL Fractions and Corresponding Equivalent Carbon Range 23

Table 6 – EILs Land Use Criteria and Protection Levels 24

Table 7 – Sampling Personnel.....30

Table 8 – Sample Location Selection.....31

Table 9 – Data Quality Objectives 34

Table 10 – Summary of Soil RPDs 39

Table 11 – Laboratory QAQC Performance.....39

Table 12 – Summary of Sample Analysis.....40

Table 13 – Fill Material Identification 43

ANALYTICAL TABLES

Analytical Table 1 – Soil Result Summary

Analytical Table 2 – RPD Summary

Analytical Table 3 – Rinsate Blank Summary

FIGURES

Figure 1 – Project Location

Figure 2 – General Arrangement of the Key Modification Elements

Figure 2a to 2b – Land Title Information

Figures 3a to 3e – Features of Interest

Figures 4a to 4i - Sample Location

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APPENDICES

Appendix A Site Photographs

Appendix B Historical Aerial Photographs

Appendix C 149 (2) & (5) Planning Certificates

Appendix D NEPM 2013 Health Screening Levels TRH
NEPM 2013 Ecological Investigation Levels
NEPM 2013 Ecological Screening Levels

Appendix E Search of the Contaminated Land Record – NSW EPA

Appendix F Laboratory Certificates of Analysis, COC

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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

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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

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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

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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

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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).

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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);

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- 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.

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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
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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

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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*.

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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.

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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.

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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.

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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.

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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.

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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.

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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.

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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.

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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.

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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.

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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.

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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.

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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.

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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.

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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”.

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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.

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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.

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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.

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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)*.*

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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;

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- 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

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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

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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

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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

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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).

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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.

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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.

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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.

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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.

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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.

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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.

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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.

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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.

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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.

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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

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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.

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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.

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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.

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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.

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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

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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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Certified System Quality ISO 9001

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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

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

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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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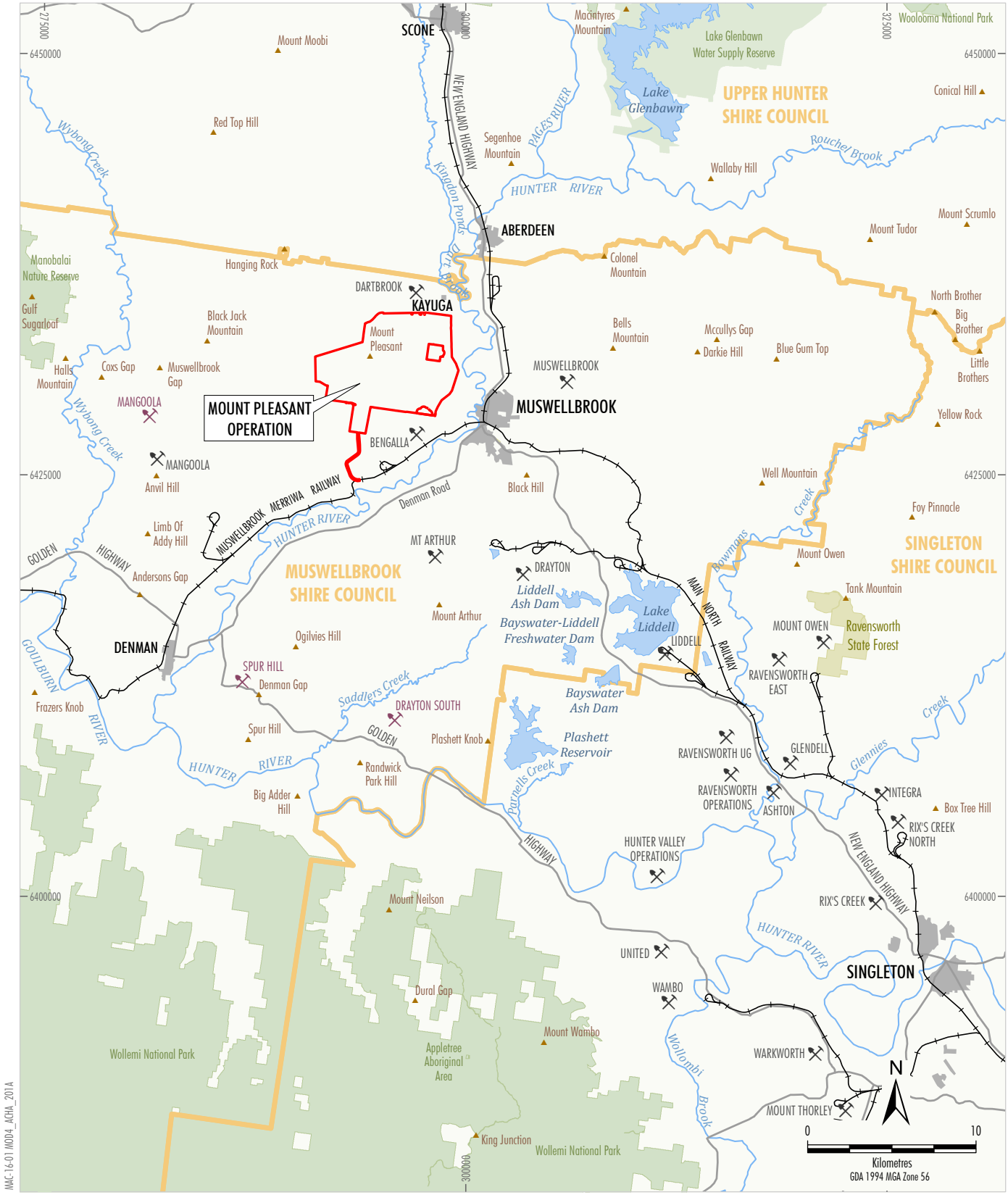

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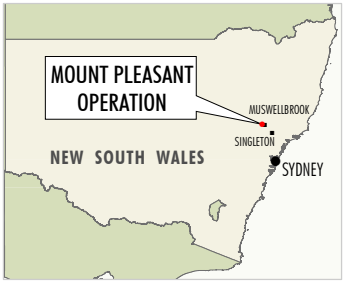

LEGEND

- 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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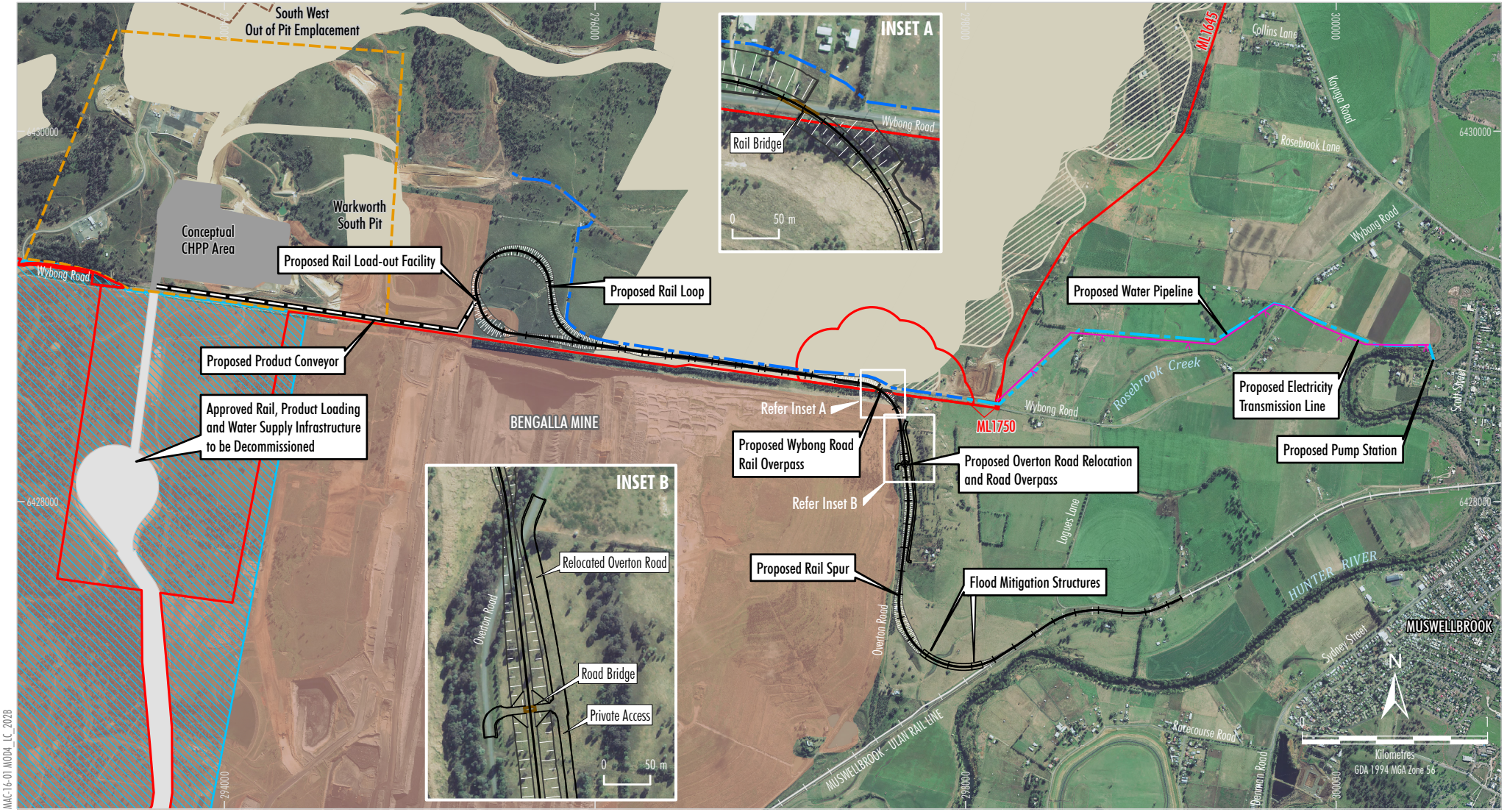

MAC-16-01 MOD4_LC_202B

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

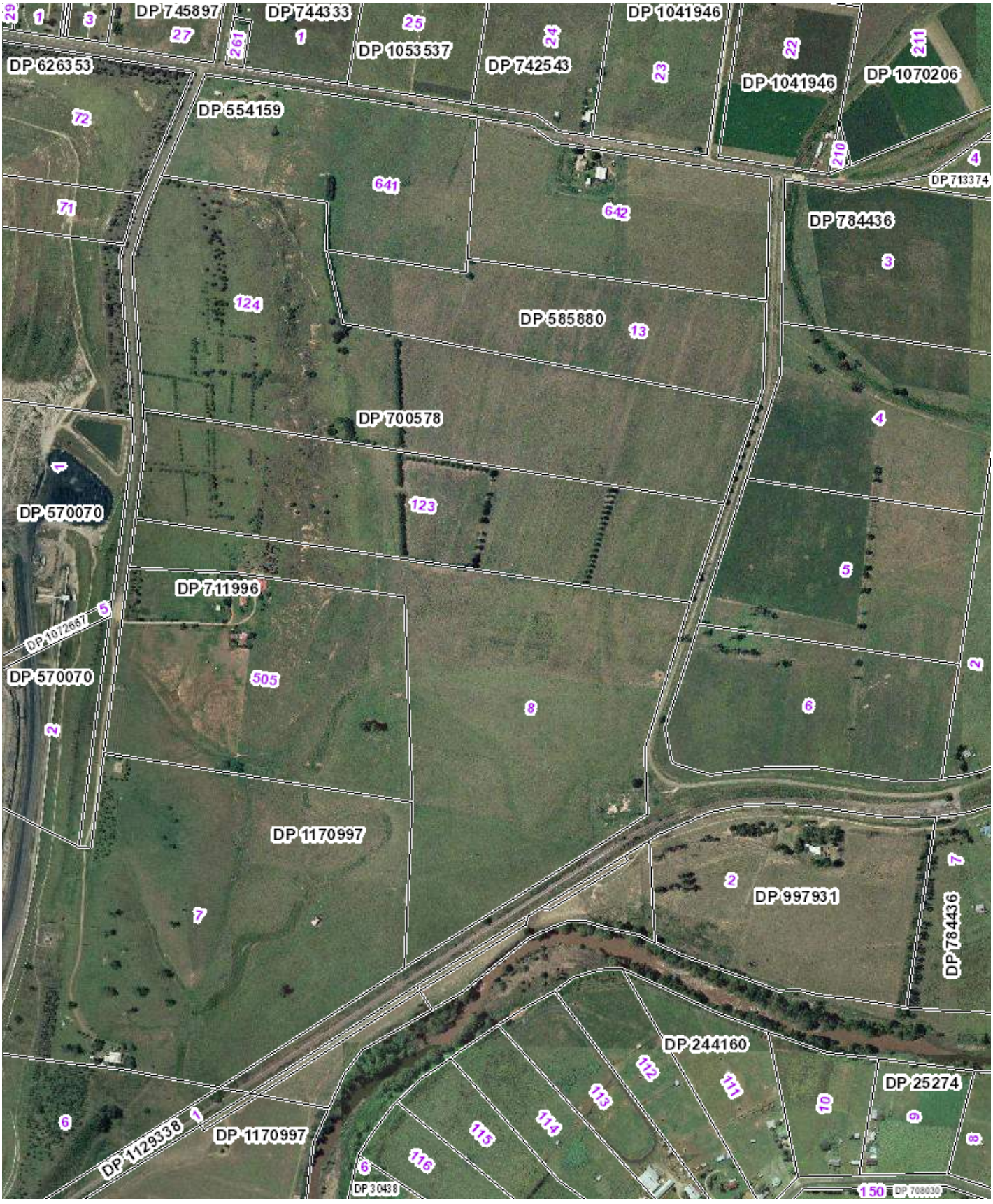

Figure 2a: Land Title Information
Location: Mount Pleasant Operation Rail Modification NSW
Project: J000373
Date: 22/11/2017

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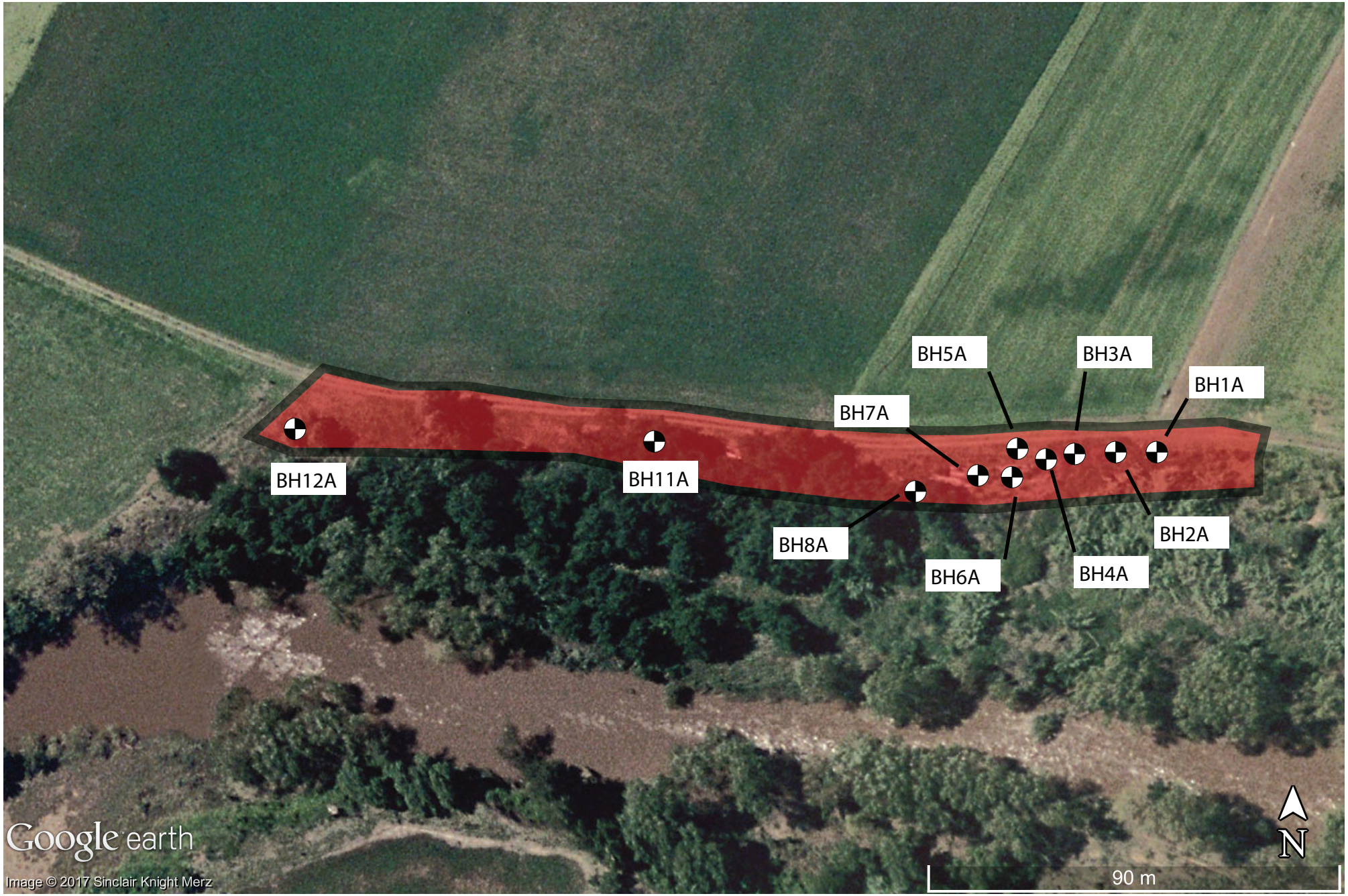
Title: Figure 4g: Sample Locations
Location: Mount Pleasant
Project: J000373 - Detailed Site Investigation
Date: 09/12/2017

Legend

Borehole Locations

Note: Approximate locations



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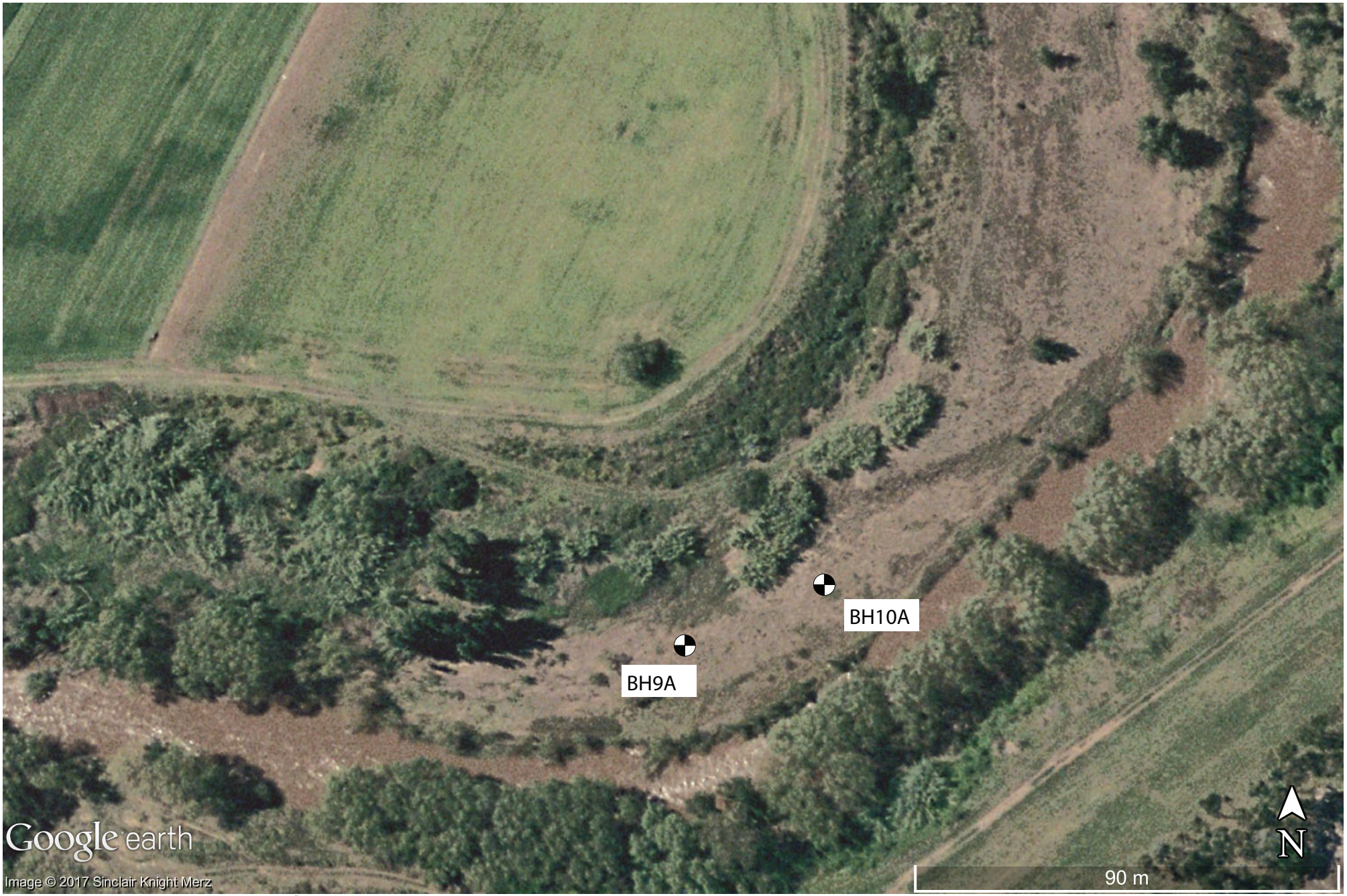
Title: Figure 4h: Sample Locations
Location: Mount Pleasant
Project: J000373 - Detailed Site Investigation
Date: 09/12/2017

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

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Appendix A

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Site Photographs



Photo 1.	Feature 2



Photo 2.	Feature 2



Photo 3.	Feature 2



Photo 4.	Feature 2

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Site Photographs



Photo 5. **Feature 5**



Photo 6. **Feature 5 - Asbestos**



Photo 7. **Feature 6**



Photo 8. **Feature 7**

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Site Photographs



Photo 9. **Feature 3**



Photo 10. **Feature 3**



Photo 11. **Feature 17**



Photo 12. **Feature 17**

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Site Photographs



Photo 13. **Feature 16**



Photo 14. **Feature 16**



Photo 15. **Feature 18 – Suspected Livestock Dip**



Photo 16. **Feature 18 – Chemical Container Storage**

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Site Photographs



Photo 17.	Feature 18 - Fill



Photo 18.	Feature 18 - Fill



Photo 19.	Feature 18 - Structure



Photo 20.	Feature 18 – ACM Fragment

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Site Photographs



Photo 21.	Feature 19



Photo 22.	Feature 20



Photo 23.	Feature 21



Photo 24.	Feature 21

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Site Photographs



Photo 25. **Feature 22 – Fill Materials**



Photo 26. **Feature 22 – Fill Materials**



Photo 27. **Feature 22 – Scrap/Vehicle Storage**



Photo 28. **Feature 22 – Chemical Storage**

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Site Photographs



Photo 29.	Feature 22 – ACM Fragments



Photo 30.	Feature 22 – Fill Profile



Photo 31.	Feature 22 – Scrap Storage



Photo 32.	Feature 22 – Scrap Storage

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Appendix B

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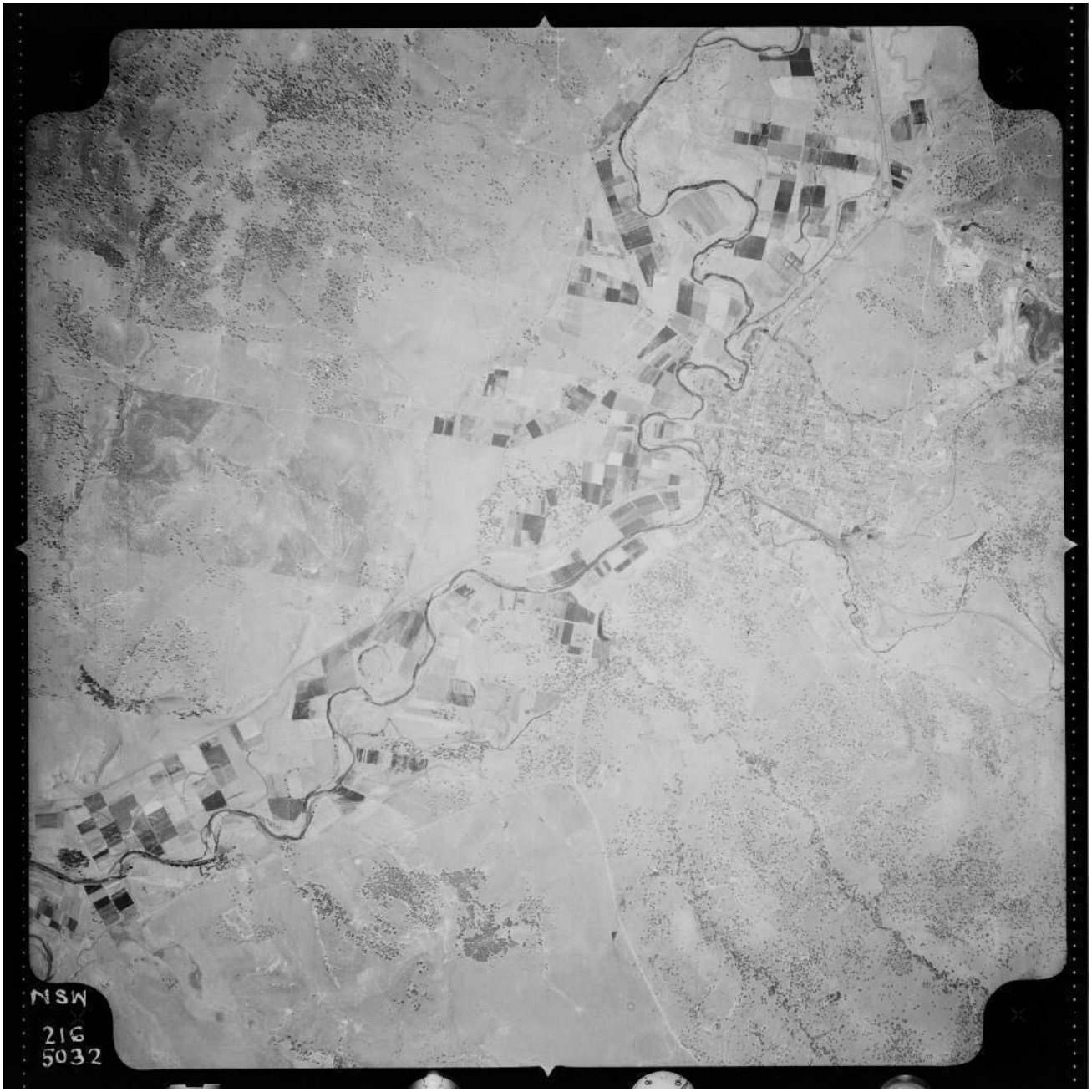

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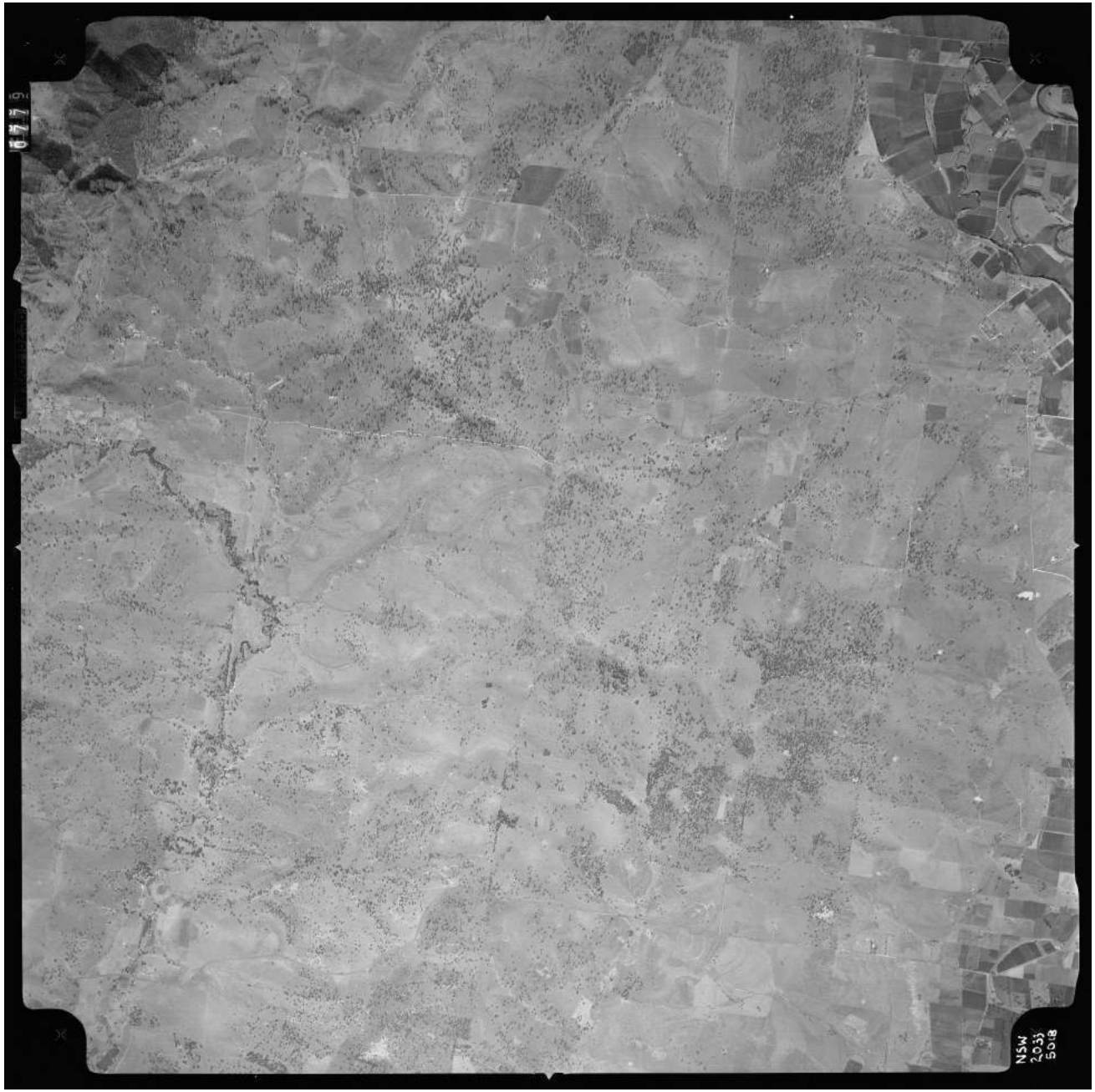

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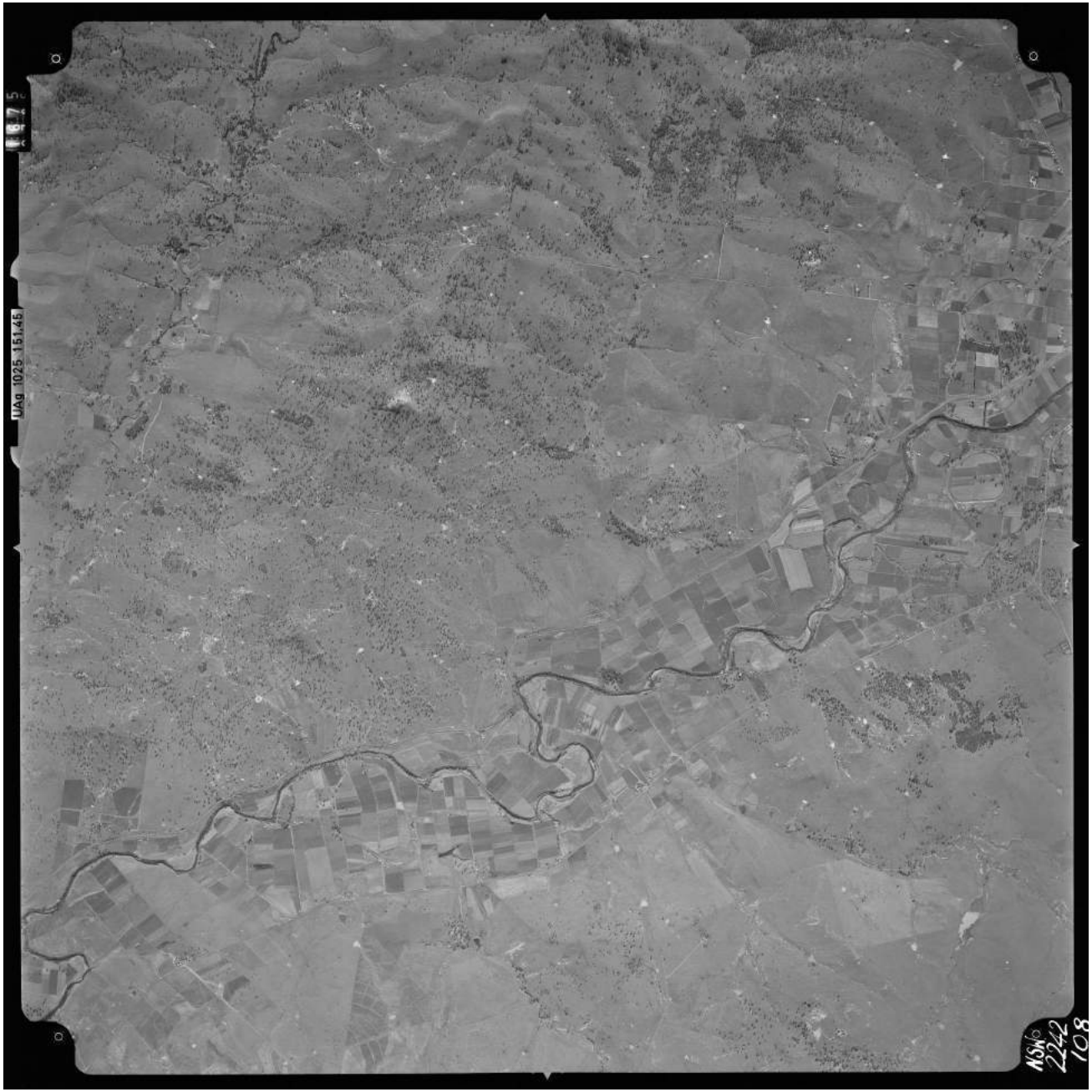

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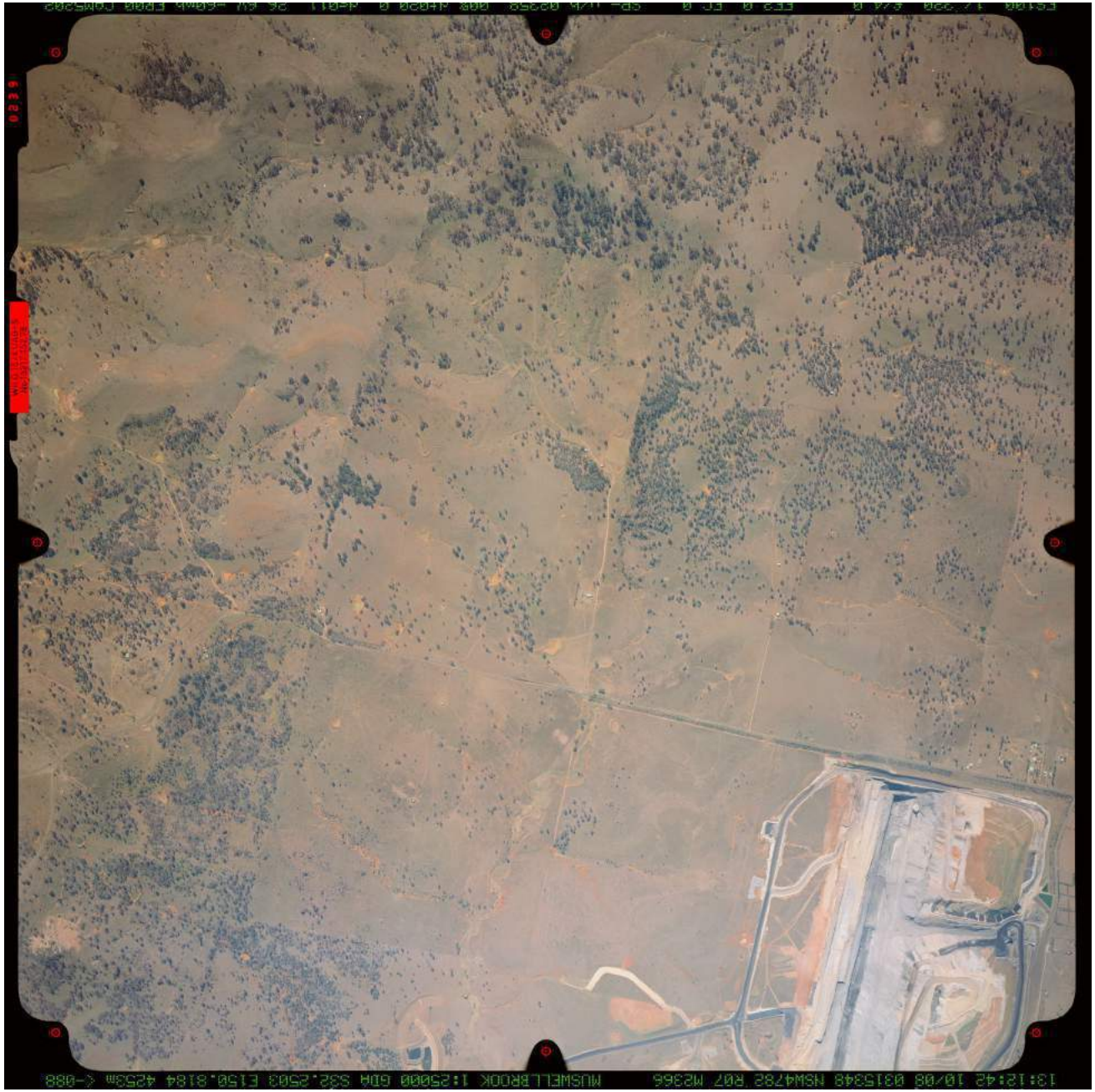

2003_4782_07_241



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Appendix C

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PLANNING CERTIFICATE UNDER SECTION 149 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

Enquiries	Environmental Services
Contact	02 6549 3700
Invoice no.	43721
Your reference	Application

Date: 4 October 2017

Assessment: 127951 **Cert No: 21298**

MACH Energy Australia Pty Ltd
GPO Box 94
BRISBANE QLD 4001

Owner (as recorded by Council)

Wesfarmers Bengalla Limited & Taipower Bengalla Pty Limited & others

Property Description: 3 BENGALLA ROAD MUSWELLBROOK 2333
LOT: 641 DP: 554159

Land to which the certificate relates

The land to which this certificate relates, being the lot or lots described on the application form, is shown in the Council's records as being situated at the street address described above. The information contained in this certificate relates only to the lot or lots described on this certificate. Separate planning certificates can be obtained upon application for the other lots, those certificates may contain different information than is contained in this certificate.

CERTIFICATE UNDER SECTION 149(2) ENVIRONMENTAL PLANNING & ASSESSMENT ACT

LOCAL ENVIRONMENTAL PLANS

PLANNING INSTRUMENT	Muswellbrook Local Environmental Plan 2009
LAND USE ZONING	RU1 Primary Production

PERMITTED WITHOUT CONSENT

Extensive agriculture; Home occupations; Intensive plant agriculture

PERMITTED WITH CONSENT

Air transport facilities; Airstrips; Animal boarding or training establishments; Aquaculture; Camping grounds; Caravan parks; Cellar door premises; Cemeteries; Community facilities; Crematoria; Depots; Dwelling houses; Educational establishments; Environmental facilities; Environmental protection works; Extractive industries; Farm buildings; Flood mitigation works; Forestry; Function centres; Group homes; Hazardous industries; Health consulting rooms; Heavy industrial storage establishments; Helipads; Highway service centres; Home-based child care; Home businesses; Home industries; Industrial retail outlets; Information and education facilities; Intensive livestock agriculture; Intensive plant agriculture; Kiosks; Landscaping material supplies; Open cut mining; Places of public worship; Plant nurseries; Recreation areas; Recreation facilities (indoor); Recreation facilities (major); Recreation facilities (outdoor); Research stations; Restaurants or cafes; Roads; Roadside stalls; Rural industries; Rural supplies; Rural worker's dwellings; Secondary dwellings; Service stations; Sewerage systems; Signage; Storage premises; Take away food and drink premises; Tourist and visitor accommodation; Transport depots; Truck depots; Turf farming; Veterinary hospitals; Waste disposal facilities; Water supply systems.

PROHIBITED

Any development not specified above.

MINIMUM LAND DIMENSIONS FOR THE ERECTION OF A DWELLING

Under the provisions of the Muswellbrook Local Environmental Plan 2009, the minimum subdivision lot size is 80ha and is also subject to the provisions detailed below.

Land zoned RU1 Primary Production may, with the consent of Council, be subdivided for the purpose of primary production to create a lot less than the minimum lot size. However, such a lot cannot be created if an existing dwelling would, as the result of the subdivision, be situated on the lot. A dwelling cannot be erected on such a lot created.

Development consent must not be granted to the subdivision of a lot in a strata plan or community title scheme on land zoned RU1 Primary Production that is used, or proposed to be used, for residential accommodation or tourist and visitor accommodation.

Only one dwelling house may be erected on land zoned RU1 Primary Production only if the land is:

(a) a lot created in accordance with clause 4.1 of the LEP 2009, or

(b) a lot created before the LEP 2009 commenced and on which the erection of a dwelling house was permissible immediately before that commencement, or

(c) a lot created before the LEP 2009 commenced that is at least the minimum lot size specified for that lot by the Lot Size Map, or

(d) a lot for which subdivision approval was granted before the LEP 2009 commenced and on which the erection of a dwelling house would have been permissible immediately before that commencement, or

(e) an existing holding.

NOTE: EXISTING HOLDING means all adjoining land, even if separated by a road or railway, held in the same ownership:

(a) on 11 April 1974, and

(b) at the time of lodging a development application for the erection of a dwelling house under this clause.

and includes any other land adjoining that land acquired by the owner since 11 April 1974.

NOTE: The owner in whose ownership all the land is at the time the application is lodged need not be the same person as the owner in whose ownership all the land was on the stated date.

WHETHER THE LAND INCLUDES OR COMPRISES CRITICAL HABITAT

The subject land has not been declared as critical habitat.

WHETHER THE LAND IS IN A CONSERVATION AREA

The subject land is not known to be in a conservation area.

Date: 5 October 2017

Cert No: 21298

WHETHER AN ITEM OF ENVIRONMENTAL HERITAGE IS SITUATED ON THE LAND

The land is NOT affected by any known or listed heritage item.

STATE ENVIRONMENTAL PLANNING POLICIES (EXEMPT & COMPLYING DEVELOPMENT CODES 2008)

CERTIFICATE UNDER SECTION 149(2) IDENTIFYING THE INFORMATION SET OUT IN CLAUSE 3 OF SCHEDULE 4 OF THE ENVIRONMENTAL PLANNING & ASSESSMENT REGULATIONS

Part 3 General Housing Code

Not applicable to the land to which this certificate relates.

Part 3A Rural Housing Code

YES. Complying development specified in the Rural Housing Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 4 Housing Alterations Code

YES. Complying development specified in the Housing Alterations Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 4A General Development Code

YES. Complying development specified in the General Development Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 5 Commercial and Industrial Alterations Code

Not applicable to the land to which this certificate relates.

Part 5A Commercial and Industrial (New Buildings and Additions) Code

Not applicable to the land to which this certificate relates.

Part 6 Subdivision Code

YES. Complying development specified in the Subdivision Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 7 Demolition Code

YES. Complying development specified in the Demolition Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 8 Fire Safety Code

YES. Complying development specified in the Fire Safety Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

STATE ENVIRONMENTAL PLANNING POLICIES

The following State Environmental Planning Policies apply to land within the Muswellbrook Shire LGA:-

No. 21. Caravan Parks - Ensures that where caravan parks or camping grounds are permitted under an environmental planning instrument, movable dwellings, as defined in the Local Government Act 1993, are also permitted. The policy ensures that development consent is required for new caravan parks and camping grounds and for additional long-term sites in existing caravan parks.

No. 30. Intensive Agriculture - Requires development consent for cattle feedlots having a capacity of 50 or more cattle or piggeries having a capacity of 200 or more pigs. The policy sets out information and public notification requirements to ensure there are effective planning control over this export-driven rural industry. The policy does not alter if, and where, such development is permitted, or the functions of the consent authority.

No. 33. Hazardous and Offensive Development - Provides new definitions for 'hazardous industry', 'hazardous storage establishment', 'offensive industry' and 'offensive storage establishment'. The definitions apply to all planning instruments, existing and future. The new definitions enable decisions to approve or refuse a development to be based on the merit of proposal. The consent authority must careful consider the specifics the case, the location and the way in which the proposed activity is to be carried out. The policy also requires specified matters to be considered for proposals that are 'potentially hazardous' or 'potentially offensive' as defined in the policy. For example, any application to carry out a potentially hazardous or potentially offensive development is to be advertised for public comment, and applications to carry out potentially hazardous development must be supported by a preliminary hazard analysis (PHA).

No. 36. Manufactured Home Estates - Helps establish well-designed and properly serviced manufactured home estates (MHEs) in suitable locations. Affordability and security of tenure for residents are important aspects. To enable the immediate development of estates, the policy allows MHEs to be located on certain land where caravan parks are permitted. There are however, criteria that a proposal must satisfy before the local council can approved development.

No. 44. Koala Habitat Protection - Encourages the proper conservation and management of areas of natural vegetation that provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline.

No. 55. Remediation of Land - Introduces state-wide planning controls for the remediation of contaminated land. The policy states that land must not be developed if it is unsuitable for a proposed use because it is contaminated. If the land is unsuitable, remediation must take place before the land is developed. The policy makes remediation permissible across the State, defines when consent is required, requires all remediation to comply with standards, ensures land is investigated if contamination is suspected, and requires councils to be notified of all remediation proposals.

No. 62. Sustainable Aquaculture - The policy implements the regional strategies already developed by creating a simple approach to identity and categorise aquaculture development on the basis of its potential environmental impact. The SEPP also identifies aquaculture development as a designated development only where there are potential environmental risks.

No. 64. Advertising and Signage - Aims to improve the amenity of urban and natural settings by managing the impact of outdoor advertising. The policy responds to growing concerns from the community, the advertising industry and local government that existing controls and guidelines were not effective. SEPP No. 64 offers the comprehensive provisions and consistent approach needed. SEPP 64 – Advertising and Signage: Explanatory Information should be read in conjunction with the policy.

No. 65. Design Quality of Residential Flat Development - Raises the design quality of residential flat development across the state through the application of a series of design principles. The policy provides for the establishment of Design Review Panels to provide independent expert advice to councils on the merit of residential flat development. The accompanying regulation requires the involvement of a qualified designer throughout the design, approval and construction stages.

SEPP (Housing for Seniors or People with a Disability) 2004 - Encourage the development of high quality accommodation for our ageing population and for people who have disabilities - housing that is in keeping with the local neighbourhood

SEPP (Building Sustainability Index: BASIX) 2004 - This SEPP operates in conjunction with Environmental Planning and Assessment Amendment (Building Sustainability Index: BASIX) Regulation 2004 to ensure the effective introduction of BASIX in NSW. The SEPP ensures consistency in the implementation of BASIX throughout the State by overriding competing provisions in other environmental planning instruments and development control plans, and specifying that SEPP 1 does not apply in relation to any development standard arising under BASIX.

SEPP (Infrastructure) 2007 - Provides a consistent planning regime for infrastructure and the provision of services across NSW, along with providing for consultation with relevant public authorities during the assessment process. The SEPP supports greater flexibility in the location of infrastructure and service facilities along with improved regulatory certainty and efficiency.

SEPP (Mining, Petroleum Production and Extractive Industries) 2007 - This Policy aims to provide for the proper management and development of mineral, petroleum and extractive material resources for the social and economic welfare of the State. The Policy establishes appropriate planning controls to encourage ecologically sustainable development.

SEPP (Miscellaneous Consent Provisions) 2007 - Provides for the erection of temporary structures and the use of places of public entertainment while protecting public safety and local amenity. The SEPP supports the transfer of the regulation of places of public entertainment and temporary structures (such as tents, marquees and booths) from the Local Government Act 1993 to the Environmental Planning and Assessment Act 1979.

SEPP (Rural Lands) 2008 - The aim of this policy is to facilitate the orderly and economic use and development of rural lands for rural and related purposes.

SEPP (Exempt and Complying Development Codes) 2008 – This policy streamlines assessment processes for development that complies with specified development standards. The policy provides exempt codes that have State-wide application, identifying, in the General Exempt Development Code, types of development that are of minimal environmental impact that may be carried out without the need for development consent.

SEPP (Affordable Rental Housing) 2009 – The aims of this policy are to provide a consistent planning regime for the provision of affordable rental housing; facilitate the effective delivery of new affordable rental housing by providing incentives by way of expanding zoning permissibility, floor space ratio bonuses and non-discretionary development standards; facilitate the retention and mitigate the loss of existing affordable rental housing; employ a balanced approach between obligations for retaining and mitigating the loss of existing affordable rental housing, and incentives for the development of new

affordable rental housing; facilitate an expanding role for not-for-profit-providers of affordable rental housing; support local business centres by providing affordable rental housing for workers close to places of work; and facilitate the development of housing for the homeless and other disadvantaged people who may require support services, including group homes and supportive accommodation.

SEPP (State and Regional Development) 2011 – The aims of this policy are to identify development that is State significant development; identify development that is State significant infrastructure and critical State significant infrastructure; and confer functions on joint regional planning panels to determine development applications.

Further details regarding these State Environmental Planning Policies and the circumstances in which they may apply to the subject and can be found on the Department of Planning's website.

REGIONAL PLANNING INSTRUMENTS

There are no Regional Environmental Plans applying within the Muswellbrook Shire Council area.

DEVELOPMENT CONTROL PLANS

This land is affected by the following Development Control Plans:
Muswellbrook Shire Development Control Plan 2009

COASTAL PROTECTION

The land IS NOT affected by the operations of Sections 38 and 39 of the *Coastal Protection Act* 1979.

MINE SUBSIDENCE

The land IS NOT WITHIN a Mine Subsidence District proclaimed under section 15 of the Mine Subsidence Compensation Act, 1961.

ROAD WIDENING AND ROAD REALIGNMENT

The subject land IS NOT affected by any road widening or road realignment under:
(a) Division 2 of Part 3 of the Roads Act 1993, or
(b) Any environmental planning instrument, or
(c) Any resolution of the council.

COUNCIL AND OTHER PUBLIC AUTHORITY POLICIES ON HAZARD RISK RESTRICTIONS

The land IS NOT affected by a policy adopted by the council, or adopted by any other public authority and notified to the council for the express purpose of its adoption by that authority being referred to in planning certificates issued by the council: that restricts the development of the land because of the likelihood of land slip, bushfire, tidal inundation, subsidence, acid sulphate soils or any other risk (other than flooding).

FLOOD RELATED DEVELOPMENT CONTROLS INFORMATION

The Hunter River Flood Study 2014 shows the land to be affected by flooding.

LAND RESERVED FOR ACQUISITION

There are NOT any environmental planning instruments; deemed environmental planning instruments or draft environmental planning instruments applying to the land that provide for the acquisition of the

land by a public authority, as referred to in section 27 of the Environmental Planning and Assessment Act 1979.

CONTRIBUTIONS PLANS

The Muswellbrook Section 94 Contributions Plan 2001 and Muswellbrook Section 94A Contributions Plan 2009 apply to all land within the Muswellbrook Shire Local Government Area.

BIODIVERSITY CERTIFIED LAND

The land IS NOT biodiversity certified land (within the meaning of Part 7AA of the Threatened Species Conservation Act 1995)

BIOBANKING AGREEMENTS

The land IS NOT affected by a biobanking agreement under Part 7A of the *Threatened Species Conservation Act 1995*.

MATTERS RELATING TO THE MANAGEMENT OF CONTAMINATED LAND

(a) The land to which this certificate relates is NOT within land declared to be significantly contaminated land under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(b) The land to which this certificate relates is NOT subject to a management order under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(c) The land to which this certificate relates is NOT the subject of approved voluntary management proposal the subject of the Environment Protection Authority's agreement under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(d) The land to which this certificate relates is NOT the subject to an ongoing maintenance order under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(e) The land to which this certificate relates has NOT been the subject of a site audit statement provided to Muswellbrook Shire Council.

BUSH FIRE PRONE LAND

The land IS NOT bushfire prone land.

PROPERTY VEGETATION PLANS

Council has NOT been notified of the existence of such a plan or if the land is land to which a property vegetation plan under the Native Vegetation Act 2003 applies.

ORDERS UNDER TREES (DISPUTES BETWEEN NEIGHBOURS) ACT 2006

Council has NOT been notified of any order made under the Trees (Disputes Between Neighbours) Act 2006 to carry out work in relation to a tree on the land.

Date: 5 October 2017

Cert No: 21298

DIRECTIONS UNDER PART 3A

There is NOT a direction by the Minister in force under section 75P (2) (c1) of the Act in relation to prohibiting or restricting the carrying out of a project or a stage of a project on the land under Part 4 of the Act.

SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR SENIORS HOUSING

There is NOT a current site compatibility certificate (of which the council is aware), issued under clause 25 of State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 in respect of proposed development on the land.

SITE COMPATIBILITY CERTIFICATES FOR INFRASTRUCTURE

There is NOT a valid site compatibility certificate (of which the council is aware), issued under clause 19 of State Environmental Planning Policy (Infrastructure) 2007 in respect of proposed development on the land.

SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR AFFORDABLE RENTAL HOUSING

There is NOT a current site compatibility certificate for affordable rental housing (of which the council is aware), issued under clause 37 of State Environmental Planning Policy (Affordable Rental Housing) 2007 in respect of proposed development on the land.

PAPER SUBDIVISION INFORMATION

There is NOT an adopted development plan or subdivision order that applies to the land.

SITE VERIFICATION CERTIFICATE

There is NOT a current site verification certificate (of which the council is aware), issued under clause 17C of State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007, in relation to the land.

LOOSE-FILL ASBESTOS INSULATION

There are NO residential premises located on this land that are listed on the register that are required to be maintained under Division 1A of Part 8 of the *Home Building Act 1989*.

The accuracy and currency of the details provided by agencies external to Council have not be verified by Muswellbrook Shire Council and should be verified by the applicant.

ADDITIONAL INFORMATION PURSUANT TO SECTION 149(5) OF THE ACT

Council is unaware of any other relevant matters that may affect the land.

For further information, please contact the
Environmental Services Department.

S J McDonald
General Manager

Per: D L Watson

PLANNING CERTIFICATE UNDER SECTION 149 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

Enquiries	Environmental Services
Contact	02 6549 3700
Invoice no.	43721
Your reference	Application

Date: 3 October 2017

Assessment: 127845 **Cert No: 21286**

MACH Energy Australia Pty Ltd
GPO Box 94
BRISBANE QLD 4001

Owner (as recorded by Council)

Wesfarmers Bengalla Limited & Taipower Bengalla Pty Limited & others

Property Description: BENGALLA ROAD MUSWELLBROOK 2333
LOT: 28 DP: 1072668

Land to which the certificate relates

The land to which this certificate relates, being the lot or lots described on the application form, is shown in the Council's records as being situated at the street address described above. The information contained in this certificate relates only to the lot or lots described on this certificate. Separate planning certificates can be obtained upon application for the other lots, those certificates may contain different information than is contained in this certificate.

CERTIFICATE UNDER SECTION 149(2) ENVIRONMENTAL PLANNING & ASSESSMENT ACT

LOCAL ENVIRONMENTAL PLANS

PLANNING INSTRUMENT	Muswellbrook Local Environmental Plan 2009
LAND USE ZONING	RU1 Primary Production

PERMITTED WITHOUT CONSENT

Extensive agriculture; Home occupations; Intensive plant agriculture

PERMITTED WITH CONSENT

Air transport facilities; Airstrips; Animal boarding or training establishments; Aquaculture; Camping grounds; Caravan parks; Cellar door premises; Cemeteries; Community facilities; Crematoria; Depots; Dwelling houses; Educational establishments; Environmental facilities; Environmental protection works; Extractive industries; Farm buildings; Flood mitigation works; Forestry; Function centres; Group homes; Hazardous industries; Health consulting rooms; Heavy industrial storage establishments; Helipads; Highway service centres; Home-based child care; Home businesses; Home industries; Industrial retail outlets; Information and education facilities; Intensive livestock agriculture; Intensive plant agriculture; Kiosks; Landscaping material supplies; Open cut mining; Places of public worship; Plant nurseries; Recreation areas; Recreation facilities (indoor); Recreation facilities (major); Recreation facilities (outdoor); Research stations; Restaurants or cafes; Roads; Roadside stalls; Rural industries; Rural supplies; Rural worker's dwellings; Secondary dwellings; Service stations; Sewerage systems; Signage; Storage premises; Take away food and drink premises; Tourist and visitor accommodation; Transport depots; Truck depots; Turf farming; Veterinary hospitals; Waste disposal facilities; Water supply systems.

PROHIBITED

Any development not specified above.

MINIMUM LAND DIMENSIONS FOR THE ERECTION OF A DWELLING

Under the provisions of the Muswellbrook Local Environmental Plan 2009, the minimum subdivision lot size is 80ha and is also subject to the provisions detailed below.

Land zoned RU1 Primary Production may, with the consent of Council, be subdivided for the purpose of primary production to create a lot less than the minimum lot size. However, such a lot cannot be created if an existing dwelling would, as the result of the subdivision, be situated on the lot. A dwelling cannot be erected on such a lot created.

Development consent must not be granted to the subdivision of a lot in a strata plan or community title scheme on land zoned RU1 Primary Production that is used, or proposed to be used, for residential accommodation or tourist and visitor accommodation.

Only one dwelling house may be erected on land zoned RU1 Primary Production only if the land is:

(a) a lot created in accordance with clause 4.1 of the LEP 2009, or

(b) a lot created before the LEP 2009 commenced and on which the erection of a dwelling house was permissible immediately before that commencement, or

(c) a lot created before the LEP 2009 commenced that is at least the minimum lot size specified for that lot by the Lot Size Map, or

(d) a lot for which subdivision approval was granted before the LEP 2009 commenced and on which the erection of a dwelling house would have been permissible immediately before that commencement, or

(e) an existing holding.

NOTE: EXISTING HOLDING means all adjoining land, even if separated by a road or railway, held in the same ownership:

(a) on 11 April 1974, and

(b) at the time of lodging a development application for the erection of a dwelling house under this clause.

and includes any other land adjoining that land acquired by the owner since 11 April 1974.

NOTE: The owner in whose ownership all the land is at the time the application is lodged need not be the same person as the owner in whose ownership all the land was on the stated date.

WHETHER THE LAND INCLUDES OR COMPRISES CRITICAL HABITAT

The subject land has not been declared as critical habitat.

WHETHER THE LAND IS IN A CONSERVATION AREA

The subject land is not known to be in a conservation area.

Date: 5 October 2017

Cert No: 21286

WHETHER AN ITEM OF ENVIRONMENTAL HERITAGE IS SITUATED ON THE LAND

The land is NOT affected by any known or listed heritage item.

STATE ENVIRONMENTAL PLANNING POLICIES (EXEMPT & COMPLYING DEVELOPMENT CODES 2008)

CERTIFICATE UNDER SECTION 149(2) IDENTIFYING THE INFORMATION SET OUT IN CLAUSE 3 OF SCHEDULE 4 OF THE ENVIRONMENTAL PLANNING & ASSESSMENT REGULATIONS

Part 3 General Housing Code

Not applicable to the land to which this certificate relates.

Part 3A Rural Housing Code

YES. Complying development specified in the Rural Housing Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 4 Housing Alterations Code

YES. Complying development specified in the Housing Alterations Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 4A General Development Code

YES. Complying development specified in the General Development Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 5 Commercial and Industrial Alterations Code

Not applicable to the land to which this certificate relates.

Part 5A Commercial and Industrial (New Buildings and Additions) Code

Not applicable to the land to which this certificate relates.

Part 6 Subdivision Code

YES. Complying development specified in the Subdivision Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 7 Demolition Code

YES. Complying development specified in the Demolition Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 8 Fire Safety Code

YES. Complying development specified in the Fire Safety Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

STATE ENVIRONMENTAL PLANNING POLICIES

The following State Environmental Planning Policies apply to land within the Muswellbrook Shire LGA:-

No. 21. Caravan Parks - Ensures that where caravan parks or camping grounds are permitted under an environmental planning instrument, movable dwellings, as defined in the Local Government Act 1993, are also permitted. The policy ensures that development consent is required for new caravan parks and camping grounds and for additional long-term sites in existing caravan parks.

No. 30. Intensive Agriculture - Requires development consent for cattle feedlots having a capacity of 50 or more cattle or piggeries having a capacity of 200 or more pigs. The policy sets out information and public notification requirements to ensure there are effective planning control over this export-driven rural industry. The policy does not alter if, and where, such development is permitted, or the functions of the consent authority.

No. 33. Hazardous and Offensive Development - Provides new definitions for 'hazardous industry', 'hazardous storage establishment', 'offensive industry' and 'offensive storage establishment'. The definitions apply to all planning instruments, existing and future. The new definitions enable decisions to approve or refuse a development to be based on the merit of proposal. The consent authority must careful consider the specifics the case, the location and the way in which the proposed activity is to be carried out. The policy also requires specified matters to be considered for proposals that are 'potentially hazardous' or 'potentially offensive' as defined in the policy. For example, any application to carry out a potentially hazardous or potentially offensive development is to be advertised for public comment, and applications to carry out potentially hazardous development must be supported by a preliminary hazard analysis (PHA).

No. 36. Manufactured Home Estates - Helps establish well-designed and properly serviced manufactured home estates (MHEs) in suitable locations. Affordability and security of tenure for residents are important aspects. To enable the immediate development of estates, the policy allows MHEs to be located on certain land where caravan parks are permitted. There are however, criteria that a proposal must satisfy before the local council can approved development.

No. 44. Koala Habitat Protection - Encourages the proper conservation and management of areas of natural vegetation that provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline.

No. 55. Remediation of Land - Introduces state-wide planning controls for the remediation of contaminated land. The policy states that land must not be developed if it is unsuitable for a proposed use because it is contaminated. If the land is unsuitable, remediation must take place before the land is developed. The policy makes remediation permissible across the State, defines when consent is required, requires all remediation to comply with standards, ensures land is investigated if contamination is suspected, and requires councils to be notified of all remediation proposals.

No. 62. Sustainable Aquaculture - The policy implements the regional strategies already developed by creating a simple approach to identity and categorise aquaculture development on the basis of its potential environmental impact. The SEPP also identifies aquaculture development as a designated development only where there are potential environmental risks.

No. 64. Advertising and Signage - Aims to improve the amenity of urban and natural settings by managing the impact of outdoor advertising. The policy responds to growing concerns from the community, the advertising industry and local government that existing controls and guidelines were not effective. SEPP No. 64 offers the comprehensive provisions and consistent approach needed. SEPP 64 – Advertising and Signage: Explanatory Information should be read in conjunction with the policy.

No. 65. Design Quality of Residential Flat Development - Raises the design quality of residential flat development across the state through the application of a series of design principles. The policy provides for the establishment of Design Review Panels to provide independent expert advice to councils on the merit of residential flat development. The accompanying regulation requires the involvement of a qualified designer throughout the design, approval and construction stages.

SEPP (Housing for Seniors or People with a Disability) 2004 - Encourage the development of high quality accommodation for our ageing population and for people who have disabilities - housing that is in keeping with the local neighbourhood

SEPP (Building Sustainability Index: BASIX) 2004 - This SEPP operates in conjunction with Environmental Planning and Assessment Amendment (Building Sustainability Index: BASIX) Regulation 2004 to ensure the effective introduction of BASIX in NSW. The SEPP ensures consistency in the implementation of BASIX throughout the State by overriding competing provisions in other environmental planning instruments and development control plans, and specifying that SEPP 1 does not apply in relation to any development standard arising under BASIX.

SEPP (Infrastructure) 2007 - Provides a consistent planning regime for infrastructure and the provision of services across NSW, along with providing for consultation with relevant public authorities during the assessment process. The SEPP supports greater flexibility in the location of infrastructure and service facilities along with improved regulatory certainty and efficiency.

SEPP (Mining, Petroleum Production and Extractive Industries) 2007 - This Policy aims to provide for the proper management and development of mineral, petroleum and extractive material resources for the social and economic welfare of the State. The Policy establishes appropriate planning controls to encourage ecologically sustainable development.

SEPP (Miscellaneous Consent Provisions) 2007 - Provides for the erection of temporary structures and the use of places of public entertainment while protecting public safety and local amenity. The SEPP supports the transfer of the regulation of places of public entertainment and temporary structures (such as tents, marquees and booths) from the Local Government Act 1993 to the Environmental Planning and Assessment Act 1979.

SEPP (Rural Lands) 2008 - The aim of this policy is to facilitate the orderly and economic use and development of rural lands for rural and related purposes.

SEPP (Exempt and Complying Development Codes) 2008 – This policy streamlines assessment processes for development that complies with specified development standards. The policy provides exempt codes that have State-wide application, identifying, in the General Exempt Development Code, types of development that are of minimal environmental impact that may be carried out without the need for development consent.

SEPP (Affordable Rental Housing) 2009 – The aims of this policy are to provide a consistent planning regime for the provision of affordable rental housing; facilitate the effective delivery of new affordable rental housing by providing incentives by way of expanding zoning permissibility, floor space ratio bonuses and non-discretionary development standards; facilitate the retention and mitigate the loss of existing affordable rental housing; employ a balanced approach between obligations for retaining and mitigating the loss of existing affordable rental housing, and incentives for the development of new

affordable rental housing; facilitate an expanding role for not-for-profit-providers of affordable rental housing; support local business centres by providing affordable rental housing for workers close to places of work; and facilitate the development of housing for the homeless and other disadvantaged people who may require support services, including group homes and supportive accommodation.

SEPP (State and Regional Development) 2011 – The aims of this policy are to identify development that is State significant development; identify development that is State significant infrastructure and critical State significant infrastructure; and confer functions on joint regional planning panels to determine development applications.

Further details regarding these State Environmental Planning Policies and the circumstances in which they may apply to the subject and can be found on the Department of Planning's website.

REGIONAL PLANNING INSTRUMENTS

There are no Regional Environmental Plans applying within the Muswellbrook Shire Council area.

DEVELOPMENT CONTROL PLANS

This land is affected by the following Development Control Plans:
Muswellbrook Shire Development Control Plan 2009

COASTAL PROTECTION

The land IS NOT affected by the operations of Sections 38 and 39 of the *Coastal Protection Act* 1979.

MINE SUBSIDENCE

The land IS NOT WITHIN a Mine Subsidence District proclaimed under section 15 of the Mine Subsidence Compensation Act, 1961.

ROAD WIDENING AND ROAD REALIGNMENT

The subject land IS NOT affected by any road widening or road realignment under:
(a) Division 2 of Part 3 of the Roads Act 1993, or
(b) Any environmental planning instrument, or
(c) Any resolution of the council.

COUNCIL AND OTHER PUBLIC AUTHORITY POLICIES ON HAZARD RISK RESTRICTIONS

The land IS NOT affected by a policy adopted by the council, or adopted by any other public authority and notified to the council for the express purpose of its adoption by that authority being referred to in planning certificates issued by the council: that restricts the development of the land because of the likelihood of land slip, bushfire, tidal inundation, subsidence, acid sulphate soils or any other risk (other than flooding).

FLOOD RELATED DEVELOPMENT CONTROLS INFORMATION

The Hunter River Flood Study 2014 shows the land to be affected by flooding.

LAND RESERVED FOR ACQUISITION

There are NOT any environmental planning instruments; deemed environmental planning instruments or draft environmental planning instruments applying to the land that provide for the acquisition of the

land by a public authority, as referred to in section 27 of the Environmental Planning and Assessment Act 1979.

CONTRIBUTIONS PLANS

The Muswellbrook Section 94 Contributions Plan 2001 and Muswellbrook Section 94A Contributions Plan 2009 apply to all land within the Muswellbrook Shire Local Government Area.

BIODIVERSITY CERTIFIED LAND

The land IS NOT biodiversity certified land (within the meaning of Part 7AA of the Threatened Species Conservation Act 1995)

BIOBANKING AGREEMENTS

The land IS NOT affected by a biobanking agreement under Part 7A of the *Threatened Species Conservation Act 1995*.

MATTERS RELATING TO THE MANAGEMENT OF CONTAMINATED LAND

(a) The land to which this certificate relates is NOT within land declared to be significantly contaminated land under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(b) The land to which this certificate relates is NOT subject to a management order under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(c) The land to which this certificate relates is NOT the subject of approved voluntary management proposal the subject of the Environment Protection Authority's agreement under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(d) The land to which this certificate relates is NOT the subject to an ongoing maintenance order under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(e) The land to which this certificate relates has NOT been the subject of a site audit statement provided to Muswellbrook Shire Council.

BUSH FIRE PRONE LAND

The land IS NOT bushfire prone land.

PROPERTY VEGETATION PLANS

Council has NOT been notified of the existence of such a plan or if the land is land to which a property vegetation plan under the Native Vegetation Act 2003 applies.

ORDERS UNDER TREES (DISPUTES BETWEEN NEIGHBOURS) ACT 2006

Council has NOT been notified of any order made under the Trees (Disputes Between Neighbours) Act 2006 to carry out work in relation to a tree on the land.

Date: 5 October 2017

Cert No: 21286

DIRECTIONS UNDER PART 3A

There is NOT a direction by the Minister in force under section 75P (2) (c1) of the Act in relation to prohibiting or restricting the carrying out of a project or a stage of a project on the land under Part 4 of the Act.

SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR SENIORS HOUSING

There is NOT a current site compatibility certificate (of which the council is aware), issued under clause 25 of State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 in respect of proposed development on the land.

SITE COMPATIBILITY CERTIFICATES FOR INFRASTRUCTURE

There is NOT a valid site compatibility certificate (of which the council is aware), issued under clause 19 of State Environmental Planning Policy (Infrastructure) 2007 in respect of proposed development on the land.

SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR AFFORDABLE RENTAL HOUSING

There is NOT a current site compatibility certificate for affordable rental housing (of which the council is aware), issued under clause 37 of State Environmental Planning Policy (Affordable Rental Housing) 2007 in respect of proposed development on the land.

PAPER SUBDIVISION INFORMATION

There is NOT an adopted development plan or subdivision order that applies to the land.

SITE VERIFICATION CERTIFICATE

There is NOT a current site verification certificate (of which the council is aware), issued under clause 17C of State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007, in relation to the land.

LOOSE-FILL ASBESTOS INSULATION

There are NO residential premises located on this land that are listed on the register that are required to be maintained under Division 1A of Part 8 of the *Home Building Act 1989*.

The accuracy and currency of the details provided by agencies external to Council have not be verified by Muswellbrook Shire Council and should be verified by the applicant.

ADDITIONAL INFORMATION PURSUANT TO SECTION 149(5) OF THE ACT

Council is unaware of any other relevant matters that may affect the land.

For further information, please contact the
Environmental Services Department.

S J McDonald
General Manager

Per: D L Watson

PLANNING CERTIFICATE UNDER SECTION 149 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

Enquiries	Environmental Services
Contact	02 6549 3700
Invoice no.	43721
Your reference	Application

Date: 4 October 2017

Assessment: 127845 **Cert No: 21293**

MACH Energy Australia Pty Ltd
GPO Box 94
BRISBANE QLD 4001

Owner (as recorded by Council)

Wesfarmers Bengalla Limited & Taipower Bengalla Pty Limited & others

Property Description: BENGALLA ROAD MUSWELLBROOK 2333
LOT: 123 DP: 700578

Land to which the certificate relates

The land to which this certificate relates, being the lot or lots described on the application form, is shown in the Council's records as being situated at the street address described above. The information contained in this certificate relates only to the lot or lots described on this certificate. Separate planning certificates can be obtained upon application for the other lots, those certificates may contain different information than is contained in this certificate.

CERTIFICATE UNDER SECTION 149(2) ENVIRONMENTAL PLANNING & ASSESSMENT ACT

LOCAL ENVIRONMENTAL PLANS

PLANNING INSTRUMENT	Muswellbrook Local Environmental Plan 2009
LAND USE ZONING	RU1 Primary Production

PERMITTED WITHOUT CONSENT

Extensive agriculture; Home occupations; Intensive plant agriculture

PERMITTED WITH CONSENT

Air transport facilities; Airstrips; Animal boarding or training establishments; Aquaculture; Camping grounds; Caravan parks; Cellar door premises; Cemeteries; Community facilities; Crematoria; Depots; Dwelling houses; Educational establishments; Environmental facilities; Environmental protection works; Extractive industries; Farm buildings; Flood mitigation works; Forestry; Function centres; Group homes; Hazardous industries; Health consulting rooms; Heavy industrial storage establishments; Helipads; Highway service centres; Home-based child care; Home businesses; Home industries; Industrial retail outlets; Information and education facilities; Intensive livestock agriculture; Intensive plant agriculture; Kiosks; Landscaping material supplies; Open cut mining; Places of public worship; Plant nurseries; Recreation areas; Recreation facilities (indoor); Recreation facilities (major); Recreation facilities (outdoor); Research stations; Restaurants or cafes; Roads; Roadside stalls; Rural industries; Rural supplies; Rural worker's dwellings; Secondary dwellings; Service stations; Sewerage systems; Signage; Storage premises; Take away food and drink premises; Tourist and visitor accommodation; Transport depots; Truck depots; Turf farming; Veterinary hospitals; Waste disposal facilities; Water supply systems.

PROHIBITED

Any development not specified above.

MINIMUM LAND DIMENSIONS FOR THE ERECTION OF A DWELLING

Under the provisions of the Muswellbrook Local Environmental Plan 2009, the minimum subdivision lot size is 80ha and is also subject to the provisions detailed below.

Land zoned RU1 Primary Production may, with the consent of Council, be subdivided for the purpose of primary production to create a lot less than the minimum lot size. However, such a lot cannot be created if an existing dwelling would, as the result of the subdivision, be situated on the lot. A dwelling cannot be erected on such a lot created.

Development consent must not be granted to the subdivision of a lot in a strata plan or community title scheme on land zoned RU1 Primary Production that is used, or proposed to be used, for residential accommodation or tourist and visitor accommodation.

Only one dwelling house may be erected on land zoned RU1 Primary Production only if the land is:

(a) a lot created in accordance with clause 4.1 of the LEP 2009, or

(b) a lot created before the LEP 2009 commenced and on which the erection of a dwelling house was permissible immediately before that commencement, or

(c) a lot created before the LEP 2009 commenced that is at least the minimum lot size specified for that lot by the Lot Size Map, or

(d) a lot for which subdivision approval was granted before the LEP 2009 commenced and on which the erection of a dwelling house would have been permissible immediately before that commencement, or

(e) an existing holding.

NOTE: EXISTING HOLDING means all adjoining land, even if separated by a road or railway, held in the same ownership:

(a) on 11 April 1974, and

(b) at the time of lodging a development application for the erection of a dwelling house under this clause.

and includes any other land adjoining that land acquired by the owner since 11 April 1974.

NOTE: The owner in whose ownership all the land is at the time the application is lodged need not be the same person as the owner in whose ownership all the land was on the stated date.

WHETHER THE LAND INCLUDES OR COMPRISES CRITICAL HABITAT

The subject land has not been declared as critical habitat.

WHETHER THE LAND IS IN A CONSERVATION AREA

The subject land is not known to be in a conservation area.

Date: 5 October 2017

Cert No: 21293

WHETHER AN ITEM OF ENVIRONMENTAL HERITAGE IS SITUATED ON THE LAND

The land is NOT affected by any known or listed heritage item.

STATE ENVIRONMENTAL PLANNING POLICIES (EXEMPT & COMPLYING DEVELOPMENT CODES 2008)

CERTIFICATE UNDER SECTION 149(2) IDENTIFYING THE INFORMATION SET OUT IN CLAUSE 3 OF SCHEDULE 4 OF THE ENVIRONMENTAL PLANNING & ASSESSMENT REGULATIONS

Part 3 General Housing Code

Not applicable to the land to which this certificate relates.

Part 3A Rural Housing Code

YES. Complying development specified in the Rural Housing Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 4 Housing Alterations Code

YES. Complying development specified in the Housing Alterations Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 4A General Development Code

YES. Complying development specified in the General Development Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 5 Commercial and Industrial Alterations Code

Not applicable to the land to which this certificate relates.

Part 5A Commercial and Industrial (New Buildings and Additions) Code

Not applicable to the land to which this certificate relates.

Part 6 Subdivision Code

YES. Complying development specified in the Subdivision Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 7 Demolition Code

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Part 8 Fire Safety Code

YES. Complying development specified in the Fire Safety Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

STATE ENVIRONMENTAL PLANNING POLICIES

The following State Environmental Planning Policies apply to land within the Muswellbrook Shire LGA:-

No. 21. Caravan Parks - Ensures that where caravan parks or camping grounds are permitted under an environmental planning instrument, movable dwellings, as defined in the Local Government Act 1993, are also permitted. The policy ensures that development consent is required for new caravan parks and camping grounds and for additional long-term sites in existing caravan parks.

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SEPP (Mining, Petroleum Production and Extractive Industries) 2007 - This Policy aims to provide for the proper management and development of mineral, petroleum and extractive material resources for the social and economic welfare of the State. The Policy establishes appropriate planning controls to encourage ecologically sustainable development.

SEPP (Miscellaneous Consent Provisions) 2007 - Provides for the erection of temporary structures and the use of places of public entertainment while protecting public safety and local amenity. The SEPP supports the transfer of the regulation of places of public entertainment and temporary structures (such as tents, marquees and booths) from the Local Government Act 1993 to the Environmental Planning and Assessment Act 1979.

SEPP (Rural Lands) 2008 - The aim of this policy is to facilitate the orderly and economic use and development of rural lands for rural and related purposes.

SEPP (Exempt and Complying Development Codes) 2008 – This policy streamlines assessment processes for development that complies with specified development standards. The policy provides exempt codes that have State-wide application, identifying, in the General Exempt Development Code, types of development that are of minimal environmental impact that may be carried out without the need for development consent.

SEPP (Affordable Rental Housing) 2009 – The aims of this policy are to provide a consistent planning regime for the provision of affordable rental housing; facilitate the effective delivery of new affordable rental housing by providing incentives by way of expanding zoning permissibility, floor space ratio bonuses and non-discretionary development standards; facilitate the retention and mitigate the loss of existing affordable rental housing; employ a balanced approach between obligations for retaining and mitigating the loss of existing affordable rental housing, and incentives for the development of new

affordable rental housing; facilitate an expanding role for not-for-profit-providers of affordable rental housing; support local business centres by providing affordable rental housing for workers close to places of work; and facilitate the development of housing for the homeless and other disadvantaged people who may require support services, including group homes and supportive accommodation.

SEPP (State and Regional Development) 2011 – The aims of this policy are to identify development that is State significant development; identify development that is State significant infrastructure and critical State significant infrastructure; and confer functions on joint regional planning panels to determine development applications.

Further details regarding these State Environmental Planning Policies and the circumstances in which they may apply to the subject and can be found on the Department of Planning's website.

REGIONAL PLANNING INSTRUMENTS

There are no Regional Environmental Plans applying within the Muswellbrook Shire Council area.

DEVELOPMENT CONTROL PLANS

This land is affected by the following Development Control Plans:
Muswellbrook Shire Development Control Plan 2009

COASTAL PROTECTION

The land IS NOT affected by the operations of Sections 38 and 39 of the *Coastal Protection Act* 1979.

MINE SUBSIDENCE

The land IS NOT WITHIN a Mine Subsidence District proclaimed under section 15 of the Mine Subsidence Compensation Act, 1961.

ROAD WIDENING AND ROAD REALIGNMENT

The subject land IS NOT affected by any road widening or road realignment under:
(a) Division 2 of Part 3 of the Roads Act 1993, or
(b) Any environmental planning instrument, or
(c) Any resolution of the council.

COUNCIL AND OTHER PUBLIC AUTHORITY POLICIES ON HAZARD RISK RESTRICTIONS

The land IS NOT affected by a policy adopted by the council, or adopted by any other public authority and notified to the council for the express purpose of its adoption by that authority being referred to in planning certificates issued by the council: that restricts the development of the land because of the likelihood of land slip, bushfire, tidal inundation, subsidence, acid sulphate soils or any other risk (other than flooding).

FLOOD RELATED DEVELOPMENT CONTROLS INFORMATION

The Hunter River Flood Study 2014 shows the land to be affected by flooding.

LAND RESERVED FOR ACQUISITION

There are NOT any environmental planning instruments; deemed environmental planning instruments or draft environmental planning instruments applying to the land that provide for the acquisition of the

land by a public authority, as referred to in section 27 of the Environmental Planning and Assessment Act 1979.

CONTRIBUTIONS PLANS

The Muswellbrook Section 94 Contributions Plan 2001 and Muswellbrook Section 94A Contributions Plan 2009 apply to all land within the Muswellbrook Shire Local Government Area.

BIODIVERSITY CERTIFIED LAND

The land IS NOT biodiversity certified land (within the meaning of Part 7AA of the Threatened Species Conservation Act 1995)

BIOBANKING AGREEMENTS

The land IS NOT affected by a biobanking agreement under Part 7A of the *Threatened Species Conservation Act 1995*.

MATTERS RELATING TO THE MANAGEMENT OF CONTAMINATED LAND

(a) The land to which this certificate relates is NOT within land declared to be significantly contaminated land under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(b) The land to which this certificate relates is NOT subject to a management order under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(c) The land to which this certificate relates is NOT the subject of approved voluntary management proposal the subject of the Environment Protection Authority's agreement under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(d) The land to which this certificate relates is NOT the subject to an ongoing maintenance order under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(e) The land to which this certificate relates has NOT been the subject of a site audit statement provided to Muswellbrook Shire Council.

BUSH FIRE PRONE LAND

The land IS NOT bushfire prone land.

PROPERTY VEGETATION PLANS

Council has NOT been notified of the existence of such a plan or if the land is land to which a property vegetation plan under the Native Vegetation Act 2003 applies.

ORDERS UNDER TREES (DISPUTES BETWEEN NEIGHBOURS) ACT 2006

Council has NOT been notified of any order made under the Trees (Disputes Between Neighbours) Act 2006 to carry out work in relation to a tree on the land.

Date: 5 October 2017

Cert No: 21293

DIRECTIONS UNDER PART 3A

There is NOT a direction by the Minister in force under section 75P (2) (c1) of the Act in relation to prohibiting or restricting the carrying out of a project or a stage of a project on the land under Part 4 of the Act.

SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR SENIORS HOUSING

There is NOT a current site compatibility certificate (of which the council is aware), issued under clause 25 of State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 in respect of proposed development on the land.

SITE COMPATIBILITY CERTIFICATES FOR INFRASTRUCTURE

There is NOT a valid site compatibility certificate (of which the council is aware), issued under clause 19 of State Environmental Planning Policy (Infrastructure) 2007 in respect of proposed development on the land.

SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR AFFORDABLE RENTAL HOUSING

There is NOT a current site compatibility certificate for affordable rental housing (of which the council is aware), issued under clause 37 of State Environmental Planning Policy (Affordable Rental Housing) 2007 in respect of proposed development on the land.

PAPER SUBDIVISION INFORMATION

There is NOT an adopted development plan or subdivision order that applies to the land.

SITE VERIFICATION CERTIFICATE

There is NOT a current site verification certificate (of which the council is aware), issued under clause 17C of State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007, in relation to the land.

LOOSE-FILL ASBESTOS INSULATION

There are NO residential premises located on this land that are listed on the register that are required to be maintained under Division 1A of Part 8 of the *Home Building Act 1989*.

The accuracy and currency of the details provided by agencies external to Council have not be verified by Muswellbrook Shire Council and should be verified by the applicant.

ADDITIONAL INFORMATION PURSUANT TO SECTION 149(5) OF THE ACT

Council is unaware of any other relevant matters that may affect the land.

For further information, please contact the Environmental Services Department.

S J McDonald
General Manager

Per: DL Watson

PLANNING CERTIFICATE UNDER SECTION 149 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

Enquiries	Environmental Services
Contact	02 6549 3700
Invoice no.	43721
Your reference	Application

Date: 4 October 2017

Assessment: 127852 **Cert No: 21294**

MACH Energy Australia Pty Ltd
GPO Box 94
BRISBANE QLD 4001

Owner (as recorded by Council)

New Hope Bengalla Pty Ltd & Taipower Bengalla Pty Limited & others

Property Description: BENGALLA ROAD MUSWELLBROOK 2333
LOT: 124 DP: 700578

Land to which the certificate relates

The land to which this certificate relates, being the lot or lots described on the application form, is shown in the Council's records as being situated at the street address described above. The information contained in this certificate relates only to the lot or lots described on this certificate. Separate planning certificates can be obtained upon application for the other lots, those certificates may contain different information than is contained in this certificate.

CERTIFICATE UNDER SECTION 149(2) ENVIRONMENTAL PLANNING & ASSESSMENT ACT

LOCAL ENVIRONMENTAL PLANS

PLANNING INSTRUMENT	Muswellbrook Local Environmental Plan 2009
LAND USE ZONING	RU1 Primary Production

PERMITTED WITHOUT CONSENT

Extensive agriculture; Home occupations; Intensive plant agriculture

PERMITTED WITH CONSENT

Air transport facilities; Airstrips; Animal boarding or training establishments; Aquaculture; Camping grounds; Caravan parks; Cellar door premises; Cemeteries; Community facilities; Crematoria; Depots; Dwelling houses; Educational establishments; Environmental facilities; Environmental protection works; Extractive industries; Farm buildings; Flood mitigation works; Forestry; Function centres; Group homes; Hazardous industries; Health consulting rooms; Heavy industrial storage establishments; Helipads; Highway service centres; Home-based child care; Home businesses; Home industries; Industrial retail outlets; Information and education facilities; Intensive livestock agriculture; Intensive plant agriculture; Kiosks; Landscaping material supplies; Open cut mining; Places of public worship; Plant nurseries; Recreation areas; Recreation facilities (indoor); Recreation facilities (major); Recreation facilities (outdoor); Research stations; Restaurants or cafes; Roads; Roadside stalls; Rural industries; Rural supplies; Rural worker's dwellings; Secondary dwellings; Service stations; Sewerage systems; Signage; Storage premises; Take away food and drink premises; Tourist and visitor accommodation; Transport depots; Truck depots; Turf farming; Veterinary hospitals; Waste disposal facilities; Water supply systems.

PROHIBITED

Any development not specified above.

MINIMUM LAND DIMENSIONS FOR THE ERECTION OF A DWELLING

Under the provisions of the Muswellbrook Local Environmental Plan 2009, the minimum subdivision lot size is 80ha and is also subject to the provisions detailed below.

Land zoned RU1 Primary Production may, with the consent of Council, be subdivided for the purpose of primary production to create a lot less than the minimum lot size. However, such a lot cannot be created if an existing dwelling would, as the result of the subdivision, be situated on the lot. A dwelling cannot be erected on such a lot created.

Development consent must not be granted to the subdivision of a lot in a strata plan or community title scheme on land zoned RU1 Primary Production that is used, or proposed to be used, for residential accommodation or tourist and visitor accommodation.

Only one dwelling house may be erected on land zoned RU1 Primary Production only if the land is:

(a) a lot created in accordance with clause 4.1 of the LEP 2009, or

(b) a lot created before the LEP 2009 commenced and on which the erection of a dwelling house was permissible immediately before that commencement, or

(c) a lot created before the LEP 2009 commenced that is at least the minimum lot size specified for that lot by the Lot Size Map, or

(d) a lot for which subdivision approval was granted before the LEP 2009 commenced and on which the erection of a dwelling house would have been permissible immediately before that commencement, or

(e) an existing holding.

NOTE: EXISTING HOLDING means all adjoining land, even if separated by a road or railway, held in the same ownership:

(a) on 11 April 1974, and

(b) at the time of lodging a development application for the erection of a dwelling house under this clause.

and includes any other land adjoining that land acquired by the owner since 11 April 1974.

NOTE: The owner in whose ownership all the land is at the time the application is lodged need not be the same person as the owner in whose ownership all the land was on the stated date.

WHETHER THE LAND INCLUDES OR COMPRISES CRITICAL HABITAT

The subject land has not been declared as critical habitat.

WHETHER THE LAND IS IN A CONSERVATION AREA

The subject land is not known to be in a conservation area.

Date: 5 October 2017

Cert No: 21294

WHETHER AN ITEM OF ENVIRONMENTAL HERITAGE IS SITUATED ON THE LAND

The land is NOT affected by any known or listed heritage item.

STATE ENVIRONMENTAL PLANNING POLICIES (EXEMPT & COMPLYING DEVELOPMENT CODES 2008)

CERTIFICATE UNDER SECTION 149(2) IDENTIFYING THE INFORMATION SET OUT IN CLAUSE 3 OF SCHEDULE 4 OF THE ENVIRONMENTAL PLANNING & ASSESSMENT REGULATIONS

Part 3 General Housing Code

Not applicable to the land to which this certificate relates.

Part 3A Rural Housing Code

YES. Complying development specified in the Rural Housing Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 4 Housing Alterations Code

YES. Complying development specified in the Housing Alterations Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 4A General Development Code

YES. Complying development specified in the General Development Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 5 Commercial and Industrial Alterations Code

Not applicable to the land to which this certificate relates.

Part 5A Commercial and Industrial (New Buildings and Additions) Code

Not applicable to the land to which this certificate relates.

Part 6 Subdivision Code

YES. Complying development specified in the Subdivision Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 7 Demolition Code

YES. Complying development specified in the Demolition Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 8 Fire Safety Code

YES. Complying development specified in the Fire Safety Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

STATE ENVIRONMENTAL PLANNING POLICIES

The following State Environmental Planning Policies apply to land within the Muswellbrook Shire LGA:-

No. 21. Caravan Parks - Ensures that where caravan parks or camping grounds are permitted under an environmental planning instrument, movable dwellings, as defined in the Local Government Act 1993, are also permitted. The policy ensures that development consent is required for new caravan parks and camping grounds and for additional long-term sites in existing caravan parks.

No. 30. Intensive Agriculture - Requires development consent for cattle feedlots having a capacity of 50 or more cattle or piggeries having a capacity of 200 or more pigs. The policy sets out information and public notification requirements to ensure there are effective planning control over this export-driven rural industry. The policy does not alter if, and where, such development is permitted, or the functions of the consent authority.

No. 33. Hazardous and Offensive Development - Provides new definitions for 'hazardous industry', 'hazardous storage establishment', 'offensive industry' and 'offensive storage establishment'. The definitions apply to all planning instruments, existing and future. The new definitions enable decisions to approve or refuse a development to be based on the merit of proposal. The consent authority must careful consider the specifics the case, the location and the way in which the proposed activity is to be carried out. The policy also requires specified matters to be considered for proposals that are 'potentially hazardous' or 'potentially offensive' as defined in the policy. For example, any application to carry out a potentially hazardous or potentially offensive development is to be advertised for public comment, and applications to carry out potentially hazardous development must be supported by a preliminary hazard analysis (PHA).

No. 36. Manufactured Home Estates - Helps establish well-designed and properly serviced manufactured home estates (MHEs) in suitable locations. Affordability and security of tenure for residents are important aspects. To enable the immediate development of estates, the policy allows MHEs to be located on certain land where caravan parks are permitted. There are however, criteria that a proposal must satisfy before the local council can approved development.

No. 44. Koala Habitat Protection - Encourages the proper conservation and management of areas of natural vegetation that provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline.

No. 55. Remediation of Land - Introduces state-wide planning controls for the remediation of contaminated land. The policy states that land must not be developed if it is unsuitable for a proposed use because it is contaminated. If the land is unsuitable, remediation must take place before the land is developed. The policy makes remediation permissible across the State, defines when consent is required, requires all remediation to comply with standards, ensures land is investigated if contamination is suspected, and requires councils to be notified of all remediation proposals.

No. 62. Sustainable Aquaculture - The policy implements the regional strategies already developed by creating a simple approach to identity and categorise aquaculture development on the basis of its potential environmental impact. The SEPP also identifies aquaculture development as a designated development only where there are potential environmental risks.

No. 64. Advertising and Signage - Aims to improve the amenity of urban and natural settings by managing the impact of outdoor advertising. The policy responds to growing concerns from the community, the advertising industry and local government that existing controls and guidelines were not effective. SEPP No. 64 offers the comprehensive provisions and consistent approach needed. SEPP 64 – Advertising and Signage: Explanatory Information should be read in conjunction with the policy.

No. 65. Design Quality of Residential Flat Development - Raises the design quality of residential flat development across the state through the application of a series of design principles. The policy provides for the establishment of Design Review Panels to provide independent expert advice to councils on the merit of residential flat development. The accompanying regulation requires the involvement of a qualified designer throughout the design, approval and construction stages.

SEPP (Housing for Seniors or People with a Disability) 2004 - Encourage the development of high quality accommodation for our ageing population and for people who have disabilities - housing that is in keeping with the local neighbourhood

SEPP (Building Sustainability Index: BASIX) 2004 - This SEPP operates in conjunction with Environmental Planning and Assessment Amendment (Building Sustainability Index: BASIX) Regulation 2004 to ensure the effective introduction of BASIX in NSW. The SEPP ensures consistency in the implementation of BASIX throughout the State by overriding competing provisions in other environmental planning instruments and development control plans, and specifying that SEPP 1 does not apply in relation to any development standard arising under BASIX.

SEPP (Infrastructure) 2007 - Provides a consistent planning regime for infrastructure and the provision of services across NSW, along with providing for consultation with relevant public authorities during the assessment process. The SEPP supports greater flexibility in the location of infrastructure and service facilities along with improved regulatory certainty and efficiency.

SEPP (Mining, Petroleum Production and Extractive Industries) 2007 - This Policy aims to provide for the proper management and development of mineral, petroleum and extractive material resources for the social and economic welfare of the State. The Policy establishes appropriate planning controls to encourage ecologically sustainable development.

SEPP (Miscellaneous Consent Provisions) 2007 - Provides for the erection of temporary structures and the use of places of public entertainment while protecting public safety and local amenity. The SEPP supports the transfer of the regulation of places of public entertainment and temporary structures (such as tents, marquees and booths) from the Local Government Act 1993 to the Environmental Planning and Assessment Act 1979.

SEPP (Rural Lands) 2008 - The aim of this policy is to facilitate the orderly and economic use and development of rural lands for rural and related purposes.

SEPP (Exempt and Complying Development Codes) 2008 – This policy streamlines assessment processes for development that complies with specified development standards. The policy provides exempt codes that have State-wide application, identifying, in the General Exempt Development Code, types of development that are of minimal environmental impact that may be carried out without the need for development consent.

SEPP (Affordable Rental Housing) 2009 – The aims of this policy are to provide a consistent planning regime for the provision of affordable rental housing; facilitate the effective delivery of new affordable rental housing by providing incentives by way of expanding zoning permissibility, floor space ratio bonuses and non-discretionary development standards; facilitate the retention and mitigate the loss of existing affordable rental housing; employ a balanced approach between obligations for retaining and mitigating the loss of existing affordable rental housing, and incentives for the development of new

affordable rental housing; facilitate an expanding role for not-for-profit-providers of affordable rental housing; support local business centres by providing affordable rental housing for workers close to places of work; and facilitate the development of housing for the homeless and other disadvantaged people who may require support services, including group homes and supportive accommodation.

SEPP (State and Regional Development) 2011 – The aims of this policy are to identify development that is State significant development; identify development that is State significant infrastructure and critical State significant infrastructure; and confer functions on joint regional planning panels to determine development applications.

Further details regarding these State Environmental Planning Policies and the circumstances in which they may apply to the subject and can be found on the Department of Planning's website.

REGIONAL PLANNING INSTRUMENTS

There are no Regional Environmental Plans applying within the Muswellbrook Shire Council area.

DEVELOPMENT CONTROL PLANS

This land is affected by the following Development Control Plans:
Muswellbrook Shire Development Control Plan 2009

COASTAL PROTECTION

The land IS NOT affected by the operations of Sections 38 and 39 of the *Coastal Protection Act* 1979.

MINE SUBSIDENCE

The land IS NOT WITHIN a Mine Subsidence District proclaimed under section 15 of the Mine Subsidence Compensation Act, 1961.

ROAD WIDENING AND ROAD REALIGNMENT

The subject land IS NOT affected by any road widening or road realignment under:
(a) Division 2 of Part 3 of the Roads Act 1993, or
(b) Any environmental planning instrument, or
(c) Any resolution of the council.

COUNCIL AND OTHER PUBLIC AUTHORITY POLICIES ON HAZARD RISK RESTRICTIONS

The land IS NOT affected by a policy adopted by the council, or adopted by any other public authority and notified to the council for the express purpose of its adoption by that authority being referred to in planning certificates issued by the council: that restricts the development of the land because of the likelihood of land slip, bushfire, tidal inundation, subsidence, acid sulphate soils or any other risk (other than flooding).

FLOOD RELATED DEVELOPMENT CONTROLS INFORMATION

The Hunter River Flood Study 2014 shows the land to be affected by flooding.

LAND RESERVED FOR ACQUISITION

There are NOT any environmental planning instruments; deemed environmental planning instruments or draft environmental planning instruments applying to the land that provide for the acquisition of the

land by a public authority, as referred to in section 27 of the Environmental Planning and Assessment Act 1979.

CONTRIBUTIONS PLANS

The Muswellbrook Section 94 Contributions Plan 2001 and Muswellbrook Section 94A Contributions Plan 2009 apply to all land within the Muswellbrook Shire Local Government Area.

BIODIVERSITY CERTIFIED LAND

The land IS NOT biodiversity certified land (within the meaning of Part 7AA of the Threatened Species Conservation Act 1995)

BIOBANKING AGREEMENTS

The land IS NOT affected by a biobanking agreement under Part 7A of the *Threatened Species Conservation Act 1995*.

MATTERS RELATING TO THE MANAGEMENT OF CONTAMINATED LAND

(a) The land to which this certificate relates is NOT within land declared to be significantly contaminated land under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(b) The land to which this certificate relates is NOT subject to a management order under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(c) The land to which this certificate relates is NOT the subject of approved voluntary management proposal the subject of the Environment Protection Authority's agreement under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(d) The land to which this certificate relates is NOT the subject to an ongoing maintenance order under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(e) The land to which this certificate relates has NOT been the subject of a site audit statement provided to Muswellbrook Shire Council.

BUSH FIRE PRONE LAND

The land IS NOT bushfire prone land.

PROPERTY VEGETATION PLANS

Council has NOT been notified of the existence of such a plan or if the land is land to which a property vegetation plan under the Native Vegetation Act 2003 applies.

ORDERS UNDER TREES (DISPUTES BETWEEN NEIGHBOURS) ACT 2006

Council has NOT been notified of any order made under the Trees (Disputes Between Neighbours) Act 2006 to carry out work in relation to a tree on the land.

Date: 5 October 2017

Cert No: 21294

DIRECTIONS UNDER PART 3A

There is NOT a direction by the Minister in force under section 75P (2) (c1) of the Act in relation to prohibiting or restricting the carrying out of a project or a stage of a project on the land under Part 4 of the Act.

SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR SENIORS HOUSING

There is NOT a current site compatibility certificate (of which the council is aware), issued under clause 25 of State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 in respect of proposed development on the land.

SITE COMPATIBILITY CERTIFICATES FOR INFRASTRUCTURE

There is NOT a valid site compatibility certificate (of which the council is aware), issued under clause 19 of State Environmental Planning Policy (Infrastructure) 2007 in respect of proposed development on the land.

SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR AFFORDABLE RENTAL HOUSING

There is NOT a current site compatibility certificate for affordable rental housing (of which the council is aware), issued under clause 37 of State Environmental Planning Policy (Affordable Rental Housing) 2007 in respect of proposed development on the land.

PAPER SUBDIVISION INFORMATION

There is NOT an adopted development plan or subdivision order that applies to the land.

SITE VERIFICATION CERTIFICATE

There is NOT a current site verification certificate (of which the council is aware), issued under clause 17C of State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007, in relation to the land.

LOOSE-FILL ASBESTOS INSULATION

There are NO residential premises located on this land that are listed on the register that are required to be maintained under Division 1A of Part 8 of the *Home Building Act 1989*.

The accuracy and currency of the details provided by agencies external to Council have not be verified by Muswellbrook Shire Council and should be verified by the applicant.

ADDITIONAL INFORMATION PURSUANT TO SECTION 149(5) OF THE ACT

Council is unaware of any other relevant matters that may affect the land.

For further information, please contact the Environmental Services Department.

S J McDonald
General Manager

Per: DL Watson

PLANNING CERTIFICATE UNDER SECTION 149 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

Enquiries	Environmental Services
Contact	02 6549 3700
Invoice no.	43721
Your reference	Application

Date: 29 September 2017

Assessment: 70763 **Cert No: 21236**

MACH Energy Australia Pty Ltd
GPO Box 94
BRISBANE QLD 4001

Owner (as recorded by Council)

MACH Energy Australia Pty Ltd

Property Description: LOGUES LANE MUSWELLBROOK 2333
LOT: 2 DP: 784436

Land to which the certificate relates

The land to which this certificate relates, being the lot or lots described on the application form, is shown in the Council's records as being situated at the street address described above. The information contained in this certificate relates only to the lot or lots described on this certificate. Separate planning certificates can be obtained upon application for the other lots, those certificates may contain different information than is contained in this certificate.

CERTIFICATE UNDER SECTION 149(2) ENVIRONMENTAL PLANNING & ASSESSMENT ACT

LOCAL ENVIRONMENTAL PLANS

PLANNING INSTRUMENT	Muswellbrook Local Environmental Plan 2009
LAND USE ZONING	RU1 Primary Production

PERMITTED WITHOUT CONSENT

Extensive agriculture; Home occupations; Intensive plant agriculture

PERMITTED WITH CONSENT

Air transport facilities; Airstrips; Animal boarding or training establishments; Aquaculture; Camping grounds; Caravan parks; Cellar door premises; Cemeteries; Community facilities; Crematoria; Depots; Dwelling houses; Educational establishments; Environmental facilities; Environmental protection works; Extractive industries; Farm buildings; Flood mitigation works; Forestry; Function centres; Group homes; Hazardous industries; Health consulting rooms; Heavy industrial storage establishments; Helipads; Highway service centres; Home-based child care; Home businesses; Home industries; Industrial retail outlets; Information and education facilities; Intensive livestock agriculture; Intensive plant agriculture; Kiosks; Landscaping material supplies; Open cut mining; Places of public worship; Plant nurseries; Recreation areas; Recreation facilities (indoor); Recreation facilities (major); Recreation facilities (outdoor); Research stations; Restaurants or cafes; Roads; Roadside stalls; Rural industries; Rural supplies; Rural worker's dwellings; Secondary dwellings; Service stations; Sewerage systems; Signage; Storage premises; Take away food and drink premises; Tourist and visitor accommodation; Transport depots; Truck depots; Turf farming; Veterinary hospitals; Waste disposal facilities; Water supply systems.

PROHIBITED

Any development not specified above.

MINIMUM LAND DIMENSIONS FOR THE ERECTION OF A DWELLING

Under the provisions of the Muswellbrook Local Environmental Plan 2009, the minimum subdivision lot size is 80ha and is also subject to the provisions detailed below.

Land zoned RU1 Primary Production may, with the consent of Council, be subdivided for the purpose of primary production to create a lot less than the minimum lot size. However, such a lot cannot be created if an existing dwelling would, as the result of the subdivision, be situated on the lot. A dwelling cannot be erected on such a lot created.

Development consent must not be granted to the subdivision of a lot in a strata plan or community title scheme on land zoned RU1 Primary Production that is used, or proposed to be used, for residential accommodation or tourist and visitor accommodation.

Only one dwelling house may be erected on land zoned RU1 Primary Production only if the land is:

(a) a lot created in accordance with clause 4.1 of the LEP 2009, or

(b) a lot created before the LEP 2009 commenced and on which the erection of a dwelling house was permissible immediately before that commencement, or

(c) a lot created before the LEP 2009 commenced that is at least the minimum lot size specified for that lot by the Lot Size Map, or

(d) a lot for which subdivision approval was granted before the LEP 2009 commenced and on which the erection of a dwelling house would have been permissible immediately before that commencement, or

(e) an existing holding.

NOTE: EXISTING HOLDING means all adjoining land, even if separated by a road or railway, held in the same ownership:

(a) on 11 April 1974, and

(b) at the time of lodging a development application for the erection of a dwelling house under this clause.

and includes any other land adjoining that land acquired by the owner since 11 April 1974.

NOTE: The owner in whose ownership all the land is at the time the application is lodged need not be the same person as the owner in whose ownership all the land was on the stated date.

WHETHER THE LAND INCLUDES OR COMPRISES CRITICAL HABITAT

The subject land has not been declared as critical habitat.

WHETHER THE LAND IS IN A CONSERVATION AREA

The subject land is not known to be in a conservation area.

muswellbrook shire council

Date: 29 September 2017

Cert No: 21236

WHETHER AN ITEM OF ENVIRONMENTAL HERITAGE IS SITUATED ON THE LAND

The land is NOT affected by any known or listed heritage item.

STATE ENVIRONMENTAL PLANNING POLICIES (EXEMPT & COMPLYING DEVELOPMENT CODES 2008)

CERTIFICATE UNDER SECTION 149(2) IDENTIFYING THE INFORMATION SET OUT IN CLAUSE 3 OF SCHEDULE 4 OF THE ENVIRONMENTAL PLANNING & ASSESSMENT REGULATIONS

Part 3 General Housing Code

Not applicable to the land to which this certificate relates.

Part 3A Rural Housing Code

YES. Complying development specified in the Rural Housing Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 4 Housing Alterations Code

YES. Complying development specified in the Housing Alterations Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 4A General Development Code

YES. Complying development specified in the General Development Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 5 Commercial and Industrial Alterations Code

Not applicable to the land to which this certificate relates.

Part 5A Commercial and Industrial (New Buildings and Additions) Code

Not applicable to the land to which this certificate relates.

Part 6 Subdivision Code

YES. Complying development specified in the Subdivision Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 7 Demolition Code

YES. Complying development specified in the Demolition Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 8 Fire Safety Code

YES. Complying development specified in the Fire Safety Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

STATE ENVIRONMENTAL PLANNING POLICIES

The following State Environmental Planning Policies apply to land within the Muswellbrook Shire LGA:-

No. 21. Caravan Parks - Ensures that where caravan parks or camping grounds are permitted under an environmental planning instrument, movable dwellings, as defined in the Local Government Act 1993, are also permitted. The policy ensures that development consent is required for new caravan parks and camping grounds and for additional long-term sites in existing caravan parks.

No. 30. Intensive Agriculture - Requires development consent for cattle feedlots having a capacity of 50 or more cattle or piggeries having a capacity of 200 or more pigs. The policy sets out information and public notification requirements to ensure there are effective planning control over this export-driven rural industry. The policy does not alter if, and where, such development is permitted, or the functions of the consent authority.

No. 33. Hazardous and Offensive Development - Provides new definitions for 'hazardous industry', 'hazardous storage establishment', 'offensive industry' and 'offensive storage establishment'. The definitions apply to all planning instruments, existing and future. The new definitions enable decisions to approve or refuse a development to be based on the merit of proposal. The consent authority must careful consider the specifics the case, the location and the way in which the proposed activity is to be carried out. The policy also requires specified matters to be considered for proposals that are 'potentially hazardous' or 'potentially offensive' as defined in the policy. For example, any application to carry out a potentially hazardous or potentially offensive development is to be advertised for public comment, and applications to carry out potentially hazardous development must be supported by a preliminary hazard analysis (PHA).

No. 36. Manufactured Home Estates - Helps establish well-designed and properly serviced manufactured home estates (MHEs) in suitable locations. Affordability and security of tenure for residents are important aspects. To enable the immediate development of estates, the policy allows MHEs to be located on certain land where caravan parks are permitted. There are however, criteria that a proposal must satisfy before the local council can approved development.

No. 44. Koala Habitat Protection - Encourages the proper conservation and management of areas of natural vegetation that provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline.

No. 55. Remediation of Land - Introduces state-wide planning controls for the remediation of contaminated land. The policy states that land must not be developed if it is unsuitable for a proposed use because it is contaminated. If the land is unsuitable, remediation must take place before the land is developed. The policy makes remediation permissible across the State, defines when consent is required, requires all remediation to comply with standards, ensures land is investigated if contamination is suspected, and requires councils to be notified of all remediation proposals.

No. 62. Sustainable Aquaculture - The policy implements the regional strategies already developed by creating a simple approach to identity and categorise aquaculture development on the basis of its potential environmental impact. The SEPP also identifies aquaculture development as a designated development only where there are potential environmental risks.

No. 64. Advertising and Signage - Aims to improve the amenity of urban and natural settings by managing the impact of outdoor advertising. The policy responds to growing concerns from the community, the advertising industry and local government that existing controls and guidelines were not effective. SEPP No. 64 offers the comprehensive provisions and consistent approach needed. SEPP 64 – Advertising and Signage: Explanatory Information should be read in conjunction with the policy.

No. 65. Design Quality of Residential Flat Development - Raises the design quality of residential flat development across the state through the application of a series of design principles. The policy provides for the establishment of Design Review Panels to provide independent expert advice to councils on the merit of residential flat development. The accompanying regulation requires the involvement of a qualified designer throughout the design, approval and construction stages.

SEPP (Housing for Seniors or People with a Disability) 2004 - Encourage the development of high quality accommodation for our ageing population and for people who have disabilities - housing that is in keeping with the local neighbourhood

SEPP (Building Sustainability Index: BASIX) 2004 - This SEPP operates in conjunction with Environmental Planning and Assessment Amendment (Building Sustainability Index: BASIX) Regulation 2004 to ensure the effective introduction of BASIX in NSW. The SEPP ensures consistency in the implementation of BASIX throughout the State by overriding competing provisions in other environmental planning instruments and development control plans, and specifying that SEPP 1 does not apply in relation to any development standard arising under BASIX.

SEPP (Infrastructure) 2007 - Provides a consistent planning regime for infrastructure and the provision of services across NSW, along with providing for consultation with relevant public authorities during the assessment process. The SEPP supports greater flexibility in the location of infrastructure and service facilities along with improved regulatory certainty and efficiency.

SEPP (Mining, Petroleum Production and Extractive Industries) 2007 - This Policy aims to provide for the proper management and development of mineral, petroleum and extractive material resources for the social and economic welfare of the State. The Policy establishes appropriate planning controls to encourage ecologically sustainable development.

SEPP (Miscellaneous Consent Provisions) 2007 - Provides for the erection of temporary structures and the use of places of public entertainment while protecting public safety and local amenity. The SEPP supports the transfer of the regulation of places of public entertainment and temporary structures (such as tents, marquees and booths) from the Local Government Act 1993 to the Environmental Planning and Assessment Act 1979.

SEPP (Rural Lands) 2008 - The aim of this policy is to facilitate the orderly and economic use and development of rural lands for rural and related purposes.

SEPP (Exempt and Complying Development Codes) 2008 – This policy streamlines assessment processes for development that complies with specified development standards. The policy provides exempt codes that have State-wide application, identifying, in the General Exempt Development Code, types of development that are of minimal environmental impact that may be carried out without the need for development consent.

SEPP (Affordable Rental Housing) 2009 – The aims of this policy are to provide a consistent planning regime for the provision of affordable rental housing; facilitate the effective delivery of new affordable rental housing by providing incentives by way of expanding zoning permissibility, floor space ratio bonuses and non-discretionary development standards; facilitate the retention and mitigate the loss of existing affordable rental housing; employ a balanced approach between obligations for retaining and mitigating the loss of existing affordable rental housing, and incentives for the development of new

affordable rental housing; facilitate an expanding role for not-for-profit-providers of affordable rental housing; support local business centres by providing affordable rental housing for workers close to places of work; and facilitate the development of housing for the homeless and other disadvantaged people who may require support services, including group homes and supportive accommodation.

SEPP (State and Regional Development) 2011 – The aims of this policy are to identify development that is State significant development; identify development that is State significant infrastructure and critical State significant infrastructure; and confer functions on joint regional planning panels to determine development applications.

Further details regarding these State Environmental Planning Policies and the circumstances in which they may apply to the subject and can be found on the Department of Planning's website.

REGIONAL PLANNING INSTRUMENTS

There are no Regional Environmental Plans applying within the Muswellbrook Shire Council area.

DEVELOPMENT CONTROL PLANS

This land is affected by the following Development Control Plans:
Muswellbrook Shire Development Control Plan 2009

COASTAL PROTECTION

The land IS NOT affected by the operations of Sections 38 and 39 of the *Coastal Protection Act* 1979.

MINE SUBSIDENCE

The land IS NOT WITHIN a Mine Subsidence District proclaimed under section 15 of the Mine Subsidence Compensation Act, 1961.

ROAD WIDENING AND ROAD REALIGNMENT

The subject land IS NOT affected by any road widening or road realignment under:
(a) Division 2 of Part 3 of the Roads Act 1993, or
(b) Any environmental planning instrument, or
(c) Any resolution of the council.

COUNCIL AND OTHER PUBLIC AUTHORITY POLICIES ON HAZARD RISK RESTRICTIONS

The land IS NOT affected by a policy adopted by the council, or adopted by any other public authority and notified to the council for the express purpose of its adoption by that authority being referred to in planning certificates issued by the council: that restricts the development of the land because of the likelihood of land slip, bushfire, tidal inundation, subsidence, acid sulphate soils or any other risk (other than flooding).

FLOOD RELATED DEVELOPMENT CONTROLS INFORMATION

The Hunter River Flood Study 2014 shows the land to be affected by flooding.

LAND RESERVED FOR ACQUISITION

There are NOT any environmental planning instruments; deemed environmental planning instruments or draft environmental planning instruments applying to the land that provide for the acquisition of the

land by a public authority, as referred to in section 27 of the Environmental Planning and Assessment Act 1979.

CONTRIBUTIONS PLANS

The Muswellbrook Section 94 Contributions Plan 2001 and Muswellbrook Section 94A Contributions Plan 2009 apply to all land within the Muswellbrook Shire Local Government Area.

BIODIVERSITY CERTIFIED LAND

The land IS NOT biodiversity certified land (within the meaning of Part 7AA of the Threatened Species Conservation Act 1995)

BIOBANKING AGREEMENTS

The land IS NOT affected by a biobanking agreement under Part 7A of the *Threatened Species Conservation Act 1995*.

MATTERS RELATING TO THE MANAGEMENT OF CONTAMINATED LAND

(a) The land to which this certificate relates is NOT within land declared to be significantly contaminated land under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(b) The land to which this certificate relates is NOT subject to a management order under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(c) The land to which this certificate relates is NOT the subject of approved voluntary management proposal the subject of the Environment Protection Authority's agreement under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(d) The land to which this certificate relates is NOT the subject to an ongoing maintenance order under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(e) The land to which this certificate relates has NOT been the subject of a site audit statement provided to Muswellbrook Shire Council.

BUSH FIRE PRONE LAND

The land IS NOT bushfire prone land.

PROPERTY VEGETATION PLANS

Council has NOT been notified of the existence of such a plan or if the land is land to which a property vegetation plan under the Native Vegetation Act 2003 applies.

ORDERS UNDER TREES (DISPUTES BETWEEN NEIGHBOURS) ACT 2006

Council has NOT been notified of any order made under the Trees (Disputes Between Neighbours) Act 2006 to carry out work in relation to a tree on the land.

Date: 29 September 2017

Cert No: 21236

DIRECTIONS UNDER PART 3A

There is NOT a direction by the Minister in force under section 75P (2) (c1) of the Act in relation to prohibiting or restricting the carrying out of a project or a stage of a project on the land under Part 4 of the Act.

SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR SENIORS HOUSING

There is NOT a current site compatibility certificate (of which the council is aware), issued under clause 25 of State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 in respect of proposed development on the land.

SITE COMPATIBILITY CERTIFICATES FOR INFRASTRUCTURE

There is NOT a valid site compatibility certificate (of which the council is aware), issued under clause 19 of State Environmental Planning Policy (Infrastructure) 2007 in respect of proposed development on the land.

SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR AFFORDABLE RENTAL HOUSING

There is NOT a current site compatibility certificate for affordable rental housing (of which the council is aware), issued under clause 37 of State Environmental Planning Policy (Affordable Rental Housing) 2007 in respect of proposed development on the land.

PAPER SUBDIVISION INFORMATION

There is NOT an adopted development plan or subdivision order that applies to the land.

SITE VERIFICATION CERTIFICATE

There is NOT a current site verification certificate (of which the council is aware), issued under clause 17C of State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007, in relation to the land.

LOOSE-FILL ASBESTOS INSULATION

There are NO residential premises located on this land that are listed on the register that are required to be maintained under Division 1A of Part 8 of the *Home Building Act 1989*.

The accuracy and currency of the details provided by agencies external to Council have not be verified by Muswellbrook Shire Council and should be verified by the applicant.

ADDITIONAL INFORMATION PURSUANT TO SECTION 149(5) OF THE ACT

Council is unaware of any other relevant matters that may affect the land.

For further information, please contact the Environmental Services Department.

S J McDonald
General Manager

Per: DL Watson

PLANNING CERTIFICATE UNDER SECTION 149 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

Enquiries	Environmental Services
Contact	02 6549 3700
Invoice no.	43721
Your reference	Application

Date: 30 September 2017

Assessment: 70763 **Cert No: 21252**

MACH Energy Australia Pty Ltd
GPO Box 94
BRISBANE QLD 4001

Owner (as recorded by Council)
MACH Energy Australia Pty Ltd

Property Description: LOGUES LANE MUSWELLBROOK 2333
LOT: 6 DP: 784436

Land to which the certificate relates

The land to which this certificate relates, being the lot or lots described on the application form, is shown in the Council's records as being situated at the street address described above. The information contained in this certificate relates only to the lot or lots described on this certificate. Separate planning certificates can be obtained upon application for the other lots, those certificates may contain different information than is contained in this certificate.

CERTIFICATE UNDER SECTION 149(2) ENVIRONMENTAL PLANNING & ASSESSMENT ACT

LOCAL ENVIRONMENTAL PLANS

PLANNING INSTRUMENT	Muswellbrook Local Environmental Plan 2009
LAND USE ZONING	RU1 Primary Production

PERMITTED WITHOUT CONSENT

Extensive agriculture; Home occupations; Intensive plant agriculture

PERMITTED WITH CONSENT

Air transport facilities; Airstrips; Animal boarding or training establishments; Aquaculture; Camping grounds; Caravan parks; Cellar door premises; Cemeteries; Community facilities; Crematoria; Depots; Dwelling houses; Educational establishments; Environmental facilities; Environmental protection works; Extractive industries; Farm buildings; Flood mitigation works; Forestry; Function centres; Group homes; Hazardous industries; Health consulting rooms; Heavy industrial storage establishments; Helipads; Highway service centres; Home-based child care; Home businesses; Home industries; Industrial retail outlets; Information and education facilities; Intensive livestock agriculture; Intensive plant agriculture; Kiosks; Landscaping material supplies; Open cut mining; Places of public worship; Plant nurseries; Recreation areas; Recreation facilities (indoor); Recreation facilities (major); Recreation facilities (outdoor); Research stations; Restaurants or cafes; Roads; Roadside stalls; Rural industries; Rural supplies; Rural worker's dwellings; Secondary dwellings; Service stations; Sewerage systems; Signage; Storage premises; Take away food and drink premises; Tourist and visitor accommodation; Transport depots; Truck depots; Turf farming; Veterinary hospitals; Waste disposal facilities; Water supply systems.

PROHIBITED

Any development not specified above.

MINIMUM LAND DIMENSIONS FOR THE ERECTION OF A DWELLING

Under the provisions of the Muswellbrook Local Environmental Plan 2009, the minimum subdivision lot size is 80ha and is also subject to the provisions detailed below.

Land zoned RU1 Primary Production may, with the consent of Council, be subdivided for the purpose of primary production to create a lot less than the minimum lot size. However, such a lot cannot be created if an existing dwelling would, as the result of the subdivision, be situated on the lot. A dwelling cannot be erected on such a lot created.

Development consent must not be granted to the subdivision of a lot in a strata plan or community title scheme on land zoned RU1 Primary Production that is used, or proposed to be used, for residential accommodation or tourist and visitor accommodation.

Only one dwelling house may be erected on land zoned RU1 Primary Production only if the land is:

(a) a lot created in accordance with clause 4.1 of the LEP 2009, or

(b) a lot created before the LEP 2009 commenced and on which the erection of a dwelling house was permissible immediately before that commencement, or

(c) a lot created before the LEP 2009 commenced that is at least the minimum lot size specified for that lot by the Lot Size Map, or

(d) a lot for which subdivision approval was granted before the LEP 2009 commenced and on which the erection of a dwelling house would have been permissible immediately before that commencement, or

(e) an existing holding.

NOTE: EXISTING HOLDING means all adjoining land, even if separated by a road or railway, held in the same ownership:

(a) on 11 April 1974, and

(b) at the time of lodging a development application for the erection of a dwelling house under this clause.

and includes any other land adjoining that land acquired by the owner since 11 April 1974.

NOTE: The owner in whose ownership all the land is at the time the application is lodged need not be the same person as the owner in whose ownership all the land was on the stated date.

WHETHER THE LAND INCLUDES OR COMPRISES CRITICAL HABITAT

The subject land has not been declared as critical habitat.

WHETHER THE LAND IS IN A CONSERVATION AREA

The subject land is not known to be in a conservation area.

muswellbrook shire council

Date: 3 October 2017

Cert No: 21252

WHETHER AN ITEM OF ENVIRONMENTAL HERITAGE IS SITUATED ON THE LAND

The land is NOT affected by any known or listed heritage item.

STATE ENVIRONMENTAL PLANNING POLICIES (EXEMPT & COMPLYING DEVELOPMENT CODES 2008)

CERTIFICATE UNDER SECTION 149(2) IDENTIFYING THE INFORMATION SET OUT IN CLAUSE 3 OF SCHEDULE 4 OF THE ENVIRONMENTAL PLANNING & ASSESSMENT REGULATIONS

Part 3 General Housing Code

Not applicable to the land to which this certificate relates.

Part 3A Rural Housing Code

YES. Complying development specified in the Rural Housing Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 4 Housing Alterations Code

YES. Complying development specified in the Housing Alterations Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 4A General Development Code

YES. Complying development specified in the General Development Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 5 Commercial and Industrial Alterations Code

Not applicable to the land to which this certificate relates.

Part 5A Commercial and Industrial (New Buildings and Additions) Code

Not applicable to the land to which this certificate relates.

Part 6 Subdivision Code

YES. Complying development specified in the Subdivision Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 7 Demolition Code

YES. Complying development specified in the Demolition Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 8 Fire Safety Code

YES. Complying development specified in the Fire Safety Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

STATE ENVIRONMENTAL PLANNING POLICIES

The following State Environmental Planning Policies apply to land within the Muswellbrook Shire LGA:-

No. 21. Caravan Parks - Ensures that where caravan parks or camping grounds are permitted under an environmental planning instrument, movable dwellings, as defined in the Local Government Act 1993, are also permitted. The policy ensures that development consent is required for new caravan parks and camping grounds and for additional long-term sites in existing caravan parks.

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SEPP (Building Sustainability Index: BASIX) 2004 - This SEPP operates in conjunction with Environmental Planning and Assessment Amendment (Building Sustainability Index: BASIX) Regulation 2004 to ensure the effective introduction of BASIX in NSW. The SEPP ensures consistency in the implementation of BASIX throughout the State by overriding competing provisions in other environmental planning instruments and development control plans, and specifying that SEPP 1 does not apply in relation to any development standard arising under BASIX.

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SEPP (Miscellaneous Consent Provisions) 2007 - Provides for the erection of temporary structures and the use of places of public entertainment while protecting public safety and local amenity. The SEPP supports the transfer of the regulation of places of public entertainment and temporary structures (such as tents, marquees and booths) from the Local Government Act 1993 to the Environmental Planning and Assessment Act 1979.

SEPP (Rural Lands) 2008 - The aim of this policy is to facilitate the orderly and economic use and development of rural lands for rural and related purposes.

SEPP (Exempt and Complying Development Codes) 2008 – This policy streamlines assessment processes for development that complies with specified development standards. The policy provides exempt codes that have State-wide application, identifying, in the General Exempt Development Code, types of development that are of minimal environmental impact that may be carried out without the need for development consent.

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affordable rental housing; facilitate an expanding role for not-for-profit-providers of affordable rental housing; support local business centres by providing affordable rental housing for workers close to places of work; and facilitate the development of housing for the homeless and other disadvantaged people who may require support services, including group homes and supportive accommodation.

SEPP (State and Regional Development) 2011 – The aims of this policy are to identify development that is State significant development; identify development that is State significant infrastructure and critical State significant infrastructure; and confer functions on joint regional planning panels to determine development applications.

Further details regarding these State Environmental Planning Policies and the circumstances in which they may apply to the subject and can be found on the Department of Planning's website.

REGIONAL PLANNING INSTRUMENTS

There are no Regional Environmental Plans applying within the Muswellbrook Shire Council area.

DEVELOPMENT CONTROL PLANS

This land is affected by the following Development Control Plans:
Muswellbrook Shire Development Control Plan 2009

COASTAL PROTECTION

The land IS NOT affected by the operations of Sections 38 and 39 of the *Coastal Protection Act* 1979.

MINE SUBSIDENCE

The land IS NOT WITHIN a Mine Subsidence District proclaimed under section 15 of the Mine Subsidence Compensation Act, 1961.

ROAD WIDENING AND ROAD REALIGNMENT

The subject land IS NOT affected by any road widening or road realignment under:
(a) Division 2 of Part 3 of the Roads Act 1993, or
(b) Any environmental planning instrument, or
(c) Any resolution of the council.

COUNCIL AND OTHER PUBLIC AUTHORITY POLICIES ON HAZARD RISK RESTRICTIONS

The land IS NOT affected by a policy adopted by the council, or adopted by any other public authority and notified to the council for the express purpose of its adoption by that authority being referred to in planning certificates issued by the council: that restricts the development of the land because of the likelihood of land slip, bushfire, tidal inundation, subsidence, acid sulphate soils or any other risk (other than flooding).

FLOOD RELATED DEVELOPMENT CONTROLS INFORMATION

The Hunter River Flood Study 2014 shows the land to be affected by flooding.

LAND RESERVED FOR ACQUISITION

There are NOT any environmental planning instruments; deemed environmental planning instruments or draft environmental planning instruments applying to the land that provide for the acquisition of the

land by a public authority, as referred to in section 27 of the Environmental Planning and Assessment Act 1979.

CONTRIBUTIONS PLANS

The Muswellbrook Section 94 Contributions Plan 2001 and Muswellbrook Section 94A Contributions Plan 2009 apply to all land within the Muswellbrook Shire Local Government Area.

BIODIVERSITY CERTIFIED LAND

The land IS NOT biodiversity certified land (within the meaning of Part 7AA of the Threatened Species Conservation Act 1995)

BIOBANKING AGREEMENTS

The land IS NOT affected by a biobanking agreement under Part 7A of the *Threatened Species Conservation Act 1995*.

MATTERS RELATING TO THE MANAGEMENT OF CONTAMINATED LAND

(a) The land to which this certificate relates is NOT within land declared to be significantly contaminated land under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(b) The land to which this certificate relates is NOT subject to a management order under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(c) The land to which this certificate relates is NOT the subject of approved voluntary management proposal the subject of the Environment Protection Authority's agreement under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(d) The land to which this certificate relates is NOT the subject to an ongoing maintenance order under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(e) The land to which this certificate relates has NOT been the subject of a site audit statement provided to Muswellbrook Shire Council.

BUSH FIRE PRONE LAND

The land IS NOT bushfire prone land.

PROPERTY VEGETATION PLANS

Council has NOT been notified of the existence of such a plan or if the land is land to which a property vegetation plan under the Native Vegetation Act 2003 applies.

ORDERS UNDER TREES (DISPUTES BETWEEN NEIGHBOURS) ACT 2006

Council has NOT been notified of any order made under the Trees (Disputes Between Neighbours) Act 2006 to carry out work in relation to a tree on the land.

Date: 3 October 2017

Cert No: 21252

DIRECTIONS UNDER PART 3A

There is NOT a direction by the Minister in force under section 75P (2) (c1) of the Act in relation to prohibiting or restricting the carrying out of a project or a stage of a project on the land under Part 4 of the Act.

SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR SENIORS HOUSING

There is NOT a current site compatibility certificate (of which the council is aware), issued under clause 25 of State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 in respect of proposed development on the land.

SITE COMPATIBILITY CERTIFICATES FOR INFRASTRUCTURE

There is NOT a valid site compatibility certificate (of which the council is aware), issued under clause 19 of State Environmental Planning Policy (Infrastructure) 2007 in respect of proposed development on the land.

SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR AFFORDABLE RENTAL HOUSING

There is NOT a current site compatibility certificate for affordable rental housing (of which the council is aware), issued under clause 37 of State Environmental Planning Policy (Affordable Rental Housing) 2007 in respect of proposed development on the land.

PAPER SUBDIVISION INFORMATION

There is NOT an adopted development plan or subdivision order that applies to the land.

SITE VERIFICATION CERTIFICATE

There is NOT a current site verification certificate (of which the council is aware), issued under clause 17C of State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007, in relation to the land.

LOOSE-FILL ASBESTOS INSULATION

There are NO residential premises located on this land that are listed on the register that are required to be maintained under Division 1A of Part 8 of the *Home Building Act 1989*.

The accuracy and currency of the details provided by agencies external to Council have not be verified by Muswellbrook Shire Council and should be verified by the applicant.

ADDITIONAL INFORMATION PURSUANT TO SECTION 149(5) OF THE ACT

Council is unaware of any other relevant matters that may affect the land.

For further information, please contact the
Environmental Services Department.

S J McDonald
General Manager

Per: D L Watson

PLANNING CERTIFICATE UNDER SECTION 149 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

Enquiries	Environmental Services
Contact	02 6549 3700
Invoice no.	43721
Your reference	Application

Date: 4 October 2017

Assessment: 127969 **Cert No: 21297**

MACH Energy Australia Pty Ltd
GPO Box 94
BRISBANE QLD 4001

Owner (as recorded by Council)

Wesfarmers Bengalla Limited & Taipower Bengalla Pty Limited & others

Property Description: 79 OVERTON ROAD MUSWELLBROOK 2333
LOT: 505 DP: 711996

Land to which the certificate relates

The land to which this certificate relates, being the lot or lots described on the application form, is shown in the Council's records as being situated at the street address described above. The information contained in this certificate relates only to the lot or lots described on this certificate. Separate planning certificates can be obtained upon application for the other lots, those certificates may contain different information than is contained in this certificate.

CERTIFICATE UNDER SECTION 149(2) ENVIRONMENTAL PLANNING & ASSESSMENT ACT

LOCAL ENVIRONMENTAL PLANS

PLANNING INSTRUMENT	Muswellbrook Local Environmental Plan 2009
LAND USE ZONING	RU1 Primary Production

PERMITTED WITHOUT CONSENT

Extensive agriculture; Home occupations; Intensive plant agriculture

PERMITTED WITH CONSENT

Air transport facilities; Airstrips; Animal boarding or training establishments; Aquaculture; Camping grounds; Caravan parks; Cellar door premises; Cemeteries; Community facilities; Crematoria; Depots; Dwelling houses; Educational establishments; Environmental facilities; Environmental protection works; Extractive industries; Farm buildings; Flood mitigation works; Forestry; Function centres; Group homes; Hazardous industries; Health consulting rooms; Heavy industrial storage establishments; Helipads; Highway service centres; Home-based child care; Home businesses; Home industries; Industrial retail outlets; Information and education facilities; Intensive livestock agriculture; Intensive plant agriculture; Kiosks; Landscaping material supplies; Open cut mining; Places of public worship; Plant nurseries; Recreation areas; Recreation facilities (indoor); Recreation facilities (major); Recreation facilities (outdoor); Research stations; Restaurants or cafes; Roads; Roadside stalls; Rural industries; Rural supplies; Rural worker's dwellings; Secondary dwellings; Service stations; Sewerage systems; Signage; Storage premises; Take away food and drink premises; Tourist and visitor accommodation; Transport depots; Truck depots; Turf farming; Veterinary hospitals; Waste disposal facilities; Water supply systems.

PROHIBITED

Any development not specified above.

MINIMUM LAND DIMENSIONS FOR THE ERECTION OF A DWELLING

Under the provisions of the Muswellbrook Local Environmental Plan 2009, the minimum subdivision lot size is 80ha and is also subject to the provisions detailed below.

Land zoned RU1 Primary Production may, with the consent of Council, be subdivided for the purpose of primary production to create a lot less than the minimum lot size. However, such a lot cannot be created if an existing dwelling would, as the result of the subdivision, be situated on the lot. A dwelling cannot be erected on such a lot created.

Development consent must not be granted to the subdivision of a lot in a strata plan or community title scheme on land zoned RU1 Primary Production that is used, or proposed to be used, for residential accommodation or tourist and visitor accommodation.

Only one dwelling house may be erected on land zoned RU1 Primary Production only if the land is:

(a) a lot created in accordance with clause 4.1 of the LEP 2009, or

(b) a lot created before the LEP 2009 commenced and on which the erection of a dwelling house was permissible immediately before that commencement, or

(c) a lot created before the LEP 2009 commenced that is at least the minimum lot size specified for that lot by the Lot Size Map, or

(d) a lot for which subdivision approval was granted before the LEP 2009 commenced and on which the erection of a dwelling house would have been permissible immediately before that commencement, or

(e) an existing holding.

NOTE: EXISTING HOLDING means all adjoining land, even if separated by a road or railway, held in the same ownership:

(a) on 11 April 1974, and

(b) at the time of lodging a development application for the erection of a dwelling house under this clause.

and includes any other land adjoining that land acquired by the owner since 11 April 1974.

NOTE: The owner in whose ownership all the land is at the time the application is lodged need not be the same person as the owner in whose ownership all the land was on the stated date.

WHETHER THE LAND INCLUDES OR COMPRISES CRITICAL HABITAT

The subject land has not been declared as critical habitat.

WHETHER THE LAND IS IN A CONSERVATION AREA

The subject land is not known to be in a conservation area.

Date: 5 October 2017

Cert No: 21297

WHETHER AN ITEM OF ENVIRONMENTAL HERITAGE IS SITUATED ON THE LAND

The subject property is listed as an item of heritage under schedule 5 of the Muswellbrook Local Environmental Plan 2009.

STATE ENVIRONMENTAL PLANNING POLICIES (EXEMPT & COMPLYING DEVELOPMENT CODES 2008)

CERTIFICATE UNDER SECTION 149(2) IDENTIFYING THE INFORMATION SET OUT IN CLAUSE 3 OF SCHEDULE 4 OF THE ENVIRONMENTAL PLANNING & ASSESSMENT REGULATIONS

Part 3 General Housing Code

Not applicable to the land to which this certificate relates.

Part 3A Rural Housing Code

NO. Complying development specified in the Rural Housing Code may NOT be carried out on this land pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

The land is excluded land; being land identified by an environmental planning instrument as being within an area of:-

HERITAGE ITEM UNDER THE MUSWELLBROOK LOCAL ENVIRONMENTAL PLAN 2009

Part 4 Housing Alterations Code

NO. Complying development specified in the Housing Alterations Code may NOT be carried out on this land pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

The land is excluded land; being land identified by an environmental planning instrument as being within an area of:-

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Part 4A General Development Code

NO. Complying development specified in the General Development Code may NOT be carried out on this land pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

The land is excluded land; being land identified by an environmental planning instrument as being within an area of:-

HERITAGE ITEM UNDER THE MUSWELLBROOK LOCAL ENVIRONMENTAL PLAN 2009

Part 5 Commercial and Industrial Alterations Code

Not applicable to the land to which this certificate relates.

Part 5A Commercial and Industrial (New Buildings and Additions) Code

Not applicable to the land to which this certificate relates.

Part 6 Subdivision Code

NO. Complying development specified in the Subdivision Code may NOT be carried out on this land pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

The land is excluded land; being land identified by an environmental planning instrument as being within an area of:-

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Part 7 Demolition Code

NO. Complying development specified in the Demolition Code may NOT be carried out on this land pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

The land is excluded land; being land identified by an environmental planning instrument as being within an area of:-

HERITAGE ITEM UNDER THE MUSWELLBROOK LOCAL ENVIRONMENTAL PLAN 2009

Part 8 Fire Safety Code

YES. Complying development specified in the Fire Safety Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

STATE ENVIRONMENTAL PLANNING POLICIES

The following State Environmental Planning Policies apply to land within the Muswellbrook Shire LGA:-

No. 21. Caravan Parks - Ensures that where caravan parks or camping grounds are permitted under an environmental planning instrument, movable dwellings, as defined in the Local Government Act 1993, are also permitted. The policy ensures that development consent is required for new caravan parks and camping grounds and for additional long-term sites in existing caravan parks.

No. 30. Intensive Agriculture - Requires development consent for cattle feedlots having a capacity of 50 or more cattle or piggeries having a capacity of 200 or more pigs. The policy sets out information and public notification requirements to ensure there are effective planning control over this export-driven rural industry. The policy does not alter if, and where, such development is permitted, or the functions of the consent authority.

No. 33. Hazardous and Offensive Development - Provides new definitions for 'hazardous industry', 'hazardous storage establishment', 'offensive industry' and 'offensive storage establishment'. The definitions apply to all planning instruments, existing and future. The new definitions enable decisions to approve or refuse a development to be based on the merit of proposal. The consent authority must careful consider the specifics the case, the location and the way in which the proposed activity is to be carried out. The policy also requires specified matters to be considered for proposals that are 'potentially hazardous' or 'potentially offensive' as defined in the policy. For example, any application to carry out a potentially hazardous or potentially offensive development is to be advertised for public comment, and applications to carry out potentially hazardous development must be supported by a preliminary hazard analysis (PHA).

No. 36. Manufactured Home Estates - Helps establish well-designed and properly serviced manufactured home estates (MHEs) in suitable locations. Affordability and security of tenure for residents are important aspects. To enable the immediate development of estates, the policy allows MHEs to be located on certain land where caravan parks are permitted. There are however, criteria that a proposal must satisfy before the local council can approved development.

No. 44. Koala Habitat Protection - Encourages the proper conservation and management of areas of natural vegetation that provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline.

No. 55. Remediation of Land - Introduces state-wide planning controls for the remediation of contaminated land. The policy states that land must not be developed if it is unsuitable for a proposed use because it is contaminated. If the land is unsuitable, remediation must take place before the land is developed. The policy makes remediation permissible across the State, defines when consent is required, requires all remediation to comply with standards, ensures land is investigated if contamination is suspected, and requires councils to be notified of all remediation proposals.

No. 62. Sustainable Aquaculture - The policy implements the regional strategies already developed by creating a simple approach to identity and categorise aquaculture development on the basis of its potential environmental impact. The SEPP also identifies aquaculture development as a designated development only where there are potential environmental risks.

No. 64. Advertising and Signage - Aims to improve the amenity of urban and natural settings by managing the impact of outdoor advertising. The policy responds to growing concerns from the community, the advertising industry and local government that existing controls and guidelines were not effective. SEPP No. 64 offers the comprehensive provisions and consistent approach needed. SEPP 64 – Advertising and Signage: Explanatory Information should be read in conjunction with the policy.

No. 65. Design Quality of Residential Flat Development - Raises the design quality of residential flat development across the state through the application of a series of design principles. The policy provides for the establishment of Design Review Panels to provide independent expert advice to councils on the merit of residential flat development. The accompanying regulation requires the involvement of a qualified designer throughout the design, approval and construction stages.

SEPP (Housing for Seniors or People with a Disability) 2004 - Encourage the development of high quality accommodation for our ageing population and for people who have disabilities - housing that is in keeping with the local neighbourhood

SEPP (Building Sustainability Index: BASIX) 2004 - This SEPP operates in conjunction with Environmental Planning and Assessment Amendment (Building Sustainability Index: BASIX) Regulation 2004 to ensure the effective introduction of BASIX in NSW. The SEPP ensures consistency in the implementation of BASIX throughout the State by overriding competing provisions in other environmental planning instruments and development control plans, and specifying that SEPP 1 does not apply in relation to any development standard arising under BASIX.

SEPP (Infrastructure) 2007 - Provides a consistent planning regime for infrastructure and the provision of services across NSW, along with providing for consultation with relevant public authorities during the assessment process. The SEPP supports greater flexibility in the location of infrastructure and service facilities along with improved regulatory certainty and efficiency.

SEPP (Mining, Petroleum Production and Extractive Industries) 2007 - This Policy aims to provide for the proper management and development of mineral, petroleum and extractive material resources for the social and economic welfare of the State. The Policy establishes appropriate planning controls to encourage ecologically sustainable development.

SEPP (Miscellaneous Consent Provisions) 2007 - Provides for the erection of temporary structures and the use of places of public entertainment while protecting public safety and local amenity. The SEPP supports the transfer of the regulation of places of public entertainment and temporary structures (such as tents, marquees and booths) from the Local Government Act 1993 to the Environmental Planning and Assessment Act 1979.

SEPP (Rural Lands) 2008 - The aim of this policy is to facilitate the orderly and economic use and development of rural lands for rural and related purposes.

SEPP (Exempt and Complying Development Codes) 2008 – This policy streamlines assessment processes for development that complies with specified development standards. The policy provides exempt codes that have State-wide application, identifying, in the General Exempt Development Code, types of development that are of minimal environmental impact that may be carried out without the need for development consent.

SEPP (Affordable Rental Housing) 2009 – The aims of this policy are to provide a consistent planning regime for the provision of affordable rental housing; facilitate the effective delivery of new affordable rental housing by providing incentives by way of expanding zoning permissibility, floor space ratio bonuses and non-discretionary development standards; facilitate the retention and mitigate the loss of existing affordable rental housing; employ a balanced approach between obligations for retaining and mitigating the loss of existing affordable rental housing, and incentives for the development of new affordable rental housing; facilitate an expanding role for not-for-profit-providers of affordable rental housing; support local business centres by providing affordable rental housing for workers close to places of work; and facilitate the development of housing for the homeless and other disadvantaged people who may require support services, including group homes and supportive accommodation.

SEPP (State and Regional Development) 2011 – The aims of this policy are to identify development that is State significant development; identify development that is State significant infrastructure and critical State significant infrastructure; and confer functions on joint regional planning panels to determine development applications.

Further details regarding these State Environmental Planning Policies and the circumstances in which they may apply to the subject and can be found on the Department of Planning's website.

REGIONAL PLANNING INSTRUMENTS

There are no Regional Environmental Plans applying within the Muswellbrook Shire Council area.

DEVELOPMENT CONTROL PLANS

This land is affected by the following Development Control Plans:
Muswellbrook Shire Development Control Plan 2009

COASTAL PROTECTION

The land IS NOT affected by the operations of Sections 38 and 39 of the *Coastal Protection Act* 1979.

MINE SUBSIDENCE

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

The Board can assist with information about mine subsidence and advise whether existing structures comply with the requirements of the Act.

The Department of Mineral Resources has identified the lands may be subject to coal mining (either open cut mining or underground mining). Further enquiries should be directed to the Department of Mineral Resources.

ROAD WIDENING AND ROAD REALIGNMENT

The subject land IS NOT affected by any road widening or road realignment under:
(a) Division 2 of Part 3 of the Roads Act 1993, or
(b) Any environmental planning instrument, or
(c) Any resolution of the council.

COUNCIL AND OTHER PUBLIC AUTHORITY POLICIES ON HAZARD RISK RESTRICTIONS

The land IS NOT affected by a policy adopted by the council, or adopted by any other public authority and notified to the council for the express purpose of its adoption by that authority being referred to in planning certificates issued by the council: that restricts the development of the land because of the likelihood of land slip, bushfire, tidal inundation, subsidence, acid sulphate soils or any other risk (other than flooding).

FLOOD RELATED DEVELOPMENT CONTROLS INFORMATION

The Hunter River Flood Study 2014 shows the land to be affected by flooding.

LAND RESERVED FOR ACQUISITION

There are NOT any environmental planning instruments; deemed environmental planning instruments or draft environmental planning instruments applying to the land that provide for the acquisition of the land by a public authority, as referred to in section 27 of the Environmental Planning and Assessment Act 1979.

CONTRIBUTIONS PLANS

The Muswellbrook Section 94 Contributions Plan 2001 and Muswellbrook Section 94A Contributions Plan 2009 apply to all land within the Muswellbrook Shire Local Government Area.

BIODIVERSITY CERTIFIED LAND

The land IS NOT biodiversity certified land (within the meaning of Part 7AA of the Threatened Species Conservation Act 1995)

BIOBANKING AGREEMENTS

The land IS NOT affected by a biobanking agreement under Part 7A of the *Threatened Species Conservation Act 1995*.

MATTERS RELATING TO THE MANAGEMENT OF CONTAMINATED LAND

(a) The land to which this certificate relates is NOT within land declared to be significantly contaminated land under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(b) The land to which this certificate relates is NOT subject to a management order under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(c) The land to which this certificate relates is NOT the subject of approved voluntary management proposal the subject of the Environment Protection Authority's agreement under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(d) The land to which this certificate relates is NOT the subject to an ongoing maintenance order under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(e) The land to which this certificate relates has NOT been the subject of a site audit statement provided to Muswellbrook Shire Council.

BUSH FIRE PRONE LAND

The land IS NOT bushfire prone land.

PROPERTY VEGETATION PLANS

Council has NOT been notified of the existence of such a plan or if the land is land to which a property vegetation plan under the Native Vegetation Act 2003 applies.

ORDERS UNDER TREES (DISPUTES BETWEEN NEIGHBOURS) ACT 2006

Council has NOT been notified of any order made under the Trees (Disputes Between Neighbours) Act 2006 to carry out work in relation to a tree on the land.

DIRECTIONS UNDER PART 3A

There is NOT a direction by the Minister in force under section 75P (2) (c1) of the Act in relation to prohibiting or restricting the carrying out of a project or a stage of a project on the land under Part 4 of the Act.

SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR SENIORS HOUSING

There is NOT a current site compatibility certificate (of which the council is aware), issued under clause 25 of State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 in respect of proposed development on the land.

SITE COMPATIBILITY CERTIFICATES FOR INFRASTRUCTURE

There is NOT a valid site compatibility certificate (of which the council is aware), issued under clause 19 of State Environmental Planning Policy (Infrastructure) 2007 in respect of proposed development on the land.

SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR AFFORDABLE RENTAL HOUSING

There is NOT a current site compatibility certificate for affordable rental housing (of which the council is aware), issued under clause 37 of State Environmental Planning Policy (Affordable Rental Housing) 2007 in respect of proposed development on the land.

PAPER SUBDIVISION INFORMATION

There is NOT an adopted development plan or subdivision order that applies to the land.

Date: 5 October 2017

Cert No: 21297

SITE VERIFICATION CERTIFICATE

There is NOT a current site verification certificate (of which the council is aware), issued under clause 17C of State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007, in relation to the land.

LOOSE-FILL ASBESTOS INSULATION

There are NO residential premises located on this land that are listed on the register that are required to be maintained under Division 1A of Part 8 of the *Home Building Act 1989*.

The accuracy and currency of the details provided by agencies external to Council have not be verified by Muswellbrook Shire Council and should be verified by the applicant.

ADDITIONAL INFORMATION PURSUANT TO SECTION 149(5) OF THE ACT

Council is unaware of any other relevant matters that may affect the land.

For further information, please contact the Environmental Services Department.

S J McDonald
General Manager

Per: DL Watson

PLANNING CERTIFICATE UNDER SECTION 149 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

Enquiries	Environmental Services
Contact	02 6549 3700
Invoice no.	43721
Your reference	Application

Date: 30 September 2017

Assessment: 127696 **Cert No: 21253**

MACH Energy Australia Pty Ltd
GPO Box 94
BRISBANE QLD 4001

Owner (as recorded by Council)

Wesfarmers Bengalla Limited & Taipower Bengalla Pty Limited & others

Property Description: OVERTON ROAD MUSWELLBROOK 2333
LOT: 6 DP: 1170997

Land to which the certificate relates

The land to which this certificate relates, being the lot or lots described on the application form, is shown in the Council's records as being situated at the street address described above. The information contained in this certificate relates only to the lot or lots described on this certificate. Separate planning certificates can be obtained upon application for the other lots, those certificates may contain different information than is contained in this certificate.

CERTIFICATE UNDER SECTION 149(2) ENVIRONMENTAL PLANNING & ASSESSMENT ACT

LOCAL ENVIRONMENTAL PLANS

PLANNING INSTRUMENT	Muswellbrook Local Environmental Plan 2009
LAND USE ZONING	RU1 Primary Production

PERMITTED WITHOUT CONSENT

Extensive agriculture; Home occupations; Intensive plant agriculture

PERMITTED WITH CONSENT

Air transport facilities; Airstrips; Animal boarding or training establishments; Aquaculture; Camping grounds; Caravan parks; Cellar door premises; Cemeteries; Community facilities; Crematoria; Depots; Dwelling houses; Educational establishments; Environmental facilities; Environmental protection works; Extractive industries; Farm buildings; Flood mitigation works; Forestry; Function centres; Group homes; Hazardous industries; Health consulting rooms; Heavy industrial storage establishments; Helipads; Highway service centres; Home-based child care; Home businesses; Home industries; Industrial retail outlets; Information and education facilities; Intensive livestock agriculture; Intensive plant agriculture; Kiosks; Landscaping material supplies; Open cut mining; Places of public worship; Plant nurseries; Recreation areas; Recreation facilities (indoor); Recreation facilities (major); Recreation facilities (outdoor); Research stations; Restaurants or cafes; Roads; Roadside stalls; Rural industries; Rural supplies; Rural worker's dwellings; Secondary dwellings; Service stations; Sewerage systems; Signage; Storage premises; Take away food and drink premises; Tourist and visitor accommodation; Transport depots; Truck depots; Turf farming; Veterinary hospitals; Waste disposal facilities; Water supply systems.

PROHIBITED

Any development not specified above.

MINIMUM LAND DIMENSIONS FOR THE ERECTION OF A DWELLING

Under the provisions of the Muswellbrook Local Environmental Plan 2009, the minimum subdivision lot size is 80ha and is also subject to the provisions detailed below.

Land zoned RU1 Primary Production may, with the consent of Council, be subdivided for the purpose of primary production to create a lot less than the minimum lot size. However, such a lot cannot be created if an existing dwelling would, as the result of the subdivision, be situated on the lot. A dwelling cannot be erected on such a lot created.

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(a) a lot created in accordance with clause 4.1 of the LEP 2009, or

(b) a lot created before the LEP 2009 commenced and on which the erection of a dwelling house was permissible immediately before that commencement, or

(c) a lot created before the LEP 2009 commenced that is at least the minimum lot size specified for that lot by the Lot Size Map, or

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(e) an existing holding.

NOTE: EXISTING HOLDING means all adjoining land, even if separated by a road or railway, held in the same ownership:

(a) on 11 April 1974, and

(b) at the time of lodging a development application for the erection of a dwelling house under this clause.

and includes any other land adjoining that land acquired by the owner since 11 April 1974.

NOTE: The owner in whose ownership all the land is at the time the application is lodged need not be the same person as the owner in whose ownership all the land was on the stated date.

WHETHER THE LAND INCLUDES OR COMPRISES CRITICAL HABITAT

The subject land has not been declared as critical habitat.

WHETHER THE LAND IS IN A CONSERVATION AREA

The subject land is not known to be in a conservation area.

Date: 3 October 2017

Cert No: 21253

WHETHER AN ITEM OF ENVIRONMENTAL HERITAGE IS SITUATED ON THE LAND

The subject property is listed as an item of heritage under schedule 5 of the Muswellbrook Local Environmental Plan 2009.

STATE ENVIRONMENTAL PLANNING POLICIES (EXEMPT & COMPLYING DEVELOPMENT CODES 2008)

CERTIFICATE UNDER SECTION 149(2) IDENTIFYING THE INFORMATION SET OUT IN CLAUSE 3 OF SCHEDULE 4 OF THE ENVIRONMENTAL PLANNING & ASSESSMENT REGULATIONS

Part 3 General Housing Code

Not applicable to the land to which this certificate relates.

Part 3A Rural Housing Code

NO. Complying development specified in the Rural Housing Code may NOT be carried out on this land pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

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SEPP (Rural Lands) 2008 - The aim of this policy is to facilitate the orderly and economic use and development of rural lands for rural and related purposes.

SEPP (Exempt and Complying Development Codes) 2008 – This policy streamlines assessment processes for development that complies with specified development standards. The policy provides exempt codes that have State-wide application, identifying, in the General Exempt Development Code, types of development that are of minimal environmental impact that may be carried out without the need for development consent.

SEPP (Affordable Rental Housing) 2009 – The aims of this policy are to provide a consistent planning regime for the provision of affordable rental housing; facilitate the effective delivery of new affordable rental housing by providing incentives by way of expanding zoning permissibility, floor space ratio bonuses and non-discretionary development standards; facilitate the retention and mitigate the loss of existing affordable rental housing; employ a balanced approach between obligations for retaining and mitigating the loss of existing affordable rental housing, and incentives for the development of new affordable rental housing; facilitate an expanding role for not-for-profit-providers of affordable rental housing; support local business centres by providing affordable rental housing for workers close to places of work; and facilitate the development of housing for the homeless and other disadvantaged people who may require support services, including group homes and supportive accommodation.

SEPP (State and Regional Development) 2011 – The aims of this policy are to identify development that is State significant development; identify development that is State significant infrastructure and critical State significant infrastructure; and confer functions on joint regional planning panels to determine development applications.

Further details regarding these State Environmental Planning Policies and the circumstances in which they may apply to the subject and can be found on the Department of Planning's website.

REGIONAL PLANNING INSTRUMENTS

There are no Regional Environmental Plans applying within the Muswellbrook Shire Council area.

DEVELOPMENT CONTROL PLANS

This land is affected by the following Development Control Plans:
Muswellbrook Shire Development Control Plan 2009

COASTAL PROTECTION

The land IS NOT affected by the operations of Sections 38 and 39 of the *Coastal Protection Act* 1979.

MINE SUBSIDENCE

The land IS NOT WITHIN a Mine Subsidence District proclaimed under section 15 of the Mine Subsidence Compensation Act, 1961.

muswellbrook shire council

Date: 3 October 2017

Cert No: 21253

ROAD WIDENING AND ROAD REALIGNMENT

The subject land IS NOT affected by any road widening or road realignment under:
(a) Division 2 of Part 3 of the Roads Act 1993, or
(b) Any environmental planning instrument, or
(c) Any resolution of the council.

COUNCIL AND OTHER PUBLIC AUTHORITY POLICIES ON HAZARD RISK RESTRICTIONS

The land IS NOT affected by a policy adopted by the council, or adopted by any other public authority and notified to the council for the express purpose of its adoption by that authority being referred to in planning certificates issued by the council: that restricts the development of the land because of the likelihood of land slip, bushfire, tidal inundation, subsidence, acid sulphate soils or any other risk (other than flooding).

FLOOD RELATED DEVELOPMENT CONTROLS INFORMATION

The Hunter River Flood Study 2014 shows the land to be affected by flooding.

LAND RESERVED FOR ACQUISITION

There are NOT any environmental planning instruments; deemed environmental planning instruments or draft environmental planning instruments applying to the land that provide for the acquisition of the land by a public authority, as referred to in section 27 of the Environmental Planning and Assessment Act 1979.

CONTRIBUTIONS PLANS

The Muswellbrook Section 94 Contributions Plan 2001 and Muswellbrook Section 94A Contributions Plan 2009 apply to all land within the Muswellbrook Shire Local Government Area.

BIODIVERSITY CERTIFIED LAND

The land IS NOT biodiversity certified land (within the meaning of Part 7AA of the Threatened Species Conservation Act 1995)

BIOBANKING AGREEMENTS

The land IS NOT affected by a biobanking agreement under Part 7A of the *Threatened Species Conservation Act 1995*.

MATTERS RELATING TO THE MANAGEMENT OF CONTAMINATED LAND

(a) The land to which this certificate relates is NOT within land declared to be significantly contaminated land under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(b) The land to which this certificate relates is NOT subject to a management order under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(c) The land to which this certificate relates is NOT the subject of approved voluntary management proposal the subject of the Environment Protection Authority's agreement under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(d) The land to which this certificate relates is NOT the subject to an ongoing maintenance order under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(e) The land to which this certificate relates has NOT been the subject of a site audit statement provided to Muswellbrook Shire Council.

BUSH FIRE PRONE LAND

Rural Fire and Environmental Assessment Legislation Amendment Act 2002. This land is designated as bush fire prone land and any development of the land will require appropriate fire protection assessment prior to such development of the land. For further information concerning the bush fire status of the land, please contact Council on (02) 6549 3700.

PROPERTY VEGETATION PLANS

Council has NOT been notified of the existence of such a plan or if the land is land to which a property vegetation plan under the Native Vegetation Act 2003 applies.

ORDERS UNDER TREES (DISPUTES BETWEEN NEIGHBOURS) ACT 2006

Council has NOT been notified of any order made under the Trees (Disputes Between Neighbours) Act 2006 to carry out work in relation to a tree on the land.

DIRECTIONS UNDER PART 3A

There is NOT a direction by the Minister in force under section 75P (2) (c1) of the Act in relation to prohibiting or restricting the carrying out of a project or a stage of a project on the land under Part 4 of the Act.

SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR SENIORS HOUSING

There is NOT a current site compatibility certificate (of which the council is aware), issued under clause 25 of State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 in respect of proposed development on the land.

SITE COMPATIBILITY CERTIFICATES FOR INFRASTRUCTURE

There is NOT a valid site compatibility certificate (of which the council is aware), issued under clause 19 of State Environmental Planning Policy (Infrastructure) 2007 in respect of proposed development on the land.

SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR AFFORDABLE RENTAL HOUSING

There is NOT a current site compatibility certificate for affordable rental housing (of which the council is aware), issued under clause 37 of State Environmental Planning Policy (Affordable Rental Housing) 2007 in respect of proposed development on the land.

PAPER SUBDIVISION INFORMATION

There is NOT an adopted development plan or subdivision order that applies to the land.

Date: 3 October 2017

Cert No: 21253

SITE VERIFICATION CERTIFICATE

There is NOT a current site verification certificate (of which the council is aware), issued under clause 17C of State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007, in relation to the land.

LOOSE-FILL ASBESTOS INSULATION

There are NO residential premises located on this land that are listed on the register that are required to be maintained under Division 1A of Part 8 of the *Home Building Act 1989*.

The accuracy and currency of the details provided by agencies external to Council have not be verified by Muswellbrook Shire Council and should be verified by the applicant.

ADDITIONAL INFORMATION PURSUANT TO SECTION 149(5) OF THE ACT

Council is unaware of any other relevant matters that may affect the land.

For further information, please contact the
Environmental Services Department.

S J McDonald
General Manager

Per: D L Watson

PLANNING CERTIFICATE UNDER SECTION 149 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

Enquiries	Environmental Services
Contact	02 6549 3700
Invoice no.	43721
Your reference	Application

Date: 30 September 2017

Assessment: 127985 **Cert No: 21256**

MACH Energy Australia Pty Ltd
GPO Box 94
BRISBANE QLD 4001

Owner (as recorded by Council)

Wesfarmers Bengalla Limited & Taipower Bengalla Pty Limited & others

Property Description: OVERTON ROAD MUSWELLBROOK 2333
LOT: 7 DP: 1170997

Land to which the certificate relates

The land to which this certificate relates, being the lot or lots described on the application form, is shown in the Council's records as being situated at the street address described above. The information contained in this certificate relates only to the lot or lots described on this certificate. Separate planning certificates can be obtained upon application for the other lots, those certificates may contain different information than is contained in this certificate.

CERTIFICATE UNDER SECTION 149(2) ENVIRONMENTAL PLANNING & ASSESSMENT ACT

LOCAL ENVIRONMENTAL PLANS

PLANNING INSTRUMENT	Muswellbrook Local Environmental Plan 2009
LAND USE ZONING	RU1 Primary Production

PERMITTED WITHOUT CONSENT

Extensive agriculture; Home occupations; Intensive plant agriculture

PERMITTED WITH CONSENT

Air transport facilities; Airstrips; Animal boarding or training establishments; Aquaculture; Camping grounds; Caravan parks; Cellar door premises; Cemeteries; Community facilities; Crematoria; Depots; Dwelling houses; Educational establishments; Environmental facilities; Environmental protection works; Extractive industries; Farm buildings; Flood mitigation works; Forestry; Function centres; Group homes; Hazardous industries; Health consulting rooms; Heavy industrial storage establishments; Helipads; Highway service centres; Home-based child care; Home businesses; Home industries; Industrial retail outlets; Information and education facilities; Intensive livestock agriculture; Intensive plant agriculture; Kiosks; Landscaping material supplies; Open cut mining; Places of public worship; Plant nurseries; Recreation areas; Recreation facilities (indoor); Recreation facilities (major); Recreation facilities (outdoor); Research stations; Restaurants or cafes; Roads; Roadside stalls; Rural industries; Rural supplies; Rural worker's dwellings; Secondary dwellings; Service stations; Sewerage systems; Signage; Storage premises; Take away food and drink premises; Tourist and visitor accommodation; Transport depots; Truck depots; Turf farming; Veterinary hospitals; Waste disposal facilities; Water supply systems.

PROHIBITED

Any development not specified above.

MINIMUM LAND DIMENSIONS FOR THE ERECTION OF A DWELLING

Under the provisions of the Muswellbrook Local Environmental Plan 2009, the minimum subdivision lot size is 80ha and is also subject to the provisions detailed below.

Land zoned RU1 Primary Production may, with the consent of Council, be subdivided for the purpose of primary production to create a lot less than the minimum lot size. However, such a lot cannot be created if an existing dwelling would, as the result of the subdivision, be situated on the lot. A dwelling cannot be erected on such a lot created.

Development consent must not be granted to the subdivision of a lot in a strata plan or community title scheme on land zoned RU1 Primary Production that is used, or proposed to be used, for residential accommodation or tourist and visitor accommodation.

Only one dwelling house may be erected on land zoned RU1 Primary Production only if the land is:

(a) a lot created in accordance with clause 4.1 of the LEP 2009, or

(b) a lot created before the LEP 2009 commenced and on which the erection of a dwelling house was permissible immediately before that commencement, or

(c) a lot created before the LEP 2009 commenced that is at least the minimum lot size specified for that lot by the Lot Size Map, or

(d) a lot for which subdivision approval was granted before the LEP 2009 commenced and on which the erection of a dwelling house would have been permissible immediately before that commencement, or

(e) an existing holding.

NOTE: EXISTING HOLDING means all adjoining land, even if separated by a road or railway, held in the same ownership:

(a) on 11 April 1974, and

(b) at the time of lodging a development application for the erection of a dwelling house under this clause.

and includes any other land adjoining that land acquired by the owner since 11 April 1974.

NOTE: The owner in whose ownership all the land is at the time the application is lodged need not be the same person as the owner in whose ownership all the land was on the stated date.

WHETHER THE LAND INCLUDES OR COMPRISES CRITICAL HABITAT

The subject land has not been declared as critical habitat.

WHETHER THE LAND IS IN A CONSERVATION AREA

The subject land is not known to be in a conservation area.

Date: 3 October 2017

Cert No: 21256

WHETHER AN ITEM OF ENVIRONMENTAL HERITAGE IS SITUATED ON THE LAND

The subject property is listed as an item of heritage under schedule 5 of the Muswellbrook Local Environmental Plan 2009.

STATE ENVIRONMENTAL PLANNING POLICIES (EXEMPT & COMPLYING DEVELOPMENT CODES 2008)

CERTIFICATE UNDER SECTION 149(2) IDENTIFYING THE INFORMATION SET OUT IN CLAUSE 3 OF SCHEDULE 4 OF THE ENVIRONMENTAL PLANNING & ASSESSMENT REGULATIONS

Part 3 General Housing Code

Not applicable to the land to which this certificate relates.

Part 3A Rural Housing Code

NO. Complying development specified in the Rural Housing Code may NOT be carried out on this land pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

The land is excluded land; being land identified by an environmental planning instrument as being within an area of:-

HERITAGE ITEM UNDER THE MUSWELLBROOK LOCAL ENVIRONMENTAL PLAN 2009

Part 4 Housing Alterations Code

NO. Complying development specified in the Housing Alterations Code may NOT be carried out on this land pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

The land is excluded land; being land identified by an environmental planning instrument as being within an area of:-

HERITAGE ITEM UNDER THE MUSWELLBROOK LOCAL ENVIRONMENTAL PLAN 2009

Part 4A General Development Code

NO. Complying development specified in the General Development Code may NOT be carried out on this land pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

The land is excluded land; being land identified by an environmental planning instrument as being within an area of:-

HERITAGE ITEM UNDER THE MUSWELLBROOK LOCAL ENVIRONMENTAL PLAN 2009

Part 5 Commercial and Industrial Alterations Code

Not applicable to the land to which this certificate relates.

Part 5A Commercial and Industrial (New Buildings and Additions) Code

Not applicable to the land to which this certificate relates.

Part 6 Subdivision Code

NO. Complying development specified in the Subdivision Code may NOT be carried out on this land pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

The land is excluded land; being land identified by an environmental planning instrument as being within an area of:-

HERITAGE ITEM UNDER THE MUSWELLBROOK LOCAL ENVIRONMENTAL PLAN 2009

Part 7 Demolition Code

NO. Complying development specified in the Demolition Code may NOT be carried out on this land pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

The land is excluded land; being land identified by an environmental planning instrument as being within an area of:-

HERITAGE ITEM UNDER THE MUSWELLBROOK LOCAL ENVIRONMENTAL PLAN 2009

Part 8 Fire Safety Code

YES. Complying development specified in the Fire Safety Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

STATE ENVIRONMENTAL PLANNING POLICIES

The following State Environmental Planning Policies apply to land within the Muswellbrook Shire LGA:-

No. 21. Caravan Parks - Ensures that where caravan parks or camping grounds are permitted under an environmental planning instrument, movable dwellings, as defined in the Local Government Act 1993, are also permitted. The policy ensures that development consent is required for new caravan parks and camping grounds and for additional long-term sites in existing caravan parks.

No. 30. Intensive Agriculture - Requires development consent for cattle feedlots having a capacity of 50 or more cattle or piggeries having a capacity of 200 or more pigs. The policy sets out information and public notification requirements to ensure there are effective planning control over this export-driven rural industry. The policy does not alter if, and where, such development is permitted, or the functions of the consent authority.

No. 33. Hazardous and Offensive Development - Provides new definitions for 'hazardous industry', 'hazardous storage establishment', 'offensive industry' and 'offensive storage establishment'. The definitions apply to all planning instruments, existing and future. The new definitions enable decisions to approve or refuse a development to be based on the merit of proposal. The consent authority must careful consider the specifics the case, the location and the way in which the proposed activity is to be carried out. The policy also requires specified matters to be considered for proposals that are 'potentially hazardous' or 'potentially offensive' as defined in the policy. For example, any application to carry out a potentially hazardous or potentially offensive development is to be advertised for public comment, and applications to carry out potentially hazardous development must be supported by a preliminary hazard analysis (PHA).

No. 36. Manufactured Home Estates - Helps establish well-designed and properly serviced manufactured home estates (MHEs) in suitable locations. Affordability and security of tenure for residents are important aspects. To enable the immediate development of estates, the policy allows MHEs to be located on certain land where caravan parks are permitted. There are however, criteria that a proposal must satisfy before the local council can approved development.

No. 44. Koala Habitat Protection - Encourages the proper conservation and management of areas of natural vegetation that provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline.

No. 55. Remediation of Land - Introduces state-wide planning controls for the remediation of contaminated land. The policy states that land must not be developed if it is unsuitable for a proposed use because it is contaminated. If the land is unsuitable, remediation must take place before the land is developed. The policy makes remediation permissible across the State, defines when consent is required, requires all remediation to comply with standards, ensures land is investigated if contamination is suspected, and requires councils to be notified of all remediation proposals.

No. 62. Sustainable Aquaculture - The policy implements the regional strategies already developed by creating a simple approach to identity and categorise aquaculture development on the basis of its potential environmental impact. The SEPP also identifies aquaculture development as a designated development only where there are potential environmental risks.

No. 64. Advertising and Signage - Aims to improve the amenity of urban and natural settings by managing the impact of outdoor advertising. The policy responds to growing concerns from the community, the advertising industry and local government that existing controls and guidelines were not effective. SEPP No. 64 offers the comprehensive provisions and consistent approach needed. SEPP 64 – Advertising and Signage: Explanatory Information should be read in conjunction with the policy.

No. 65. Design Quality of Residential Flat Development - Raises the design quality of residential flat development across the state through the application of a series of design principles. The policy provides for the establishment of Design Review Panels to provide independent expert advice to councils on the merit of residential flat development. The accompanying regulation requires the involvement of a qualified designer throughout the design, approval and construction stages.

SEPP (Housing for Seniors or People with a Disability) 2004 - Encourage the development of high quality accommodation for our ageing population and for people who have disabilities - housing that is in keeping with the local neighbourhood

SEPP (Building Sustainability Index: BASIX) 2004 - This SEPP operates in conjunction with Environmental Planning and Assessment Amendment (Building Sustainability Index: BASIX) Regulation 2004 to ensure the effective introduction of BASIX in NSW. The SEPP ensures consistency in the implementation of BASIX throughout the State by overriding competing provisions in other environmental planning instruments and development control plans, and specifying that SEPP 1 does not apply in relation to any development standard arising under BASIX.

SEPP (Infrastructure) 2007 - Provides a consistent planning regime for infrastructure and the provision of services across NSW, along with providing for consultation with relevant public authorities during the assessment process. The SEPP supports greater flexibility in the location of infrastructure and service facilities along with improved regulatory certainty and efficiency.

SEPP (Mining, Petroleum Production and Extractive Industries) 2007 - This Policy aims to provide for the proper management and development of mineral, petroleum and extractive material resources for the social and economic welfare of the State. The Policy establishes appropriate planning controls to encourage ecologically sustainable development.

SEPP (Miscellaneous Consent Provisions) 2007 - Provides for the erection of temporary structures and the use of places of public entertainment while protecting public safety and local amenity. The SEPP supports the transfer of the regulation of places of public entertainment and temporary structures (such as tents, marquees and booths) from the Local Government Act 1993 to the Environmental Planning and Assessment Act 1979.

SEPP (Rural Lands) 2008 - The aim of this policy is to facilitate the orderly and economic use and development of rural lands for rural and related purposes.

SEPP (Exempt and Complying Development Codes) 2008 – This policy streamlines assessment processes for development that complies with specified development standards. The policy provides exempt codes that have State-wide application, identifying, in the General Exempt Development Code, types of development that are of minimal environmental impact that may be carried out without the need for development consent.

SEPP (Affordable Rental Housing) 2009 – The aims of this policy are to provide a consistent planning regime for the provision of affordable rental housing; facilitate the effective delivery of new affordable rental housing by providing incentives by way of expanding zoning permissibility, floor space ratio bonuses and non-discretionary development standards; facilitate the retention and mitigate the loss of existing affordable rental housing; employ a balanced approach between obligations for retaining and mitigating the loss of existing affordable rental housing, and incentives for the development of new affordable rental housing; facilitate an expanding role for not-for-profit-providers of affordable rental housing; support local business centres by providing affordable rental housing for workers close to places of work; and facilitate the development of housing for the homeless and other disadvantaged people who may require support services, including group homes and supportive accommodation.

SEPP (State and Regional Development) 2011 – The aims of this policy are to identify development that is State significant development; identify development that is State significant infrastructure and critical State significant infrastructure; and confer functions on joint regional planning panels to determine development applications.

Further details regarding these State Environmental Planning Policies and the circumstances in which they may apply to the subject and can be found on the Department of Planning's website.

REGIONAL PLANNING INSTRUMENTS

There are no Regional Environmental Plans applying within the Muswellbrook Shire Council area.

DEVELOPMENT CONTROL PLANS

This land is affected by the following Development Control Plans:
Muswellbrook Shire Development Control Plan 2009

COASTAL PROTECTION

The land IS NOT affected by the operations of Sections 38 and 39 of the *Coastal Protection Act* 1979.

MINE SUBSIDENCE

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

The Board can assist with information about mine subsidence and advise whether existing structures comply with the requirements of the Act.

The Department of Mineral Resources has identified the lands may be subject to coal mining (either open cut mining or underground mining). Further enquiries should be directed to the Department of Mineral Resources.

ROAD WIDENING AND ROAD REALIGNMENT

The subject land IS NOT affected by any road widening or road realignment under:
(a) Division 2 of Part 3 of the Roads Act 1993, or
(b) Any environmental planning instrument, or
(c) Any resolution of the council.

COUNCIL AND OTHER PUBLIC AUTHORITY POLICIES ON HAZARD RISK RESTRICTIONS

The land IS NOT affected by a policy adopted by the council, or adopted by any other public authority and notified to the council for the express purpose of its adoption by that authority being referred to in planning certificates issued by the council: that restricts the development of the land because of the likelihood of land slip, bushfire, tidal inundation, subsidence, acid sulphate soils or any other risk (other than flooding).

FLOOD RELATED DEVELOPMENT CONTROLS INFORMATION

The Hunter River Flood Study 2014 shows the land to be affected by flooding.

LAND RESERVED FOR ACQUISITION

There are NOT any environmental planning instruments; deemed environmental planning instruments or draft environmental planning instruments applying to the land that provide for the acquisition of the land by a public authority, as referred to in section 27 of the Environmental Planning and Assessment Act 1979.

CONTRIBUTIONS PLANS

The Muswellbrook Section 94 Contributions Plan 2001 and Muswellbrook Section 94A Contributions Plan 2009 apply to all land within the Muswellbrook Shire Local Government Area.

BIODIVERSITY CERTIFIED LAND

The land IS NOT biodiversity certified land (within the meaning of Part 7AA of the Threatened Species Conservation Act 1995)

BIOBANKING AGREEMENTS

The land IS NOT affected by a biobanking agreement under Part 7A of the *Threatened Species Conservation Act 1995*.

MATTERS RELATING TO THE MANAGEMENT OF CONTAMINATED LAND

(a) The land to which this certificate relates is NOT within land declared to be significantly contaminated land under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(b) The land to which this certificate relates is NOT subject to a management order under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(c) The land to which this certificate relates is NOT the subject of approved voluntary management proposal the subject of the Environment Protection Authority's agreement under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(d) The land to which this certificate relates is NOT the subject to an ongoing maintenance order under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(e) The land to which this certificate relates has NOT been the subject of a site audit statement provided to Muswellbrook Shire Council.

BUSH FIRE PRONE LAND

Rural Fire and Environmental Assessment Legislation Amendment Act 2002. This land is designated as bush fire prone land and any development of the land will require appropriate fire protection assessment prior to such development of the land. For further information concerning the bush fire status of the land, please contact Council on (02) 6549 3700.

PROPERTY VEGETATION PLANS

Council has NOT been notified of the existence of such a plan or if the land is land to which a property vegetation plan under the Native Vegetation Act 2003 applies.

ORDERS UNDER TREES (DISPUTES BETWEEN NEIGHBOURS) ACT 2006

Council has NOT been notified of any order made under the Trees (Disputes Between Neighbours) Act 2006 to carry out work in relation to a tree on the land.

DIRECTIONS UNDER PART 3A

There is NOT a direction by the Minister in force under section 75P (2) (c1) of the Act in relation to prohibiting or restricting the carrying out of a project or a stage of a project on the land under Part 4 of the Act.

SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR SENIORS HOUSING

There is NOT a current site compatibility certificate (of which the council is aware), issued under clause 25 of State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 in respect of proposed development on the land.

SITE COMPATIBILITY CERTIFICATES FOR INFRASTRUCTURE

There is NOT a valid site compatibility certificate (of which the council is aware), issued under clause 19 of State Environmental Planning Policy (Infrastructure) 2007 in respect of proposed development on the land.

SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR AFFORDABLE RENTAL HOUSING

There is NOT a current site compatibility certificate for affordable rental housing (of which the council is aware), issued under clause 37 of State Environmental Planning Policy (Affordable Rental Housing) 2007 in respect of proposed development on the land.

Date: 3 October 2017

Cert No: 21256

PAPER SUBDIVISION INFORMATION

There is NOT an adopted development plan or subdivision order that applies to the land.

SITE VERIFICATION CERTIFICATE

There is NOT a current site verification certificate (of which the council is aware), issued under clause 17C of State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007, in relation to the land.

LOOSE-FILL ASBESTOS INSULATION

There are NO residential premises located on this land that are listed on the register that are required to be maintained under Division 1A of Part 8 of the *Home Building Act 1989*.

The accuracy and currency of the details provided by agencies external to Council have not be verified by Muswellbrook Shire Council and should be verified by the applicant.

ADDITIONAL INFORMATION PURSUANT TO SECTION 149(5) OF THE ACT

Council is unaware of any other relevant matters that may affect the land.

For further information, please contact the Environmental Services Department.

S J McDonald
General Manager

Per: DL Watson

PLANNING CERTIFICATE UNDER SECTION 149 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

Enquiries	Environmental Services
Contact	02 6549 3700
Invoice no.	43721
Your reference	Application

Date: 30 September 2017

Assessment: 127977 **Cert No: 21258**

MACH Energy Australia Pty Ltd
GPO Box 94
BRISBANE QLD 4001

Owner (as recorded by Council)

Wesfarmers Bengalla Limited & Taipower Bengalla Pty Limited & others

Property Description: OVERTON ROAD MUSWELLBROOK 2333
LOT: 8 DP: 1170997

Land to which the certificate relates

The land to which this certificate relates, being the lot or lots described on the application form, is shown in the Council's records as being situated at the street address described above. The information contained in this certificate relates only to the lot or lots described on this certificate. Separate planning certificates can be obtained upon application for the other lots, those certificates may contain different information than is contained in this certificate.

CERTIFICATE UNDER SECTION 149(2) ENVIRONMENTAL PLANNING & ASSESSMENT ACT

LOCAL ENVIRONMENTAL PLANS

PLANNING INSTRUMENT	Muswellbrook Local Environmental Plan 2009
LAND USE ZONING	RU1 Primary Production

PERMITTED WITHOUT CONSENT

Extensive agriculture; Home occupations; Intensive plant agriculture

PERMITTED WITH CONSENT

Air transport facilities; Airstrips; Animal boarding or training establishments; Aquaculture; Camping grounds; Caravan parks; Cellar door premises; Cemeteries; Community facilities; Crematoria; Depots; Dwelling houses; Educational establishments; Environmental facilities; Environmental protection works; Extractive industries; Farm buildings; Flood mitigation works; Forestry; Function centres; Group homes; Hazardous industries; Health consulting rooms; Heavy industrial storage establishments; Helipads; Highway service centres; Home-based child care; Home businesses; Home industries; Industrial retail outlets; Information and education facilities; Intensive livestock agriculture; Intensive plant agriculture; Kiosks; Landscaping material supplies; Open cut mining; Places of public worship; Plant nurseries; Recreation areas; Recreation facilities (indoor); Recreation facilities (major); Recreation facilities (outdoor); Research stations; Restaurants or cafes; Roads; Roadside stalls; Rural industries; Rural supplies; Rural worker's dwellings; Secondary dwellings; Service stations; Sewerage systems; Signage; Storage premises; Take away food and drink premises; Tourist and visitor accommodation; Transport depots; Truck depots; Turf farming; Veterinary hospitals; Waste disposal facilities; Water supply systems.

PROHIBITED

Any development not specified above.

MINIMUM LAND DIMENSIONS FOR THE ERECTION OF A DWELLING

Under the provisions of the Muswellbrook Local Environmental Plan 2009, the minimum subdivision lot size is 80ha and is also subject to the provisions detailed below.

Land zoned RU1 Primary Production may, with the consent of Council, be subdivided for the purpose of primary production to create a lot less than the minimum lot size. However, such a lot cannot be created if an existing dwelling would, as the result of the subdivision, be situated on the lot. A dwelling cannot be erected on such a lot created.

Development consent must not be granted to the subdivision of a lot in a strata plan or community title scheme on land zoned RU1 Primary Production that is used, or proposed to be used, for residential accommodation or tourist and visitor accommodation.

Only one dwelling house may be erected on land zoned RU1 Primary Production only if the land is:

(a) a lot created in accordance with clause 4.1 of the LEP 2009, or

(b) a lot created before the LEP 2009 commenced and on which the erection of a dwelling house was permissible immediately before that commencement, or

(c) a lot created before the LEP 2009 commenced that is at least the minimum lot size specified for that lot by the Lot Size Map, or

(d) a lot for which subdivision approval was granted before the LEP 2009 commenced and on which the erection of a dwelling house would have been permissible immediately before that commencement, or

(e) an existing holding.

NOTE: EXISTING HOLDING means all adjoining land, even if separated by a road or railway, held in the same ownership:

(a) on 11 April 1974, and

(b) at the time of lodging a development application for the erection of a dwelling house under this clause.

and includes any other land adjoining that land acquired by the owner since 11 April 1974.

NOTE: The owner in whose ownership all the land is at the time the application is lodged need not be the same person as the owner in whose ownership all the land was on the stated date.

WHETHER THE LAND INCLUDES OR COMPRISES CRITICAL HABITAT

The subject land has not been declared as critical habitat.

WHETHER THE LAND IS IN A CONSERVATION AREA

The subject land is not known to be in a conservation area.

Date: 3 October 2017

Cert No: 21258

WHETHER AN ITEM OF ENVIRONMENTAL HERITAGE IS SITUATED ON THE LAND

The land is NOT affected by any known or listed heritage item.

STATE ENVIRONMENTAL PLANNING POLICIES (EXEMPT & COMPLYING DEVELOPMENT CODES 2008)

CERTIFICATE UNDER SECTION 149(2) IDENTIFYING THE INFORMATION SET OUT IN CLAUSE 3 OF SCHEDULE 4 OF THE ENVIRONMENTAL PLANNING & ASSESSMENT REGULATIONS

Part 3 General Housing Code

Not applicable to the land to which this certificate relates.

Part 3A Rural Housing Code

YES. Complying development specified in the Rural Housing Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 4 Housing Alterations Code

YES. Complying development specified in the Housing Alterations Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 4A General Development Code

YES. Complying development specified in the General Development Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 5 Commercial and Industrial Alterations Code

Not applicable to the land to which this certificate relates.

Part 5A Commercial and Industrial (New Buildings and Additions) Code

Not applicable to the land to which this certificate relates.

Part 6 Subdivision Code

YES. Complying development specified in the Subdivision Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 7 Demolition Code

YES. Complying development specified in the Demolition Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 8 Fire Safety Code

YES. Complying development specified in the Fire Safety Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

STATE ENVIRONMENTAL PLANNING POLICIES

The following State Environmental Planning Policies apply to land within the Muswellbrook Shire LGA:-

No. 21. Caravan Parks - Ensures that where caravan parks or camping grounds are permitted under an environmental planning instrument, movable dwellings, as defined in the Local Government Act 1993, are also permitted. The policy ensures that development consent is required for new caravan parks and camping grounds and for additional long-term sites in existing caravan parks.

No. 30. Intensive Agriculture - Requires development consent for cattle feedlots having a capacity of 50 or more cattle or piggeries having a capacity of 200 or more pigs. The policy sets out information and public notification requirements to ensure there are effective planning control over this export-driven rural industry. The policy does not alter if, and where, such development is permitted, or the functions of the consent authority.

No. 33. Hazardous and Offensive Development - Provides new definitions for 'hazardous industry', 'hazardous storage establishment', 'offensive industry' and 'offensive storage establishment'. The definitions apply to all planning instruments, existing and future. The new definitions enable decisions to approve or refuse a development to be based on the merit of proposal. The consent authority must careful consider the specifics the case, the location and the way in which the proposed activity is to be carried out. The policy also requires specified matters to be considered for proposals that are 'potentially hazardous' or 'potentially offensive' as defined in the policy. For example, any application to carry out a potentially hazardous or potentially offensive development is to be advertised for public comment, and applications to carry out potentially hazardous development must be supported by a preliminary hazard analysis (PHA).

No. 36. Manufactured Home Estates - Helps establish well-designed and properly serviced manufactured home estates (MHEs) in suitable locations. Affordability and security of tenure for residents are important aspects. To enable the immediate development of estates, the policy allows MHEs to be located on certain land where caravan parks are permitted. There are however, criteria that a proposal must satisfy before the local council can approved development.

No. 44. Koala Habitat Protection - Encourages the proper conservation and management of areas of natural vegetation that provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline.

No. 55. Remediation of Land - Introduces state-wide planning controls for the remediation of contaminated land. The policy states that land must not be developed if it is unsuitable for a proposed use because it is contaminated. If the land is unsuitable, remediation must take place before the land is developed. The policy makes remediation permissible across the State, defines when consent is required, requires all remediation to comply with standards, ensures land is investigated if contamination is suspected, and requires councils to be notified of all remediation proposals.

No. 62. Sustainable Aquaculture - The policy implements the regional strategies already developed by creating a simple approach to identity and categorise aquaculture development on the basis of its potential environmental impact. The SEPP also identifies aquaculture development as a designated development only where there are potential environmental risks.

No. 64. Advertising and Signage - Aims to improve the amenity of urban and natural settings by managing the impact of outdoor advertising. The policy responds to growing concerns from the community, the advertising industry and local government that existing controls and guidelines were not effective. SEPP No. 64 offers the comprehensive provisions and consistent approach needed. SEPP 64 – Advertising and Signage: Explanatory Information should be read in conjunction with the policy.

No. 65. Design Quality of Residential Flat Development - Raises the design quality of residential flat development across the state through the application of a series of design principles. The policy provides for the establishment of Design Review Panels to provide independent expert advice to councils on the merit of residential flat development. The accompanying regulation requires the involvement of a qualified designer throughout the design, approval and construction stages.

SEPP (Housing for Seniors or People with a Disability) 2004 - Encourage the development of high quality accommodation for our ageing population and for people who have disabilities - housing that is in keeping with the local neighbourhood

SEPP (Building Sustainability Index: BASIX) 2004 - This SEPP operates in conjunction with Environmental Planning and Assessment Amendment (Building Sustainability Index: BASIX) Regulation 2004 to ensure the effective introduction of BASIX in NSW. The SEPP ensures consistency in the implementation of BASIX throughout the State by overriding competing provisions in other environmental planning instruments and development control plans, and specifying that SEPP 1 does not apply in relation to any development standard arising under BASIX.

SEPP (Infrastructure) 2007 - Provides a consistent planning regime for infrastructure and the provision of services across NSW, along with providing for consultation with relevant public authorities during the assessment process. The SEPP supports greater flexibility in the location of infrastructure and service facilities along with improved regulatory certainty and efficiency.

SEPP (Mining, Petroleum Production and Extractive Industries) 2007 - This Policy aims to provide for the proper management and development of mineral, petroleum and extractive material resources for the social and economic welfare of the State. The Policy establishes appropriate planning controls to encourage ecologically sustainable development.

SEPP (Miscellaneous Consent Provisions) 2007 - Provides for the erection of temporary structures and the use of places of public entertainment while protecting public safety and local amenity. The SEPP supports the transfer of the regulation of places of public entertainment and temporary structures (such as tents, marquees and booths) from the Local Government Act 1993 to the Environmental Planning and Assessment Act 1979.

SEPP (Rural Lands) 2008 - The aim of this policy is to facilitate the orderly and economic use and development of rural lands for rural and related purposes.

SEPP (Exempt and Complying Development Codes) 2008 – This policy streamlines assessment processes for development that complies with specified development standards. The policy provides exempt codes that have State-wide application, identifying, in the General Exempt Development Code, types of development that are of minimal environmental impact that may be carried out without the need for development consent.

SEPP (Affordable Rental Housing) 2009 – The aims of this policy are to provide a consistent planning regime for the provision of affordable rental housing; facilitate the effective delivery of new affordable rental housing by providing incentives by way of expanding zoning permissibility, floor space ratio bonuses and non-discretionary development standards; facilitate the retention and mitigate the loss of existing affordable rental housing; employ a balanced approach between obligations for retaining and mitigating the loss of existing affordable rental housing, and incentives for the development of new

affordable rental housing; facilitate an expanding role for not-for-profit-providers of affordable rental housing; support local business centres by providing affordable rental housing for workers close to places of work; and facilitate the development of housing for the homeless and other disadvantaged people who may require support services, including group homes and supportive accommodation.

SEPP (State and Regional Development) 2011 – The aims of this policy are to identify development that is State significant development; identify development that is State significant infrastructure and critical State significant infrastructure; and confer functions on joint regional planning panels to determine development applications.

Further details regarding these State Environmental Planning Policies and the circumstances in which they may apply to the subject and can be found on the Department of Planning's website.

REGIONAL PLANNING INSTRUMENTS

There are no Regional Environmental Plans applying within the Muswellbrook Shire Council area.

DEVELOPMENT CONTROL PLANS

This land is affected by the following Development Control Plans:
Muswellbrook Shire Development Control Plan 2009

COASTAL PROTECTION

The land IS NOT affected by the operations of Sections 38 and 39 of the *Coastal Protection Act* 1979.

MINE SUBSIDENCE

The land IS NOT WITHIN a Mine Subsidence District proclaimed under section 15 of the Mine Subsidence Compensation Act, 1961.

ROAD WIDENING AND ROAD REALIGNMENT

The subject land IS NOT affected by any road widening or road realignment under:
(a) Division 2 of Part 3 of the Roads Act 1993, or
(b) Any environmental planning instrument, or
(c) Any resolution of the council.

COUNCIL AND OTHER PUBLIC AUTHORITY POLICIES ON HAZARD RISK RESTRICTIONS

The land IS NOT affected by a policy adopted by the council, or adopted by any other public authority and notified to the council for the express purpose of its adoption by that authority being referred to in planning certificates issued by the council: that restricts the development of the land because of the likelihood of land slip, bushfire, tidal inundation, subsidence, acid sulphate soils or any other risk (other than flooding).

FLOOD RELATED DEVELOPMENT CONTROLS INFORMATION

The Hunter River Flood Study 2014 shows the land to be affected by flooding.

LAND RESERVED FOR ACQUISITION

There are NOT any environmental planning instruments; deemed environmental planning instruments or draft environmental planning instruments applying to the land that provide for the acquisition of the

land by a public authority, as referred to in section 27 of the Environmental Planning and Assessment Act 1979.

CONTRIBUTIONS PLANS

The Muswellbrook Section 94 Contributions Plan 2001 and Muswellbrook Section 94A Contributions Plan 2009 apply to all land within the Muswellbrook Shire Local Government Area.

BIODIVERSITY CERTIFIED LAND

The land IS NOT biodiversity certified land (within the meaning of Part 7AA of the Threatened Species Conservation Act 1995)

BIOBANKING AGREEMENTS

The land IS NOT affected by a biobanking agreement under Part 7A of the *Threatened Species Conservation Act 1995*.

MATTERS RELATING TO THE MANAGEMENT OF CONTAMINATED LAND

(a) The land to which this certificate relates is NOT within land declared to be significantly contaminated land under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(b) The land to which this certificate relates is NOT subject to a management order under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(c) The land to which this certificate relates is NOT the subject of approved voluntary management proposal the subject of the Environment Protection Authority's agreement under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(d) The land to which this certificate relates is NOT the subject to an ongoing maintenance order under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(e) The land to which this certificate relates has NOT been the subject of a site audit statement provided to Muswellbrook Shire Council.

BUSH FIRE PRONE LAND

The land IS NOT bushfire prone land.

PROPERTY VEGETATION PLANS

Council has NOT been notified of the existence of such a plan or if the land is land to which a property vegetation plan under the Native Vegetation Act 2003 applies.

ORDERS UNDER TREES (DISPUTES BETWEEN NEIGHBOURS) ACT 2006

Council has NOT been notified of any order made under the Trees (Disputes Between Neighbours) Act 2006 to carry out work in relation to a tree on the land.

Date: 3 October 2017

Cert No: 21258

DIRECTIONS UNDER PART 3A

There is NOT a direction by the Minister in force under section 75P (2) (c1) of the Act in relation to prohibiting or restricting the carrying out of a project or a stage of a project on the land under Part 4 of the Act.

SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR SENIORS HOUSING

There is NOT a current site compatibility certificate (of which the council is aware), issued under clause 25 of State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 in respect of proposed development on the land.

SITE COMPATIBILITY CERTIFICATES FOR INFRASTRUCTURE

There is NOT a valid site compatibility certificate (of which the council is aware), issued under clause 19 of State Environmental Planning Policy (Infrastructure) 2007 in respect of proposed development on the land.

SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR AFFORDABLE RENTAL HOUSING

There is NOT a current site compatibility certificate for affordable rental housing (of which the council is aware), issued under clause 37 of State Environmental Planning Policy (Affordable Rental Housing) 2007 in respect of proposed development on the land.

PAPER SUBDIVISION INFORMATION

There is NOT an adopted development plan or subdivision order that applies to the land.

SITE VERIFICATION CERTIFICATE

There is NOT a current site verification certificate (of which the council is aware), issued under clause 17C of State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007, in relation to the land.

LOOSE-FILL ASBESTOS INSULATION

There are NO residential premises located on this land that are listed on the register that are required to be maintained under Division 1A of Part 8 of the *Home Building Act 1989*.

The accuracy and currency of the details provided by agencies external to Council have not be verified by Muswellbrook Shire Council and should be verified by the applicant.

ADDITIONAL INFORMATION PURSUANT TO SECTION 149(5) OF THE ACT

Council is unaware of any other relevant matters that may affect the land.

For further information, please contact the Environmental Services Department.

S J McDonald
General Manager

Per: D L Watson

PLANNING CERTIFICATE UNDER SECTION 149 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

Enquiries	Environmental Services
Contact	02 6549 3700
Invoice no.	43721
Your reference	Application

Date: 29 September 2017

Assessment: 63719 **Cert No: 21235**

MACH Energy Australia Pty Ltd
GPO Box 94
BRISBANE QLD 4001

Owner (as recorded by Council)

MACH Energy Australia Pty Ltd

Property Description: WYBONG ROAD MUSWELLBROOK 2333
LOT: 2 DP: 780673

Land to which the certificate relates

The land to which this certificate relates, being the lot or lots described on the application form, is shown in the Council's records as being situated at the street address described above. The information contained in this certificate relates only to the lot or lots described on this certificate. Separate planning certificates can be obtained upon application for the other lots, those certificates may contain different information than is contained in this certificate.

CERTIFICATE UNDER SECTION 149(2) ENVIRONMENTAL PLANNING & ASSESSMENT ACT

LOCAL ENVIRONMENTAL PLANS

PLANNING INSTRUMENT	Muswellbrook Local Environmental Plan 2009
LAND USE ZONING	RU1 Primary Production

PERMITTED WITHOUT CONSENT

Extensive agriculture; Home occupations; Intensive plant agriculture

PERMITTED WITH CONSENT

Air transport facilities; Airstrips; Animal boarding or training establishments; Aquaculture; Camping grounds; Caravan parks; Cellar door premises; Cemeteries; Community facilities; Crematoria; Depots; Dwelling houses; Educational establishments; Environmental facilities; Environmental protection works; Extractive industries; Farm buildings; Flood mitigation works; Forestry; Function centres; Group homes; Hazardous industries; Health consulting rooms; Heavy industrial storage establishments; Helipads; Highway service centres; Home-based child care; Home businesses; Home industries; Industrial retail outlets; Information and education facilities; Intensive livestock agriculture; Intensive plant agriculture; Kiosks; Landscaping material supplies; Open cut mining; Places of public worship; Plant nurseries; Recreation areas; Recreation facilities (indoor); Recreation facilities (major); Recreation facilities (outdoor); Research stations; Restaurants or cafes; Roads; Roadside stalls; Rural industries; Rural supplies; Rural worker's dwellings; Secondary dwellings; Service stations; Sewerage systems; Signage; Storage premises; Take away food and drink premises; Tourist and visitor accommodation; Transport depots; Truck depots; Turf farming; Veterinary hospitals; Waste disposal facilities; Water supply systems.

PROHIBITED

Any development not specified above.

MINIMUM LAND DIMENSIONS FOR THE ERECTION OF A DWELLING

Under the provisions of the Muswellbrook Local Environmental Plan 2009, the minimum subdivision lot size is 80ha and is also subject to the provisions detailed below.

Land zoned RU1 Primary Production may, with the consent of Council, be subdivided for the purpose of primary production to create a lot less than the minimum lot size. However, such a lot cannot be created if an existing dwelling would, as the result of the subdivision, be situated on the lot. A dwelling cannot be erected on such a lot created.

Development consent must not be granted to the subdivision of a lot in a strata plan or community title scheme on land zoned RU1 Primary Production that is used, or proposed to be used, for residential accommodation or tourist and visitor accommodation.

Only one dwelling house may be erected on land zoned RU1 Primary Production only if the land is:

(a) a lot created in accordance with clause 4.1 of the LEP 2009, or

(b) a lot created before the LEP 2009 commenced and on which the erection of a dwelling house was permissible immediately before that commencement, or

(c) a lot created before the LEP 2009 commenced that is at least the minimum lot size specified for that lot by the Lot Size Map, or

(d) a lot for which subdivision approval was granted before the LEP 2009 commenced and on which the erection of a dwelling house would have been permissible immediately before that commencement, or

(e) an existing holding.

NOTE: EXISTING HOLDING means all adjoining land, even if separated by a road or railway, held in the same ownership:

(a) on 11 April 1974, and

(b) at the time of lodging a development application for the erection of a dwelling house under this clause.

and includes any other land adjoining that land acquired by the owner since 11 April 1974.

NOTE: The owner in whose ownership all the land is at the time the application is lodged need not be the same person as the owner in whose ownership all the land was on the stated date.

WHETHER THE LAND INCLUDES OR COMPRISES CRITICAL HABITAT

The subject land has not been declared as critical habitat.

WHETHER THE LAND IS IN A CONSERVATION AREA

The subject land is not known to be in a conservation area.

muswellbrook shire council

Date: 29 September 2017

Cert No: 21235

WHETHER AN ITEM OF ENVIRONMENTAL HERITAGE IS SITUATED ON THE LAND

The land is NOT affected by any known or listed heritage item.

STATE ENVIRONMENTAL PLANNING POLICIES (EXEMPT & COMPLYING DEVELOPMENT CODES 2008)

CERTIFICATE UNDER SECTION 149(2) IDENTIFYING THE INFORMATION SET OUT IN CLAUSE 3 OF SCHEDULE 4 OF THE ENVIRONMENTAL PLANNING & ASSESSMENT REGULATIONS

Part 3 General Housing Code

Not applicable to the land to which this certificate relates.

Part 3A Rural Housing Code

YES. Complying development specified in the Rural Housing Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

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YES. Complying development specified in the Housing Alterations Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

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Part 5 Commercial and Industrial Alterations Code

Not applicable to the land to which this certificate relates.

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Not applicable to the land to which this certificate relates.

Part 6 Subdivision Code

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The following State Environmental Planning Policies apply to land within the Muswellbrook Shire LGA:-

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affordable rental housing; facilitate an expanding role for not-for-profit-providers of affordable rental housing; support local business centres by providing affordable rental housing for workers close to places of work; and facilitate the development of housing for the homeless and other disadvantaged people who may require support services, including group homes and supportive accommodation.

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Further details regarding these State Environmental Planning Policies and the circumstances in which they may apply to the subject and can be found on the Department of Planning's website.

REGIONAL PLANNING INSTRUMENTS

There are no Regional Environmental Plans applying within the Muswellbrook Shire Council area.

DEVELOPMENT CONTROL PLANS

This land is affected by the following Development Control Plans:
Muswellbrook Shire Development Control Plan 2009

COASTAL PROTECTION

The land IS NOT affected by the operations of Sections 38 and 39 of the *Coastal Protection Act* 1979.

MINE SUBSIDENCE

The land IS NOT WITHIN a Mine Subsidence District proclaimed under section 15 of the Mine Subsidence Compensation Act, 1961.

ROAD WIDENING AND ROAD REALIGNMENT

The subject land IS NOT affected by any road widening or road realignment under:
(a) Division 2 of Part 3 of the Roads Act 1993, or
(b) Any environmental planning instrument, or
(c) Any resolution of the council.

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The land IS NOT affected by a policy adopted by the council, or adopted by any other public authority and notified to the council for the express purpose of its adoption by that authority being referred to in planning certificates issued by the council: that restricts the development of the land because of the likelihood of land slip, bushfire, tidal inundation, subsidence, acid sulphate soils or any other risk (other than flooding).

FLOOD RELATED DEVELOPMENT CONTROLS INFORMATION

The Hunter River Flood Study 2014 shows the land to be affected by flooding.

LAND RESERVED FOR ACQUISITION

There are NOT any environmental planning instruments; deemed environmental planning instruments or draft environmental planning instruments applying to the land that provide for the acquisition of the

land by a public authority, as referred to in section 27 of the Environmental Planning and Assessment Act 1979.

CONTRIBUTIONS PLANS

The Muswellbrook Section 94 Contributions Plan 2001 and Muswellbrook Section 94A Contributions Plan 2009 apply to all land within the Muswellbrook Shire Local Government Area.

BIODIVERSITY CERTIFIED LAND

The land IS NOT biodiversity certified land (within the meaning of Part 7AA of the Threatened Species Conservation Act 1995)

BIOBANKING AGREEMENTS

The land IS NOT affected by a biobanking agreement under Part 7A of the *Threatened Species Conservation Act 1995*.

MATTERS RELATING TO THE MANAGEMENT OF CONTAMINATED LAND

(a) The land to which this certificate relates is NOT within land declared to be significantly contaminated land under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(b) The land to which this certificate relates is NOT subject to a management order under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(c) The land to which this certificate relates is NOT the subject of approved voluntary management proposal the subject of the Environment Protection Authority's agreement under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(d) The land to which this certificate relates is NOT the subject to an ongoing maintenance order under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(e) The land to which this certificate relates has NOT been the subject of a site audit statement provided to Muswellbrook Shire Council.

BUSH FIRE PRONE LAND

The land IS NOT bushfire prone land.

PROPERTY VEGETATION PLANS

Council has NOT been notified of the existence of such a plan or if the land is land to which a property vegetation plan under the Native Vegetation Act 2003 applies.

ORDERS UNDER TREES (DISPUTES BETWEEN NEIGHBOURS) ACT 2006

Council has NOT been notified of any order made under the Trees (Disputes Between Neighbours) Act 2006 to carry out work in relation to a tree on the land.

Date: 29 September 2017

Cert No: 21235

DIRECTIONS UNDER PART 3A

There is NOT a direction by the Minister in force under section 75P (2) (c1) of the Act in relation to prohibiting or restricting the carrying out of a project or a stage of a project on the land under Part 4 of the Act.

SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR SENIORS HOUSING

There is NOT a current site compatibility certificate (of which the council is aware), issued under clause 25 of State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 in respect of proposed development on the land.

SITE COMPATIBILITY CERTIFICATES FOR INFRASTRUCTURE

There is NOT a valid site compatibility certificate (of which the council is aware), issued under clause 19 of State Environmental Planning Policy (Infrastructure) 2007 in respect of proposed development on the land.

SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR AFFORDABLE RENTAL HOUSING

There is NOT a current site compatibility certificate for affordable rental housing (of which the council is aware), issued under clause 37 of State Environmental Planning Policy (Affordable Rental Housing) 2007 in respect of proposed development on the land.

PAPER SUBDIVISION INFORMATION

There is NOT an adopted development plan or subdivision order that applies to the land.

SITE VERIFICATION CERTIFICATE

There is NOT a current site verification certificate (of which the council is aware), issued under clause 17C of State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007, in relation to the land.

LOOSE-FILL ASBESTOS INSULATION

There are NO residential premises located on this land that are listed on the register that are required to be maintained under Division 1A of Part 8 of the *Home Building Act 1989*.

The accuracy and currency of the details provided by agencies external to Council have not be verified by Muswellbrook Shire Council and should be verified by the applicant.

ADDITIONAL INFORMATION PURSUANT TO SECTION 149(5) OF THE ACT

Council is unaware of any other relevant matters that may affect the land.

For further information, please contact the Environmental Services Department.

S J McDonald
General Manager

Per: DL Watson

PLANNING CERTIFICATE UNDER SECTION 149 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

Enquiries	Environmental Services
Contact	02 6549 3700
Invoice no.	43721
Your reference	Application

Date: 30 September 2017

Assessment: 61481 **Cert No: 21257**

MACH Energy Australia Pty Ltd
GPO Box 94
BRISBANE QLD 4001

Owner (as recorded by Council)
Mr R K & Mrs N V Googe

Property Description: ELLIS PARISH COUNTY BRISBANE 2333
LOT: 8 DP: 770911

Land to which the certificate relates

The land to which this certificate relates, being the lot or lots described on the application form, is shown in the Council's records as being situated at the street address described above. The information contained in this certificate relates only to the lot or lots described on this certificate. Separate planning certificates can be obtained upon application for the other lots, those certificates may contain different information than is contained in this certificate.

CERTIFICATE UNDER SECTION 149(2) ENVIRONMENTAL PLANNING & ASSESSMENT ACT

LOCAL ENVIRONMENTAL PLANS

PLANNING INSTRUMENT	Muswellbrook Local Environmental Plan 2009
LAND USE ZONING	RU1 Primary Production

PERMITTED WITHOUT CONSENT

Extensive agriculture; Home occupations; Intensive plant agriculture

PERMITTED WITH CONSENT

Air transport facilities; Airstrips; Animal boarding or training establishments; Aquaculture; Camping grounds; Caravan parks; Cellar door premises; Cemeteries; Community facilities; Crematoria; Depots; Dwelling houses; Educational establishments; Environmental facilities; Environmental protection works; Extractive industries; Farm buildings; Flood mitigation works; Forestry; Function centres; Group homes; Hazardous industries; Health consulting rooms; Heavy industrial storage establishments; Helipads; Highway service centres; Home-based child care; Home businesses; Home industries; Industrial retail outlets; Information and education facilities; Intensive livestock agriculture; Intensive plant agriculture; Kiosks; Landscaping material supplies; Open cut mining; Places of public worship; Plant nurseries; Recreation areas; Recreation facilities (indoor); Recreation facilities (major); Recreation facilities (outdoor); Research stations; Restaurants or cafes; Roads; Roadside stalls; Rural industries; Rural supplies; Rural worker's dwellings; Secondary dwellings; Service stations; Sewerage systems; Signage; Storage premises; Take away food and drink premises; Tourist and visitor accommodation; Transport depots; Truck depots; Turf farming; Veterinary hospitals; Waste disposal facilities; Water supply systems.

PROHIBITED

Any development not specified above.

MINIMUM LAND DIMENSIONS FOR THE ERECTION OF A DWELLING

Under the provisions of the Muswellbrook Local Environmental Plan 2009, the minimum subdivision lot size is 80ha and is also subject to the provisions detailed below.

Land zoned RU1 Primary Production may, with the consent of Council, be subdivided for the purpose of primary production to create a lot less than the minimum lot size. However, such a lot cannot be created if an existing dwelling would, as the result of the subdivision, be situated on the lot. A dwelling cannot be erected on such a lot created.

Development consent must not be granted to the subdivision of a lot in a strata plan or community title scheme on land zoned RU1 Primary Production that is used, or proposed to be used, for residential accommodation or tourist and visitor accommodation.

Only one dwelling house may be erected on land zoned RU1 Primary Production only if the land is:

(a) a lot created in accordance with clause 4.1 of the LEP 2009, or

(b) a lot created before the LEP 2009 commenced and on which the erection of a dwelling house was permissible immediately before that commencement, or

(c) a lot created before the LEP 2009 commenced that is at least the minimum lot size specified for that lot by the Lot Size Map, or

(d) a lot for which subdivision approval was granted before the LEP 2009 commenced and on which the erection of a dwelling house would have been permissible immediately before that commencement, or

(e) an existing holding.

NOTE: EXISTING HOLDING means all adjoining land, even if separated by a road or railway, held in the same ownership:

(a) on 11 April 1974, and

(b) at the time of lodging a development application for the erection of a dwelling house under this clause.

and includes any other land adjoining that land acquired by the owner since 11 April 1974.

NOTE: The owner in whose ownership all the land is at the time the application is lodged need not be the same person as the owner in whose ownership all the land was on the stated date.

WHETHER THE LAND INCLUDES OR COMPRISES CRITICAL HABITAT

The subject land has not been declared as critical habitat.

WHETHER THE LAND IS IN A CONSERVATION AREA

The subject land is not known to be in a conservation area.

Date: 3 October 2017

Cert No: 21257

WHETHER AN ITEM OF ENVIRONMENTAL HERITAGE IS SITUATED ON THE LAND

The land is NOT affected by any known or listed heritage item.

STATE ENVIRONMENTAL PLANNING POLICIES (EXEMPT & COMPLYING DEVELOPMENT CODES 2008)

CERTIFICATE UNDER SECTION 149(2) IDENTIFYING THE INFORMATION SET OUT IN CLAUSE 3 OF SCHEDULE 4 OF THE ENVIRONMENTAL PLANNING & ASSESSMENT REGULATIONS

Part 3 General Housing Code

Not applicable to the land to which this certificate relates.

Part 3A Rural Housing Code

YES. Complying development specified in the Rural Housing Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 4 Housing Alterations Code

YES. Complying development specified in the Housing Alterations Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 4A General Development Code

YES. Complying development specified in the General Development Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 5 Commercial and Industrial Alterations Code

Not applicable to the land to which this certificate relates.

Part 5A Commercial and Industrial (New Buildings and Additions) Code

Not applicable to the land to which this certificate relates.

Part 6 Subdivision Code

YES. Complying development specified in the Subdivision Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 7 Demolition Code

YES. Complying development specified in the Demolition Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 8 Fire Safety Code

YES. Complying development specified in the Fire Safety Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

STATE ENVIRONMENTAL PLANNING POLICIES

The following State Environmental Planning Policies apply to land within the Muswellbrook Shire LGA:-

No. 21. Caravan Parks - Ensures that where caravan parks or camping grounds are permitted under an environmental planning instrument, movable dwellings, as defined in the Local Government Act 1993, are also permitted. The policy ensures that development consent is required for new caravan parks and camping grounds and for additional long-term sites in existing caravan parks.

No. 30. Intensive Agriculture - Requires development consent for cattle feedlots having a capacity of 50 or more cattle or piggeries having a capacity of 200 or more pigs. The policy sets out information and public notification requirements to ensure there are effective planning control over this export-driven rural industry. The policy does not alter if, and where, such development is permitted, or the functions of the consent authority.

No. 33. Hazardous and Offensive Development - Provides new definitions for 'hazardous industry', 'hazardous storage establishment', 'offensive industry' and 'offensive storage establishment'. The definitions apply to all planning instruments, existing and future. The new definitions enable decisions to approve or refuse a development to be based on the merit of proposal. The consent authority must careful consider the specifics the case, the location and the way in which the proposed activity is to be carried out. The policy also requires specified matters to be considered for proposals that are 'potentially hazardous' or 'potentially offensive' as defined in the policy. For example, any application to carry out a potentially hazardous or potentially offensive development is to be advertised for public comment, and applications to carry out potentially hazardous development must be supported by a preliminary hazard analysis (PHA).

No. 36. Manufactured Home Estates - Helps establish well-designed and properly serviced manufactured home estates (MHEs) in suitable locations. Affordability and security of tenure for residents are important aspects. To enable the immediate development of estates, the policy allows MHEs to be located on certain land where caravan parks are permitted. There are however, criteria that a proposal must satisfy before the local council can approved development.

No. 44. Koala Habitat Protection - Encourages the proper conservation and management of areas of natural vegetation that provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline.

No. 55. Remediation of Land - Introduces state-wide planning controls for the remediation of contaminated land. The policy states that land must not be developed if it is unsuitable for a proposed use because it is contaminated. If the land is unsuitable, remediation must take place before the land is developed. The policy makes remediation permissible across the State, defines when consent is required, requires all remediation to comply with standards, ensures land is investigated if contamination is suspected, and requires councils to be notified of all remediation proposals.

No. 62. Sustainable Aquaculture - The policy implements the regional strategies already developed by creating a simple approach to identity and categorise aquaculture development on the basis of its potential environmental impact. The SEPP also identifies aquaculture development as a designated development only where there are potential environmental risks.

No. 64. Advertising and Signage - Aims to improve the amenity of urban and natural settings by managing the impact of outdoor advertising. The policy responds to growing concerns from the community, the advertising industry and local government that existing controls and guidelines were not effective. SEPP No. 64 offers the comprehensive provisions and consistent approach needed. SEPP 64 – Advertising and Signage: Explanatory Information should be read in conjunction with the policy.

No. 65. Design Quality of Residential Flat Development - Raises the design quality of residential flat development across the state through the application of a series of design principles. The policy provides for the establishment of Design Review Panels to provide independent expert advice to councils on the merit of residential flat development. The accompanying regulation requires the involvement of a qualified designer throughout the design, approval and construction stages.

SEPP (Housing for Seniors or People with a Disability) 2004 - Encourage the development of high quality accommodation for our ageing population and for people who have disabilities - housing that is in keeping with the local neighbourhood

SEPP (Building Sustainability Index: BASIX) 2004 - This SEPP operates in conjunction with Environmental Planning and Assessment Amendment (Building Sustainability Index: BASIX) Regulation 2004 to ensure the effective introduction of BASIX in NSW. The SEPP ensures consistency in the implementation of BASIX throughout the State by overriding competing provisions in other environmental planning instruments and development control plans, and specifying that SEPP 1 does not apply in relation to any development standard arising under BASIX.

SEPP (Infrastructure) 2007 - Provides a consistent planning regime for infrastructure and the provision of services across NSW, along with providing for consultation with relevant public authorities during the assessment process. The SEPP supports greater flexibility in the location of infrastructure and service facilities along with improved regulatory certainty and efficiency.

SEPP (Mining, Petroleum Production and Extractive Industries) 2007 - This Policy aims to provide for the proper management and development of mineral, petroleum and extractive material resources for the social and economic welfare of the State. The Policy establishes appropriate planning controls to encourage ecologically sustainable development.

SEPP (Miscellaneous Consent Provisions) 2007 - Provides for the erection of temporary structures and the use of places of public entertainment while protecting public safety and local amenity. The SEPP supports the transfer of the regulation of places of public entertainment and temporary structures (such as tents, marquees and booths) from the Local Government Act 1993 to the Environmental Planning and Assessment Act 1979.

SEPP (Rural Lands) 2008 - The aim of this policy is to facilitate the orderly and economic use and development of rural lands for rural and related purposes.

SEPP (Exempt and Complying Development Codes) 2008 – This policy streamlines assessment processes for development that complies with specified development standards. The policy provides exempt codes that have State-wide application, identifying, in the General Exempt Development Code, types of development that are of minimal environmental impact that may be carried out without the need for development consent.

SEPP (Affordable Rental Housing) 2009 – The aims of this policy are to provide a consistent planning regime for the provision of affordable rental housing; facilitate the effective delivery of new affordable rental housing by providing incentives by way of expanding zoning permissibility, floor space ratio bonuses and non-discretionary development standards; facilitate the retention and mitigate the loss of existing affordable rental housing; employ a balanced approach between obligations for retaining and mitigating the loss of existing affordable rental housing, and incentives for the development of new

affordable rental housing; facilitate an expanding role for not-for-profit-providers of affordable rental housing; support local business centres by providing affordable rental housing for workers close to places of work; and facilitate the development of housing for the homeless and other disadvantaged people who may require support services, including group homes and supportive accommodation.

SEPP (State and Regional Development) 2011 – The aims of this policy are to identify development that is State significant development; identify development that is State significant infrastructure and critical State significant infrastructure; and confer functions on joint regional planning panels to determine development applications.

Further details regarding these State Environmental Planning Policies and the circumstances in which they may apply to the subject and can be found on the Department of Planning's website.

REGIONAL PLANNING INSTRUMENTS

There are no Regional Environmental Plans applying within the Muswellbrook Shire Council area.

DEVELOPMENT CONTROL PLANS

This land is affected by the following Development Control Plans:
Muswellbrook Shire Development Control Plan 2009

COASTAL PROTECTION

The land IS NOT affected by the operations of Sections 38 and 39 of the *Coastal Protection Act* 1979.

MINE SUBSIDENCE

The land IS NOT WITHIN a Mine Subsidence District proclaimed under section 15 of the Mine Subsidence Compensation Act, 1961.

ROAD WIDENING AND ROAD REALIGNMENT

The subject land IS NOT affected by any road widening or road realignment under:
(a) Division 2 of Part 3 of the Roads Act 1993, or
(b) Any environmental planning instrument, or
(c) Any resolution of the council.

COUNCIL AND OTHER PUBLIC AUTHORITY POLICIES ON HAZARD RISK RESTRICTIONS

The land IS NOT affected by a policy adopted by the council, or adopted by any other public authority and notified to the council for the express purpose of its adoption by that authority being referred to in planning certificates issued by the council: that restricts the development of the land because of the likelihood of land slip, bushfire, tidal inundation, subsidence, acid sulphate soils or any other risk (other than flooding).

FLOOD RELATED DEVELOPMENT CONTROLS INFORMATION

The Hunter River Flood Study 2014 shows the land to be affected by flooding.

LAND RESERVED FOR ACQUISITION

There are NOT any environmental planning instruments; deemed environmental planning instruments or draft environmental planning instruments applying to the land that provide for the acquisition of the

land by a public authority, as referred to in section 27 of the Environmental Planning and Assessment Act 1979.

CONTRIBUTIONS PLANS

The Muswellbrook Section 94 Contributions Plan 2001 and Muswellbrook Section 94A Contributions Plan 2009 apply to all land within the Muswellbrook Shire Local Government Area.

BIODIVERSITY CERTIFIED LAND

The land IS NOT biodiversity certified land (within the meaning of Part 7AA of the Threatened Species Conservation Act 1995)

BIOBANKING AGREEMENTS

The land IS NOT affected by a biobanking agreement under Part 7A of the *Threatened Species Conservation Act 1995*.

MATTERS RELATING TO THE MANAGEMENT OF CONTAMINATED LAND

(a) The land to which this certificate relates is NOT within land declared to be significantly contaminated land under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(b) The land to which this certificate relates is NOT subject to a management order under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(c) The land to which this certificate relates is NOT the subject of approved voluntary management proposal the subject of the Environment Protection Authority's agreement under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(d) The land to which this certificate relates is NOT the subject to an ongoing maintenance order under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(e) The land to which this certificate relates has NOT been the subject of a site audit statement provided to Muswellbrook Shire Council.

BUSH FIRE PRONE LAND

The land IS NOT bushfire prone land.

PROPERTY VEGETATION PLANS

Council has NOT been notified of the existence of such a plan or if the land is land to which a property vegetation plan under the Native Vegetation Act 2003 applies.

ORDERS UNDER TREES (DISPUTES BETWEEN NEIGHBOURS) ACT 2006

Council has NOT been notified of any order made under the Trees (Disputes Between Neighbours) Act 2006 to carry out work in relation to a tree on the land.

Date: 3 October 2017

Cert No: 21257

DIRECTIONS UNDER PART 3A

There is NOT a direction by the Minister in force under section 75P (2) (c1) of the Act in relation to prohibiting or restricting the carrying out of a project or a stage of a project on the land under Part 4 of the Act.

SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR SENIORS HOUSING

There is NOT a current site compatibility certificate (of which the council is aware), issued under clause 25 of State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 in respect of proposed development on the land.

SITE COMPATIBILITY CERTIFICATES FOR INFRASTRUCTURE

There is NOT a valid site compatibility certificate (of which the council is aware), issued under clause 19 of State Environmental Planning Policy (Infrastructure) 2007 in respect of proposed development on the land.

SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR AFFORDABLE RENTAL HOUSING

There is NOT a current site compatibility certificate for affordable rental housing (of which the council is aware), issued under clause 37 of State Environmental Planning Policy (Affordable Rental Housing) 2007 in respect of proposed development on the land.

PAPER SUBDIVISION INFORMATION

There is NOT an adopted development plan or subdivision order that applies to the land.

SITE VERIFICATION CERTIFICATE

There is NOT a current site verification certificate (of which the council is aware), issued under clause 17C of State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007, in relation to the land.

LOOSE-FILL ASBESTOS INSULATION

There are NO residential premises located on this land that are listed on the register that are required to be maintained under Division 1A of Part 8 of the *Home Building Act 1989*.

The accuracy and currency of the details provided by agencies external to Council have not be verified by Muswellbrook Shire Council and should be verified by the applicant.

ADDITIONAL INFORMATION PURSUANT TO SECTION 149(5) OF THE ACT

Council is unaware of any other relevant matters that may affect the land.

For further information, please contact the
Environmental Services Department.

S J McDonald
General Manager

Per: D L Watson

PLANNING CERTIFICATE UNDER SECTION 149 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

Enquiries	Environmental Services
Contact	02 6549 3700
Invoice no.	43721
Your reference	Application

Date: 27 September 2017

Assessment: 63719 **Cert No: 21223**

MACH Energy Australia Pty Ltd
GPO Box 94
BRISBANE QLD 4001

Owner (as recorded by Council)

MACH Energy Australia Pty Ltd

Property Description: 380 WYBONG ROAD MUSWELLBROOK 2333
LOT: 1 DP: 780673

Land to which the certificate relates

The land to which this certificate relates, being the lot or lots described on the application form, is shown in the Council's records as being situated at the street address described above. The information contained in this certificate relates only to the lot or lots described on this certificate. Separate planning certificates can be obtained upon application for the other lots, those certificates may contain different information than is contained in this certificate.

CERTIFICATE UNDER SECTION 149(2) ENVIRONMENTAL PLANNING & ASSESSMENT ACT

LOCAL ENVIRONMENTAL PLANS

PLANNING INSTRUMENT	Muswellbrook Local Environmental Plan 2009
LAND USE ZONING	RU1 Primary Production

PERMITTED WITHOUT CONSENT

Extensive agriculture; Home occupations; Intensive plant agriculture

PERMITTED WITH CONSENT

Air transport facilities; Airstrips; Animal boarding or training establishments; Aquaculture; Camping grounds; Caravan parks; Cellar door premises; Cemeteries; Community facilities; Crematoria; Depots; Dwelling houses; Educational establishments; Environmental facilities; Environmental protection works; Extractive industries; Farm buildings; Flood mitigation works; Forestry; Function centres; Group homes; Hazardous industries; Health consulting rooms; Heavy industrial storage establishments; Helipads; Highway service centres; Home-based child care; Home businesses; Home industries; Industrial retail outlets; Information and education facilities; Intensive livestock agriculture; Intensive plant agriculture; Kiosks; Landscaping material supplies; Open cut mining; Places of public worship; Plant nurseries; Recreation areas; Recreation facilities (indoor); Recreation facilities (major); Recreation facilities (outdoor); Research stations; Restaurants or cafes; Roads; Roadside stalls; Rural industries; Rural supplies; Rural worker's dwellings; Secondary dwellings; Service stations; Sewerage systems; Signage; Storage premises; Take away food and drink premises; Tourist and visitor accommodation; Transport depots; Truck depots; Turf farming; Veterinary hospitals; Waste disposal facilities; Water supply systems.

PROHIBITED

Any development not specified above.

MINIMUM LAND DIMENSIONS FOR THE ERECTION OF A DWELLING

Under the provisions of the Muswellbrook Local Environmental Plan 2009, the minimum subdivision lot size is 80ha and is also subject to the provisions detailed below.

Land zoned RU1 Primary Production may, with the consent of Council, be subdivided for the purpose of primary production to create a lot less than the minimum lot size. However, such a lot cannot be created if an existing dwelling would, as the result of the subdivision, be situated on the lot. A dwelling cannot be erected on such a lot created.

Development consent must not be granted to the subdivision of a lot in a strata plan or community title scheme on land zoned RU1 Primary Production that is used, or proposed to be used, for residential accommodation or tourist and visitor accommodation.

Only one dwelling house may be erected on land zoned RU1 Primary Production only if the land is:

(a) a lot created in accordance with clause 4.1 of the LEP 2009, or

(b) a lot created before the LEP 2009 commenced and on which the erection of a dwelling house was permissible immediately before that commencement, or

(c) a lot created before the LEP 2009 commenced that is at least the minimum lot size specified for that lot by the Lot Size Map, or

(d) a lot for which subdivision approval was granted before the LEP 2009 commenced and on which the erection of a dwelling house would have been permissible immediately before that commencement, or

(e) an existing holding.

NOTE: EXISTING HOLDING means all adjoining land, even if separated by a road or railway, held in the same ownership:

(a) on 11 April 1974, and

(b) at the time of lodging a development application for the erection of a dwelling house under this clause.

and includes any other land adjoining that land acquired by the owner since 11 April 1974.

NOTE: The owner in whose ownership all the land is at the time the application is lodged need not be the same person as the owner in whose ownership all the land was on the stated date.

WHETHER THE LAND INCLUDES OR COMPRISES CRITICAL HABITAT

The subject land has not been declared as critical habitat.

WHETHER THE LAND IS IN A CONSERVATION AREA

The subject land is not known to be in a conservation area.

Date: 28 September 2017

Cert No: 21223

WHETHER AN ITEM OF ENVIRONMENTAL HERITAGE IS SITUATED ON THE LAND

The land is NOT affected by any known or listed heritage item.

STATE ENVIRONMENTAL PLANNING POLICIES (EXEMPT & COMPLYING DEVELOPMENT CODES 2008)

CERTIFICATE UNDER SECTION 149(2) IDENTIFYING THE INFORMATION SET OUT IN CLAUSE 3 OF SCHEDULE 4 OF THE ENVIRONMENTAL PLANNING & ASSESSMENT REGULATIONS

Part 3 General Housing Code

Not applicable to the land to which this certificate relates.

Part 3A Rural Housing Code

YES. Complying development specified in the Rural Housing Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 4 Housing Alterations Code

YES. Complying development specified in the Housing Alterations Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 4A General Development Code

YES. Complying development specified in the General Development Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 5 Commercial and Industrial Alterations Code

Not applicable to the land to which this certificate relates.

Part 5A Commercial and Industrial (New Buildings and Additions) Code

Not applicable to the land to which this certificate relates.

Part 6 Subdivision Code

YES. Complying development specified in the Subdivision Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 7 Demolition Code

YES. Complying development specified in the Demolition Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 8 Fire Safety Code

YES. Complying development specified in the Fire Safety Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

STATE ENVIRONMENTAL PLANNING POLICIES

The following State Environmental Planning Policies apply to land within the Muswellbrook Shire LGA:-

No. 21. Caravan Parks - Ensures that where caravan parks or camping grounds are permitted under an environmental planning instrument, movable dwellings, as defined in the Local Government Act 1993, are also permitted. The policy ensures that development consent is required for new caravan parks and camping grounds and for additional long-term sites in existing caravan parks.

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affordable rental housing; facilitate an expanding role for not-for-profit-providers of affordable rental housing; support local business centres by providing affordable rental housing for workers close to places of work; and facilitate the development of housing for the homeless and other disadvantaged people who may require support services, including group homes and supportive accommodation.

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Further details regarding these State Environmental Planning Policies and the circumstances in which they may apply to the subject and can be found on the Department of Planning's website.

REGIONAL PLANNING INSTRUMENTS

There are no Regional Environmental Plans applying within the Muswellbrook Shire Council area.

DEVELOPMENT CONTROL PLANS

This land is affected by the following Development Control Plans:
Muswellbrook Shire Development Control Plan 2009

COASTAL PROTECTION

The land IS NOT affected by the operations of Sections 38 and 39 of the *Coastal Protection Act* 1979.

MINE SUBSIDENCE

The land IS NOT WITHIN a Mine Subsidence District proclaimed under section 15 of the Mine Subsidence Compensation Act, 1961.

ROAD WIDENING AND ROAD REALIGNMENT

The subject land IS NOT affected by any road widening or road realignment under:
(a) Division 2 of Part 3 of the Roads Act 1993, or
(b) Any environmental planning instrument, or
(c) Any resolution of the council.

COUNCIL AND OTHER PUBLIC AUTHORITY POLICIES ON HAZARD RISK RESTRICTIONS

The land IS NOT affected by a policy adopted by the council, or adopted by any other public authority and notified to the council for the express purpose of its adoption by that authority being referred to in planning certificates issued by the council: that restricts the development of the land because of the likelihood of land slip, bushfire, tidal inundation, subsidence, acid sulphate soils or any other risk (other than flooding).

FLOOD RELATED DEVELOPMENT CONTROLS INFORMATION

The Hunter River Flood Study 2014 shows the land to be affected by flooding.

LAND RESERVED FOR ACQUISITION

There are NOT any environmental planning instruments; deemed environmental planning instruments or draft environmental planning instruments applying to the land that provide for the acquisition of the land by a public authority, as referred to in section 27 of the Environmental Planning and Assessment Act 1979.

CONTRIBUTIONS PLANS

The Muswellbrook Section 94 Contributions Plan 2001 and Muswellbrook Section 94A Contributions Plan 2009 apply to all land within the Muswellbrook Shire Local Government Area.

BIODIVERSITY CERTIFIED LAND

The land IS NOT biodiversity certified land (within the meaning of Part 7AA of the Threatened Species Conservation Act 1995)

BIOBANKING AGREEMENTS

The land IS NOT affected by a biobanking agreement under Part 7A of the *Threatened Species Conservation Act 1995*.

MATTERS RELATING TO THE MANAGEMENT OF CONTAMINATED LAND

(a) The land to which this certificate relates is NOT within land declared to be significantly contaminated land under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(b) The land to which this certificate relates is NOT subject to a management order under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(c) The land to which this certificate relates is NOT the subject of approved voluntary management proposal the subject of the Environment Protection Authority's agreement under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(d) The land to which this certificate relates is NOT the subject to an ongoing maintenance order under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(e) The land to which this certificate relates has NOT been the subject of a site audit statement provided to Muswellbrook Shire Council.

BUSH FIRE PRONE LAND

The land IS NOT bushfire prone land.

PROPERTY VEGETATION PLANS

Council has NOT been notified of the existence of such a plan or if the land is land to which a property vegetation plan under the Native Vegetation Act 2003 applies.

ORDERS UNDER TREES (DISPUTES BETWEEN NEIGHBOURS) ACT 2006

Council has NOT been notified of any order made under the Trees (Disputes Between Neighbours) Act 2006 to carry out work in relation to a tree on the land.

muswellbrook shire council

Date: 28 September 2017

Cert No: 21223

DIRECTIONS UNDER PART 3A

There is NOT a direction by the Minister in force under section 75P (2) (c1) of the Act in relation to prohibiting or restricting the carrying out of a project or a stage of a project on the land under Part 4 of the Act.

SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR SENIORS HOUSING

There is NOT a current site compatibility certificate (of which the council is aware), issued under clause 25 of State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 in respect of proposed development on the land.

SITE COMPATIBILITY CERTIFICATES FOR INFRASTRUCTURE

There is NOT a valid site compatibility certificate (of which the council is aware), issued under clause 19 of State Environmental Planning Policy (Infrastructure) 2007 in respect of proposed development on the land.

SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR AFFORDABLE RENTAL HOUSING

There is NOT a current site compatibility certificate for affordable rental housing (of which the council is aware), issued under clause 37 of State Environmental Planning Policy (Affordable Rental Housing) 2007 in respect of proposed development on the land.

PAPER SUBDIVISION INFORMATION

There is NOT an adopted development plan or subdivision order that applies to the land.

SITE VERIFICATION CERTIFICATE

There is NOT a current site verification certificate (of which the council is aware), issued under clause 17C of State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007, in relation to the land.

LOOSE-FILL ASBESTOS INSULATION

There are NO residential premises located on this land that are listed on the register that are required to be maintained under Division 1A of Part 8 of the *Home Building Act 1989*.

The accuracy and currency of the details provided by agencies external to Council have not be verified by Muswellbrook Shire Council and should be verified by the applicant.

ADDITIONAL INFORMATION PURSUANT TO SECTION 149(5) OF THE ACT

Council is unaware of any other relevant matters that may affect the land.

For further information, please contact the Environmental Services Department.

S J McDonald
General Manager

Per: DL Watson

PLANNING CERTIFICATE UNDER SECTION 149 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

Enquiries	Environmental Services
Contact	02 6549 3700
Invoice no.	43721
Your reference	Application

Date: 27 September 2017

Assessment: 11635 **Cert No: 21222**

MACH Energy Australia Pty Ltd
GPO Box 94
BRISBANE QLD 4001

Owner (as recorded by Council)

MACH Energy Australia Pty Ltd

Property Description: 401 WYBONG ROAD MUSWELLBROOK 2333
LOT: 1 DP: 745369

Land to which the certificate relates

The land to which this certificate relates, being the lot or lots described on the application form, is shown in the Council's records as being situated at the street address described above. The information contained in this certificate relates only to the lot or lots described on this certificate. Separate planning certificates can be obtained upon application for the other lots, those certificates may contain different information than is contained in this certificate.

CERTIFICATE UNDER SECTION 149(2) ENVIRONMENTAL PLANNING & ASSESSMENT ACT

LOCAL ENVIRONMENTAL PLANS

PLANNING INSTRUMENT	Muswellbrook Local Environmental Plan 2009
LAND USE ZONING	RU1 Primary Production

PERMITTED WITHOUT CONSENT

Extensive agriculture; Home occupations; Intensive plant agriculture

PERMITTED WITH CONSENT

Air transport facilities; Airstrips; Animal boarding or training establishments; Aquaculture; Camping grounds; Caravan parks; Cellar door premises; Cemeteries; Community facilities; Crematoria; Depots; Dwelling houses; Educational establishments; Environmental facilities; Environmental protection works; Extractive industries; Farm buildings; Flood mitigation works; Forestry; Function centres; Group homes; Hazardous industries; Health consulting rooms; Heavy industrial storage establishments; Helipads; Highway service centres; Home-based child care; Home businesses; Home industries; Industrial retail outlets; Information and education facilities; Intensive livestock agriculture; Intensive plant agriculture; Kiosks; Landscaping material supplies; Open cut mining; Places of public worship; Plant nurseries; Recreation areas; Recreation facilities (indoor); Recreation facilities (major); Recreation facilities (outdoor); Research stations; Restaurants or cafes; Roads; Roadside stalls; Rural industries; Rural supplies; Rural worker's dwellings; Secondary dwellings; Service stations; Sewerage systems; Signage; Storage premises; Take away food and drink premises; Tourist and visitor accommodation; Transport depots; Truck depots; Turf farming; Veterinary hospitals; Waste disposal facilities; Water supply systems.

PROHIBITED

Any development not specified above.

MINIMUM LAND DIMENSIONS FOR THE ERECTION OF A DWELLING

Under the provisions of the Muswellbrook Local Environmental Plan 2009, the minimum subdivision lot size is 80ha and is also subject to the provisions detailed below.

Land zoned RU1 Primary Production may, with the consent of Council, be subdivided for the purpose of primary production to create a lot less than the minimum lot size. However, such a lot cannot be created if an existing dwelling would, as the result of the subdivision, be situated on the lot. A dwelling cannot be erected on such a lot created.

Development consent must not be granted to the subdivision of a lot in a strata plan or community title scheme on land zoned RU1 Primary Production that is used, or proposed to be used, for residential accommodation or tourist and visitor accommodation.

Only one dwelling house may be erected on land zoned RU1 Primary Production only if the land is:

(a) a lot created in accordance with clause 4.1 of the LEP 2009, or

(b) a lot created before the LEP 2009 commenced and on which the erection of a dwelling house was permissible immediately before that commencement, or

(c) a lot created before the LEP 2009 commenced that is at least the minimum lot size specified for that lot by the Lot Size Map, or

(d) a lot for which subdivision approval was granted before the LEP 2009 commenced and on which the erection of a dwelling house would have been permissible immediately before that commencement, or

(e) an existing holding.

NOTE: EXISTING HOLDING means all adjoining land, even if separated by a road or railway, held in the same ownership:

(a) on 11 April 1974, and

(b) at the time of lodging a development application for the erection of a dwelling house under this clause.

and includes any other land adjoining that land acquired by the owner since 11 April 1974.

NOTE: The owner in whose ownership all the land is at the time the application is lodged need not be the same person as the owner in whose ownership all the land was on the stated date.

WHETHER THE LAND INCLUDES OR COMPRISES CRITICAL HABITAT

The subject land has not been declared as critical habitat.

WHETHER THE LAND IS IN A CONSERVATION AREA

The subject land is not known to be in a conservation area.

Date: 28 September 2017

Cert No: 21222

WHETHER AN ITEM OF ENVIRONMENTAL HERITAGE IS SITUATED ON THE LAND

The land is NOT affected by any known or listed heritage item.

STATE ENVIRONMENTAL PLANNING POLICIES (EXEMPT & COMPLYING DEVELOPMENT CODES 2008)

CERTIFICATE UNDER SECTION 149(2) IDENTIFYING THE INFORMATION SET OUT IN CLAUSE 3 OF SCHEDULE 4 OF THE ENVIRONMENTAL PLANNING & ASSESSMENT REGULATIONS

Part 3 General Housing Code

Not applicable to the land to which this certificate relates.

Part 3A Rural Housing Code

YES. Complying development specified in the Rural Housing Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 4 Housing Alterations Code

YES. Complying development specified in the Housing Alterations Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 4A General Development Code

YES. Complying development specified in the General Development Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 5 Commercial and Industrial Alterations Code

Not applicable to the land to which this certificate relates.

Part 5A Commercial and Industrial (New Buildings and Additions) Code

Not applicable to the land to which this certificate relates.

Part 6 Subdivision Code

YES. Complying development specified in the Subdivision Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 7 Demolition Code

YES. Complying development specified in the Demolition Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 8 Fire Safety Code

YES. Complying development specified in the Fire Safety Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

STATE ENVIRONMENTAL PLANNING POLICIES

The following State Environmental Planning Policies apply to land within the Muswellbrook Shire LGA:-

No. 21. Caravan Parks - Ensures that where caravan parks or camping grounds are permitted under an environmental planning instrument, movable dwellings, as defined in the Local Government Act 1993, are also permitted. The policy ensures that development consent is required for new caravan parks and camping grounds and for additional long-term sites in existing caravan parks.

No. 30. Intensive Agriculture - Requires development consent for cattle feedlots having a capacity of 50 or more cattle or piggeries having a capacity of 200 or more pigs. The policy sets out information and public notification requirements to ensure there are effective planning control over this export-driven rural industry. The policy does not alter if, and where, such development is permitted, or the functions of the consent authority.

No. 33. Hazardous and Offensive Development - Provides new definitions for 'hazardous industry', 'hazardous storage establishment', 'offensive industry' and 'offensive storage establishment'. The definitions apply to all planning instruments, existing and future. The new definitions enable decisions to approve or refuse a development to be based on the merit of proposal. The consent authority must careful consider the specifics the case, the location and the way in which the proposed activity is to be carried out. The policy also requires specified matters to be considered for proposals that are 'potentially hazardous' or 'potentially offensive' as defined in the policy. For example, any application to carry out a potentially hazardous or potentially offensive development is to be advertised for public comment, and applications to carry out potentially hazardous development must be supported by a preliminary hazard analysis (PHA).

No. 36. Manufactured Home Estates - Helps establish well-designed and properly serviced manufactured home estates (MHEs) in suitable locations. Affordability and security of tenure for residents are important aspects. To enable the immediate development of estates, the policy allows MHEs to be located on certain land where caravan parks are permitted. There are however, criteria that a proposal must satisfy before the local council can approved development.

No. 44. Koala Habitat Protection - Encourages the proper conservation and management of areas of natural vegetation that provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline.

No. 55. Remediation of Land - Introduces state-wide planning controls for the remediation of contaminated land. The policy states that land must not be developed if it is unsuitable for a proposed use because it is contaminated. If the land is unsuitable, remediation must take place before the land is developed. The policy makes remediation permissible across the State, defines when consent is required, requires all remediation to comply with standards, ensures land is investigated if contamination is suspected, and requires councils to be notified of all remediation proposals.

No. 62. Sustainable Aquaculture - The policy implements the regional strategies already developed by creating a simple approach to identity and categorise aquaculture development on the basis of its potential environmental impact. The SEPP also identifies aquaculture development as a designated development only where there are potential environmental risks.

No. 64. Advertising and Signage - Aims to improve the amenity of urban and natural settings by managing the impact of outdoor advertising. The policy responds to growing concerns from the community, the advertising industry and local government that existing controls and guidelines were not effective. SEPP No. 64 offers the comprehensive provisions and consistent approach needed. SEPP 64 – Advertising and Signage: Explanatory Information should be read in conjunction with the policy.

No. 65. Design Quality of Residential Flat Development - Raises the design quality of residential flat development across the state through the application of a series of design principles. The policy provides for the establishment of Design Review Panels to provide independent expert advice to councils on the merit of residential flat development. The accompanying regulation requires the involvement of a qualified designer throughout the design, approval and construction stages.

SEPP (Housing for Seniors or People with a Disability) 2004 - Encourage the development of high quality accommodation for our ageing population and for people who have disabilities - housing that is in keeping with the local neighbourhood

SEPP (Building Sustainability Index: BASIX) 2004 - This SEPP operates in conjunction with Environmental Planning and Assessment Amendment (Building Sustainability Index: BASIX) Regulation 2004 to ensure the effective introduction of BASIX in NSW. The SEPP ensures consistency in the implementation of BASIX throughout the State by overriding competing provisions in other environmental planning instruments and development control plans, and specifying that SEPP 1 does not apply in relation to any development standard arising under BASIX.

SEPP (Infrastructure) 2007 - Provides a consistent planning regime for infrastructure and the provision of services across NSW, along with providing for consultation with relevant public authorities during the assessment process. The SEPP supports greater flexibility in the location of infrastructure and service facilities along with improved regulatory certainty and efficiency.

SEPP (Mining, Petroleum Production and Extractive Industries) 2007 - This Policy aims to provide for the proper management and development of mineral, petroleum and extractive material resources for the social and economic welfare of the State. The Policy establishes appropriate planning controls to encourage ecologically sustainable development.

SEPP (Miscellaneous Consent Provisions) 2007 - Provides for the erection of temporary structures and the use of places of public entertainment while protecting public safety and local amenity. The SEPP supports the transfer of the regulation of places of public entertainment and temporary structures (such as tents, marquees and booths) from the Local Government Act 1993 to the Environmental Planning and Assessment Act 1979.

SEPP (Rural Lands) 2008 - The aim of this policy is to facilitate the orderly and economic use and development of rural lands for rural and related purposes.

SEPP (Exempt and Complying Development Codes) 2008 – This policy streamlines assessment processes for development that complies with specified development standards. The policy provides exempt codes that have State-wide application, identifying, in the General Exempt Development Code, types of development that are of minimal environmental impact that may be carried out without the need for development consent.

SEPP (Affordable Rental Housing) 2009 – The aims of this policy are to provide a consistent planning regime for the provision of affordable rental housing; facilitate the effective delivery of new affordable rental housing by providing incentives by way of expanding zoning permissibility, floor space ratio bonuses and non-discretionary development standards; facilitate the retention and mitigate the loss of existing affordable rental housing; employ a balanced approach between obligations for retaining and mitigating the loss of existing affordable rental housing, and incentives for the development of new

affordable rental housing; facilitate an expanding role for not-for-profit-providers of affordable rental housing; support local business centres by providing affordable rental housing for workers close to places of work; and facilitate the development of housing for the homeless and other disadvantaged people who may require support services, including group homes and supportive accommodation.

SEPP (State and Regional Development) 2011 – The aims of this policy are to identify development that is State significant development; identify development that is State significant infrastructure and critical State significant infrastructure; and confer functions on joint regional planning panels to determine development applications.

Further details regarding these State Environmental Planning Policies and the circumstances in which they may apply to the subject and can be found on the Department of Planning's website.

REGIONAL PLANNING INSTRUMENTS

There are no Regional Environmental Plans applying within the Muswellbrook Shire Council area.

DEVELOPMENT CONTROL PLANS

This land is affected by the following Development Control Plans:
Muswellbrook Shire Development Control Plan 2009

COASTAL PROTECTION

The land IS NOT affected by the operations of Sections 38 and 39 of the *Coastal Protection Act* 1979.

MINE SUBSIDENCE

The land IS NOT WITHIN a Mine Subsidence District proclaimed under section 15 of the Mine Subsidence Compensation Act, 1961.

ROAD WIDENING AND ROAD REALIGNMENT

The subject land IS NOT affected by any road widening or road realignment under:
(a) Division 2 of Part 3 of the Roads Act 1993, or
(b) Any environmental planning instrument, or
(c) Any resolution of the council.

COUNCIL AND OTHER PUBLIC AUTHORITY POLICIES ON HAZARD RISK RESTRICTIONS

The land IS NOT affected by a policy adopted by the council, or adopted by any other public authority and notified to the council for the express purpose of its adoption by that authority being referred to in planning certificates issued by the council: that restricts the development of the land because of the likelihood of land slip, bushfire, tidal inundation, subsidence, acid sulphate soils or any other risk (other than flooding).

FLOOD RELATED DEVELOPMENT CONTROLS INFORMATION

The Hunter River Flood Study 2014 shows the land to be affected by flooding.

LAND RESERVED FOR ACQUISITION

There are NOT any environmental planning instruments; deemed environmental planning instruments or draft environmental planning instruments applying to the land that provide for the acquisition of the land by a public authority, as referred to in section 27 of the Environmental Planning and Assessment Act 1979.

CONTRIBUTIONS PLANS

The Muswellbrook Section 94 Contributions Plan 2001 and Muswellbrook Section 94A Contributions Plan 2009 apply to all land within the Muswellbrook Shire Local Government Area.

BIODIVERSITY CERTIFIED LAND

The land IS NOT biodiversity certified land (within the meaning of Part 7AA of the Threatened Species Conservation Act 1995)

BIOBANKING AGREEMENTS

The land IS NOT affected by a biobanking agreement under Part 7A of the *Threatened Species Conservation Act 1995*.

MATTERS RELATING TO THE MANAGEMENT OF CONTAMINATED LAND

(a) The land to which this certificate relates is NOT within land declared to be significantly contaminated land under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(b) The land to which this certificate relates is NOT subject to a management order under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(c) The land to which this certificate relates is NOT the subject of approved voluntary management proposal the subject of the Environment Protection Authority's agreement under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(d) The land to which this certificate relates is NOT the subject to an ongoing maintenance order under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(e) The land to which this certificate relates has NOT been the subject of a site audit statement provided to Muswellbrook Shire Council.

BUSH FIRE PRONE LAND

The land IS NOT bushfire prone land.

PROPERTY VEGETATION PLANS

Council has NOT been notified of the existence of such a plan or if the land is land to which a property vegetation plan under the Native Vegetation Act 2003 applies.

ORDERS UNDER TREES (DISPUTES BETWEEN NEIGHBOURS) ACT 2006

Council has NOT been notified of any order made under the Trees (Disputes Between Neighbours) Act 2006 to carry out work in relation to a tree on the land.

muswellbrook shire council

Date: 28 September 2017

Cert No: 21222

DIRECTIONS UNDER PART 3A

There is NOT a direction by the Minister in force under section 75P (2) (c1) of the Act in relation to prohibiting or restricting the carrying out of a project or a stage of a project on the land under Part 4 of the Act.

SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR SENIORS HOUSING

There is NOT a current site compatibility certificate (of which the council is aware), issued under clause 25 of State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 in respect of proposed development on the land.

SITE COMPATIBILITY CERTIFICATES FOR INFRASTRUCTURE

There is NOT a valid site compatibility certificate (of which the council is aware), issued under clause 19 of State Environmental Planning Policy (Infrastructure) 2007 in respect of proposed development on the land.

SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR AFFORDABLE RENTAL HOUSING

There is NOT a current site compatibility certificate for affordable rental housing (of which the council is aware), issued under clause 37 of State Environmental Planning Policy (Affordable Rental Housing) 2007 in respect of proposed development on the land.

PAPER SUBDIVISION INFORMATION

There is NOT an adopted development plan or subdivision order that applies to the land.

SITE VERIFICATION CERTIFICATE

There is NOT a current site verification certificate (of which the council is aware), issued under clause 17C of State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007, in relation to the land.

LOOSE-FILL ASBESTOS INSULATION

There are NO residential premises located on this land that are listed on the register that are required to be maintained under Division 1A of Part 8 of the *Home Building Act 1989*.

The accuracy and currency of the details provided by agencies external to Council have not be verified by Muswellbrook Shire Council and should be verified by the applicant.

ADDITIONAL INFORMATION PURSUANT TO SECTION 149(5) OF THE ACT

Council is unaware of any other relevant matters that may affect the land.

For further information, please contact the Environmental Services Department.

S J McDonald
General Manager

Per: DL Watson

PLANNING CERTIFICATE UNDER SECTION 149 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

Enquiries	Environmental Services
Contact	02 6549 3700
Invoice no.	43721
Your reference	APPLICATION

Date: 27 September 2017

Assessment: 127654 **Cert No: 21220**

MACH Energy Australia Pty Ltd
GPO Box 94
BRISBANE QLD 4001

Owner (as recorded by Council)

MACH Energy Australia Pty Ltd

Property Description: 520 WYBONG ROAD MUSWELLBROOK 2333
PT: 1 DP: 544039

Land to which the certificate relates

The land to which this certificate relates, being the lot or lots described on the application form, is shown in the Council's records as being situated at the street address described above. The information contained in this certificate relates only to the lot or lots described on this certificate. Separate planning certificates can be obtained upon application for the other lots, those certificates may contain different information than is contained in this certificate.

CERTIFICATE UNDER SECTION 149(2) ENVIRONMENTAL PLANNING & ASSESSMENT ACT

LOCAL ENVIRONMENTAL PLANS

PLANNING INSTRUMENT	Muswellbrook Local Environmental Plan 2009
LAND USE ZONING	RU1 Primary Production

PERMITTED WITHOUT CONSENT

Extensive agriculture; Home occupations; Intensive plant agriculture

PERMITTED WITH CONSENT

Air transport facilities; Airstrips; Animal boarding or training establishments; Aquaculture; Camping grounds; Caravan parks; Cellar door premises; Cemeteries; Community facilities; Crematoria; Depots; Dwelling houses; Educational establishments; Environmental facilities; Environmental protection works; Extractive industries; Farm buildings; Flood mitigation works; Forestry; Function centres; Group homes; Hazardous industries; Health consulting rooms; Heavy industrial storage establishments; Helipads; Highway service centres; Home-based child care; Home businesses; Home industries; Industrial retail outlets; Information and education facilities; Intensive livestock agriculture; Intensive plant agriculture; Kiosks; Landscaping material supplies; Open cut mining; Places of public worship; Plant nurseries; Recreation areas; Recreation facilities (indoor); Recreation facilities (major); Recreation facilities (outdoor); Research stations; Restaurants or cafes; Roads; Roadside stalls; Rural industries; Rural supplies; Rural worker's dwellings; Secondary dwellings; Service stations; Sewerage systems; Signage; Storage premises; Take away food and drink premises; Tourist and visitor accommodation; Transport depots; Truck depots; Turf farming; Veterinary hospitals; Waste disposal facilities; Water supply systems.

PROHIBITED

Any development not specified above.

MINIMUM LAND DIMENSIONS FOR THE ERECTION OF A DWELLING

Under the provisions of the Muswellbrook Local Environmental Plan 2009, the minimum subdivision lot size is 80ha and is also subject to the provisions detailed below.

Land zoned RU1 Primary Production may, with the consent of Council, be subdivided for the purpose of primary production to create a lot less than the minimum lot size. However, such a lot cannot be created if an existing dwelling would, as the result of the subdivision, be situated on the lot. A dwelling cannot be erected on such a lot created.

Development consent must not be granted to the subdivision of a lot in a strata plan or community title scheme on land zoned RU1 Primary Production that is used, or proposed to be used, for residential accommodation or tourist and visitor accommodation.

Only one dwelling house may be erected on land zoned RU1 Primary Production only if the land is:

(a) a lot created in accordance with clause 4.1 of the LEP 2009, or

(b) a lot created before the LEP 2009 commenced and on which the erection of a dwelling house was permissible immediately before that commencement, or

(c) a lot created before the LEP 2009 commenced that is at least the minimum lot size specified for that lot by the Lot Size Map, or

(d) a lot for which subdivision approval was granted before the LEP 2009 commenced and on which the erection of a dwelling house would have been permissible immediately before that commencement, or

(e) an existing holding.

NOTE: EXISTING HOLDING means all adjoining land, even if separated by a road or railway, held in the same ownership:

(a) on 11 April 1974, and

(b) at the time of lodging a development application for the erection of a dwelling house under this clause.

and includes any other land adjoining that land acquired by the owner since 11 April 1974.

NOTE: The owner in whose ownership all the land is at the time the application is lodged need not be the same person as the owner in whose ownership all the land was on the stated date.

WHETHER THE LAND INCLUDES OR COMPRISES CRITICAL HABITAT

The subject land has not been declared as critical habitat.

WHETHER THE LAND IS IN A CONSERVATION AREA

The subject land is not known to be in a conservation area.

muswellbrook shire council

Date: 28 September 2017

Cert No: 21220

WHETHER AN ITEM OF ENVIRONMENTAL HERITAGE IS SITUATED ON THE LAND

The land is NOT affected by any known or listed heritage item.

STATE ENVIRONMENTAL PLANNING POLICIES (EXEMPT & COMPLYING DEVELOPMENT CODES 2008)

CERTIFICATE UNDER SECTION 149(2) IDENTIFYING THE INFORMATION SET OUT IN CLAUSE 3 OF SCHEDULE 4 OF THE ENVIRONMENTAL PLANNING & ASSESSMENT REGULATIONS

Part 3 General Housing Code

Not applicable to the land to which this certificate relates.

Part 3A Rural Housing Code

YES. Complying development specified in the Rural Housing Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 4 Housing Alterations Code

YES. Complying development specified in the Housing Alterations Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 4A General Development Code

YES. Complying development specified in the General Development Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 5 Commercial and Industrial Alterations Code

Not applicable to the land to which this certificate relates.

Part 5A Commercial and Industrial (New Buildings and Additions) Code

Not applicable to the land to which this certificate relates.

Part 6 Subdivision Code

YES. Complying development specified in the Subdivision Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 7 Demolition Code

YES. Complying development specified in the Demolition Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 8 Fire Safety Code

YES. Complying development specified in the Fire Safety Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

STATE ENVIRONMENTAL PLANNING POLICIES

The following State Environmental Planning Policies apply to land within the Muswellbrook Shire LGA:-

No. 21. Caravan Parks - Ensures that where caravan parks or camping grounds are permitted under an environmental planning instrument, movable dwellings, as defined in the Local Government Act 1993, are also permitted. The policy ensures that development consent is required for new caravan parks and camping grounds and for additional long-term sites in existing caravan parks.

No. 30. Intensive Agriculture - Requires development consent for cattle feedlots having a capacity of 50 or more cattle or piggeries having a capacity of 200 or more pigs. The policy sets out information and public notification requirements to ensure there are effective planning control over this export-driven rural industry. The policy does not alter if, and where, such development is permitted, or the functions of the consent authority.

No. 33. Hazardous and Offensive Development - Provides new definitions for 'hazardous industry', 'hazardous storage establishment', 'offensive industry' and 'offensive storage establishment'. The definitions apply to all planning instruments, existing and future. The new definitions enable decisions to approve or refuse a development to be based on the merit of proposal. The consent authority must careful consider the specifics the case, the location and the way in which the proposed activity is to be carried out. The policy also requires specified matters to be considered for proposals that are 'potentially hazardous' or 'potentially offensive' as defined in the policy. For example, any application to carry out a potentially hazardous or potentially offensive development is to be advertised for public comment, and applications to carry out potentially hazardous development must be supported by a preliminary hazard analysis (PHA).

No. 36. Manufactured Home Estates - Helps establish well-designed and properly serviced manufactured home estates (MHEs) in suitable locations. Affordability and security of tenure for residents are important aspects. To enable the immediate development of estates, the policy allows MHEs to be located on certain land where caravan parks are permitted. There are however, criteria that a proposal must satisfy before the local council can approved development.

No. 44. Koala Habitat Protection - Encourages the proper conservation and management of areas of natural vegetation that provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline.

No. 55. Remediation of Land - Introduces state-wide planning controls for the remediation of contaminated land. The policy states that land must not be developed if it is unsuitable for a proposed use because it is contaminated. If the land is unsuitable, remediation must take place before the land is developed. The policy makes remediation permissible across the State, defines when consent is required, requires all remediation to comply with standards, ensures land is investigated if contamination is suspected, and requires councils to be notified of all remediation proposals.

No. 62. Sustainable Aquaculture - The policy implements the regional strategies already developed by creating a simple approach to identity and categorise aquaculture development on the basis of its potential environmental impact. The SEPP also identifies aquaculture development as a designated development only where there are potential environmental risks.

No. 64. Advertising and Signage - Aims to improve the amenity of urban and natural settings by managing the impact of outdoor advertising. The policy responds to growing concerns from the community, the advertising industry and local government that existing controls and guidelines were not effective. SEPP No. 64 offers the comprehensive provisions and consistent approach needed. SEPP 64 – Advertising and Signage: Explanatory Information should be read in conjunction with the policy.

No. 65. Design Quality of Residential Flat Development - Raises the design quality of residential flat development across the state through the application of a series of design principles. The policy provides for the establishment of Design Review Panels to provide independent expert advice to councils on the merit of residential flat development. The accompanying regulation requires the involvement of a qualified designer throughout the design, approval and construction stages.

SEPP (Housing for Seniors or People with a Disability) 2004 - Encourage the development of high quality accommodation for our ageing population and for people who have disabilities - housing that is in keeping with the local neighbourhood

SEPP (Building Sustainability Index: BASIX) 2004 - This SEPP operates in conjunction with Environmental Planning and Assessment Amendment (Building Sustainability Index: BASIX) Regulation 2004 to ensure the effective introduction of BASIX in NSW. The SEPP ensures consistency in the implementation of BASIX throughout the State by overriding competing provisions in other environmental planning instruments and development control plans, and specifying that SEPP 1 does not apply in relation to any development standard arising under BASIX.

SEPP (Infrastructure) 2007 - Provides a consistent planning regime for infrastructure and the provision of services across NSW, along with providing for consultation with relevant public authorities during the assessment process. The SEPP supports greater flexibility in the location of infrastructure and service facilities along with improved regulatory certainty and efficiency.

SEPP (Mining, Petroleum Production and Extractive Industries) 2007 - This Policy aims to provide for the proper management and development of mineral, petroleum and extractive material resources for the social and economic welfare of the State. The Policy establishes appropriate planning controls to encourage ecologically sustainable development.

SEPP (Miscellaneous Consent Provisions) 2007 - Provides for the erection of temporary structures and the use of places of public entertainment while protecting public safety and local amenity. The SEPP supports the transfer of the regulation of places of public entertainment and temporary structures (such as tents, marquees and booths) from the Local Government Act 1993 to the Environmental Planning and Assessment Act 1979.

SEPP (Rural Lands) 2008 - The aim of this policy is to facilitate the orderly and economic use and development of rural lands for rural and related purposes.

SEPP (Exempt and Complying Development Codes) 2008 – This policy streamlines assessment processes for development that complies with specified development standards. The policy provides exempt codes that have State-wide application, identifying, in the General Exempt Development Code, types of development that are of minimal environmental impact that may be carried out without the need for development consent.

SEPP (Affordable Rental Housing) 2009 – The aims of this policy are to provide a consistent planning regime for the provision of affordable rental housing; facilitate the effective delivery of new affordable rental housing by providing incentives by way of expanding zoning permissibility, floor space ratio bonuses and non-discretionary development standards; facilitate the retention and mitigate the loss of existing affordable rental housing; employ a balanced approach between obligations for retaining and mitigating the loss of existing affordable rental housing, and incentives for the development of new

affordable rental housing; facilitate an expanding role for not-for-profit-providers of affordable rental housing; support local business centres by providing affordable rental housing for workers close to places of work; and facilitate the development of housing for the homeless and other disadvantaged people who may require support services, including group homes and supportive accommodation.

SEPP (State and Regional Development) 2011 – The aims of this policy are to identify development that is State significant development; identify development that is State significant infrastructure and critical State significant infrastructure; and confer functions on joint regional planning panels to determine development applications.

Further details regarding these State Environmental Planning Policies and the circumstances in which they may apply to the subject and can be found on the Department of Planning's website.

REGIONAL PLANNING INSTRUMENTS

There are no Regional Environmental Plans applying within the Muswellbrook Shire Council area.

DEVELOPMENT CONTROL PLANS

This land is affected by the following Development Control Plans:
Muswellbrook Shire Development Control Plan 2009

COASTAL PROTECTION

The land IS NOT affected by the operations of Sections 38 and 39 of the *Coastal Protection Act* 1979.

MINE SUBSIDENCE

The land IS NOT WITHIN a Mine Subsidence District proclaimed under section 15 of the Mine Subsidence Compensation Act, 1961.

ROAD WIDENING AND ROAD REALIGNMENT

The subject land IS NOT affected by any road widening or road realignment under:
(a) Division 2 of Part 3 of the Roads Act 1993, or
(b) Any environmental planning instrument, or
(c) Any resolution of the council.

COUNCIL AND OTHER PUBLIC AUTHORITY POLICIES ON HAZARD RISK RESTRICTIONS

The land IS NOT affected by a policy adopted by the council, or adopted by any other public authority and notified to the council for the express purpose of its adoption by that authority being referred to in planning certificates issued by the council: that restricts the development of the land because of the likelihood of land slip, bushfire, tidal inundation, subsidence, acid sulphate soils or any other risk (other than flooding).

FLOOD RELATED DEVELOPMENT CONTROLS INFORMATION

The Hunter River Flood Study 2014 shows the land to be affected by flooding.

LAND RESERVED FOR ACQUISITION

There are NOT any environmental planning instruments; deemed environmental planning instruments or draft environmental planning instruments applying to the land that provide for the acquisition of the land by a public authority, as referred to in section 27 of the Environmental Planning and Assessment Act 1979.

CONTRIBUTIONS PLANS

The Muswellbrook Section 94 Contributions Plan 2001 and Muswellbrook Section 94A Contributions Plan 2009 apply to all land within the Muswellbrook Shire Local Government Area.

BIODIVERSITY CERTIFIED LAND

The land IS NOT biodiversity certified land (within the meaning of Part 7AA of the Threatened Species Conservation Act 1995)

BIOBANKING AGREEMENTS

The land IS NOT affected by a biobanking agreement under Part 7A of the *Threatened Species Conservation Act 1995*.

MATTERS RELATING TO THE MANAGEMENT OF CONTAMINATED LAND

(a) The land to which this certificate relates is NOT within land declared to be significantly contaminated land under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(b) The land to which this certificate relates is NOT subject to a management order under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(c) The land to which this certificate relates is NOT the subject of approved voluntary management proposal the subject of the Environment Protection Authority's agreement under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(d) The land to which this certificate relates is NOT the subject to an ongoing maintenance order under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(e) The land to which this certificate relates has NOT been the subject of a site audit statement provided to Muswellbrook Shire Council.

BUSH FIRE PRONE LAND

The land IS NOT bushfire prone land.

PROPERTY VEGETATION PLANS

Council has NOT been notified of the existence of such a plan or if the land is land to which a property vegetation plan under the Native Vegetation Act 2003 applies.

ORDERS UNDER TREES (DISPUTES BETWEEN NEIGHBOURS) ACT 2006

Council has NOT been notified of any order made under the Trees (Disputes Between Neighbours) Act 2006 to carry out work in relation to a tree on the land.

muswellbrook shire council

Date: 28 September 2017

Cert No: 21220

DIRECTIONS UNDER PART 3A

There is NOT a direction by the Minister in force under section 75P (2) (c1) of the Act in relation to prohibiting or restricting the carrying out of a project or a stage of a project on the land under Part 4 of the Act.

SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR SENIORS HOUSING

There is NOT a current site compatibility certificate (of which the council is aware), issued under clause 25 of State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 in respect of proposed development on the land.

SITE COMPATIBILITY CERTIFICATES FOR INFRASTRUCTURE

There is NOT a valid site compatibility certificate (of which the council is aware), issued under clause 19 of State Environmental Planning Policy (Infrastructure) 2007 in respect of proposed development on the land.

SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR AFFORDABLE RENTAL HOUSING

There is NOT a current site compatibility certificate for affordable rental housing (of which the council is aware), issued under clause 37 of State Environmental Planning Policy (Affordable Rental Housing) 2007 in respect of proposed development on the land.

PAPER SUBDIVISION INFORMATION

There is NOT an adopted development plan or subdivision order that applies to the land.

SITE VERIFICATION CERTIFICATE

There is NOT a current site verification certificate (of which the council is aware), issued under clause 17C of State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007, in relation to the land.

LOOSE-FILL ASBESTOS INSULATION

There are NO residential premises located on this land that are listed on the register that are required to be maintained under Division 1A of Part 8 of the *Home Building Act 1989*.

The accuracy and currency of the details provided by agencies external to Council have not be verified by Muswellbrook Shire Council and should be verified by the applicant.

ADDITIONAL INFORMATION PURSUANT TO SECTION 149(5) OF THE ACT

Council is unaware of any other relevant matters that may affect the land.

For further information, please contact the Environmental Services Department.

S J McDonald
General Manager

Per: DL Watson

PLANNING CERTIFICATE UNDER SECTION 149 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

Enquiries	Environmental Services
Contact	02 6549 3700
Invoice no.	43721
Your reference	Application

Date: 30 September 2017

Assessment: 127647 **Cert No: 21267**

MACH Energy Australia Pty Ltd
GPO Box 94
BRISBANE QLD 4001

Owner (as recorded by Council)
MACH Energy Australia Pty Ltd

Property Description: 522 WYBONG ROAD MUSWELLBROOK 2333
LOT: 22 DP: 554140

Land to which the certificate relates

The land to which this certificate relates, being the lot or lots described on the application form, is shown in the Council's records as being situated at the street address described above. The information contained in this certificate relates only to the lot or lots described on this certificate. Separate planning certificates can be obtained upon application for the other lots, those certificates may contain different information than is contained in this certificate.

CERTIFICATE UNDER SECTION 149(2) ENVIRONMENTAL PLANNING & ASSESSMENT ACT

LOCAL ENVIRONMENTAL PLANS

PLANNING INSTRUMENT	Muswellbrook Local Environmental Plan 2009
LAND USE ZONING	RU1 Primary Production

PERMITTED WITHOUT CONSENT

Extensive agriculture; Home occupations; Intensive plant agriculture

PERMITTED WITH CONSENT

Air transport facilities; Airstrips; Animal boarding or training establishments; Aquaculture; Camping grounds; Caravan parks; Cellar door premises; Cemeteries; Community facilities; Crematoria; Depots; Dwelling houses; Educational establishments; Environmental facilities; Environmental protection works; Extractive industries; Farm buildings; Flood mitigation works; Forestry; Function centres; Group homes; Hazardous industries; Health consulting rooms; Heavy industrial storage establishments; Helipads; Highway service centres; Home-based child care; Home businesses; Home industries; Industrial retail outlets; Information and education facilities; Intensive livestock agriculture; Intensive plant agriculture; Kiosks; Landscaping material supplies; Open cut mining; Places of public worship; Plant nurseries; Recreation areas; Recreation facilities (indoor); Recreation facilities (major); Recreation facilities (outdoor); Research stations; Restaurants or cafes; Roads; Roadside stalls; Rural industries; Rural supplies; Rural worker's dwellings; Secondary dwellings; Service stations; Sewerage systems; Signage; Storage premises; Take away food and drink premises; Tourist and visitor accommodation; Transport depots; Truck depots; Turf farming; Veterinary hospitals; Waste disposal facilities; Water supply systems.

PROHIBITED

Any development not specified above.

MINIMUM LAND DIMENSIONS FOR THE ERECTION OF A DWELLING

Under the provisions of the Muswellbrook Local Environmental Plan 2009, the minimum subdivision lot size is 80ha and is also subject to the provisions detailed below.

Land zoned RU1 Primary Production may, with the consent of Council, be subdivided for the purpose of primary production to create a lot less than the minimum lot size. However, such a lot cannot be created if an existing dwelling would, as the result of the subdivision, be situated on the lot. A dwelling cannot be erected on such a lot created.

Development consent must not be granted to the subdivision of a lot in a strata plan or community title scheme on land zoned RU1 Primary Production that is used, or proposed to be used, for residential accommodation or tourist and visitor accommodation.

Only one dwelling house may be erected on land zoned RU1 Primary Production only if the land is:

(a) a lot created in accordance with clause 4.1 of the LEP 2009, or

(b) a lot created before the LEP 2009 commenced and on which the erection of a dwelling house was permissible immediately before that commencement, or

(c) a lot created before the LEP 2009 commenced that is at least the minimum lot size specified for that lot by the Lot Size Map, or

(d) a lot for which subdivision approval was granted before the LEP 2009 commenced and on which the erection of a dwelling house would have been permissible immediately before that commencement, or

(e) an existing holding.

NOTE: EXISTING HOLDING means all adjoining land, even if separated by a road or railway, held in the same ownership:

(a) on 11 April 1974, and

(b) at the time of lodging a development application for the erection of a dwelling house under this clause.

and includes any other land adjoining that land acquired by the owner since 11 April 1974.

NOTE: The owner in whose ownership all the land is at the time the application is lodged need not be the same person as the owner in whose ownership all the land was on the stated date.

WHETHER THE LAND INCLUDES OR COMPRISES CRITICAL HABITAT

The subject land has not been declared as critical habitat.

WHETHER THE LAND IS IN A CONSERVATION AREA

The subject land is not known to be in a conservation area.

Date: 3 October 2017

Cert No: 21267

WHETHER AN ITEM OF ENVIRONMENTAL HERITAGE IS SITUATED ON THE LAND

The land is NOT affected by any known or listed heritage item.

STATE ENVIRONMENTAL PLANNING POLICIES (EXEMPT & COMPLYING DEVELOPMENT CODES 2008)

CERTIFICATE UNDER SECTION 149(2) IDENTIFYING THE INFORMATION SET OUT IN CLAUSE 3 OF SCHEDULE 4 OF THE ENVIRONMENTAL PLANNING & ASSESSMENT REGULATIONS

Part 3 General Housing Code

Not applicable to the land to which this certificate relates.

Part 3A Rural Housing Code

YES. Complying development specified in the Rural Housing Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 4 Housing Alterations Code

YES. Complying development specified in the Housing Alterations Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 4A General Development Code

YES. Complying development specified in the General Development Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 5 Commercial and Industrial Alterations Code

Not applicable to the land to which this certificate relates.

Part 5A Commercial and Industrial (New Buildings and Additions) Code

Not applicable to the land to which this certificate relates.

Part 6 Subdivision Code

YES. Complying development specified in the Subdivision Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 7 Demolition Code

YES. Complying development specified in the Demolition Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 8 Fire Safety Code

YES. Complying development specified in the Fire Safety Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

STATE ENVIRONMENTAL PLANNING POLICIES

The following State Environmental Planning Policies apply to land within the Muswellbrook Shire LGA:-

No. 21. Caravan Parks - Ensures that where caravan parks or camping grounds are permitted under an environmental planning instrument, movable dwellings, as defined in the Local Government Act 1993, are also permitted. The policy ensures that development consent is required for new caravan parks and camping grounds and for additional long-term sites in existing caravan parks.

No. 30. Intensive Agriculture - Requires development consent for cattle feedlots having a capacity of 50 or more cattle or piggeries having a capacity of 200 or more pigs. The policy sets out information and public notification requirements to ensure there are effective planning control over this export-driven rural industry. The policy does not alter if, and where, such development is permitted, or the functions of the consent authority.

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SEPP (Miscellaneous Consent Provisions) 2007 - Provides for the erection of temporary structures and the use of places of public entertainment while protecting public safety and local amenity. The SEPP supports the transfer of the regulation of places of public entertainment and temporary structures (such as tents, marquees and booths) from the Local Government Act 1993 to the Environmental Planning and Assessment Act 1979.

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affordable rental housing; facilitate an expanding role for not-for-profit-providers of affordable rental housing; support local business centres by providing affordable rental housing for workers close to places of work; and facilitate the development of housing for the homeless and other disadvantaged people who may require support services, including group homes and supportive accommodation.

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Further details regarding these State Environmental Planning Policies and the circumstances in which they may apply to the subject and can be found on the Department of Planning's website.

REGIONAL PLANNING INSTRUMENTS

There are no Regional Environmental Plans applying within the Muswellbrook Shire Council area.

DEVELOPMENT CONTROL PLANS

This land is affected by the following Development Control Plans:
Muswellbrook Shire Development Control Plan 2009

COASTAL PROTECTION

The land IS NOT affected by the operations of Sections 38 and 39 of the *Coastal Protection Act* 1979.

MINE SUBSIDENCE

The land IS NOT WITHIN a Mine Subsidence District proclaimed under section 15 of the Mine Subsidence Compensation Act, 1961.

ROAD WIDENING AND ROAD REALIGNMENT

The subject land IS NOT affected by any road widening or road realignment under:
(a) Division 2 of Part 3 of the Roads Act 1993, or
(b) Any environmental planning instrument, or
(c) Any resolution of the council.

COUNCIL AND OTHER PUBLIC AUTHORITY POLICIES ON HAZARD RISK RESTRICTIONS

The land IS NOT affected by a policy adopted by the council, or adopted by any other public authority and notified to the council for the express purpose of its adoption by that authority being referred to in planning certificates issued by the council: that restricts the development of the land because of the likelihood of land slip, bushfire, tidal inundation, subsidence, acid sulphate soils or any other risk (other than flooding).

FLOOD RELATED DEVELOPMENT CONTROLS INFORMATION

The Hunter River Flood Study 2014 shows the land to be affected by flooding.

LAND RESERVED FOR ACQUISITION

There are NOT any environmental planning instruments; deemed environmental planning instruments or draft environmental planning instruments applying to the land that provide for the acquisition of the

land by a public authority, as referred to in section 27 of the Environmental Planning and Assessment Act 1979.

CONTRIBUTIONS PLANS

The Muswellbrook Section 94 Contributions Plan 2001 and Muswellbrook Section 94A Contributions Plan 2009 apply to all land within the Muswellbrook Shire Local Government Area.

BIODIVERSITY CERTIFIED LAND

The land IS NOT biodiversity certified land (within the meaning of Part 7AA of the Threatened Species Conservation Act 1995)

BIOBANKING AGREEMENTS

The land IS NOT affected by a biobanking agreement under Part 7A of the *Threatened Species Conservation Act 1995*.

MATTERS RELATING TO THE MANAGEMENT OF CONTAMINATED LAND

(a) The land to which this certificate relates is NOT within land declared to be significantly contaminated land under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(b) The land to which this certificate relates is NOT subject to a management order under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(c) The land to which this certificate relates is NOT the subject of approved voluntary management proposal the subject of the Environment Protection Authority's agreement under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(d) The land to which this certificate relates is NOT the subject to an ongoing maintenance order under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(e) The land to which this certificate relates has NOT been the subject of a site audit statement provided to Muswellbrook Shire Council.

BUSH FIRE PRONE LAND

The land IS NOT bushfire prone land.

PROPERTY VEGETATION PLANS

Council has NOT been notified of the existence of such a plan or if the land is land to which a property vegetation plan under the Native Vegetation Act 2003 applies.

ORDERS UNDER TREES (DISPUTES BETWEEN NEIGHBOURS) ACT 2006

Council has NOT been notified of any order made under the Trees (Disputes Between Neighbours) Act 2006 to carry out work in relation to a tree on the land.

Date: 3 October 2017

Cert No: 21267

DIRECTIONS UNDER PART 3A

There is NOT a direction by the Minister in force under section 75P (2) (c1) of the Act in relation to prohibiting or restricting the carrying out of a project or a stage of a project on the land under Part 4 of the Act.

SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR SENIORS HOUSING

There is NOT a current site compatibility certificate (of which the council is aware), issued under clause 25 of State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 in respect of proposed development on the land.

SITE COMPATIBILITY CERTIFICATES FOR INFRASTRUCTURE

There is NOT a valid site compatibility certificate (of which the council is aware), issued under clause 19 of State Environmental Planning Policy (Infrastructure) 2007 in respect of proposed development on the land.

SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR AFFORDABLE RENTAL HOUSING

There is NOT a current site compatibility certificate for affordable rental housing (of which the council is aware), issued under clause 37 of State Environmental Planning Policy (Affordable Rental Housing) 2007 in respect of proposed development on the land.

PAPER SUBDIVISION INFORMATION

There is NOT an adopted development plan or subdivision order that applies to the land.

SITE VERIFICATION CERTIFICATE

There is NOT a current site verification certificate (of which the council is aware), issued under clause 17C of State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007, in relation to the land.

LOOSE-FILL ASBESTOS INSULATION

There are NO residential premises located on this land that are listed on the register that are required to be maintained under Division 1A of Part 8 of the *Home Building Act 1989*.

The accuracy and currency of the details provided by agencies external to Council have not be verified by Muswellbrook Shire Council and should be verified by the applicant.

ADDITIONAL INFORMATION PURSUANT TO SECTION 149(5) OF THE ACT

Council is unaware of any other relevant matters that may affect the land.

For further information, please contact the Environmental Services Department.

S J McDonald
General Manager

Per: D L Watson

PLANNING CERTIFICATE UNDER SECTION 149 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

Enquiries	Environmental Services
Contact	02 6549 3700
Invoice no.	43721
Your reference	Application

Date: 30 September 2017

Assessment: 127647 **Cert No: 21266**

MACH Energy Australia Pty Ltd
GPO Box 94
BRISBANE QLD 4001

Owner (as recorded by Council)
MACH Energy Australia Pty Ltd

Property Description: 524 WYBONG ROAD MUSWELLBROOK 2333
LOT: 21 DP: 554140

Land to which the certificate relates

The land to which this certificate relates, being the lot or lots described on the application form, is shown in the Council's records as being situated at the street address described above. The information contained in this certificate relates only to the lot or lots described on this certificate. Separate planning certificates can be obtained upon application for the other lots, those certificates may contain different information than is contained in this certificate.

CERTIFICATE UNDER SECTION 149(2) ENVIRONMENTAL PLANNING & ASSESSMENT ACT

LOCAL ENVIRONMENTAL PLANS

PLANNING INSTRUMENT	Muswellbrook Local Environmental Plan 2009
LAND USE ZONING	RU1 Primary Production

PERMITTED WITHOUT CONSENT

Extensive agriculture; Home occupations; Intensive plant agriculture

PERMITTED WITH CONSENT

Air transport facilities; Airstrips; Animal boarding or training establishments; Aquaculture; Camping grounds; Caravan parks; Cellar door premises; Cemeteries; Community facilities; Crematoria; Depots; Dwelling houses; Educational establishments; Environmental facilities; Environmental protection works; Extractive industries; Farm buildings; Flood mitigation works; Forestry; Function centres; Group homes; Hazardous industries; Health consulting rooms; Heavy industrial storage establishments; Helipads; Highway service centres; Home-based child care; Home businesses; Home industries; Industrial retail outlets; Information and education facilities; Intensive livestock agriculture; Intensive plant agriculture; Kiosks; Landscaping material supplies; Open cut mining; Places of public worship; Plant nurseries; Recreation areas; Recreation facilities (indoor); Recreation facilities (major); Recreation facilities (outdoor); Research stations; Restaurants or cafes; Roads; Roadside stalls; Rural industries; Rural supplies; Rural worker's dwellings; Secondary dwellings; Service stations; Sewerage systems; Signage; Storage premises; Take away food and drink premises; Tourist and visitor accommodation; Transport depots; Truck depots; Turf farming; Veterinary hospitals; Waste disposal facilities; Water supply systems.

Date: 3 October 2017

Cert No: 21266

PROHIBITED

Any development not specified above.

MINIMUM LAND DIMENSIONS FOR THE ERECTION OF A DWELLING

Under the provisions of the Muswellbrook Local Environmental Plan 2009, the minimum subdivision lot size is 80ha and is also subject to the provisions detailed below.

Land zoned RU1 Primary Production may, with the consent of Council, be subdivided for the purpose of primary production to create a lot less than the minimum lot size. However, such a lot cannot be created if an existing dwelling would, as the result of the subdivision, be situated on the lot. A dwelling cannot be erected on such a lot created.

Development consent must not be granted to the subdivision of a lot in a strata plan or community title scheme on land zoned RU1 Primary Production that is used, or proposed to be used, for residential accommodation or tourist and visitor accommodation.

Only one dwelling house may be erected on land zoned RU1 Primary Production only if the land is:

(a) a lot created in accordance with clause 4.1 of the LEP 2009, or

(b) a lot created before the LEP 2009 commenced and on which the erection of a dwelling house was permissible immediately before that commencement, or

(c) a lot created before the LEP 2009 commenced that is at least the minimum lot size specified for that lot by the Lot Size Map, or

(d) a lot for which subdivision approval was granted before the LEP 2009 commenced and on which the erection of a dwelling house would have been permissible immediately before that commencement, or

(e) an existing holding.

NOTE: EXISTING HOLDING means all adjoining land, even if separated by a road or railway, held in the same ownership:

(a) on 11 April 1974, and

(b) at the time of lodging a development application for the erection of a dwelling house under this clause.

and includes any other land adjoining that land acquired by the owner since 11 April 1974.

NOTE: The owner in whose ownership all the land is at the time the application is lodged need not be the same person as the owner in whose ownership all the land was on the stated date.

WHETHER THE LAND INCLUDES OR COMPRISES CRITICAL HABITAT

The subject land has not been declared as critical habitat.

WHETHER THE LAND IS IN A CONSERVATION AREA

The subject land is not known to be in a conservation area.

muswellbrook shire council

Date: 3 October 2017

Cert No: 21266

WHETHER AN ITEM OF ENVIRONMENTAL HERITAGE IS SITUATED ON THE LAND

The land is NOT affected by any known or listed heritage item.

STATE ENVIRONMENTAL PLANNING POLICIES (EXEMPT & COMPLYING DEVELOPMENT CODES 2008)

CERTIFICATE UNDER SECTION 149(2) IDENTIFYING THE INFORMATION SET OUT IN CLAUSE 3 OF SCHEDULE 4 OF THE ENVIRONMENTAL PLANNING & ASSESSMENT REGULATIONS

Part 3 General Housing Code

Not applicable to the land to which this certificate relates.

Part 3A Rural Housing Code

YES. Complying development specified in the Rural Housing Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 4 Housing Alterations Code

YES. Complying development specified in the Housing Alterations Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 4A General Development Code

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Part 5 Commercial and Industrial Alterations Code

Not applicable to the land to which this certificate relates.

Part 5A Commercial and Industrial (New Buildings and Additions) Code

Not applicable to the land to which this certificate relates.

Part 6 Subdivision Code

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Part 8 Fire Safety Code

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The following State Environmental Planning Policies apply to land within the Muswellbrook Shire LGA:-

No. 21. Caravan Parks - Ensures that where caravan parks or camping grounds are permitted under an environmental planning instrument, movable dwellings, as defined in the Local Government Act 1993, are also permitted. The policy ensures that development consent is required for new caravan parks and camping grounds and for additional long-term sites in existing caravan parks.

No. 30. Intensive Agriculture - Requires development consent for cattle feedlots having a capacity of 50 or more cattle or piggeries having a capacity of 200 or more pigs. The policy sets out information and public notification requirements to ensure there are effective planning control over this export-driven rural industry. The policy does not alter if, and where, such development is permitted, or the functions of the consent authority.

No. 33. Hazardous and Offensive Development - Provides new definitions for 'hazardous industry', 'hazardous storage establishment', 'offensive industry' and 'offensive storage establishment'. The definitions apply to all planning instruments, existing and future. The new definitions enable decisions to approve or refuse a development to be based on the merit of proposal. The consent authority must careful consider the specifics the case, the location and the way in which the proposed activity is to be carried out. The policy also requires specified matters to be considered for proposals that are 'potentially hazardous' or 'potentially offensive' as defined in the policy. For example, any application to carry out a potentially hazardous or potentially offensive development is to be advertised for public comment, and applications to carry out potentially hazardous development must be supported by a preliminary hazard analysis (PHA).

No. 36. Manufactured Home Estates - Helps establish well-designed and properly serviced manufactured home estates (MHEs) in suitable locations. Affordability and security of tenure for residents are important aspects. To enable the immediate development of estates, the policy allows MHEs to be located on certain land where caravan parks are permitted. There are however, criteria that a proposal must satisfy before the local council can approved development.

No. 44. Koala Habitat Protection - Encourages the proper conservation and management of areas of natural vegetation that provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline.

No. 55. Remediation of Land - Introduces state-wide planning controls for the remediation of contaminated land. The policy states that land must not be developed if it is unsuitable for a proposed use because it is contaminated. If the land is unsuitable, remediation must take place before the land is developed. The policy makes remediation permissible across the State, defines when consent is required, requires all remediation to comply with standards, ensures land is investigated if contamination is suspected, and requires councils to be notified of all remediation proposals.

No. 62. Sustainable Aquaculture - The policy implements the regional strategies already developed by creating a simple approach to identity and categorise aquaculture development on the basis of its potential environmental impact. The SEPP also identifies aquaculture development as a designated development only where there are potential environmental risks.

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No. 65. Design Quality of Residential Flat Development - Raises the design quality of residential flat development across the state through the application of a series of design principles. The policy provides for the establishment of Design Review Panels to provide independent expert advice to councils on the merit of residential flat development. The accompanying regulation requires the involvement of a qualified designer throughout the design, approval and construction stages.

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SEPP (Building Sustainability Index: BASIX) 2004 - This SEPP operates in conjunction with Environmental Planning and Assessment Amendment (Building Sustainability Index: BASIX) Regulation 2004 to ensure the effective introduction of BASIX in NSW. The SEPP ensures consistency in the implementation of BASIX throughout the State by overriding competing provisions in other environmental planning instruments and development control plans, and specifying that SEPP 1 does not apply in relation to any development standard arising under BASIX.

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SEPP (Mining, Petroleum Production and Extractive Industries) 2007 - This Policy aims to provide for the proper management and development of mineral, petroleum and extractive material resources for the social and economic welfare of the State. The Policy establishes appropriate planning controls to encourage ecologically sustainable development.

SEPP (Miscellaneous Consent Provisions) 2007 - Provides for the erection of temporary structures and the use of places of public entertainment while protecting public safety and local amenity. The SEPP supports the transfer of the regulation of places of public entertainment and temporary structures (such as tents, marquees and booths) from the Local Government Act 1993 to the Environmental Planning and Assessment Act 1979.

SEPP (Rural Lands) 2008 - The aim of this policy is to facilitate the orderly and economic use and development of rural lands for rural and related purposes.

SEPP (Exempt and Complying Development Codes) 2008 – This policy streamlines assessment processes for development that complies with specified development standards. The policy provides exempt codes that have State-wide application, identifying, in the General Exempt Development Code, types of development that are of minimal environmental impact that may be carried out without the need for development consent.

SEPP (Affordable Rental Housing) 2009 – The aims of this policy are to provide a consistent planning regime for the provision of affordable rental housing; facilitate the effective delivery of new affordable rental housing by providing incentives by way of expanding zoning permissibility, floor space ratio bonuses and non-discretionary development standards; facilitate the retention and mitigate the loss of existing affordable rental housing; employ a balanced approach between obligations for retaining and mitigating the loss of existing affordable rental housing, and incentives for the development of new

affordable rental housing; facilitate an expanding role for not-for-profit-providers of affordable rental housing; support local business centres by providing affordable rental housing for workers close to places of work; and facilitate the development of housing for the homeless and other disadvantaged people who may require support services, including group homes and supportive accommodation.

SEPP (State and Regional Development) 2011 – The aims of this policy are to identify development that is State significant development; identify development that is State significant infrastructure and critical State significant infrastructure; and confer functions on joint regional planning panels to determine development applications.

Further details regarding these State Environmental Planning Policies and the circumstances in which they may apply to the subject and can be found on the Department of Planning's website.

REGIONAL PLANNING INSTRUMENTS

There are no Regional Environmental Plans applying within the Muswellbrook Shire Council area.

DEVELOPMENT CONTROL PLANS

This land is affected by the following Development Control Plans:
Muswellbrook Shire Development Control Plan 2009

COASTAL PROTECTION

The land IS NOT affected by the operations of Sections 38 and 39 of the *Coastal Protection Act* 1979.

MINE SUBSIDENCE

The land IS NOT WITHIN a Mine Subsidence District proclaimed under section 15 of the Mine Subsidence Compensation Act, 1961.

ROAD WIDENING AND ROAD REALIGNMENT

The subject land IS NOT affected by any road widening or road realignment under:
(a) Division 2 of Part 3 of the Roads Act 1993, or
(b) Any environmental planning instrument, or
(c) Any resolution of the council.

COUNCIL AND OTHER PUBLIC AUTHORITY POLICIES ON HAZARD RISK RESTRICTIONS

The land IS NOT affected by a policy adopted by the council, or adopted by any other public authority and notified to the council for the express purpose of its adoption by that authority being referred to in planning certificates issued by the council: that restricts the development of the land because of the likelihood of land slip, bushfire, tidal inundation, subsidence, acid sulphate soils or any other risk (other than flooding).

FLOOD RELATED DEVELOPMENT CONTROLS INFORMATION

The Hunter River Flood Study 2014 shows the land to be affected by flooding.

LAND RESERVED FOR ACQUISITION

There are NOT any environmental planning instruments; deemed environmental planning instruments or draft environmental planning instruments applying to the land that provide for the acquisition of the

land by a public authority, as referred to in section 27 of the Environmental Planning and Assessment Act 1979.

CONTRIBUTIONS PLANS

The Muswellbrook Section 94 Contributions Plan 2001 and Muswellbrook Section 94A Contributions Plan 2009 apply to all land within the Muswellbrook Shire Local Government Area.

BIODIVERSITY CERTIFIED LAND

The land IS NOT biodiversity certified land (within the meaning of Part 7AA of the Threatened Species Conservation Act 1995)

BIOBANKING AGREEMENTS

The land IS NOT affected by a biobanking agreement under Part 7A of the *Threatened Species Conservation Act 1995*.

MATTERS RELATING TO THE MANAGEMENT OF CONTAMINATED LAND

(a) The land to which this certificate relates is NOT within land declared to be significantly contaminated land under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(b) The land to which this certificate relates is NOT subject to a management order under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(c) The land to which this certificate relates is NOT the subject of approved voluntary management proposal the subject of the Environment Protection Authority's agreement under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(d) The land to which this certificate relates is NOT the subject to an ongoing maintenance order under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(e) The land to which this certificate relates has NOT been the subject of a site audit statement provided to Muswellbrook Shire Council.

BUSH FIRE PRONE LAND

The land IS NOT bushfire prone land.

PROPERTY VEGETATION PLANS

Council has NOT been notified of the existence of such a plan or if the land is land to which a property vegetation plan under the Native Vegetation Act 2003 applies.

ORDERS UNDER TREES (DISPUTES BETWEEN NEIGHBOURS) ACT 2006

Council has NOT been notified of any order made under the Trees (Disputes Between Neighbours) Act 2006 to carry out work in relation to a tree on the land.

Date: 3 October 2017

Cert No: 21266

DIRECTIONS UNDER PART 3A

There is NOT a direction by the Minister in force under section 75P (2) (c1) of the Act in relation to prohibiting or restricting the carrying out of a project or a stage of a project on the land under Part 4 of the Act.

SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR SENIORS HOUSING

There is NOT a current site compatibility certificate (of which the council is aware), issued under clause 25 of State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 in respect of proposed development on the land.

SITE COMPATIBILITY CERTIFICATES FOR INFRASTRUCTURE

There is NOT a valid site compatibility certificate (of which the council is aware), issued under clause 19 of State Environmental Planning Policy (Infrastructure) 2007 in respect of proposed development on the land.

SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR AFFORDABLE RENTAL HOUSING

There is NOT a current site compatibility certificate for affordable rental housing (of which the council is aware), issued under clause 37 of State Environmental Planning Policy (Affordable Rental Housing) 2007 in respect of proposed development on the land.

PAPER SUBDIVISION INFORMATION

There is NOT an adopted development plan or subdivision order that applies to the land.

SITE VERIFICATION CERTIFICATE

There is NOT a current site verification certificate (of which the council is aware), issued under clause 17C of State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007, in relation to the land.

LOOSE-FILL ASBESTOS INSULATION

There are NO residential premises located on this land that are listed on the register that are required to be maintained under Division 1A of Part 8 of the *Home Building Act 1989*.

The accuracy and currency of the details provided by agencies external to Council have not be verified by Muswellbrook Shire Council and should be verified by the applicant.

ADDITIONAL INFORMATION PURSUANT TO SECTION 149(5) OF THE ACT

Council is unaware of any other relevant matters that may affect the land.

For further information, please contact the
Environmental Services Department.

S J McDonald
General Manager

Per: D L Watson

PLANNING CERTIFICATE UNDER SECTION 149 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

Enquiries	Environmental Services
Contact	02 6549 3700
Invoice no.	43721
Your reference	Application

Date: 30 September 2017

Assessment: 127647 **Cert No: 21271**

MACH Energy Australia Pty Ltd
GPO Box 94
BRISBANE QLD 4001

Owner (as recorded by Council)
MACH Energy Australia Pty Ltd

Property Description: 570 WYBONG ROAD MUSWELLBROOK 2333
LOT: 25 DP: 1053537

Land to which the certificate relates

The land to which this certificate relates, being the lot or lots described on the application form, is shown in the Council's records as being situated at the street address described above. The information contained in this certificate relates only to the lot or lots described on this certificate. Separate planning certificates can be obtained upon application for the other lots, those certificates may contain different information than is contained in this certificate.

CERTIFICATE UNDER SECTION 149(2) ENVIRONMENTAL PLANNING & ASSESSMENT ACT

LOCAL ENVIRONMENTAL PLANS

PLANNING INSTRUMENT	Muswellbrook Local Environmental Plan 2009
LAND USE ZONING	RU1 Primary Production

PERMITTED WITHOUT CONSENT

Extensive agriculture; Home occupations; Intensive plant agriculture

PERMITTED WITH CONSENT

Air transport facilities; Airstrips; Animal boarding or training establishments; Aquaculture; Camping grounds; Caravan parks; Cellar door premises; Cemeteries; Community facilities; Crematoria; Depots; Dwelling houses; Educational establishments; Environmental facilities; Environmental protection works; Extractive industries; Farm buildings; Flood mitigation works; Forestry; Function centres; Group homes; Hazardous industries; Health consulting rooms; Heavy industrial storage establishments; Helipads; Highway service centres; Home-based child care; Home businesses; Home industries; Industrial retail outlets; Information and education facilities; Intensive livestock agriculture; Intensive plant agriculture; Kiosks; Landscaping material supplies; Open cut mining; Places of public worship; Plant nurseries; Recreation areas; Recreation facilities (indoor); Recreation facilities (major); Recreation facilities (outdoor); Research stations; Restaurants or cafes; Roads; Roadside stalls; Rural industries; Rural supplies; Rural worker's dwellings; Secondary dwellings; Service stations; Sewerage systems; Signage; Storage premises; Take away food and drink premises; Tourist and visitor accommodation; Transport depots; Truck depots; Turf farming; Veterinary hospitals; Waste disposal facilities; Water supply systems.

PROHIBITED

Any development not specified above.

MINIMUM LAND DIMENSIONS FOR THE ERECTION OF A DWELLING

Under the provisions of the Muswellbrook Local Environmental Plan 2009, the minimum subdivision lot size is 80ha and is also subject to the provisions detailed below.

Land zoned RU1 Primary Production may, with the consent of Council, be subdivided for the purpose of primary production to create a lot less than the minimum lot size. However, such a lot cannot be created if an existing dwelling would, as the result of the subdivision, be situated on the lot. A dwelling cannot be erected on such a lot created.

Development consent must not be granted to the subdivision of a lot in a strata plan or community title scheme on land zoned RU1 Primary Production that is used, or proposed to be used, for residential accommodation or tourist and visitor accommodation.

Only one dwelling house may be erected on land zoned RU1 Primary Production only if the land is:

(a) a lot created in accordance with clause 4.1 of the LEP 2009, or

(b) a lot created before the LEP 2009 commenced and on which the erection of a dwelling house was permissible immediately before that commencement, or

(c) a lot created before the LEP 2009 commenced that is at least the minimum lot size specified for that lot by the Lot Size Map, or

(d) a lot for which subdivision approval was granted before the LEP 2009 commenced and on which the erection of a dwelling house would have been permissible immediately before that commencement, or

(e) an existing holding.

NOTE: EXISTING HOLDING means all adjoining land, even if separated by a road or railway, held in the same ownership:

(a) on 11 April 1974, and

(b) at the time of lodging a development application for the erection of a dwelling house under this clause.

and includes any other land adjoining that land acquired by the owner since 11 April 1974.

NOTE: The owner in whose ownership all the land is at the time the application is lodged need not be the same person as the owner in whose ownership all the land was on the stated date.

WHETHER THE LAND INCLUDES OR COMPRISES CRITICAL HABITAT

The subject land has not been declared as critical habitat.

WHETHER THE LAND IS IN A CONSERVATION AREA

The subject land is not known to be in a conservation area.

Date: 3 October 2017

Cert No: 21271

WHETHER AN ITEM OF ENVIRONMENTAL HERITAGE IS SITUATED ON THE LAND

The land is NOT affected by any known or listed heritage item.

STATE ENVIRONMENTAL PLANNING POLICIES (EXEMPT & COMPLYING DEVELOPMENT CODES 2008)

CERTIFICATE UNDER SECTION 149(2) IDENTIFYING THE INFORMATION SET OUT IN CLAUSE 3 OF SCHEDULE 4 OF THE ENVIRONMENTAL PLANNING & ASSESSMENT REGULATIONS

Part 3 General Housing Code

Not applicable to the land to which this certificate relates.

Part 3A Rural Housing Code

YES. Complying development specified in the Rural Housing Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 4 Housing Alterations Code

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Not applicable to the land to which this certificate relates.

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Not applicable to the land to which this certificate relates.

Part 6 Subdivision Code

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Part 8 Fire Safety Code

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affordable rental housing; facilitate an expanding role for not-for-profit-providers of affordable rental housing; support local business centres by providing affordable rental housing for workers close to places of work; and facilitate the development of housing for the homeless and other disadvantaged people who may require support services, including group homes and supportive accommodation.

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REGIONAL PLANNING INSTRUMENTS

There are no Regional Environmental Plans applying within the Muswellbrook Shire Council area.

DEVELOPMENT CONTROL PLANS

This land is affected by the following Development Control Plans:
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The land IS NOT affected by the operations of Sections 38 and 39 of the *Coastal Protection Act* 1979.

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The land IS NOT WITHIN a Mine Subsidence District proclaimed under section 15 of the Mine Subsidence Compensation Act, 1961.

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The subject land IS NOT affected by any road widening or road realignment under:
(a) Division 2 of Part 3 of the Roads Act 1993, or
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The land IS NOT affected by a policy adopted by the council, or adopted by any other public authority and notified to the council for the express purpose of its adoption by that authority being referred to in planning certificates issued by the council: that restricts the development of the land because of the likelihood of land slip, bushfire, tidal inundation, subsidence, acid sulphate soils or any other risk (other than flooding).

FLOOD RELATED DEVELOPMENT CONTROLS INFORMATION

The Hunter River Flood Study 2014 shows the land to be affected by flooding.

LAND RESERVED FOR ACQUISITION

There are NOT any environmental planning instruments; deemed environmental planning instruments or draft environmental planning instruments applying to the land that provide for the acquisition of the

land by a public authority, as referred to in section 27 of the Environmental Planning and Assessment Act 1979.

CONTRIBUTIONS PLANS

The Muswellbrook Section 94 Contributions Plan 2001 and Muswellbrook Section 94A Contributions Plan 2009 apply to all land within the Muswellbrook Shire Local Government Area.

BIODIVERSITY CERTIFIED LAND

The land IS NOT biodiversity certified land (within the meaning of Part 7AA of the Threatened Species Conservation Act 1995)

BIOBANKING AGREEMENTS

The land IS NOT affected by a biobanking agreement under Part 7A of the *Threatened Species Conservation Act 1995*.

MATTERS RELATING TO THE MANAGEMENT OF CONTAMINATED LAND

(a) The land to which this certificate relates is NOT within land declared to be significantly contaminated land under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(b) The land to which this certificate relates is NOT subject to a management order under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(c) The land to which this certificate relates is NOT the subject of approved voluntary management proposal the subject of the Environment Protection Authority's agreement under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(d) The land to which this certificate relates is NOT the subject to an ongoing maintenance order under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(e) The land to which this certificate relates has NOT been the subject of a site audit statement provided to Muswellbrook Shire Council.

BUSH FIRE PRONE LAND

The land IS NOT bushfire prone land.

PROPERTY VEGETATION PLANS

Council has NOT been notified of the existence of such a plan or if the land is land to which a property vegetation plan under the Native Vegetation Act 2003 applies.

ORDERS UNDER TREES (DISPUTES BETWEEN NEIGHBOURS) ACT 2006

Council has NOT been notified of any order made under the Trees (Disputes Between Neighbours) Act 2006 to carry out work in relation to a tree on the land.

Date: 3 October 2017

Cert No: 21271

DIRECTIONS UNDER PART 3A

There is NOT a direction by the Minister in force under section 75P (2) (c1) of the Act in relation to prohibiting or restricting the carrying out of a project or a stage of a project on the land under Part 4 of the Act.

SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR SENIORS HOUSING

There is NOT a current site compatibility certificate (of which the council is aware), issued under clause 25 of State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 in respect of proposed development on the land.

SITE COMPATIBILITY CERTIFICATES FOR INFRASTRUCTURE

There is NOT a valid site compatibility certificate (of which the council is aware), issued under clause 19 of State Environmental Planning Policy (Infrastructure) 2007 in respect of proposed development on the land.

SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR AFFORDABLE RENTAL HOUSING

There is NOT a current site compatibility certificate for affordable rental housing (of which the council is aware), issued under clause 37 of State Environmental Planning Policy (Affordable Rental Housing) 2007 in respect of proposed development on the land.

PAPER SUBDIVISION INFORMATION

There is NOT an adopted development plan or subdivision order that applies to the land.

SITE VERIFICATION CERTIFICATE

There is NOT a current site verification certificate (of which the council is aware), issued under clause 17C of State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007, in relation to the land.

LOOSE-FILL ASBESTOS INSULATION

There are NO residential premises located on this land that are listed on the register that are required to be maintained under Division 1A of Part 8 of the *Home Building Act 1989*.

The accuracy and currency of the details provided by agencies external to Council have not be verified by Muswellbrook Shire Council and should be verified by the applicant.

ADDITIONAL INFORMATION PURSUANT TO SECTION 149(5) OF THE ACT

Council is unaware of any other relevant matters that may affect the land.

For further information, please contact the
Environmental Services Department.

S J McDonald
General Manager

Per: D L Watson

PLANNING CERTIFICATE UNDER SECTION 149 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

Enquiries	Environmental Services
Contact	02 6549 3700
Invoice no.	43721
Your reference	Application

Date: 29 September 2017

Assessment: 63719 **Cert No: 21235**

MACH Energy Australia Pty Ltd
GPO Box 94
BRISBANE QLD 4001

Owner (as recorded by Council)

MACH Energy Australia Pty Ltd

Property Description: WYBONG ROAD MUSWELLBROOK 2333
LOT: 2 DP: 780673

Land to which the certificate relates

The land to which this certificate relates, being the lot or lots described on the application form, is shown in the Council's records as being situated at the street address described above. The information contained in this certificate relates only to the lot or lots described on this certificate. Separate planning certificates can be obtained upon application for the other lots, those certificates may contain different information than is contained in this certificate.

CERTIFICATE UNDER SECTION 149(2) ENVIRONMENTAL PLANNING & ASSESSMENT ACT

LOCAL ENVIRONMENTAL PLANS

PLANNING INSTRUMENT	Muswellbrook Local Environmental Plan 2009
LAND USE ZONING	RU1 Primary Production

PERMITTED WITHOUT CONSENT

Extensive agriculture; Home occupations; Intensive plant agriculture

PERMITTED WITH CONSENT

Air transport facilities; Airstrips; Animal boarding or training establishments; Aquaculture; Camping grounds; Caravan parks; Cellar door premises; Cemeteries; Community facilities; Crematoria; Depots; Dwelling houses; Educational establishments; Environmental facilities; Environmental protection works; Extractive industries; Farm buildings; Flood mitigation works; Forestry; Function centres; Group homes; Hazardous industries; Health consulting rooms; Heavy industrial storage establishments; Helipads; Highway service centres; Home-based child care; Home businesses; Home industries; Industrial retail outlets; Information and education facilities; Intensive livestock agriculture; Intensive plant agriculture; Kiosks; Landscaping material supplies; Open cut mining; Places of public worship; Plant nurseries; Recreation areas; Recreation facilities (indoor); Recreation facilities (major); Recreation facilities (outdoor); Research stations; Restaurants or cafes; Roads; Roadside stalls; Rural industries; Rural supplies; Rural worker's dwellings; Secondary dwellings; Service stations; Sewerage systems; Signage; Storage premises; Take away food and drink premises; Tourist and visitor accommodation; Transport depots; Truck depots; Turf farming; Veterinary hospitals; Waste disposal facilities; Water supply systems.

PROHIBITED

Any development not specified above.

MINIMUM LAND DIMENSIONS FOR THE ERECTION OF A DWELLING

Under the provisions of the Muswellbrook Local Environmental Plan 2009, the minimum subdivision lot size is 80ha and is also subject to the provisions detailed below.

Land zoned RU1 Primary Production may, with the consent of Council, be subdivided for the purpose of primary production to create a lot less than the minimum lot size. However, such a lot cannot be created if an existing dwelling would, as the result of the subdivision, be situated on the lot. A dwelling cannot be erected on such a lot created.

Development consent must not be granted to the subdivision of a lot in a strata plan or community title scheme on land zoned RU1 Primary Production that is used, or proposed to be used, for residential accommodation or tourist and visitor accommodation.

Only one dwelling house may be erected on land zoned RU1 Primary Production only if the land is:

(a) a lot created in accordance with clause 4.1 of the LEP 2009, or

(b) a lot created before the LEP 2009 commenced and on which the erection of a dwelling house was permissible immediately before that commencement, or

(c) a lot created before the LEP 2009 commenced that is at least the minimum lot size specified for that lot by the Lot Size Map, or

(d) a lot for which subdivision approval was granted before the LEP 2009 commenced and on which the erection of a dwelling house would have been permissible immediately before that commencement, or

(e) an existing holding.

NOTE: EXISTING HOLDING means all adjoining land, even if separated by a road or railway, held in the same ownership:

(a) on 11 April 1974, and

(b) at the time of lodging a development application for the erection of a dwelling house under this clause.

and includes any other land adjoining that land acquired by the owner since 11 April 1974.

NOTE: The owner in whose ownership all the land is at the time the application is lodged need not be the same person as the owner in whose ownership all the land was on the stated date.

WHETHER THE LAND INCLUDES OR COMPRISES CRITICAL HABITAT

The subject land has not been declared as critical habitat.

WHETHER THE LAND IS IN A CONSERVATION AREA

The subject land is not known to be in a conservation area.

muswellbrook shire council

Date: 29 September 2017

Cert No: 21235

WHETHER AN ITEM OF ENVIRONMENTAL HERITAGE IS SITUATED ON THE LAND

The land is NOT affected by any known or listed heritage item.

STATE ENVIRONMENTAL PLANNING POLICIES (EXEMPT & COMPLYING DEVELOPMENT CODES 2008)

CERTIFICATE UNDER SECTION 149(2) IDENTIFYING THE INFORMATION SET OUT IN CLAUSE 3 OF SCHEDULE 4 OF THE ENVIRONMENTAL PLANNING & ASSESSMENT REGULATIONS

Part 3 General Housing Code

Not applicable to the land to which this certificate relates.

Part 3A Rural Housing Code

YES. Complying development specified in the Rural Housing Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 4 Housing Alterations Code

YES. Complying development specified in the Housing Alterations Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 4A General Development Code

YES. Complying development specified in the General Development Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 5 Commercial and Industrial Alterations Code

Not applicable to the land to which this certificate relates.

Part 5A Commercial and Industrial (New Buildings and Additions) Code

Not applicable to the land to which this certificate relates.

Part 6 Subdivision Code

YES. Complying development specified in the Subdivision Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 7 Demolition Code

YES. Complying development specified in the Demolition Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 8 Fire Safety Code

YES. Complying development specified in the Fire Safety Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

STATE ENVIRONMENTAL PLANNING POLICIES

The following State Environmental Planning Policies apply to land within the Muswellbrook Shire LGA:-

No. 21. Caravan Parks - Ensures that where caravan parks or camping grounds are permitted under an environmental planning instrument, movable dwellings, as defined in the Local Government Act 1993, are also permitted. The policy ensures that development consent is required for new caravan parks and camping grounds and for additional long-term sites in existing caravan parks.

No. 30. Intensive Agriculture - Requires development consent for cattle feedlots having a capacity of 50 or more cattle or piggeries having a capacity of 200 or more pigs. The policy sets out information and public notification requirements to ensure there are effective planning control over this export-driven rural industry. The policy does not alter if, and where, such development is permitted, or the functions of the consent authority.

No. 33. Hazardous and Offensive Development - Provides new definitions for 'hazardous industry', 'hazardous storage establishment', 'offensive industry' and 'offensive storage establishment'. The definitions apply to all planning instruments, existing and future. The new definitions enable decisions to approve or refuse a development to be based on the merit of proposal. The consent authority must careful consider the specifics the case, the location and the way in which the proposed activity is to be carried out. The policy also requires specified matters to be considered for proposals that are 'potentially hazardous' or 'potentially offensive' as defined in the policy. For example, any application to carry out a potentially hazardous or potentially offensive development is to be advertised for public comment, and applications to carry out potentially hazardous development must be supported by a preliminary hazard analysis (PHA).

No. 36. Manufactured Home Estates - Helps establish well-designed and properly serviced manufactured home estates (MHEs) in suitable locations. Affordability and security of tenure for residents are important aspects. To enable the immediate development of estates, the policy allows MHEs to be located on certain land where caravan parks are permitted. There are however, criteria that a proposal must satisfy before the local council can approved development.

No. 44. Koala Habitat Protection - Encourages the proper conservation and management of areas of natural vegetation that provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline.

No. 55. Remediation of Land - Introduces state-wide planning controls for the remediation of contaminated land. The policy states that land must not be developed if it is unsuitable for a proposed use because it is contaminated. If the land is unsuitable, remediation must take place before the land is developed. The policy makes remediation permissible across the State, defines when consent is required, requires all remediation to comply with standards, ensures land is investigated if contamination is suspected, and requires councils to be notified of all remediation proposals.

No. 62. Sustainable Aquaculture - The policy implements the regional strategies already developed by creating a simple approach to identity and categorise aquaculture development on the basis of its potential environmental impact. The SEPP also identifies aquaculture development as a designated development only where there are potential environmental risks.

No. 64. Advertising and Signage - Aims to improve the amenity of urban and natural settings by managing the impact of outdoor advertising. The policy responds to growing concerns from the community, the advertising industry and local government that existing controls and guidelines were not effective. SEPP No. 64 offers the comprehensive provisions and consistent approach needed. SEPP 64 – Advertising and Signage: Explanatory Information should be read in conjunction with the policy.

No. 65. Design Quality of Residential Flat Development - Raises the design quality of residential flat development across the state through the application of a series of design principles. The policy provides for the establishment of Design Review Panels to provide independent expert advice to councils on the merit of residential flat development. The accompanying regulation requires the involvement of a qualified designer throughout the design, approval and construction stages.

SEPP (Housing for Seniors or People with a Disability) 2004 - Encourage the development of high quality accommodation for our ageing population and for people who have disabilities - housing that is in keeping with the local neighbourhood

SEPP (Building Sustainability Index: BASIX) 2004 - This SEPP operates in conjunction with Environmental Planning and Assessment Amendment (Building Sustainability Index: BASIX) Regulation 2004 to ensure the effective introduction of BASIX in NSW. The SEPP ensures consistency in the implementation of BASIX throughout the State by overriding competing provisions in other environmental planning instruments and development control plans, and specifying that SEPP 1 does not apply in relation to any development standard arising under BASIX.

SEPP (Infrastructure) 2007 - Provides a consistent planning regime for infrastructure and the provision of services across NSW, along with providing for consultation with relevant public authorities during the assessment process. The SEPP supports greater flexibility in the location of infrastructure and service facilities along with improved regulatory certainty and efficiency.

SEPP (Mining, Petroleum Production and Extractive Industries) 2007 - This Policy aims to provide for the proper management and development of mineral, petroleum and extractive material resources for the social and economic welfare of the State. The Policy establishes appropriate planning controls to encourage ecologically sustainable development.

SEPP (Miscellaneous Consent Provisions) 2007 - Provides for the erection of temporary structures and the use of places of public entertainment while protecting public safety and local amenity. The SEPP supports the transfer of the regulation of places of public entertainment and temporary structures (such as tents, marquees and booths) from the Local Government Act 1993 to the Environmental Planning and Assessment Act 1979.

SEPP (Rural Lands) 2008 - The aim of this policy is to facilitate the orderly and economic use and development of rural lands for rural and related purposes.

SEPP (Exempt and Complying Development Codes) 2008 – This policy streamlines assessment processes for development that complies with specified development standards. The policy provides exempt codes that have State-wide application, identifying, in the General Exempt Development Code, types of development that are of minimal environmental impact that may be carried out without the need for development consent.

SEPP (Affordable Rental Housing) 2009 – The aims of this policy are to provide a consistent planning regime for the provision of affordable rental housing; facilitate the effective delivery of new affordable rental housing by providing incentives by way of expanding zoning permissibility, floor space ratio bonuses and non-discretionary development standards; facilitate the retention and mitigate the loss of existing affordable rental housing; employ a balanced approach between obligations for retaining and mitigating the loss of existing affordable rental housing, and incentives for the development of new

affordable rental housing; facilitate an expanding role for not-for-profit-providers of affordable rental housing; support local business centres by providing affordable rental housing for workers close to places of work; and facilitate the development of housing for the homeless and other disadvantaged people who may require support services, including group homes and supportive accommodation.

SEPP (State and Regional Development) 2011 – The aims of this policy are to identify development that is State significant development; identify development that is State significant infrastructure and critical State significant infrastructure; and confer functions on joint regional planning panels to determine development applications.

Further details regarding these State Environmental Planning Policies and the circumstances in which they may apply to the subject and can be found on the Department of Planning's website.

REGIONAL PLANNING INSTRUMENTS

There are no Regional Environmental Plans applying within the Muswellbrook Shire Council area.

DEVELOPMENT CONTROL PLANS

This land is affected by the following Development Control Plans:
Muswellbrook Shire Development Control Plan 2009

COASTAL PROTECTION

The land IS NOT affected by the operations of Sections 38 and 39 of the *Coastal Protection Act* 1979.

MINE SUBSIDENCE

The land IS NOT WITHIN a Mine Subsidence District proclaimed under section 15 of the Mine Subsidence Compensation Act, 1961.

ROAD WIDENING AND ROAD REALIGNMENT

The subject land IS NOT affected by any road widening or road realignment under:
(a) Division 2 of Part 3 of the Roads Act 1993, or
(b) Any environmental planning instrument, or
(c) Any resolution of the council.

COUNCIL AND OTHER PUBLIC AUTHORITY POLICIES ON HAZARD RISK RESTRICTIONS

The land IS NOT affected by a policy adopted by the council, or adopted by any other public authority and notified to the council for the express purpose of its adoption by that authority being referred to in planning certificates issued by the council: that restricts the development of the land because of the likelihood of land slip, bushfire, tidal inundation, subsidence, acid sulphate soils or any other risk (other than flooding).

FLOOD RELATED DEVELOPMENT CONTROLS INFORMATION

The Hunter River Flood Study 2014 shows the land to be affected by flooding.

LAND RESERVED FOR ACQUISITION

There are NOT any environmental planning instruments; deemed environmental planning instruments or draft environmental planning instruments applying to the land that provide for the acquisition of the

land by a public authority, as referred to in section 27 of the Environmental Planning and Assessment Act 1979.

CONTRIBUTIONS PLANS

The Muswellbrook Section 94 Contributions Plan 2001 and Muswellbrook Section 94A Contributions Plan 2009 apply to all land within the Muswellbrook Shire Local Government Area.

BIODIVERSITY CERTIFIED LAND

The land IS NOT biodiversity certified land (within the meaning of Part 7AA of the Threatened Species Conservation Act 1995)

BIOBANKING AGREEMENTS

The land IS NOT affected by a biobanking agreement under Part 7A of the *Threatened Species Conservation Act 1995*.

MATTERS RELATING TO THE MANAGEMENT OF CONTAMINATED LAND

(a) The land to which this certificate relates is NOT within land declared to be significantly contaminated land under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(b) The land to which this certificate relates is NOT subject to a management order under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(c) The land to which this certificate relates is NOT the subject of approved voluntary management proposal the subject of the Environment Protection Authority's agreement under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(d) The land to which this certificate relates is NOT the subject to an ongoing maintenance order under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(e) The land to which this certificate relates has NOT been the subject of a site audit statement provided to Muswellbrook Shire Council.

BUSH FIRE PRONE LAND

The land IS NOT bushfire prone land.

PROPERTY VEGETATION PLANS

Council has NOT been notified of the existence of such a plan or if the land is land to which a property vegetation plan under the Native Vegetation Act 2003 applies.

ORDERS UNDER TREES (DISPUTES BETWEEN NEIGHBOURS) ACT 2006

Council has NOT been notified of any order made under the Trees (Disputes Between Neighbours) Act 2006 to carry out work in relation to a tree on the land.

Date: 29 September 2017

Cert No: 21235

DIRECTIONS UNDER PART 3A

There is NOT a direction by the Minister in force under section 75P (2) (c1) of the Act in relation to prohibiting or restricting the carrying out of a project or a stage of a project on the land under Part 4 of the Act.

SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR SENIORS HOUSING

There is NOT a current site compatibility certificate (of which the council is aware), issued under clause 25 of State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 in respect of proposed development on the land.

SITE COMPATIBILITY CERTIFICATES FOR INFRASTRUCTURE

There is NOT a valid site compatibility certificate (of which the council is aware), issued under clause 19 of State Environmental Planning Policy (Infrastructure) 2007 in respect of proposed development on the land.

SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR AFFORDABLE RENTAL HOUSING

There is NOT a current site compatibility certificate for affordable rental housing (of which the council is aware), issued under clause 37 of State Environmental Planning Policy (Affordable Rental Housing) 2007 in respect of proposed development on the land.

PAPER SUBDIVISION INFORMATION

There is NOT an adopted development plan or subdivision order that applies to the land.

SITE VERIFICATION CERTIFICATE

There is NOT a current site verification certificate (of which the council is aware), issued under clause 17C of State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007, in relation to the land.

LOOSE-FILL ASBESTOS INSULATION

There are NO residential premises located on this land that are listed on the register that are required to be maintained under Division 1A of Part 8 of the *Home Building Act 1989*.

The accuracy and currency of the details provided by agencies external to Council have not be verified by Muswellbrook Shire Council and should be verified by the applicant.

ADDITIONAL INFORMATION PURSUANT TO SECTION 149(5) OF THE ACT

Council is unaware of any other relevant matters that may affect the land.

For further information, please contact the Environmental Services Department.

S J McDonald
General Manager

Per: DL Watson

PLANNING CERTIFICATE UNDER SECTION 149 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

Enquiries	Environmental Services
Contact	02 6549 3700
Invoice no.	43721
Your reference	Application

Date: 30 September 2017

Assessment: 125989 **Cert No: 21269**

MACH Energy Australia Pty Ltd
GPO Box 94
BRISBANE QLD 4001

Owner (as recorded by Council)
MACH Energy Australia Pty Ltd

Property Description: WYBONG ROAD MUSWELLBROOK 2333
LOT: 23 DP: 1041946

Land to which the certificate relates

The land to which this certificate relates, being the lot or lots described on the application form, is shown in the Council's records as being situated at the street address described above. The information contained in this certificate relates only to the lot or lots described on this certificate. Separate planning certificates can be obtained upon application for the other lots, those certificates may contain different information than is contained in this certificate.

CERTIFICATE UNDER SECTION 149(2) ENVIRONMENTAL PLANNING & ASSESSMENT ACT

LOCAL ENVIRONMENTAL PLANS

PLANNING INSTRUMENT	Muswellbrook Local Environmental Plan 2009
LAND USE ZONING	RU1 Primary Production

PERMITTED WITHOUT CONSENT

Extensive agriculture; Home occupations; Intensive plant agriculture

PERMITTED WITH CONSENT

Air transport facilities; Airstrips; Animal boarding or training establishments; Aquaculture; Camping grounds; Caravan parks; Cellar door premises; Cemeteries; Community facilities; Crematoria; Depots; Dwelling houses; Educational establishments; Environmental facilities; Environmental protection works; Extractive industries; Farm buildings; Flood mitigation works; Forestry; Function centres; Group homes; Hazardous industries; Health consulting rooms; Heavy industrial storage establishments; Helipads; Highway service centres; Home-based child care; Home businesses; Home industries; Industrial retail outlets; Information and education facilities; Intensive livestock agriculture; Intensive plant agriculture; Kiosks; Landscaping material supplies; Open cut mining; Places of public worship; Plant nurseries; Recreation areas; Recreation facilities (indoor); Recreation facilities (major); Recreation facilities (outdoor); Research stations; Restaurants or cafes; Roads; Roadside stalls; Rural industries; Rural supplies; Rural worker's dwellings; Secondary dwellings; Service stations; Sewerage systems; Signage; Storage premises; Take away food and drink premises; Tourist and visitor accommodation; Transport depots; Truck depots; Turf farming; Veterinary hospitals; Waste disposal facilities; Water supply systems.

PROHIBITED

Any development not specified above.

MINIMUM LAND DIMENSIONS FOR THE ERECTION OF A DWELLING

Under the provisions of the Muswellbrook Local Environmental Plan 2009, the minimum subdivision lot size is 80ha and is also subject to the provisions detailed below.

Land zoned RU1 Primary Production may, with the consent of Council, be subdivided for the purpose of primary production to create a lot less than the minimum lot size. However, such a lot cannot be created if an existing dwelling would, as the result of the subdivision, be situated on the lot. A dwelling cannot be erected on such a lot created.

Development consent must not be granted to the subdivision of a lot in a strata plan or community title scheme on land zoned RU1 Primary Production that is used, or proposed to be used, for residential accommodation or tourist and visitor accommodation.

Only one dwelling house may be erected on land zoned RU1 Primary Production only if the land is:

(a) a lot created in accordance with clause 4.1 of the LEP 2009, or

(b) a lot created before the LEP 2009 commenced and on which the erection of a dwelling house was permissible immediately before that commencement, or

(c) a lot created before the LEP 2009 commenced that is at least the minimum lot size specified for that lot by the Lot Size Map, or

(d) a lot for which subdivision approval was granted before the LEP 2009 commenced and on which the erection of a dwelling house would have been permissible immediately before that commencement, or

(e) an existing holding.

NOTE: EXISTING HOLDING means all adjoining land, even if separated by a road or railway, held in the same ownership:

(a) on 11 April 1974, and

(b) at the time of lodging a development application for the erection of a dwelling house under this clause.

and includes any other land adjoining that land acquired by the owner since 11 April 1974.

NOTE: The owner in whose ownership all the land is at the time the application is lodged need not be the same person as the owner in whose ownership all the land was on the stated date.

WHETHER THE LAND INCLUDES OR COMPRISES CRITICAL HABITAT

The subject land has not been declared as critical habitat.

WHETHER THE LAND IS IN A CONSERVATION AREA

The subject land is not known to be in a conservation area.

Date: 3 October 2017

Cert No: 21269

WHETHER AN ITEM OF ENVIRONMENTAL HERITAGE IS SITUATED ON THE LAND

The land is NOT affected by any known or listed heritage item.

STATE ENVIRONMENTAL PLANNING POLICIES (EXEMPT & COMPLYING DEVELOPMENT CODES 2008)

CERTIFICATE UNDER SECTION 149(2) IDENTIFYING THE INFORMATION SET OUT IN CLAUSE 3 OF SCHEDULE 4 OF THE ENVIRONMENTAL PLANNING & ASSESSMENT REGULATIONS

Part 3 General Housing Code

Not applicable to the land to which this certificate relates.

Part 3A Rural Housing Code

YES. Complying development specified in the Rural Housing Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 4 Housing Alterations Code

YES. Complying development specified in the Housing Alterations Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 4A General Development Code

YES. Complying development specified in the General Development Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 5 Commercial and Industrial Alterations Code

Not applicable to the land to which this certificate relates.

Part 5A Commercial and Industrial (New Buildings and Additions) Code

Not applicable to the land to which this certificate relates.

Part 6 Subdivision Code

YES. Complying development specified in the Subdivision Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 7 Demolition Code

YES. Complying development specified in the Demolition Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 8 Fire Safety Code

YES. Complying development specified in the Fire Safety Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

STATE ENVIRONMENTAL PLANNING POLICIES

The following State Environmental Planning Policies apply to land within the Muswellbrook Shire LGA:-

No. 21. Caravan Parks - Ensures that where caravan parks or camping grounds are permitted under an environmental planning instrument, movable dwellings, as defined in the Local Government Act 1993, are also permitted. The policy ensures that development consent is required for new caravan parks and camping grounds and for additional long-term sites in existing caravan parks.

No. 30. Intensive Agriculture - Requires development consent for cattle feedlots having a capacity of 50 or more cattle or piggeries having a capacity of 200 or more pigs. The policy sets out information and public notification requirements to ensure there are effective planning control over this export-driven rural industry. The policy does not alter if, and where, such development is permitted, or the functions of the consent authority.

No. 33. Hazardous and Offensive Development - Provides new definitions for 'hazardous industry', 'hazardous storage establishment', 'offensive industry' and 'offensive storage establishment'. The definitions apply to all planning instruments, existing and future. The new definitions enable decisions to approve or refuse a development to be based on the merit of proposal. The consent authority must careful consider the specifics the case, the location and the way in which the proposed activity is to be carried out. The policy also requires specified matters to be considered for proposals that are 'potentially hazardous' or 'potentially offensive' as defined in the policy. For example, any application to carry out a potentially hazardous or potentially offensive development is to be advertised for public comment, and applications to carry out potentially hazardous development must be supported by a preliminary hazard analysis (PHA).

No. 36. Manufactured Home Estates - Helps establish well-designed and properly serviced manufactured home estates (MHEs) in suitable locations. Affordability and security of tenure for residents are important aspects. To enable the immediate development of estates, the policy allows MHEs to be located on certain land where caravan parks are permitted. There are however, criteria that a proposal must satisfy before the local council can approved development.

No. 44. Koala Habitat Protection - Encourages the proper conservation and management of areas of natural vegetation that provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline.

No. 55. Remediation of Land - Introduces state-wide planning controls for the remediation of contaminated land. The policy states that land must not be developed if it is unsuitable for a proposed use because it is contaminated. If the land is unsuitable, remediation must take place before the land is developed. The policy makes remediation permissible across the State, defines when consent is required, requires all remediation to comply with standards, ensures land is investigated if contamination is suspected, and requires councils to be notified of all remediation proposals.

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affordable rental housing; facilitate an expanding role for not-for-profit-providers of affordable rental housing; support local business centres by providing affordable rental housing for workers close to places of work; and facilitate the development of housing for the homeless and other disadvantaged people who may require support services, including group homes and supportive accommodation.

SEPP (State and Regional Development) 2011 – The aims of this policy are to identify development that is State significant development; identify development that is State significant infrastructure and critical State significant infrastructure; and confer functions on joint regional planning panels to determine development applications.

Further details regarding these State Environmental Planning Policies and the circumstances in which they may apply to the subject and can be found on the Department of Planning's website.

REGIONAL PLANNING INSTRUMENTS

There are no Regional Environmental Plans applying within the Muswellbrook Shire Council area.

DEVELOPMENT CONTROL PLANS

This land is affected by the following Development Control Plans:
Muswellbrook Shire Development Control Plan 2009

COASTAL PROTECTION

The land IS NOT affected by the operations of Sections 38 and 39 of the *Coastal Protection Act* 1979.

MINE SUBSIDENCE

The land IS NOT WITHIN a Mine Subsidence District proclaimed under section 15 of the Mine Subsidence Compensation Act, 1961.

ROAD WIDENING AND ROAD REALIGNMENT

The subject land IS NOT affected by any road widening or road realignment under:
(a) Division 2 of Part 3 of the Roads Act 1993, or
(b) Any environmental planning instrument, or
(c) Any resolution of the council.

COUNCIL AND OTHER PUBLIC AUTHORITY POLICIES ON HAZARD RISK RESTRICTIONS

The land IS NOT affected by a policy adopted by the council, or adopted by any other public authority and notified to the council for the express purpose of its adoption by that authority being referred to in planning certificates issued by the council: that restricts the development of the land because of the likelihood of land slip, bushfire, tidal inundation, subsidence, acid sulphate soils or any other risk (other than flooding).

FLOOD RELATED DEVELOPMENT CONTROLS INFORMATION

The Hunter River Flood Study 2014 shows the land to be affected by flooding.

LAND RESERVED FOR ACQUISITION

There are NOT any environmental planning instruments; deemed environmental planning instruments or draft environmental planning instruments applying to the land that provide for the acquisition of the

land by a public authority, as referred to in section 27 of the Environmental Planning and Assessment Act 1979.

CONTRIBUTIONS PLANS

The Muswellbrook Section 94 Contributions Plan 2001 and Muswellbrook Section 94A Contributions Plan 2009 apply to all land within the Muswellbrook Shire Local Government Area.

BIODIVERSITY CERTIFIED LAND

The land IS NOT biodiversity certified land (within the meaning of Part 7AA of the Threatened Species Conservation Act 1995)

BIOBANKING AGREEMENTS

The land IS NOT affected by a biobanking agreement under Part 7A of the *Threatened Species Conservation Act 1995*.

MATTERS RELATING TO THE MANAGEMENT OF CONTAMINATED LAND

(a) The land to which this certificate relates is NOT within land declared to be significantly contaminated land under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(b) The land to which this certificate relates is NOT subject to a management order under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(c) The land to which this certificate relates is NOT the subject of approved voluntary management proposal the subject of the Environment Protection Authority's agreement under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(d) The land to which this certificate relates is NOT the subject to an ongoing maintenance order under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(e) The land to which this certificate relates has NOT been the subject of a site audit statement provided to Muswellbrook Shire Council.

BUSH FIRE PRONE LAND

The land IS NOT bushfire prone land.

PROPERTY VEGETATION PLANS

Council has NOT been notified of the existence of such a plan or if the land is land to which a property vegetation plan under the Native Vegetation Act 2003 applies.

ORDERS UNDER TREES (DISPUTES BETWEEN NEIGHBOURS) ACT 2006

Council has NOT been notified of any order made under the Trees (Disputes Between Neighbours) Act 2006 to carry out work in relation to a tree on the land.

Date: 3 October 2017

Cert No: 21269

DIRECTIONS UNDER PART 3A

There is NOT a direction by the Minister in force under section 75P (2) (c1) of the Act in relation to prohibiting or restricting the carrying out of a project or a stage of a project on the land under Part 4 of the Act.

SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR SENIORS HOUSING

There is NOT a current site compatibility certificate (of which the council is aware), issued under clause 25 of State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 in respect of proposed development on the land.

SITE COMPATIBILITY CERTIFICATES FOR INFRASTRUCTURE

There is NOT a valid site compatibility certificate (of which the council is aware), issued under clause 19 of State Environmental Planning Policy (Infrastructure) 2007 in respect of proposed development on the land.

SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR AFFORDABLE RENTAL HOUSING

There is NOT a current site compatibility certificate for affordable rental housing (of which the council is aware), issued under clause 37 of State Environmental Planning Policy (Affordable Rental Housing) 2007 in respect of proposed development on the land.

PAPER SUBDIVISION INFORMATION

There is NOT an adopted development plan or subdivision order that applies to the land.

SITE VERIFICATION CERTIFICATE

There is NOT a current site verification certificate (of which the council is aware), issued under clause 17C of State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007, in relation to the land.

LOOSE-FILL ASBESTOS INSULATION

There are NO residential premises located on this land that are listed on the register that are required to be maintained under Division 1A of Part 8 of the *Home Building Act 1989*.

The accuracy and currency of the details provided by agencies external to Council have not be verified by Muswellbrook Shire Council and should be verified by the applicant.

ADDITIONAL INFORMATION PURSUANT TO SECTION 149(5) OF THE ACT

Council is unaware of any other relevant matters that may affect the land.

For further information, please contact the Environmental Services Department.

S J McDonald
General Manager

Per: DL Watson

PLANNING CERTIFICATE UNDER SECTION 149 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

Enquiries	Environmental Services
Contact	02 6549 3700
Invoice no.	43721
Your reference	Application

Date: 30 September 2017

Assessment: 11817 **Cert No: 21270**

MACH Energy Australia Pty Ltd
GPO Box 94
BRISBANE QLD 4001

Owner (as recorded by Council)
MACH Energy Australia Pty Ltd

Property Description: WYBONG ROAD MUSWELLBROOK 2333
LOT: 24 DP: 742543

Land to which the certificate relates

The land to which this certificate relates, being the lot or lots described on the application form, is shown in the Council's records as being situated at the street address described above. The information contained in this certificate relates only to the lot or lots described on this certificate. Separate planning certificates can be obtained upon application for the other lots, those certificates may contain different information than is contained in this certificate.

CERTIFICATE UNDER SECTION 149(2) ENVIRONMENTAL PLANNING & ASSESSMENT ACT

LOCAL ENVIRONMENTAL PLANS

PLANNING INSTRUMENT	Muswellbrook Local Environmental Plan 2009
LAND USE ZONING	RU1 Primary Production

PERMITTED WITHOUT CONSENT

Extensive agriculture; Home occupations; Intensive plant agriculture

PERMITTED WITH CONSENT

Air transport facilities; Airstrips; Animal boarding or training establishments; Aquaculture; Camping grounds; Caravan parks; Cellar door premises; Cemeteries; Community facilities; Crematoria; Depots; Dwelling houses; Educational establishments; Environmental facilities; Environmental protection works; Extractive industries; Farm buildings; Flood mitigation works; Forestry; Function centres; Group homes; Hazardous industries; Health consulting rooms; Heavy industrial storage establishments; Helipads; Highway service centres; Home-based child care; Home businesses; Home industries; Industrial retail outlets; Information and education facilities; Intensive livestock agriculture; Intensive plant agriculture; Kiosks; Landscaping material supplies; Open cut mining; Places of public worship; Plant nurseries; Recreation areas; Recreation facilities (indoor); Recreation facilities (major); Recreation facilities (outdoor); Research stations; Restaurants or cafes; Roads; Roadside stalls; Rural industries; Rural supplies; Rural worker's dwellings; Secondary dwellings; Service stations; Sewerage systems; Signage; Storage premises; Take away food and drink premises; Tourist and visitor accommodation; Transport depots; Truck depots; Turf farming; Veterinary hospitals; Waste disposal facilities; Water supply systems.

PROHIBITED

Any development not specified above.

MINIMUM LAND DIMENSIONS FOR THE ERECTION OF A DWELLING

Under the provisions of the Muswellbrook Local Environmental Plan 2009, the minimum subdivision lot size is 80ha and is also subject to the provisions detailed below.

Land zoned RU1 Primary Production may, with the consent of Council, be subdivided for the purpose of primary production to create a lot less than the minimum lot size. However, such a lot cannot be created if an existing dwelling would, as the result of the subdivision, be situated on the lot. A dwelling cannot be erected on such a lot created.

Development consent must not be granted to the subdivision of a lot in a strata plan or community title scheme on land zoned RU1 Primary Production that is used, or proposed to be used, for residential accommodation or tourist and visitor accommodation.

Only one dwelling house may be erected on land zoned RU1 Primary Production only if the land is:

(a) a lot created in accordance with clause 4.1 of the LEP 2009, or

(b) a lot created before the LEP 2009 commenced and on which the erection of a dwelling house was permissible immediately before that commencement, or

(c) a lot created before the LEP 2009 commenced that is at least the minimum lot size specified for that lot by the Lot Size Map, or

(d) a lot for which subdivision approval was granted before the LEP 2009 commenced and on which the erection of a dwelling house would have been permissible immediately before that commencement, or

(e) an existing holding.

NOTE: EXISTING HOLDING means all adjoining land, even if separated by a road or railway, held in the same ownership:

(a) on 11 April 1974, and

(b) at the time of lodging a development application for the erection of a dwelling house under this clause.

and includes any other land adjoining that land acquired by the owner since 11 April 1974.

NOTE: The owner in whose ownership all the land is at the time the application is lodged need not be the same person as the owner in whose ownership all the land was on the stated date.

WHETHER THE LAND INCLUDES OR COMPRISES CRITICAL HABITAT

The subject land has not been declared as critical habitat.

WHETHER THE LAND IS IN A CONSERVATION AREA

The subject land is not known to be in a conservation area.

muswellbrook shire council

Date: 3 October 2017

Cert No: 21270

WHETHER AN ITEM OF ENVIRONMENTAL HERITAGE IS SITUATED ON THE LAND

The land is NOT affected by any known or listed heritage item.

STATE ENVIRONMENTAL PLANNING POLICIES (EXEMPT & COMPLYING DEVELOPMENT CODES 2008)

CERTIFICATE UNDER SECTION 149(2) IDENTIFYING THE INFORMATION SET OUT IN CLAUSE 3 OF SCHEDULE 4 OF THE ENVIRONMENTAL PLANNING & ASSESSMENT REGULATIONS

Part 3 General Housing Code

Not applicable to the land to which this certificate relates.

Part 3A Rural Housing Code

YES. Complying development specified in the Rural Housing Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 4 Housing Alterations Code

YES. Complying development specified in the Housing Alterations Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 4A General Development Code

YES. Complying development specified in the General Development Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 5 Commercial and Industrial Alterations Code

Not applicable to the land to which this certificate relates.

Part 5A Commercial and Industrial (New Buildings and Additions) Code

Not applicable to the land to which this certificate relates.

Part 6 Subdivision Code

YES. Complying development specified in the Subdivision Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 7 Demolition Code

YES. Complying development specified in the Demolition Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

Part 8 Fire Safety Code

YES. Complying development specified in the Fire Safety Code may be carried out on this land in certain circumstances pursuant to Clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

STATE ENVIRONMENTAL PLANNING POLICIES

The following State Environmental Planning Policies apply to land within the Muswellbrook Shire LGA:-

No. 21. Caravan Parks - Ensures that where caravan parks or camping grounds are permitted under an environmental planning instrument, movable dwellings, as defined in the Local Government Act 1993, are also permitted. The policy ensures that development consent is required for new caravan parks and camping grounds and for additional long-term sites in existing caravan parks.

No. 30. Intensive Agriculture - Requires development consent for cattle feedlots having a capacity of 50 or more cattle or piggeries having a capacity of 200 or more pigs. The policy sets out information and public notification requirements to ensure there are effective planning control over this export-driven rural industry. The policy does not alter if, and where, such development is permitted, or the functions of the consent authority.

No. 33. Hazardous and Offensive Development - Provides new definitions for 'hazardous industry', 'hazardous storage establishment', 'offensive industry' and 'offensive storage establishment'. The definitions apply to all planning instruments, existing and future. The new definitions enable decisions to approve or refuse a development to be based on the merit of proposal. The consent authority must careful consider the specifics the case, the location and the way in which the proposed activity is to be carried out. The policy also requires specified matters to be considered for proposals that are 'potentially hazardous' or 'potentially offensive' as defined in the policy. For example, any application to carry out a potentially hazardous or potentially offensive development is to be advertised for public comment, and applications to carry out potentially hazardous development must be supported by a preliminary hazard analysis (PHA).

No. 36. Manufactured Home Estates - Helps establish well-designed and properly serviced manufactured home estates (MHEs) in suitable locations. Affordability and security of tenure for residents are important aspects. To enable the immediate development of estates, the policy allows MHEs to be located on certain land where caravan parks are permitted. There are however, criteria that a proposal must satisfy before the local council can approved development.

No. 44. Koala Habitat Protection - Encourages the proper conservation and management of areas of natural vegetation that provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline.

No. 55. Remediation of Land - Introduces state-wide planning controls for the remediation of contaminated land. The policy states that land must not be developed if it is unsuitable for a proposed use because it is contaminated. If the land is unsuitable, remediation must take place before the land is developed. The policy makes remediation permissible across the State, defines when consent is required, requires all remediation to comply with standards, ensures land is investigated if contamination is suspected, and requires councils to be notified of all remediation proposals.

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Muswellbrook Shire Development Control Plan 2009

COASTAL PROTECTION

The land IS NOT affected by the operations of Sections 38 and 39 of the *Coastal Protection Act* 1979.

MINE SUBSIDENCE

The land IS NOT WITHIN a Mine Subsidence District proclaimed under section 15 of the Mine Subsidence Compensation Act, 1961.

ROAD WIDENING AND ROAD REALIGNMENT

The subject land IS NOT affected by any road widening or road realignment under:
(a) Division 2 of Part 3 of the Roads Act 1993, or
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COUNCIL AND OTHER PUBLIC AUTHORITY POLICIES ON HAZARD RISK RESTRICTIONS

The land IS NOT affected by a policy adopted by the council, or adopted by any other public authority and notified to the council for the express purpose of its adoption by that authority being referred to in planning certificates issued by the council: that restricts the development of the land because of the likelihood of land slip, bushfire, tidal inundation, subsidence, acid sulphate soils or any other risk (other than flooding).

FLOOD RELATED DEVELOPMENT CONTROLS INFORMATION

The Hunter River Flood Study 2014 shows the land to be affected by flooding.

LAND RESERVED FOR ACQUISITION

There are NOT any environmental planning instruments; deemed environmental planning instruments or draft environmental planning instruments applying to the land that provide for the acquisition of the

land by a public authority, as referred to in section 27 of the Environmental Planning and Assessment Act 1979.

CONTRIBUTIONS PLANS

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BIODIVERSITY CERTIFIED LAND

The land IS NOT biodiversity certified land (within the meaning of Part 7AA of the Threatened Species Conservation Act 1995)

BIOBANKING AGREEMENTS

The land IS NOT affected by a biobanking agreement under Part 7A of the *Threatened Species Conservation Act 1995*.

MATTERS RELATING TO THE MANAGEMENT OF CONTAMINATED LAND

(a) The land to which this certificate relates is NOT within land declared to be significantly contaminated land under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

(b) The land to which this certificate relates is NOT subject to a management order under the Contaminated Land Management Act 2008 at the date when the certificate is issued.

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(e) The land to which this certificate relates has NOT been the subject of a site audit statement provided to Muswellbrook Shire Council.

BUSH FIRE PRONE LAND

The land IS NOT bushfire prone land.

PROPERTY VEGETATION PLANS

Council has NOT been notified of the existence of such a plan or if the land is land to which a property vegetation plan under the Native Vegetation Act 2003 applies.

ORDERS UNDER TREES (DISPUTES BETWEEN NEIGHBOURS) ACT 2006

Council has NOT been notified of any order made under the Trees (Disputes Between Neighbours) Act 2006 to carry out work in relation to a tree on the land.

Date: 3 October 2017

Cert No: 21270

DIRECTIONS UNDER PART 3A

There is NOT a direction by the Minister in force under section 75P (2) (c1) of the Act in relation to prohibiting or restricting the carrying out of a project or a stage of a project on the land under Part 4 of the Act.

SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR SENIORS HOUSING

There is NOT a current site compatibility certificate (of which the council is aware), issued under clause 25 of State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 in respect of proposed development on the land.

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SITE COMPATIBILITY CERTIFICATES AND CONDITIONS FOR AFFORDABLE RENTAL HOUSING

There is NOT a current site compatibility certificate for affordable rental housing (of which the council is aware), issued under clause 37 of State Environmental Planning Policy (Affordable Rental Housing) 2007 in respect of proposed development on the land.

PAPER SUBDIVISION INFORMATION

There is NOT an adopted development plan or subdivision order that applies to the land.

SITE VERIFICATION CERTIFICATE

There is NOT a current site verification certificate (of which the council is aware), issued under clause 17C of State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007, in relation to the land.

LOOSE-FILL ASBESTOS INSULATION

There are NO residential premises located on this land that are listed on the register that are required to be maintained under Division 1A of Part 8 of the *Home Building Act 1989*.

The accuracy and currency of the details provided by agencies external to Council have not be verified by Muswellbrook Shire Council and should be verified by the applicant.

ADDITIONAL INFORMATION PURSUANT TO SECTION 149(5) OF THE ACT

Council is unaware of any other relevant matters that may affect the land.

For further information, please contact the Environmental Services Department.

S J McDonald
General Manager

Per: D L Watson

SESL AUSTRALIA
Environment & Soil Sciences

Appendix D

ABN 70 106 810 708
T 1300 30 40 80
F 1300 64 46 89
E info@sesl.com.au
W sesl.com.au

POST PO Box 357, Pennant Hills NSW 1715
LAB 16 Chilvers Rd, Thornleigh NSW 2120
ACT Level 5 Tower A, 7 London Cct, Canberra ACT 2601
VIC Level 1, 21 Shields St, Flemington VIC 3031
QLD Level 10, 15 Green Square Cl, Fortitude Valley QLD 4006

NATA
ASPAC A member of the Australasian Soil and Plant Analysis Council
Certified System Health & Safety AS 4801
Certified System Environment ISO 14001
Certified System Quality ISO 9001

Table 1A(3) Soil HSLs for vapour intrusion (mg/kg)

	HSL A & HSL B Low – high density residential				HSL C recreational / open space				HSL D Commercial / Industrial				
CHEMICAL	**0 m to <1 m**	**1 m to <2 m**	**2 m to <4m**	**4 m+**	**0 m to <1 m**	**1 m to <2 m**	**2 m to <4 m**	**4 m+**	**0 m to <1 m**	**1 m to <2 m**	**2 m to <4 m**	**4 m+**	**Soil saturation concentration (Csat)**
SAND													
Toluene	160	220	310	540	NL	NL	NL	NL	NL	NL	NL	NL	560
Ethylbenzene	55	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	64
Xylenes	40	60	95	170	NL	NL	NL	NL	230	NL	NL	NL	300
Naphthalene	3	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	9
Benzene	0.5	0.5	0.5	0.5	NL	NL	NL	NL	3	3	3	3	360
F1[9]	45	70	110	200	NL	NL	NL	NL	260	370	630	NL	950
F2[10]	110	240	440	NL	NL	NL	NL	NL	NL	NL	NL	NL	560
SILT													
Toluene	390	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	640
Ethylbenzene	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	69
Xylenes	95	210	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	330

	HSL A & HSL B Low – high density residential				HSL C recreational / open space				HSL D Commercial / Industrial				
Naphthalene	4	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	10
Benzene	0.6	0.7	1	2	NL	NL	NL	NL	4	4	6	10	440
F1[9]	40	65	100	190	NL	NL	NL	NL	250	360	590	NL	910
F2[10]	230	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	570
CLAY													
Toluene	480	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	630
Ethylbenzene	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	68
Xylenes	110	310	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	330
Naphthalene	5	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	10
Benzene	0.7	1	2	3	NL	NL	NL	NL	4	6	9	20	430
F1[9]	50	90	150	290	NL	NL	NL	NL	310	480	NL	NL	850
F2[10]	280	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	560

Notes:

(1) Land use settings are equivalent to those described in Table 1A(1) Footnote 1 and Schedule B7. HSLs for vapour intrusion for high density residential assume residential occupation of the ground floor. If communal car parks or commercial properties occupy the ground floor, HSL D should be used,

(2) The key limitations of the HSLs should be referred to prior to application and are presented in Friebel and Nadebaum (2011b and 2011d).

(3) Detailed assumptions in the derivation of the HSLs and information on how to apply the HSLs are presented in Friebel and Nadebaum (2011a and 2011b).

(4) Soil HSLs for vapour inhalation incorporate an adjustment factor of 10 applied to the vapour phase partitioning to reflect the differences observed between theoretical estimates of soil vapour partitioning and field measurements. Refer Friebel & Nadebaum (2011a) for further information.

(5) The soil saturation concentration (Csat) is defined as the soil concentration at which the porewater phase cannot dissolve any more of an individual chemical. The soil vapour that is in equilibrium with the porewater will be at its maximum. If the derived soil HSL exceeds Csat, a soil vapour source concentration for a petroleum mixture could not exceed a level that would result in the maximum allowable vapour risk for the given scenario. For these scenarios, no HSL is presented for these chemicals and the HSL is shown as 'not limiting' or 'NL'.

(6) The HSLs for TPH C_6-C_{10} in sandy soil are based on a finite source that depletes in less than seven years, and therefore consideration has been given to use of sub-chronic toxicity values. The >C_8-C_{10} aliphatic toxicity has been adjusted to represent sub-chronic exposure, resulting in higher HSLs than if based on chronic toxicity. For further information refer to Section 8.2 and Appendix J in Friebel and Nadebaum (2011a).

(7) The figures in the above table may be multiplied by a factor to account for biodegradation of vapour. A factor of 10 may apply for source depths from 2 m to <4 m or a factor of 100 for source depths of 4 m and deeper. To apply the attenuation factor for vapour degradation, a number of conditions must be satisfied. Firstly the maximum length of the shorter side of the concrete slab and surrounding pavement cannot exceed 15 m, as this would prevent oxygen penetrating to the centre of the slab. Secondly, measurement of oxygen in the subsurface is required to determine the potential for biodegradation. Oxygen must be confirmed to be present at >5% to use these factors.

(8) For soil texture classification undertaken in accord with AS 1726, the classifications of sand, silt and clay may be applied as coarse, fine with liquid limit <50% and fine with liquid limit>50% respectively, as the underlying properties to develop the HSLs may reasonably be selected to be similar. Where there is uncertainty, either a conservative approach may be adopted or laboratory analysis should be carried out.

(9) To obtain F1 subtract the sum of BTEX concentrations from the C_6-C_{10} fraction.

(10) To obtain F2 subtract naphthalene from the >C_{10}-C_{16} fraction.

Table 1B(5) Generic EILs for aged As, fresh DDT and fresh naphthalene in soils irrespective of their physicochemical properties

	Ecological Investigation Levels (mg total contaminant/kg)		
CHEMICAL	**Areas of ecological significance**	**Urban residential and public open space[1]**	**Commercial and industrial**
Arsenic[2]	40	100	160
DDT[3]	3	180	640
Naphthalene[3]	10	170	370

Notes:

1. Urban residential/public open space is broadly equivalent to the HIL-A, HIL-B and HIL-C land use scenarios in Table 1A(1) Footnote 1 and as described in Schedule B7.
2. Aged values are applicable to arsenic contamination present in soil for at least two years. For fresh contamination refer to Schedule B5c.
3. Insufficient data was available to calculate aged values for DDT and naphthalene, consequently the values for fresh contamination should be used.
4. Insufficient data was available to calculate ACLs for As, DDT and naphthalene. The EIL should be taken directly from Table 1B(5).

Table 1B(6) ESLs for TPH fractions F1 – F4, BTEX and benzo(a)pyrene in soil

CHEMICAL	Soil texture	ESLs (mg/kg dry soil)		
		Areas of ecological significance	Urban residential and public open space	Commercial and industrial
F1 C_6-C_{10}	*Coarse/ Fine*	125*	180*	215*
F2 >C_{10}-C_{16}		25*	120*	170*
F3 >C_{16}-C_{34}	*Coarse*	-	300	1700
	Fine	-	1300	2500
F4 >C_{34}-C_{40}	*Coarse*	-	2800	3300
	Fine	-	5600	6600
Benzene	*Coarse*	10	50	75
	Fine	10	65	95
Toluene	*Coarse*	10	85	135
	Fine	65	105	135
Ethylbenzene	*Coarse*	1.5	70	165
	Fine	40	125	185
Xylenes	*Coarse*	10	105	180
	Fine	1.6	45	95
Benzo(a)pyrene	*Coarse*	0.7	0.7	0.7
	Fine	0.7	0.7	0.7

Notes:

(1) ESLs are of low reliability except where indicated by * which indicates that the ESL is of moderate reliability.

(2) '-' indicates that insufficient data was available to derive a value.

(3) To obtain F1, subtract the sum of BTEX concentrations from C_6-C_{10} fraction and subtract naphthalene from >C_{10}-C_{16} to obtain F2.

SESL AUSTRALIA
Environment & Soil Sciences

Appendix E

ABN 70 106 810 708
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POST PO Box 357, Pennant Hills NSW 1715
LAB 16 Chilvers Rd, Thornleigh NSW 2120
ACT Level 5 Tower A, 7 London Cct, Canberra ACT 2601
VIC Level 1, 21 Shields St, Flemington VIC 3031
QLD Level 10, 15 Green Square Cl, Fortitude Valley QLD 4006

NATA
ASPAC A member of the Australasian Soil and Plant Analysis Council
Certified System Health & Safety AS 4801
Certified System Environment ISO 14001
Certified System Quality ISO 9001

Search results

Your search for:LGA: Muswellbrook Shire Council

Search Again
Refine Search

did not find any records in our database.

If a site does not appear on the record it may still be affected by contamination. For example:

- Contamination may be present but the site has not been regulated by the EPA under the Contaminated Land Management Act 1997 or the Environmentally Hazardous Chemicals Act 1985.
- The EPA may be regulating contamination at the site through a licence or notice under the Protection of the Environment Operations Act 1997 (POEO Act).
- Contamination at the site may be being managed under the planning process.

Search TIP

To search for a specific site, search by LGA (local government area) and carefully review all sites listed.

... more search tips

More information about particular sites may be available from:

- The POEO public register
- The appropriate planning authority: for example, on a planning certificate issued by the local council under section 149 of the Environmental Planning and Assessment Act.

See What's in the record and What's not in the record.

If you want to know whether a specific site has been the subject of notices issued by the EPA under the CLM Act, we suggest that you search by Local Government Area only and carefully review the sites that are listed.
This public record provides information about sites regulated by the EPA under the Contaminated Land Management Act 1997, including sites currently and previously regulated under the Environmentally Hazardous Chemicals Act 1985. Your inquiry using the above search criteria has not matched any record of current or former regulation. You should consider searching again using different criteria. The fact that a site does not appear on the record does not necessarily mean that it is not affected by contamination. The site may have been notified to the EPA but not yet assessed, or contamination may be present but the site is not yet being regulated by the EPA. Further information about particular sites may be available from the appropriate planning authority, for example, on a planning certificate issued by the local council under section 149 of the Environmental Planning and Assessment Act. In addition the EPA may be regulating contamination at the site through a licence under the Protection of the Environment Operations Act 1997. You may wish to search the POEO public register

6 December 2017

SESL AUSTRALIA
Environment & Soil Sciences

Appendix F

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QLD Level 10, 15 Green Square Cl, Fortitude Valley QLD 4006

NATA
ASPAC A member of the Australasian Soil and Plant Analysis Council
Certified System Health & Safety AS 4801
Certified System Environment ISO 14001
Certified System Quality ISO 9001

SESL AUSTRALIA
Environment & Soil Sciences

Chain of Custody

CoC N°: 25133 | QUOTE N°: sy60713 | SESL PO #: | BATCH N°: 45880

REPORTING REQUIREMENTS				RELINQUISHED BY:	DISPATCH TO::
REPORT FORMAT:	☐ Hardcopy (mail) ☒ Email PDF ☒ Email Excel ☐ Fax			NAME: SESL Sample Receipt	Jennifer Cullen
SEND REPORT TO:	Harrison Leake	subsamples@sesl.com.au		OF: SESL Australia	ALS Laboratory Group
CC TO:	Andrew Jacovides	andrewj@sesl.com.au		DATE: 24-11-17	**277-289 Woodpark Rd**
URGENCY REQ'D:	Normal	DATE REQ'D:	Fri, 1 Dec 2017 By 4pm	TIME: 12:00	**Smithfield NSW 2164**

SAMPLE DESCRIPTION		DATE SAMPLED	MATRIX	TEMP °C	PRES.	CONTAINER TYPE*	CONTAINER N°	ANALYSIS REQUIRED
1 : 45880 - BH1 Surface	1	24/11/2017	Soil	19.20	Ice	G	1	1 - S-16
2 : 45880 - BH2 Surface	2	24/11/2017	Soil				1	2 - S-16
3 : 45880 - BH3 Surface	3	24/11/2017	Soil				1	3 - S-16
4 : 45880 - BH4 Surface	4	24/11/2017	Soil				1	4 - S-16
5 : 45880 - BH4 300-400	5	24/11/2017	Soil				1	5 - S-16
6 : 45880 - BH5 Surface	6	24/11/2017	Soil				1	6 - S-16
7 : 45880 - BH6 Surface	7	24/11/2017	Soil				1	7 - S-16
8 : 45880 - BH7 Surface	8	24/11/2017	S				1	8 - S-16, EA200
9 : 45880 - BH7 300-400	9	24/11/2017	S				1	9 - S-16
10 : 45880 - BH8 Surface	10	24/11/2017	S				1	10 - S-16
11 : 45880 - BH9 Surface	11	24/11/2017	S				1	11 - S-16, EA200
12 : 45880 - BH10 Surface	12	24/11/2017	S				1	12 - S-16, EA200
13 : 45880 - BH11 Surface	13	24/11/2017	S				1	13 - S-16, EA200
14 : 45880 - BH12 Surface	14	24/11/2017	S				1	14 - S-16, EA200
15 : 45880 - BH13 Surface	15	24/11/2017	S				1	15 - S-16
16 : 45880 - BH14 Surface	16	24/11/2017	S				1	16 - S-16
17 : 45880 - BH15 Surface	17	24/11/2017	S				1	17 - S-16
18 : 45880 - BH16 Surface	18	24/11/2017	So				1	18 - S-16
19 : 45880 - BH17 Surface	19	24/11/2017	Soil				1	19 - S-16
20 : 45880 - BH18 Surface	20	24/11/2017	Soil				1	20 - S-16

Environmental Division
Sydney
Work Order Reference
ES1729769
Telephone : +61-2-6784 8555

Subcon / Forward Lab / Split WO
Lab / Analysis:
Organised By / Date: Asbestos
Relinquished By / Date: Newcomb
Connote / Courier:
WO No:
Attach By PO / Internal Sheet:

ALL WATER FOR METALS, OCP/OPP LOW LEVEL in ug/L

RECEIVED BY:		SAMPLE CONDITION:	*Containers Guide
NAME: Sophie	DATE: 24/11/17	SAMPLE CONTAINERS: ☒ Intact ☐ Broken	Bo1 .... Bottle, amber glass; G ..... Glass jar
COMPANY: ALS	TIME: 1800	TEMPERATURE: ☐ Cold ☒ Room ☒ Other 8.8 C	Bo2 .... Bottle, plastic; S ..... Sterile
			Bg1 .... Bag, plastic; V ..... Vial
			Bg2 .... Bag, paper; O ..... Other

SESL AUSTRALIA
Environment & Soil Sciences

Chain of Custody

CoC N°: 25134 | QUOTE N°: sy60713 | SESL PO #: | BATCH N°: 45880

REPORTING REQUIREMENTS			RELINQUISHED BY:	DISPATCH TO:
REPORT FORMAT:	☐ Hardcopy (mail) ☒ Email PDF ☒ Email Excel ☐ Fax		NAME: SESL Sample Receipt	Jennifer Cullen
SEND REPORT TO:	Harrison Leake	subsamples@sesl.com.au	OF: SESL Australia	ALS Laboratory Group
CC TO:	Andrew Jacovides	andrewj@sesl.com.au	DATE: 24-11-17	277-289 Woodpark Rd Smithfield NSW 2164
URGENCY REQ'D:	Normal	DATE REQ'D: Fri, 1 Dec 2017 By 4pm	TIME: 12:00	

SAMPLE DESCRIPTION		DATE SAMPLED	MATRIX	TEMP °C	PRES.	CONTAINER TYPE*	N°	ANALYSIS REQUIRED
21 : 45880 - BH18 300-400	21	24/11/2017	Soil	19.20	Ice	G	1	21 - S-16
22 : 45880 - BH19 Surface	22	24/11/2017	Soil				1	22 - S-16
23 : 45880 - BH19 300-400	23	24/11/2017	Soil				1	23 - S-16
24 : 45880 - BH20 Surface	24	24/11/2017	Soil				1	24 - S-16
25 : 45880 - BH20 300-400	25	24/11/2017	Soil				1	25 - S-16
26 : 45880 - QA1	26	24/11/2017	Soil				1	26 - S-16
27 : 45880 - QA2	27	24/11/2017	Soil				1	27 - S-16, EA200
28 : 45880 - QA3	28	24/11/2017	Soil				1	28 - S-16

ALL WATER FOR METALS, OCP/OPP LOW LEVEL in ug/L

RECEIVED BY:		SAMPLE CONDITION	*Containers Guide	
NAME: [signature]	DATE: 24/11/17	SAMPLE CONTAINERS: ☒ Intact ☐ Broken	Bo1 .... Bottle, amber glass	G ..... Glass jar
COMPANY: yes	TIME: 1800	TEMPERATURE: ☐ Cold ☐ Room ☒ Other 8-8 C	Bo2 .... Bottle, plastic	S ..... Sterile
			Bg1 .... Bag, plastic	V ..... Vial
			Bg2 .... Bag, paper	O ..... Other

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1729769**	Page	: 1 of 28
Client	: **SESL Australia Pty Ltd**	Laboratory	: Environmental Division Sydney
Contact	: Harrison Leake (SUBSAMPLES)	Contact	: Customer Services ES
Address	: PO BOX 357 PENNANT HILLS NSW, AUSTRALIA 1715	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9980 6554	Telephone	: +61-2-8784 8555
Project	: 45880	Date Samples Received	: 24-Nov-2017 18:00
Order number	: ----	Date Analysis Commenced	: 27-Nov-2017
C-O-C number	: 25133	Issue Date	: 01-Dec-2017 17:24
Sampler	: ----		
Site	: ----		
Quote number	: SYBQ/259/16		
No. of samples received	: 28		
No. of samples analysed	: 28		

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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Descriptive Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Christopher Owler	Team Leader - Asbestos	Newcastle - Asbestos, Mayfield West, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Sanjeshni Jyoti	Senior Chemist Volatiles	Sydney Organics, Smithfield, NSW

General Comments

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

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

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

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

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

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

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

- EP068: Positive result has been confirmed by re-extraction and re-analysis.
- EA200 'Am' Amosite (brown asbestos)
- EA200 'Cr' Crocidolite (blue asbestos)
- EA200 'Trace' - Asbestos fibres ("Free Fibres") detected by trace analysis per AS4964. The result can be interpreted that the sample contains detectable 'respirable' asbestos fibres
- EA200: Asbestos Identification Samples were analysed by Polarised Light Microscopy including dispersion staining.
- EA200 Legend
- EA200 'Ch' Chrysotile (white asbestos)
- EA200: 'UMF' Unknown Mineral Fibres. "-" indicates fibres detected may or may not be asbestos fibres. Confirmation by alternative techniques is recommended.
- EA200: Negative results for vinyl tiles should be confirmed by an independent analytical technique.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EA200: For samples larger than 30g, the <2mm fraction may be sub-sampled prior to trace analysis as outlined in ISO23909:2008(E) Sect 6.3.2-2
- EA200: 'Yes' - Asbestos detected by polarised light microscopy including dispersion staining.
- EA200: 'No*' - No asbestos found, at the reporting limit of 0.1g/kg, by polarised light microscopy including dispersion staining. Asbestos material was detected and positively identified at concentrations estimated to be below 0.1g/kg.
- EA200: 'No' - No asbestos found at the reporting limit 0.1g/kg, by polarised light microscopy including dispersion staining.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	45880-1	45880-2	45880-3	45880-4	45880-5
			Client sampling date / time	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00
Compound	CAS Number	LOR	Unit	ES1729769-001	ES1729769-002	ES1729769-003	ES1729769-004	ES1729769-005
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	9.2	13.5	9.7	14.6	19.4
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	5	<5	6	8	7
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	12	16	11	15	16
Copper	7440-50-8	5	mg/kg	15	15	14	20	19
Lead	7439-92-1	5	mg/kg	22	14	12	13	14
Nickel	7440-02-0	2	mg/kg	12	13	11	18	19
Zinc	7440-66-6	5	mg/kg	108	42	46	42	44
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	45880-1	45880-2	45880-3	45880-4	45880-5
				Client sampling date / time	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00
Compound	CAS Number	LOR	Unit		ES1729769-001	ES1729769-002	ES1729769-003	ES1729769-004	ES1729769-005
					Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued									
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Demeton-S-methyl	919-86-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Monocrotophos	6923-22-4	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Dimethoate	60-51-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Diazinon	333-41-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion-methyl	298-00-0	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	121-75-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenthion	55-38-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion	56-38-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorfenvinphos	470-90-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Bromophos-ethyl	4824-78-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenamiphos	22224-92-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Prothiofos	34643-46-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Ethion	563-12-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Carbophenothion	786-19-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Azinphos Methyl	86-50-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	45880-1	45880-2	45880-3	45880-4	45880-5
				Client sampling date / time	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00
Compound	CAS Number	LOR	Unit		ES1729769-001	ES1729769-002	ES1729769-003	ES1729769-004	ES1729769-005
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		0.6	0.6	0.6	0.6	0.6
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		1.2	1.2	1.2	1.2	1.2
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	45880-1	45880-2	45880-3	45880-4	45880-5
				Client sampling date / time	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00
Compound	CAS Number	LOR	Unit		ES1729769-001	ES1729769-002	ES1729769-003	ES1729769-004	ES1729769-005
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	1330-20-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		109	104	117	111	103
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		104	92.9	112	104	88.1
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		111	68.3	65.7	91.8	73.3
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		90.8	101	88.2	94.7	96.2
2-Chlorophenol-D4	93951-73-6	0.5	%		92.2	103	89.2	95.9	97.0
2.4.6-Tribromophenol	118-79-6	0.5	%		79.1	90.2	77.2	83.6	81.6
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		96.5	107	94.4	101	102
Anthracene-d10	1719-06-8	0.5	%		93.7	104	91.8	98.3	98.9
4-Terphenyl-d14	1718-51-0	0.5	%		86.3	94.8	84.2	91.3	92.4
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		96.5	93.8	97.7	90.4	91.6
Toluene-D8	2037-26-5	0.2	%		112	101	108	100	102
4-Bromofluorobenzene	460-00-4	0.2	%		108	102	108	101	103

SESL AUSTRALIA
Environment & Soil Sciences

Chain of Custody

CoC N°: 25133 | QUOTE N°: sy60713 | SESL PO #: | BATCH N°: 45880

REPORTING REQUIREMENTS				RELINQUISHED BY:	DISPATCH TO::
REPORT FORMAT:	☐ Hardcopy (mail) ☒ Email PDF ☒ Email Excel ☐ Fax			NAME: SESL Sample Receipt	Jennifer Cullen
SEND REPORT TO:	Harrison Leake	subsamples@sesl.com.au		OF: SESL Australia	ALS Laboratory Group
CC TO:	Andrew Jacovides	andrewj@sesl.com.au		DATE: 24-11-17	277-289 Woodpark Rd
URGENCY REQ'D:	Normal	DATE REQ'D:	Fri, 1 Dec 2017 By 4pm	TIME: 12:00	Smithfield NSW 2164

SAMPLE DESCRIPTION		DATE SAMPLED	MATRIX	TEMP °C	PRES.	CONTAINER TYPE*	CONTAINER N°	ANALYSIS REQUIRED
1 : 45880 - BH1 Surface	1	24/11/2017	Soil	19.20	Ice	G	1	1 - S-16
2 : 45880 - BH2 Surface	2	24/11/2017	Soil				1	2 - S-16
3 : 45880 - BH3 Surface	3	24/11/2017	Soil				1	3 - S-16
4 : 45880 - BH4 Surface	4	24/11/2017	Soil				1	4 - S-16
5 : 45880 - BH4 300-400	5	24/11/2017	Soil				1	5 - S-16
6 : 45880 - BH5 Surface	6	24/11/2017	Soil				1	6 - S-16
7 : 45880 - BH6 Surface	7	24/11/2017	Soil				1	7 - S-16
8 : 45880 - BH7 Surface	8	24/11/2017	S				1	8 - S-16, EA200
9 : 45880 - BH7 300-400	9	24/11/2017	S				1	9 - S-16
10 : 45880 - BH8 Surface	10	24/11/2017	S				1	10 - S-16
11 : 45880 - BH9 Surface	11	24/11/2017	S				1	11 - S-16, EA200
12 : 45880 - BH10 Surface	12	24/11/2017	S				1	12 - S-16, EA200
13 : 45880 - BH11 Surface	13	24/11/2017	S				1	13 - S-16, EA200
14 : 45880 - BH12 Surface	14	24/11/2017	S				1	14 - S-16, EA200
15 : 45880 - BH13 Surface	15	24/11/2017	S				1	15 - S-16
16 : 45880 - BH14 Surface	16	24/11/2017	S				1	16 - S-16
17 : 45880 - BH15 Surface	17	24/11/2017	S				1	17 - S-16
18 : 45880 - BH16 Surface	18	24/11/2017	So				1	18 - S-16
19 : 45880 - BH17 Surface	19	24/11/2017	Soil				1	19 - S-16
20 : 45880 - BH18 Surface	20	24/11/2017	Soil				1	20 - S-16

Environmental Division
Sydney
Work Order Reference
ES1729769
Telephone : +61-2-6784 8555

Subcon / Forward Lab / Split WO
Lab / Analysis:
Organised By / Date: Asbestos
Relinquished By / Date: Newcomb
Connote / Courier:
WO No:
Attach By PO / Internal Sheet:

ALL WATER FOR METALS, OCP/OPP LOW LEVEL in ug/L

RECEIVED BY:		SAMPLE CONDITION:	*Containers Guide
NAME: Sophie	DATE: 24/11/17	SAMPLE CONTAINERS: ☒ Intact ☐ Broken	Bo1 .... Bottle, amber glass; G ..... Glass jar
COMPANY: ALS	TIME: 1800	TEMPERATURE: ☐ Cold ☒ Room ☒ Other 8.8 C	Bo2 .... Bottle, plastic; S ..... Sterile
			Bg1 .... Bag, plastic; V ..... Vial
			Bg2 .... Bag, paper; O ..... Other

SESL AUSTRALIA
Environment & Soil Sciences

Chain of Custody

CoC N°: 25134 | QUOTE N°: sy60713 | SESL PO #: | BATCH N°: 45880

REPORTING REQUIREMENTS			RELINQUISHED BY:	DISPATCH TO:
REPORT FORMAT:	☐ Hardcopy (mail) ☒ Email PDF ☒ Email Excel ☐ Fax		NAME: SESL Sample Receipt	Jennifer Cullen
SEND REPORT TO:	Harrison Leake	subsamples@sesl.com.au	OF: SESL Australia	ALS Laboratory Group
CC TO:	Andrew Jacovides	andrewj@sesl.com.au	DATE: 24-11-17	277-289 Woodpark Rd Smithfield NSW 2164
URGENCY REQ'D:	Normal	DATE REQ'D: Fri, 1 Dec 2017 By 4pm	TIME: 12:00	

SAMPLE DESCRIPTION		DATE SAMPLED	MATRIX	TEMP °C	PRES.	CONTAINER TYPE*	N°	ANALYSIS REQUIRED
21 : 45880 - BH18 300-400	21	24/11/2017	Soil	19.20	Ice	G	1	21 - S-16
22 : 45880 - BH19 Surface	22	24/11/2017	Soil				1	22 - S-16
23 : 45880 - BH19 300-400	23	24/11/2017	Soil				1	23 - S-16
24 : 45880 - BH20 Surface	24	24/11/2017	Soil				1	24 - S-16
25 : 45880 - BH20 300-400	25	24/11/2017	Soil				1	25 - S-16
26 : 45880 - QA1	26	24/11/2017	Soil				1	26 - S-16
27 : 45880 - QA2	27	24/11/2017	Soil				1	27 - S-16, EA200
28 : 45880 - QA3	28	24/11/2017	Soil				1	28 - S-16

ALL WATER FOR METALS, OCP/OPP LOW LEVEL in ug/L

RECEIVED BY:		SAMPLE CONDITION	*Containers Guide	
NAME: [signature]	DATE: 24/11/17	SAMPLE CONTAINERS: ☒ Intact ☐ Broken	Bo1 .... Bottle, amber glass	G ..... Glass jar
COMPANY: yes	TIME: 1800	TEMPERATURE: ☐ Cold ☐ Room ☒ Other 8-8 C	Bo2 .... Bottle, plastic	S ..... Sterile
			Bg1 .... Bag, plastic	V ..... Vial
			Bg2 .... Bag, paper	O ..... Other

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1729769**	Page	: 1 of 28
Client	: **SESL Australia Pty Ltd**	Laboratory	: Environmental Division Sydney
Contact	: Harrison Leake (SUBSAMPLES)	Contact	: Customer Services ES
Address	: PO BOX 357 PENNANT HILLS NSW, AUSTRALIA 1715	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9980 6554	Telephone	: +61-2-8784 8555
Project	: 45880	Date Samples Received	: 24-Nov-2017 18:00
Order number	: ----	Date Analysis Commenced	: 27-Nov-2017
C-O-C number	: 25133	Issue Date	: 01-Dec-2017 17:24
Sampler	: ----		
Site	: ----		
Quote number	: SYBQ/259/16		
No. of samples received	: 28		
No. of samples analysed	: 28		

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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Descriptive Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Christopher Owler	Team Leader - Asbestos	Newcastle - Asbestos, Mayfield West, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Sanjeshni Jyoti	Senior Chemist Volatiles	Sydney Organics, Smithfield, NSW

General Comments

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

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

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

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

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

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

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

- EP068: Positive result has been confirmed by re-extraction and re-analysis.
- EA200 'Am' Amosite (brown asbestos)
- EA200 'Cr' Crocidolite (blue asbestos)
- EA200 'Trace' - Asbestos fibres ("Free Fibres") detected by trace analysis per AS4964. The result can be interpreted that the sample contains detectable 'respirable' asbestos fibres
- EA200: Asbestos Identification Samples were analysed by Polarised Light Microscopy including dispersion staining.
- EA200 Legend
- EA200 'Ch' Chrysotile (white asbestos)
- EA200: 'UMF' Unknown Mineral Fibres. "-" indicates fibres detected may or may not be asbestos fibres. Confirmation by alternative techniques is recommended.
- EA200: Negative results for vinyl tiles should be confirmed by an independent analytical technique.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EA200: For samples larger than 30g, the <2mm fraction may be sub-sampled prior to trace analysis as outlined in ISO23909:2008(E) Sect 6.3.2-2
- EA200: 'Yes' - Asbestos detected by polarised light microscopy including dispersion staining.
- EA200: 'No*' - No asbestos found, at the reporting limit of 0.1g/kg, by polarised light microscopy including dispersion staining. Asbestos material was detected and positively identified at concentrations estimated to be below 0.1g/kg.
- EA200: 'No' - No asbestos found at the reporting limit 0.1g/kg, by polarised light microscopy including dispersion staining.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	45880-1	45880-2	45880-3	45880-4	45880-5
			Client sampling date / time	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00
Compound	CAS Number	LOR	Unit	ES1729769-001	ES1729769-002	ES1729769-003	ES1729769-004	ES1729769-005
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	9.2	13.5	9.7	14.6	19.4
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	5	<5	6	8	7
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	12	16	11	15	16
Copper	7440-50-8	5	mg/kg	15	15	14	20	19
Lead	7439-92-1	5	mg/kg	22	14	12	13	14
Nickel	7440-02-0	2	mg/kg	12	13	11	18	19
Zinc	7440-66-6	5	mg/kg	108	42	46	42	44
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	45880-1	45880-2	45880-3	45880-4	45880-5
				Client sampling date / time	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00
Compound	CAS Number	LOR	Unit		ES1729769-001	ES1729769-002	ES1729769-003	ES1729769-004	ES1729769-005
					Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued									
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Demeton-S-methyl	919-86-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Monocrotophos	6923-22-4	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Dimethoate	60-51-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Diazinon	333-41-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion-methyl	298-00-0	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	121-75-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenthion	55-38-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion	56-38-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorfenvinphos	470-90-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Bromophos-ethyl	4824-78-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenamiphos	22224-92-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Prothiofos	34643-46-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Ethion	563-12-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Carbophenothion	786-19-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Azinphos Methyl	86-50-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	45880-1	45880-2	45880-3	45880-4	45880-5
				Client sampling date / time	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00
Compound	CAS Number	LOR	Unit		ES1729769-001	ES1729769-002	ES1729769-003	ES1729769-004	ES1729769-005
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		0.6	0.6	0.6	0.6	0.6
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		1.2	1.2	1.2	1.2	1.2
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	45880-1	45880-2	45880-3	45880-4	45880-5
				Client sampling date / time	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00
Compound	CAS Number	LOR	Unit		ES1729769-001	ES1729769-002	ES1729769-003	ES1729769-004	ES1729769-005
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	1330-20-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		109	104	117	111	103
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		104	92.9	112	104	88.1
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		111	68.3	65.7	91.8	73.3
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		90.8	101	88.2	94.7	96.2
2-Chlorophenol-D4	93951-73-6	0.5	%		92.2	103	89.2	95.9	97.0
2.4.6-Tribromophenol	118-79-6	0.5	%		79.1	90.2	77.2	83.6	81.6
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		96.5	107	94.4	101	102
Anthracene-d10	1719-06-8	0.5	%		93.7	104	91.8	98.3	98.9
4-Terphenyl-d14	1718-51-0	0.5	%		86.3	94.8	84.2	91.3	92.4
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		96.5	93.8	97.7	90.4	91.6
Toluene-D8	2037-26-5	0.2	%		112	101	108	100	102
4-Bromofluorobenzene	460-00-4	0.2	%		108	102	108	101	103

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	45880-6	45880-7	45880-8	45880-9	45880-10
			Client sampling date / time	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00
Compound	CAS Number	LOR	Unit	ES1729769-006	ES1729769-007	ES1729769-008	ES1729769-009	ES1729769-010
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	7.0	13.8	6.6	4.8	9.5
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples								
Asbestos (Trace)	1332-21-4	5	Fibres	----	----	No	----	----
EA200: AS 4964 - 2004 Identification of Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	----	----	No	----	----
Asbestos Type	1332-21-4	-	--	----	----	-	----	----
Sample weight (dry)	----	0.01	g	----	----	19.0	----	----
APPROVED IDENTIFIER:	----	-	--	----	----	C.OWLER	----	----
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	6	6	<5	5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	13	14	6	6	13
Copper	7440-50-8	5	mg/kg	14	15	15	6	14
Lead	7439-92-1	5	mg/kg	14	14	12	7	15
Nickel	7440-02-0	2	mg/kg	9	15	10	5	11
Zinc	7440-66-6	5	mg/kg	54	41	55	21	79
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05

SESL AUSTRALIA
Environment & Soil Sciences

Chain of Custody

CoC N°: 25133 | QUOTE N°: sy60713 | SESL PO #: | BATCH N°: 45880

REPORTING REQUIREMENTS				RELINQUISHED BY:	DISPATCH TO::
REPORT FORMAT:	☐ Hardcopy (mail) ☒ Email PDF ☒ Email Excel ☐ Fax			NAME: SESL Sample Receipt	Jennifer Cullen
SEND REPORT TO:	Harrison Leake	subsamples@sesl.com.au		OF: SESL Australia	ALS Laboratory Group
CC TO:	Andrew Jacovides	andrewj@sesl.com.au		DATE: 24-11-17	277-289 Woodpark Rd
URGENCY REQ'D:	Normal	DATE REQ'D:	Fri, 1 Dec 2017 By 4pm	TIME: 12:00	Smithfield NSW 2164

SAMPLE DESCRIPTION		DATE SAMPLED	MATRIX	TEMP °C	PRES.	CONTAINER TYPE*	CONTAINER N°	ANALYSIS REQUIRED
1 : 45880 - BH1 Surface	1	24/11/2017	Soil	19.20	Ice	G	1	1 - S-16
2 : 45880 - BH2 Surface	2	24/11/2017	Soil				1	2 - S-16
3 : 45880 - BH3 Surface	3	24/11/2017	Soil				1	3 - S-16
4 : 45880 - BH4 Surface	4	24/11/2017	Soil				1	4 - S-16
5 : 45880 - BH4 300-400	5	24/11/2017	Soil				1	5 - S-16
6 : 45880 - BH5 Surface	6	24/11/2017	Soil				1	6 - S-16
7 : 45880 - BH6 Surface	7	24/11/2017	Soil				1	7 - S-16
8 : 45880 - BH7 Surface	8	24/11/2017	S				1	8 - S-16, EA200
9 : 45880 - BH7 300-400	9	24/11/2017	S				1	9 - S-16
10 : 45880 - BH8 Surface	10	24/11/2017	S				1	10 - S-16
11 : 45880 - BH9 Surface	11	24/11/2017	S				1	11 - S-16, EA200
12 : 45880 - BH10 Surface	12	24/11/2017	S				1	12 - S-16, EA200
13 : 45880 - BH11 Surface	13	24/11/2017	S				1	13 - S-16, EA200
14 : 45880 - BH12 Surface	14	24/11/2017	S				1	14 - S-16, EA200
15 : 45880 - BH13 Surface	15	24/11/2017	S				1	15 - S-16
16 : 45880 - BH14 Surface	16	24/11/2017	S				1	16 - S-16
17 : 45880 - BH15 Surface	17	24/11/2017	S				1	17 - S-16
18 : 45880 - BH16 Surface	18	24/11/2017	So				1	18 - S-16
19 : 45880 - BH17 Surface	19	24/11/2017	Soil				1	19 - S-16
20 : 45880 - BH18 Surface	20	24/11/2017	Soil				1	20 - S-16

Environmental Division
Sydney
Work Order Reference
ES1729769
Telephone : +61-2-6784 8555

Subcon / Forward Lab / Split WO
Lab / Analysis:
Organised By / Date: Asbestos
Relinquished By / Date: Newcomb
Connote / Courier:
WO No:
Attach By PO / Internal Sheet:

ALL WATER FOR METALS, OCP/OPP LOW LEVEL in ug/L

RECEIVED BY:		SAMPLE CONDITION:	*Containers Guide
NAME: Sophie	DATE: 24/11/17	SAMPLE CONTAINERS: ☒ Intact ☐ Broken	Bo1 .... Bottle, amber glass; G ..... Glass jar
COMPANY: ALS	TIME: 1800	TEMPERATURE: ☐ Cold ☒ Room ☒ Other 8.8 C	Bo2 .... Bottle, plastic; S ..... Sterile
			Bg1 .... Bag, plastic; V ..... Vial
			Bg2 .... Bag, paper; O ..... Other

SESL AUSTRALIA
Environment & Soil Sciences

Chain of Custody

CoC N°: 25134 | QUOTE N°: sy60713 | SESL PO #: | BATCH N°: 45880

REPORTING REQUIREMENTS			RELINQUISHED BY:	DISPATCH TO:
REPORT FORMAT:	☐ Hardcopy (mail) ☒ Email PDF ☒ Email Excel ☐ Fax		NAME: SESL Sample Receipt	Jennifer Cullen
SEND REPORT TO:	Harrison Leake	subsamples@sesl.com.au	OF: SESL Australia	ALS Laboratory Group
CC TO:	Andrew Jacovides	andrewj@sesl.com.au	DATE: 24-11-17	277-289 Woodpark Rd Smithfield NSW 2164
URGENCY REQ'D:	Normal	DATE REQ'D: Fri, 1 Dec 2017 By 4pm	TIME: 12:00	

SAMPLE DESCRIPTION		DATE SAMPLED	MATRIX	TEMP °C	PRES.	CONTAINER TYPE*	N°	ANALYSIS REQUIRED
21 : 45880 - BH18 300-400	21	24/11/2017	Soil	19.20	Ice	G	1	21 - S-16
22 : 45880 - BH19 Surface	22	24/11/2017	Soil				1	22 - S-16
23 : 45880 - BH19 300-400	23	24/11/2017	Soil				1	23 - S-16
24 : 45880 - BH20 Surface	24	24/11/2017	Soil				1	24 - S-16
25 : 45880 - BH20 300-400	25	24/11/2017	Soil				1	25 - S-16
26 : 45880 - QA1	26	24/11/2017	Soil				1	26 - S-16
27 : 45880 - QA2	27	24/11/2017	Soil				1	27 - S-16, EA200
28 : 45880 - QA3	28	24/11/2017	Soil				1	28 - S-16

ALL WATER FOR METALS, OCP/OPP LOW LEVEL in ug/L

RECEIVED BY:		SAMPLE CONDITION	*Containers Guide	
NAME: [signature]	DATE: 24/11/17	SAMPLE CONTAINERS: ☒ Intact ☐ Broken	Bo1 .... Bottle, amber glass	G ..... Glass jar
COMPANY: yes	TIME: 1800	TEMPERATURE: ☐ Cold ☐ Room ☒ Other 8-8 C	Bo2 .... Bottle, plastic	S ..... Sterile
			Bg1 .... Bag, plastic	V ..... Vial
			Bg2 .... Bag, paper	O ..... Other

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1729769**	Page	: 1 of 28
Client	: **SESL Australia Pty Ltd**	Laboratory	: Environmental Division Sydney
Contact	: Harrison Leake (SUBSAMPLES)	Contact	: Customer Services ES
Address	: PO BOX 357 PENNANT HILLS NSW, AUSTRALIA 1715	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9980 6554	Telephone	: +61-2-8784 8555
Project	: 45880	Date Samples Received	: 24-Nov-2017 18:00
Order number	: ----	Date Analysis Commenced	: 27-Nov-2017
C-O-C number	: 25133	Issue Date	: 01-Dec-2017 17:24
Sampler	: ----		
Site	: ----		
Quote number	: SYBQ/259/16		
No. of samples received	: 28		
No. of samples analysed	: 28		

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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Descriptive Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Christopher Owler	Team Leader - Asbestos	Newcastle - Asbestos, Mayfield West, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Sanjeshni Jyoti	Senior Chemist Volatiles	Sydney Organics, Smithfield, NSW

General Comments

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

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

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

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

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

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

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

- EP068: Positive result has been confirmed by re-extraction and re-analysis.
- EA200 'Am' Amosite (brown asbestos)
- EA200 'Cr' Crocidolite (blue asbestos)
- EA200 'Trace' - Asbestos fibres ("Free Fibres") detected by trace analysis per AS4964. The result can be interpreted that the sample contains detectable 'respirable' asbestos fibres
- EA200: Asbestos Identification Samples were analysed by Polarised Light Microscopy including dispersion staining.
- EA200 Legend
- EA200 'Ch' Chrysotile (white asbestos)
- EA200: 'UMF' Unknown Mineral Fibres. "-" indicates fibres detected may or may not be asbestos fibres. Confirmation by alternative techniques is recommended.
- EA200: Negative results for vinyl tiles should be confirmed by an independent analytical technique.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EA200: For samples larger than 30g, the <2mm fraction may be sub-sampled prior to trace analysis as outlined in ISO23909:2008(E) Sect 6.3.2-2
- EA200: 'Yes' - Asbestos detected by polarised light microscopy including dispersion staining.
- EA200: 'No*' - No asbestos found, at the reporting limit of 0.1g/kg, by polarised light microscopy including dispersion staining. Asbestos material was detected and positively identified at concentrations estimated to be below 0.1g/kg.
- EA200: 'No' - No asbestos found at the reporting limit 0.1g/kg, by polarised light microscopy including dispersion staining.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	45880-1	45880-2	45880-3	45880-4	45880-5
			Client sampling date / time	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00
Compound	CAS Number	LOR	Unit	ES1729769-001	ES1729769-002	ES1729769-003	ES1729769-004	ES1729769-005
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	9.2	13.5	9.7	14.6	19.4
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	5	<5	6	8	7
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	12	16	11	15	16
Copper	7440-50-8	5	mg/kg	15	15	14	20	19
Lead	7439-92-1	5	mg/kg	22	14	12	13	14
Nickel	7440-02-0	2	mg/kg	12	13	11	18	19
Zinc	7440-66-6	5	mg/kg	108	42	46	42	44
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	45880-1	45880-2	45880-3	45880-4	45880-5
				Client sampling date / time	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00
Compound	CAS Number	LOR	Unit		ES1729769-001	ES1729769-002	ES1729769-003	ES1729769-004	ES1729769-005
					Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued									
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Demeton-S-methyl	919-86-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Monocrotophos	6923-22-4	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Dimethoate	60-51-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Diazinon	333-41-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion-methyl	298-00-0	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	121-75-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenthion	55-38-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion	56-38-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorfenvinphos	470-90-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Bromophos-ethyl	4824-78-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenamiphos	22224-92-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Prothiofos	34643-46-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Ethion	563-12-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Carbophenothion	786-19-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Azinphos Methyl	86-50-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	45880-1	45880-2	45880-3	45880-4	45880-5
				Client sampling date / time	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00
Compound	CAS Number	LOR	Unit		ES1729769-001	ES1729769-002	ES1729769-003	ES1729769-004	ES1729769-005
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		0.6	0.6	0.6	0.6	0.6
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		1.2	1.2	1.2	1.2	1.2
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	45880-1	45880-2	45880-3	45880-4	45880-5
				Client sampling date / time	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00
Compound	CAS Number	LOR	Unit		ES1729769-001	ES1729769-002	ES1729769-003	ES1729769-004	ES1729769-005
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	1330-20-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		109	104	117	111	103
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		104	92.9	112	104	88.1
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		111	68.3	65.7	91.8	73.3
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		90.8	101	88.2	94.7	96.2
2-Chlorophenol-D4	93951-73-6	0.5	%		92.2	103	89.2	95.9	97.0
2.4.6-Tribromophenol	118-79-6	0.5	%		79.1	90.2	77.2	83.6	81.6
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		96.5	107	94.4	101	102
Anthracene-d10	1719-06-8	0.5	%		93.7	104	91.8	98.3	98.9
4-Terphenyl-d14	1718-51-0	0.5	%		86.3	94.8	84.2	91.3	92.4
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		96.5	93.8	97.7	90.4	91.6
Toluene-D8	2037-26-5	0.2	%		112	101	108	100	102
4-Bromofluorobenzene	460-00-4	0.2	%		108	102	108	101	103

SESL AUSTRALIA
Environment & Soil Sciences

Chain of Custody

CoC N°: 25133 | QUOTE N°: sy60713 | SESL PO #: | BATCH N°: 45880

REPORTING REQUIREMENTS				RELINQUISHED BY:	DISPATCH TO::
REPORT FORMAT:	☐ Hardcopy (mail) ☒ Email PDF ☒ Email Excel ☐ Fax			NAME: SESL Sample Receipt	Jennifer Cullen
SEND REPORT TO:	Harrison Leake	subsamples@sesl.com.au		OF: SESL Australia	ALS Laboratory Group
CC TO:	Andrew Jacovides	andrewj@sesl.com.au		DATE: 24-11-17	**277-289 Woodpark Rd**
URGENCY REQ'D:	Normal	DATE REQ'D:	Fri, 1 Dec 2017 By 4pm	TIME: 12:00	**Smithfield NSW 2164**

SAMPLE DESCRIPTION		DATE SAMPLED	MATRIX	TEMP °C	PRES.	CONTAINER TYPE*	CONTAINER N°	ANALYSIS REQUIRED
1 : 45880 - BH1 Surface	1	24/11/2017	Soil	19.20	Ice	G	1	1 - S-16
2 : 45880 - BH2 Surface	2	24/11/2017	Soil				1	2 - S-16
3 : 45880 - BH3 Surface	3	24/11/2017	Soil				1	3 - S-16
4 : 45880 - BH4 Surface	4	24/11/2017	Soil				1	4 - S-16
5 : 45880 - BH4 300-400	5	24/11/2017	Soil				1	5 - S-16
6 : 45880 - BH5 Surface	6	24/11/2017	Soil				1	6 - S-16
7 : 45880 - BH6 Surface	7	24/11/2017	Soil				1	7 - S-16
8 : 45880 - BH7 Surface	8	24/11/2017	S				1	8 - S-16, EA200
9 : 45880 - BH7 300-400	9	24/11/2017	S				1	9 - S-16
10 : 45880 - BH8 Surface	10	24/11/2017	S				1	10 - S-16
11 : 45880 - BH9 Surface	11	24/11/2017	S				1	11 - S-16, EA200
12 : 45880 - BH10 Surface	12	24/11/2017	S				1	12 - S-16, EA200
13 : 45880 - BH11 Surface	13	24/11/2017	S				1	13 - S-16, EA200
14 : 45880 - BH12 Surface	14	24/11/2017	S				1	14 - S-16, EA200
15 : 45880 - BH13 Surface	15	24/11/2017	S				1	15 - S-16
16 : 45880 - BH14 Surface	16	24/11/2017	S				1	16 - S-16
17 : 45880 - BH15 Surface	17	24/11/2017	S				1	17 - S-16
18 : 45880 - BH16 Surface	18	24/11/2017	So				1	18 - S-16
19 : 45880 - BH17 Surface	19	24/11/2017	Soil				1	19 - S-16
20 : 45880 - BH18 Surface	20	24/11/2017	Soil				1	20 - S-16

Environmental Division
Sydney
Work Order Reference
ES1729769
Telephone : +61-2-6784 8555

Subcon / Forward Lab / Split WO
Lab / Analysis:
Organised By / Date: Asbestos
Relinquished By / Date: Newcomb
Connote / Courier:
WO No:
Attach By PO / Internal Sheet:

ALL WATER FOR METALS, OCP/OPP LOW LEVEL in ug/L

RECEIVED BY:		SAMPLE CONDITION:	*Containers Guide
NAME: Sophie	DATE: 24/11/17	SAMPLE CONTAINERS: ☒ Intact ☐ Broken	Bo1 .... Bottle, amber glass; G ..... Glass jar
COMPANY: ALS	TIME: 1800	TEMPERATURE: ☐ Cold ☒ Room ☒ Other 8.8 C	Bo2 .... Bottle, plastic; S ..... Sterile
			Bg1 .... Bag, plastic; V ..... Vial
			Bg2 .... Bag, paper; O ..... Other

SESL AUSTRALIA
Environment & Soil Sciences

Chain of Custody

CoC N°: 25134 | QUOTE N°: sy60713 | SESL PO #: | BATCH N°: 45880

REPORTING REQUIREMENTS			RELINQUISHED BY:	DISPATCH TO:
REPORT FORMAT:	☐ Hardcopy (mail) ☒ Email PDF ☒ Email Excel ☐ Fax		NAME: SESL Sample Receipt	Jennifer Cullen
SEND REPORT TO:	Harrison Leake	subsamples@sesl.com.au	OF: SESL Australia	ALS Laboratory Group
CC TO:	Andrew Jacovides	andrewj@sesl.com.au	DATE: 24-11-17	277-289 Woodpark Rd Smithfield NSW 2164
URGENCY REQ'D:	Normal	DATE REQ'D: Fri, 1 Dec 2017 By 4pm	TIME: 12:00	

SAMPLE DESCRIPTION		DATE SAMPLED	MATRIX	TEMP °C	PRES.	CONTAINER TYPE*	N°	ANALYSIS REQUIRED
21 : 45880 - BH18 300-400	21	24/11/2017	Soil	19.20	Ice	G	1	21 - S-16
22 : 45880 - BH19 Surface	22	24/11/2017	Soil				1	22 - S-16
23 : 45880 - BH19 300-400	23	24/11/2017	Soil				1	23 - S-16
24 : 45880 - BH20 Surface	24	24/11/2017	Soil				1	24 - S-16
25 : 45880 - BH20 300-400	25	24/11/2017	Soil				1	25 - S-16
26 : 45880 - QA1	26	24/11/2017	Soil				1	26 - S-16
27 : 45880 - QA2	27	24/11/2017	Soil				1	27 - S-16, EA200
28 : 45880 - QA3	28	24/11/2017	Soil				1	28 - S-16

ALL WATER FOR METALS, OCP/OPP LOW LEVEL in ug/L

RECEIVED BY:		SAMPLE CONDITION	*Containers Guide	
NAME: [signature]	DATE: 24/11/17	SAMPLE CONTAINERS: ☒ Intact ☐ Broken	Bo1 .... Bottle, amber glass	G ..... Glass jar
COMPANY: yes	TIME: 1800	TEMPERATURE: ☐ Cold ☐ Room ☒ Other 8-8 C	Bo2 .... Bottle, plastic	S ..... Sterile
			Bg1 .... Bag, plastic	V ..... Vial
			Bg2 .... Bag, paper	O ..... Other

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1729769**	Page	: 1 of 28
Client	: **SESL Australia Pty Ltd**	Laboratory	: Environmental Division Sydney
Contact	: Harrison Leake (SUBSAMPLES)	Contact	: Customer Services ES
Address	: PO BOX 357 PENNANT HILLS NSW, AUSTRALIA 1715	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9980 6554	Telephone	: +61-2-8784 8555
Project	: 45880	Date Samples Received	: 24-Nov-2017 18:00
Order number	: ----	Date Analysis Commenced	: 27-Nov-2017
C-O-C number	: 25133	Issue Date	: 01-Dec-2017 17:24
Sampler	: ----		
Site	: ----		
Quote number	: SYBQ/259/16		
No. of samples received	: 28		
No. of samples analysed	: 28		

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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Descriptive Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Christopher Owler	Team Leader - Asbestos	Newcastle - Asbestos, Mayfield West, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Sanjeshni Jyoti	Senior Chemist Volatiles	Sydney Organics, Smithfield, NSW

General Comments

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

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

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

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

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

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

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

- EP068: Positive result has been confirmed by re-extraction and re-analysis.
- EA200 'Am' Amosite (brown asbestos)
- EA200 'Cr' Crocidolite (blue asbestos)
- EA200 'Trace' - Asbestos fibres ("Free Fibres") detected by trace analysis per AS4964. The result can be interpreted that the sample contains detectable 'respirable' asbestos fibres
- EA200: Asbestos Identification Samples were analysed by Polarised Light Microscopy including dispersion staining.
- EA200 Legend
- EA200 'Ch' Chrysotile (white asbestos)
- EA200: 'UMF' Unknown Mineral Fibres. "-" indicates fibres detected may or may not be asbestos fibres. Confirmation by alternative techniques is recommended.
- EA200: Negative results for vinyl tiles should be confirmed by an independent analytical technique.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EA200: For samples larger than 30g, the <2mm fraction may be sub-sampled prior to trace analysis as outlined in ISO23909:2008(E) Sect 6.3.2-2
- EA200: 'Yes' - Asbestos detected by polarised light microscopy including dispersion staining.
- EA200: 'No*' - No asbestos found, at the reporting limit of 0.1g/kg, by polarised light microscopy including dispersion staining. Asbestos material was detected and positively identified at concentrations estimated to be below 0.1g/kg.
- EA200: 'No' - No asbestos found at the reporting limit 0.1g/kg, by polarised light microscopy including dispersion staining.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	45880-1	45880-2	45880-3	45880-4	45880-5
			Client sampling date / time	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00
Compound	CAS Number	LOR	Unit	ES1729769-001	ES1729769-002	ES1729769-003	ES1729769-004	ES1729769-005
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	9.2	13.5	9.7	14.6	19.4
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	5	<5	6	8	7
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	12	16	11	15	16
Copper	7440-50-8	5	mg/kg	15	15	14	20	19
Lead	7439-92-1	5	mg/kg	22	14	12	13	14
Nickel	7440-02-0	2	mg/kg	12	13	11	18	19
Zinc	7440-66-6	5	mg/kg	108	42	46	42	44
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	45880-1	45880-2	45880-3	45880-4	45880-5
				Client sampling date / time	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00
Compound	CAS Number	LOR	Unit		ES1729769-001	ES1729769-002	ES1729769-003	ES1729769-004	ES1729769-005
					Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued									
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Demeton-S-methyl	919-86-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Monocrotophos	6923-22-4	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Dimethoate	60-51-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Diazinon	333-41-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion-methyl	298-00-0	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	121-75-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenthion	55-38-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion	56-38-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorfenvinphos	470-90-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Bromophos-ethyl	4824-78-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenamiphos	22224-92-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Prothiofos	34643-46-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Ethion	563-12-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Carbophenothion	786-19-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Azinphos Methyl	86-50-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	45880-1	45880-2	45880-3	45880-4	45880-5
				Client sampling date / time	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00
Compound	CAS Number	LOR	Unit		ES1729769-001	ES1729769-002	ES1729769-003	ES1729769-004	ES1729769-005
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		0.6	0.6	0.6	0.6	0.6
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		1.2	1.2	1.2	1.2	1.2
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	45880-1	45880-2	45880-3	45880-4	45880-5
				Client sampling date / time	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00
Compound	CAS Number	LOR	Unit		ES1729769-001	ES1729769-002	ES1729769-003	ES1729769-004	ES1729769-005
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	1330-20-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		109	104	117	111	103
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		104	92.9	112	104	88.1
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		111	68.3	65.7	91.8	73.3
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		90.8	101	88.2	94.7	96.2
2-Chlorophenol-D4	93951-73-6	0.5	%		92.2	103	89.2	95.9	97.0
2.4.6-Tribromophenol	118-79-6	0.5	%		79.1	90.2	77.2	83.6	81.6
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		96.5	107	94.4	101	102
Anthracene-d10	1719-06-8	0.5	%		93.7	104	91.8	98.3	98.9
4-Terphenyl-d14	1718-51-0	0.5	%		86.3	94.8	84.2	91.3	92.4
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		96.5	93.8	97.7	90.4	91.6
Toluene-D8	2037-26-5	0.2	%		112	101	108	100	102
4-Bromofluorobenzene	460-00-4	0.2	%		108	102	108	101	103

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	45880-6	45880-7	45880-8	45880-9	45880-10
			Client sampling date / time	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00
Compound	CAS Number	LOR	Unit	ES1729769-006	ES1729769-007	ES1729769-008	ES1729769-009	ES1729769-010
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	7.0	13.8	6.6	4.8	9.5
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples								
Asbestos (Trace)	1332-21-4	5	Fibres	----	----	No	----	----
EA200: AS 4964 - 2004 Identification of Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	----	----	No	----	----
Asbestos Type	1332-21-4	-	--	----	----	-	----	----
Sample weight (dry)	----	0.01	g	----	----	19.0	----	----
APPROVED IDENTIFIER:	----	-	--	----	----	C.OWLER	----	----
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	6	6	<5	5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	13	14	6	6	13
Copper	7440-50-8	5	mg/kg	14	15	15	6	14
Lead	7439-92-1	5	mg/kg	14	14	12	7	15
Nickel	7440-02-0	2	mg/kg	9	15	10	5	11
Zinc	7440-66-6	5	mg/kg	54	41	55	21	79
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	45880-6	45880-7	45880-8	45880-9	45880-10
			Client sampling date / time	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00
Compound	CAS Number	LOR	Unit	ES1729769-006	ES1729769-007	ES1729769-008	ES1729769-009	ES1729769-010
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	7.0	13.8	6.6	4.8	9.5
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples								
Asbestos (Trace)	1332-21-4	5	Fibres	----	----	No	----	----
EA200: AS 4964 - 2004 Identification of Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	----	----	No	----	----
Asbestos Type	1332-21-4	-	--	----	----	-	----	----
Sample weight (dry)	----	0.01	g	----	----	19.0	----	----
APPROVED IDENTIFIER:	----	-	--	----	----	C.OWLER	----	----
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	6	6	<5	5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	13	14	6	6	13
Copper	7440-50-8	5	mg/kg	14	15	15	6	14
Lead	7439-92-1	5	mg/kg	14	14	12	7	15
Nickel	7440-02-0	2	mg/kg	9	15	10	5	11
Zinc	7440-66-6	5	mg/kg	54	41	55	21	79
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	45880-6	45880-7	45880-8	45880-9	45880-10
				Client sampling date / time	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00
Compound	CAS Number	LOR	Unit		ES1729769-006	ES1729769-007	ES1729769-008	ES1729769-009	ES1729769-010
					Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued									
4.4`-DDE	72-55-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	72-20-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
beta-Endosulfan	33213-65-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ Endosulfan (sum)	115-29-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDD	72-54-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Demeton-S-methyl	919-86-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Monocrotophos	6923-22-4	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Dimethoate	60-51-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Diazinon	333-41-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion-methyl	298-00-0	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	121-75-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenthion	55-38-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion	56-38-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorfenvinphos	470-90-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Bromophos-ethyl	4824-78-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenamiphos	22224-92-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Prothiofos	34643-46-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Ethion	563-12-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Carbophenothion	786-19-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Azinphos Methyl	86-50-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	45880-6	45880-7	45880-8	45880-9	45880-10
				Client sampling date / time	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00
Compound	CAS Number	LOR	Unit		ES1729769-006	ES1729769-007	ES1729769-008	ES1729769-009	ES1729769-010
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**0.6**	**0.6**	**0.6**	**0.6**	**0.6**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	**1.2**	**1.2**	**1.2**	**1.2**
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	<50

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	45880-6	45880-7	45880-8	45880-9	45880-10
				Client sampling date / time	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00
Compound	CAS Number	LOR	Unit		ES1729769-006	ES1729769-007	ES1729769-008	ES1729769-009	ES1729769-010
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ **Sum of BTEX**	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ **Total Xylenes**	1330-20-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		**109**	**129**	**111**	**99.4**	**107**
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		**98.0**	**108**	**107**	**86.7**	**103**
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		**65.2**	**65.0**	**68.2**	**66.2**	**66.0**
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**94.3**	**93.4**	**95.5**	**95.7**	**94.6**
2-Chlorophenol-D4	93951-73-6	0.5	%		**94.9**	**94.1**	**96.5**	**96.7**	**95.8**
2.4.6-Tribromophenol	118-79-6	0.5	%		**83.4**	**81.4**	**83.4**	**82.3**	**84.8**
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**100**	**98.5**	**101**	**101**	**100**
Anthracene-d10	1719-06-8	0.5	%		**97.4**	**95.6**	**97.9**	**97.9**	**97.3**
4-Terphenyl-d14	1718-51-0	0.5	%		**90.1**	**88.5**	**90.6**	**90.3**	**89.8**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**98.8**	**92.4**	**96.9**	**96.1**	**113**
Toluene-D8	2037-26-5	0.2	%		**110**	**99.0**	**108**	**104**	**120**
4-Bromofluorobenzene	460-00-4	0.2	%		**108**	**97.8**	**106**	**106**	**123**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	45880-11	45880-12	45880-13	45880-14	45880-15
			Client sampling date / time	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00
Compound	CAS Number	LOR	Unit	ES1729769-011	ES1729769-012	ES1729769-013	ES1729769-014	ES1729769-015
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	13.4	10.4	10.9	7.4	7.8
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples								
Asbestos (Trace)	1332-21-4	5	Fibres	No	No	No	No	----
EA200: AS 4964 - 2004 Identification of Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	No	No	No	No	----
Asbestos Type	1332-21-4	-	--	-	-	-	-	----
Sample weight (dry)	----	0.01	g	12.8	14.9	9.69	7.00	----
APPROVED IDENTIFIER:	----	-	--	C.OWLER	C.OWLER	C.OWLER	C.OWLER	----
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg	<1	<1	1	<1	<1
Chromium	7440-47-3	2	mg/kg	45	40	30	42	49
Copper	7440-50-8	5	mg/kg	20	16	29	17	13
Lead	7439-92-1	5	mg/kg	410	384	168	60	44
Nickel	7440-02-0	2	mg/kg	25	19	19	21	19
Zinc	7440-66-6	5	mg/kg	312	249	591	115	40
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	45880-11	45880-12	45880-13	45880-14	45880-15
				Client sampling date / time	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00
Compound	CAS Number	LOR	Unit		ES1729769-011	ES1729769-012	ES1729769-013	ES1729769-014	ES1729769-015
					Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued									
4.4`-DDE	72-55-9	0.05	mg/kg		<0.05	<0.05	**0.48**	<0.05	<0.05
Endrin	72-20-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
beta-Endosulfan	33213-65-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ Endosulfan (sum)	115-29-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDD	72-54-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg		<0.05	<0.05	**0.48**	<0.05	<0.05
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Demeton-S-methyl	919-86-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Monocrotophos	6923-22-4	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Dimethoate	60-51-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Diazinon	333-41-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion-methyl	298-00-0	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	121-75-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenthion	55-38-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion	56-38-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorfenvinphos	470-90-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Bromophos-ethyl	4824-78-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenamiphos	22224-92-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Prothiofos	34643-46-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Ethion	563-12-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Carbophenothion	786-19-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Azinphos Methyl	86-50-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	45880-11	45880-12	45880-13	45880-14	45880-15
				Client sampling date / time	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00
Compound	CAS Number	LOR	Unit		ES1729769-011	ES1729769-012	ES1729769-013	ES1729769-014	ES1729769-015
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		**1.0**	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		**1.1**	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg		**0.7**	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		**2.8**	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**0.6**	**0.6**	**0.6**	**0.6**	**0.6**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	**1.2**	**1.2**	**1.2**	**1.2**
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		**100**	**110**	<100	**100**	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		**100**	**110**	<50	**100**	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	<50

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	45880-11	45880-12	45880-13	45880-14	45880-15
				Client sampling date / time	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00
Compound	CAS Number	LOR	Unit		ES1729769-011	ES1729769-012	ES1729769-013	ES1729769-014	ES1729769-015
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ **Sum of BTEX**	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ **Total Xylenes**	1330-20-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		**99.7**	**101**	**86.0**	**113**	**107**
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		**80.4**	**103**	**95.1**	**113**	**102**
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		**66.3**	**89.9**	**72.8**	**72.7**	**65.1**
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**91.8**	**91.6**	**94.6**	**97.6**	**93.5**
2-Chlorophenol-D4	93951-73-6	0.5	%		**93.1**	**92.4**	**95.5**	**98.6**	**94.1**
2.4.6-Tribromophenol	118-79-6	0.5	%		**83.7**	**85.2**	**87.4**	**94.7**	**85.7**
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**96.8**	**96.3**	**98.5**	**102**	**97.5**
Anthracene-d10	1719-06-8	0.5	%		**94.1**	**93.4**	**95.8**	**99.6**	**95.4**
4-Terphenyl-d14	1718-51-0	0.5	%		**86.4**	**85.7**	**88.0**	**90.9**	**87.0**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**96.5**	**102**	**97.3**	**109**	**90.9**
Toluene-D8	2037-26-5	0.2	%		**108**	**114**	**107**	**122**	**99.8**
4-Bromofluorobenzene	460-00-4	0.2	%		**104**	**111**	**108**	**118**	**101**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	45880-16	45880-17	45880-18	45880-19	45880-20
			Client sampling date / time	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00
Compound	CAS Number	LOR	Unit	ES1729769-016	ES1729769-017	ES1729769-018	ES1729769-019	ES1729769-020
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	5.9	16.8	46.4	14.5	16.3
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	6	<5	<5	6
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	46	17	43	41	10
Copper	7440-50-8	5	mg/kg	13	22	41	39	21
Lead	7439-92-1	5	mg/kg	13	79	23	15	12
Nickel	7440-02-0	2	mg/kg	24	13	40	39	16
Zinc	7440-66-6	5	mg/kg	36	95	435	138	49
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	45880-16	45880-17	45880-18	45880-19	45880-20
				Client sampling date / time	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00
Compound	CAS Number	LOR	Unit		ES1729769-016	ES1729769-017	ES1729769-018	ES1729769-019	ES1729769-020
					Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued									
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Demeton-S-methyl	919-86-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Monocrotophos	6923-22-4	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Dimethoate	60-51-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Diazinon	333-41-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion-methyl	298-00-0	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	121-75-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenthion	55-38-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion	56-38-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorfenvinphos	470-90-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Bromophos-ethyl	4824-78-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenamiphos	22224-92-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Prothiofos	34643-46-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Ethion	563-12-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Carbophenothion	786-19-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Azinphos Methyl	86-50-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	45880-16	45880-17	45880-18	45880-19	45880-20
				Client sampling date / time	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00
Compound	CAS Number	LOR	Unit		ES1729769-016	ES1729769-017	ES1729769-018	ES1729769-019	ES1729769-020
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		0.6	0.6	0.6	0.6	0.6
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		1.2	1.2	1.2	1.2	1.2
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	45880-16	45880-17	45880-18	45880-19	45880-20
				Client sampling date / time	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00
Compound	CAS Number	LOR	Unit		ES1729769-016	ES1729769-017	ES1729769-018	ES1729769-019	ES1729769-020
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	1330-20-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		111	103	91.7	104	118
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		118	111	90.2	102	121
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		75.6	70.0	66.6	68.6	65.2
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		91.9	94.8	95.2	91.3	92.9
2-Chlorophenol-D4	93951-73-6	0.5	%		92.5	95.3	96.0	91.1	92.6
2.4.6-Tribromophenol	118-79-6	0.5	%		81.5	85.8	87.8	80.9	80.7
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		97.2	99.6	99.1	95.2	96.7
Anthracene-d10	1719-06-8	0.5	%		93.5	96.7	96.4	93.2	94.8
4-Terphenyl-d14	1718-51-0	0.5	%		86.5	88.5	88.4	85.4	87.4
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		93.0	94.0	80.6	100	94.9
Toluene-D8	2037-26-5	0.2	%		101	97.7	87.4	113	106
4-Bromofluorobenzene	460-00-4	0.2	%		99.7	97.6	87.8	110	106

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	45880-21	45880-22	45880-23	45880-24	45880-25
			Client sampling date / time	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00
Compound	CAS Number	LOR	Unit	ES1729769-021	ES1729769-022	ES1729769-023	ES1729769-024	ES1729769-025
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	18.2	11.3	10.4	11.3	11.2
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	8	6	8	8
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	9	9	9	11	14
Copper	7440-50-8	5	mg/kg	21	17	17	16	17
Lead	7439-92-1	5	mg/kg	12	14	13	13	12
Nickel	7440-02-0	2	mg/kg	13	11	11	13	14
Zinc	7440-66-6	5	mg/kg	48	42	40	42	42
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	45880-21	45880-22	45880-23	45880-24	45880-25
				Client sampling date / time	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00
Compound	CAS Number	LOR	Unit		ES1729769-021	ES1729769-022	ES1729769-023	ES1729769-024	ES1729769-025
					Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued									
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Demeton-S-methyl	919-86-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Monocrotophos	6923-22-4	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Dimethoate	60-51-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Diazinon	333-41-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion-methyl	298-00-0	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	121-75-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenthion	55-38-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion	56-38-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorfenvinphos	470-90-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Bromophos-ethyl	4824-78-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenamiphos	22224-92-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Prothiofos	34643-46-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Ethion	563-12-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Carbophenothion	786-19-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Azinphos Methyl	86-50-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	45880-21	45880-22	45880-23	45880-24	45880-25
				Client sampling date / time	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00
Compound	CAS Number	LOR	Unit		ES1729769-021	ES1729769-022	ES1729769-023	ES1729769-024	ES1729769-025
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		0.6	0.6	0.6	0.6	0.6
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		1.2	1.2	1.2	1.2	1.2
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	45880-21	45880-22	45880-23	45880-24	45880-25
				Client sampling date / time	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00
Compound	CAS Number	LOR	Unit		ES1729769-021	ES1729769-022	ES1729769-023	ES1729769-024	ES1729769-025
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	1330-20-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		115	111	110	99.3	117
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		115	72.0	80.5	83.5	113
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		71.9	64.1	67.7	64.5	88.4
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		90.8	88.3	94.3	90.8	86.2
2-Chlorophenol-D4	93951-73-6	0.5	%		92.6	90.4	96.4	93.2	88.5
2.4.6-Tribromophenol	118-79-6	0.5	%		70.2	68.4	69.5	67.6	60.6
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		97.2	95.2	102	98.1	93.6
Anthracene-d10	1719-06-8	0.5	%		97.4	95.0	100.0	95.3	93.0
4-Terphenyl-d14	1718-51-0	0.5	%		87.7	85.5	89.6	85.9	85.2
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		121	130	126	118	115
Toluene-D8	2037-26-5	0.2	%		107	115	116	109	109
4-Bromofluorobenzene	460-00-4	0.2	%		100	102	108	99.0	105

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	45880-26	45880-27	45880-28	----	----
			Client sampling date / time	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	----	----
Compound	CAS Number	LOR	Unit	ES1729769-026	ES1729769-027	ES1729769-028	--------	--------
				Result	Result	Result	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	6.6	12.2	15.8	----	----
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples								
Asbestos (Trace)	1332-21-4	5	Fibres	----	No	----	----	----
EA200: AS 4964 - 2004 Identification of Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	----	No	----	----	----
Asbestos Type	1332-21-4	-	--	----	-	----	----	----
Sample weight (dry)	----	0.01	g	----	15.5	----	----	----
APPROVED IDENTIFIER:	----	-	--	----	C.OWLER	----	----	----
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	6	<5	9	----	----
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	----	----
Chromium	7440-47-3	2	mg/kg	9	50	13	----	----
Copper	7440-50-8	5	mg/kg	10	18	17	----	----
Lead	7439-92-1	5	mg/kg	11	517	15	----	----
Nickel	7440-02-0	2	mg/kg	8	25	12	----	----
Zinc	7440-66-6	5	mg/kg	57	335	43	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	----	----
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	<0.1	----	----
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	<0.05	----	----
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	45880-26	45880-27	45880-28	----	----
				Client sampling date / time	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	----	----
Compound	CAS Number	LOR	Unit		ES1729769-026	ES1729769-027	ES1729769-028	--------	--------
					Result	Result	Result	----	----
EP068A: Organochlorine Pesticides (OC) - Continued									
4.4`-DDE	72-55-9	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Endrin	72-20-8	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
beta-Endosulfan	33213-65-9	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
^ Endosulfan (sum)	115-29-7	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
4.4`-DDD	72-54-8	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Endrin aldehyde	7421-93-4	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	<0.2	<0.2	----	----
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	<0.2	<0.2	----	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Demeton-S-methyl	919-86-8	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Monocrotophos	6923-22-4	0.2	mg/kg		<0.2	<0.2	<0.2	----	----
Dimethoate	60-51-5	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Diazinon	333-41-5	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Parathion-methyl	298-00-0	0.2	mg/kg		<0.2	<0.2	<0.2	----	----
Malathion	121-75-5	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Fenthion	55-38-9	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Parathion	56-38-2	0.2	mg/kg		<0.2	<0.2	<0.2	----	----
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Chlorfenvinphos	470-90-6	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Bromophos-ethyl	4824-78-6	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Fenamiphos	22224-92-6	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Prothiofos	34643-46-4	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Ethion	563-12-2	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Carbophenothion	786-19-6	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
Azinphos Methyl	86-50-0	0.05	mg/kg		<0.05	<0.05	<0.05	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	<0.5	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	45880-26	45880-27	45880-28	----	----
				Client sampling date / time	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	----	----
Compound	CAS Number	LOR	Unit		ES1729769-026	ES1729769-027	ES1729769-028	--------	--------
					Result	Result	Result	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Pyrene	129-00-0	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**0.6**	**0.6**	**0.6**	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	**1.2**	**1.2**	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	----	----
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	----	----
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	----	----
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	----	----
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	----	----
>C16 - C34 Fraction	----	100	mg/kg		<100	**100**	<100	----	----
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	**100**	<50	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	45880-26	45880-27	45880-28	----	----
				Client sampling date / time	24-Nov-2017 00:00	24-Nov-2017 00:00	24-Nov-2017 00:00	----	----
Compound	CAS Number	LOR	Unit		ES1729769-026	ES1729769-027	ES1729769-028	--------	--------
					Result	Result	Result	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	----	----
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
^ **Sum of BTEX**	----	0.2	mg/kg		<0.2	<0.2	<0.2	----	----
^ **Total Xylenes**	1330-20-7	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	----	----
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		**98.4**	**116**	**117**	----	----
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		**67.2**	**105**	**118**	----	----
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		**70.6**	**87.7**	**87.2**	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**89.7**	**86.9**	**90.8**	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%		**91.8**	**90.2**	**91.8**	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%		**68.7**	**72.6**	**80.0**	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**97.6**	**94.8**	**94.6**	----	----
Anthracene-d10	1719-06-8	0.5	%		**97.0**	**93.2**	**93.3**	----	----
4-Terphenyl-d14	1718-51-0	0.5	%		**86.9**	**85.1**	**69.7**	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**108**	**101**	**118**	----	----
Toluene-D8	2037-26-5	0.2	%		**126**	**122**	**111**	----	----
4-Bromofluorobenzene	460-00-4	0.2	%		**117**	**112**	**103**	----	----

Analytical Results

Descriptive Results

Sub-Matrix: **SOIL**

Method: Compound	Client sample ID - Client sampling date / time	Analytical Results
EA200: AS 4964 - 2004 Identification of Asbestos in Soils		
EA200: Description	45880-8 - 24-Nov-2017 00:00	Pale brown sandy soil
EA200: Description	45880-11 - 24-Nov-2017 00:00	Mid brown sandy soil
EA200: Description	45880-12 - 24-Nov-2017 00:00	Mid brown sandy soil
EA200: Description	45880-13 - 24-Nov-2017 00:00	Mid brown sandy soil
EA200: Description	45880-14 - 24-Nov-2017 00:00	Mid brown sandy soil
EA200: Description	45880-27 - 24-Nov-2017 00:00	Mid brown sandy soil

Surrogate Control Limits

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%) Low	High
EP066S: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	39	149
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	49	147
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	35	143
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2.4.6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **ES1729769**	Page	: 1 of 19
Client	: **SESL Australia Pty Ltd**	Laboratory	: Environmental Division Sydney
Contact	: Harrison Leake (SUBSAMPLES)	Contact	: Customer Services ES
Address	: PO BOX 357 PENNANT HILLS NSW, AUSTRALIA 1715	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9980 6554	Telephone	: +61-2-8784 8555
Project	: 45880	Date Samples Received	: 24-Nov-2017
Order number	: ----	Date Analysis Commenced	: 27-Nov-2017
C-O-C number	: 25133	Issue Date	: 01-Dec-2017
Sampler	: ----		
Site	: ----		
Quote number	: SYBQ/259/16		
No. of samples received	: 28		
No. of samples analysed	: 28		

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

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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Alex Rossi	Organic Chemist	Sydney Organics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Christopher Owler	Team Leader - Asbestos	Newcastle - Asbestos, Mayfield West, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Sanjeshni Jyoti	Senior Chemist Volatiles	Sydney Organics, Smithfield, NSW

General Comments

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

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

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 1275009)									
ES1729754-003	Anonymous	EA055: Moisture Content	----	1	%	26.0	28.1	7.48	0% - 20%
ES1729768-002	Anonymous	EA055: Moisture Content	----	1	%	17.8	16.4	7.72	0% - 50%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 1275010)									
ES1729769-004	45880-4	EA055: Moisture Content	----	1	%	14.6	14.4	1.45	0% - 50%
ES1729769-015	45880-15	EA055: Moisture Content	----	1	%	7.8	8.0	2.45	No Limit
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 1275011)									
ES1729769-024	45880-24	EA055: Moisture Content	----	1	%	11.3	11.2	0.00	0% - 50%
ES1729793-002	Anonymous	EA055: Moisture Content	----	1	%	12.1	13.7	12.8	0% - 50%
EG005T: Total Metals by ICP-AES (QC Lot: 1277855)									
ES1729384-001	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	11	11	0.00	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	3	4	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	16	13	15.4	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	51	38	29.8	0% - 50%
		EG005T: Zinc	7440-66-6	5	mg/kg	58	48	19.4	0% - 50%
ES1729769-007	45880-7	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	14	14	0.00	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	15	15	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	6	5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	15	16	0.00	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	14	13	0.00	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	41	41	0.00	No Limit
EG005T: Total Metals by ICP-AES (QC Lot: 1277858)									

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EG005T: Total Metals by ICP-AES (QC Lot: 1277858) - continued									
ES1729769-017	45880-17	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	17	17	0.00	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	13	14	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	6	6	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	22	23	0.00	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	79	79	0.00	0% - 50%
		EG005T: Zinc	7440-66-6	5	mg/kg	95	99	4.13	0% - 50%
ES1729769-027	45880-27	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	50	47	6.74	0% - 20%
		EG005T: Nickel	7440-02-0	2	mg/kg	25	26	0.00	0% - 50%
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	18	18	0.00	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	517	524	1.31	0% - 20%
		EG005T: Zinc	7440-66-6	5	mg/kg	335	349	4.13	0% - 20%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 1277856)									
ES1729384-001	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
ES1729769-007	45880-7	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 1277857)									
ES1729769-017	45880-17	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
ES1729769-027	45880-27	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EP066: Polychlorinated Biphenyls (PCB) (QC Lot: 1271302)									
ES1729769-001	45880-1	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
ES1729769-011	45880-11	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EP066: Polychlorinated Biphenyls (PCB) (QC Lot: 1271343)									
ES1729737-001	Anonymous	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
ES1729769-025	45880-25	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EP068A: Organochlorine Pesticides (OC) (QC Lot: 1271301)									
ES1729769-001	45880-1	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP068A: Organochlorine Pesticides (OC) (QC Lot: 1271301) - continued									
ES1729769-001	45880-1	EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
ES1729769-011	45880-11	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
EP068A: Organochlorine Pesticides (OC) (QC Lot: 1271342)									
ES1729737-001	Anonymous	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	0.06	0.06	0.00	No Limit

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP068A: Organochlorine Pesticides (OC) (QC Lot: 1271342) - continued									
ES1729737-001	Anonymous	EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	0.05	0.06	0.00	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
ES1729769-025	45880-25	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 1271301)									
ES1729769-001	45880-1	EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 1271301) - continued									
ES1729769-001	45880-1	EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
ES1729769-011	45880-11	EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 1271342)									
ES1729737-001	Anonymous	EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 1271342) - continued									
ES1729737-001	Anonymous	EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
ES1729769-025	45880-25	EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 1271300)									
ES1729769-001	45880-1	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 1271300) - continued									
ES1729769-001	45880-1	EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
ES1729769-011	45880-11	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	1.0	0.8	20.1	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	1.1	1.0	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	0.7	0.6	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	2.8	2.4	15.4	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 1271340)									
ES1729737-001	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 1271340) - continued									
ES1729737-001	Anonymous	EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
ES1729769-025	45880-25	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1271143)									
ES1729769-001	45880-1	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
ES1729769-011	45880-11	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1271149)									
ES1729768-001	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
ES1729769-023	45880-23	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1271299)									

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1271299) - continued									
ES1729769-001	45880-1	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
ES1729769-011	45880-11	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1271341)									
ES1729737-001	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
ES1729769-025	45880-25	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1271143)									
ES1729769-001	45880-1	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
ES1729769-011	45880-11	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1271149)									
ES1729768-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
ES1729769-023	45880-23	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1271299)									
ES1729769-001	45880-1	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
ES1729769-011	45880-11	EP071: >C16 - C34 Fraction	----	100	mg/kg	100	120	13.5	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1271341)									
ES1729737-001	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
ES1729769-025	45880-25	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080: BTEXN (QC Lot: 1271143)									
ES1729769-001	45880-1	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP080: BTEXN (QC Lot: 1271143) - continued									
ES1729769-001	45880-1	EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
ES1729769-011	45880-11	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
EP080: BTEXN (QC Lot: 1271149)									
ES1729768-001	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
ES1729769-023	45880-23	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit

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

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

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005T: Total Metals by ICP-AES (QCLot: 1277855)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	97.1	86	126
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	99.2	83	113
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	91.4	76	128
EG005T: Copper	7440-50-8	5	mg/kg	<5	32 mg/kg	101	86	120
EG005T: Lead	7439-92-1	5	mg/kg	<5	40 mg/kg	101	80	114
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55 mg/kg	101	87	123
EG005T: Zinc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	104	80	122
EG005T: Total Metals by ICP-AES (QCLot: 1277858)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	97.8	86	126
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	105	83	113
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	99.8	76	128
EG005T: Copper	7440-50-8	5	mg/kg	<5	32 mg/kg	107	86	120
EG005T: Lead	7439-92-1	5	mg/kg	<5	40 mg/kg	102	80	114
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55 mg/kg	109	87	123
EG005T: Zinc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	109	80	122
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1277856)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	76.6	70	105
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1277857)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	72.6	70	105
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 1271302)								
EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	1 mg/kg	87.0	62	126
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 1271343)								
EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	1 mg/kg	87.0	62	126
EP068A: Organochlorine Pesticides (OC) (QCLot: 1271301)								
EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.5 mg/kg	85.4	69	113
EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	0.5 mg/kg	84.3	65	117
EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	0.5 mg/kg	86.5	67	119
EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	0.5 mg/kg	90.2	68	116
EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	84.0	65	117
EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.5 mg/kg	88.6	67	115
EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	0.5 mg/kg	87.4	69	115
EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.5 mg/kg	85.8	62	118
EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	0.5 mg/kg	78.7	63	117

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP068A: Organochlorine Pesticides (OC) (QCLot: 1271301) - continued								
EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	0.5 mg/kg	80.8	66	116
EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	0.5 mg/kg	75.7	64	116
EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	0.5 mg/kg	80.5	66	116
EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	0.5 mg/kg	84.0	67	115
EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	0.5 mg/kg	78.0	67	123
EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	0.5 mg/kg	81.6	69	115
EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	0.5 mg/kg	79.8	69	121
EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	0.5 mg/kg	87.1	56	120
EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.5 mg/kg	83.2	62	124
EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	0.5 mg/kg	79.3	66	120
EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	0.5 mg/kg	84.4	64	122
EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	0.5 mg/kg	78.8	54	130
EP068A: Organochlorine Pesticides (OC) (QCLot: 1271342)								
EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.5 mg/kg	96.2	69	113
EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	0.5 mg/kg	97.1	65	117
EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	0.5 mg/kg	93.3	67	119
EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	0.5 mg/kg	96.4	68	116
EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	90.0	65	117
EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.5 mg/kg	81.5	67	115
EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	0.5 mg/kg	82.9	69	115
EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.5 mg/kg	97.1	62	118
EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	0.5 mg/kg	80.9	63	117
EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	0.5 mg/kg	92.3	66	116
EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	0.5 mg/kg	79.3	64	116
EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	0.5 mg/kg	77.8	66	116
EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	0.5 mg/kg	99.5	67	115
EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	0.5 mg/kg	89.3	67	123
EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	0.5 mg/kg	80.3	69	115
EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	0.5 mg/kg	80.0	69	121
EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	0.5 mg/kg	104	56	120
EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.5 mg/kg	104	62	124
EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	0.5 mg/kg	83.6	66	120
EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	0.5 mg/kg	107	64	122
EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	0.5 mg/kg	77.8	54	130
EP068B: Organophosphorus Pesticides (OP) (QCLot: 1271301)								
EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	0.5 mg/kg	79.0	59	119
EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	84.0	62	128
EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	0.5 mg/kg	87.9	54	126
EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	0.5 mg/kg	98.4	67	119

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP068B: Organophosphorus Pesticides (OP) (QCLot: 1271301) - continued								
EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	0.5 mg/kg	77.3	70	120
EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	0.5 mg/kg	77.0	72	120
EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	0.5 mg/kg	77.0	68	120
EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	0.5 mg/kg	79.4	68	122
EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	0.5 mg/kg	80.8	69	117
EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	0.5 mg/kg	87.5	76	118
EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	0.5 mg/kg	80.6	64	122
EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	0.5 mg/kg	80.4	70	116
EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	0.5 mg/kg	76.8	69	121
EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	0.5 mg/kg	74.8	66	118
EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	0.5 mg/kg	95.2	68	124
EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	0.5 mg/kg	77.0	62	112
EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	0.5 mg/kg	74.5	68	120
EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	0.5 mg/kg	80.4	65	127
EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	0.5 mg/kg	62.3	41	123
EP068B: Organophosphorus Pesticides (OP) (QCLot: 1271342)								
EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	0.5 mg/kg	80.1	59	119
EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	80.7	62	128
EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	0.5 mg/kg	81.4	54	126
EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	0.5 mg/kg	83.7	67	119
EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	0.5 mg/kg	85.8	70	120
EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	0.5 mg/kg	77.5	72	120
EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	0.5 mg/kg	79.1	68	120
EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	0.5 mg/kg	82.2	68	122
EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	0.5 mg/kg	80.4	69	117
EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	0.5 mg/kg	81.3	76	118
EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	0.5 mg/kg	88.5	64	122
EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	0.5 mg/kg	83.0	70	116
EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	0.5 mg/kg	99.0	69	121
EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	0.5 mg/kg	95.3	66	118
EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	0.5 mg/kg	74.1	68	124
EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	0.5 mg/kg	81.6	62	112
EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	0.5 mg/kg	85.1	68	120
EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	0.5 mg/kg	97.0	65	127
EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	0.5 mg/kg	63.0	41	123
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1271300)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	114	77	125
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	109	72	124
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	108	73	127

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1271300) - continued								
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	111	72	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	114	75	127
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	114	77	127
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	112	73	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	114	74	128
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	99.2	69	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	108	75	127
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	6 mg/kg	98.9	68	116
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	103	74	126
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	103	70	126
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	97.3	61	121
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	100	62	118
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	95.4	63	121
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1271340)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	108	77	125
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	105	72	124
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	109	73	127
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	106	72	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	109	75	127
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	110	77	127
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	111	73	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	111	74	128
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	98.1	69	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	102	75	127
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	6 mg/kg	94.7	68	116
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	101	74	126
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	105	70	126
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	82.9	61	121
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	84.6	62	118
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	76.2	63	121
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1271143)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	84.9	68	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1271149)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	91.6	68	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1271299)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	200 mg/kg	104	75	129

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1271299) - continued								
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	300 mg/kg	103	77	131
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	200 mg/kg	103	71	129
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1271341)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	200 mg/kg	100	75	129
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	300 mg/kg	110	77	131
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	200 mg/kg	100	71	129
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1271143)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	84.5	68	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1271149)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	91.0	68	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1271299)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	250 mg/kg	107	77	125
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	350 mg/kg	108	74	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	150 mg/kg	96.1	63	131
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1271341)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	250 mg/kg	106	77	125
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	350 mg/kg	103	74	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	150 mg/kg	91.7	63	131
EP080: BTEXN (QCLot: 1271143)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	90.5	62	116
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	94.7	67	121
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	92.9	65	117
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	91.9	66	118
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	93.3	68	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	88.6	63	119
EP080: BTEXN (QCLot: 1271149)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	92.9	62	116
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	78.3	67	121
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	90.3	65	117
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	94.4	66	118
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	97.4	68	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	85.2	63	119

Matrix Spike (MS) Report

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

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG005T: Total Metals by ICP-AES (QCLot: 1277855)							
ES1729384-001	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	93.5	70	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	93.9	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	94.3	70	130
		EG005T: Copper	7440-50-8	250 mg/kg	94.1	70	130
		EG005T: Lead	7439-92-1	250 mg/kg	92.3	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	94.7	70	130
		EG005T: Zinc	7440-66-6	250 mg/kg	97.6	70	130
EG005T: Total Metals by ICP-AES (QCLot: 1277858)							
ES1729769-017	45880-17	EG005T: Arsenic	7440-38-2	50 mg/kg	98.2	70	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	93.2	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	92.9	70	130
		EG005T: Copper	7440-50-8	250 mg/kg	94.0	70	130
		EG005T: Lead	7439-92-1	250 mg/kg	93.4	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	92.4	70	130
		EG005T: Zinc	7440-66-6	250 mg/kg	92.0	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1277856)							
ES1729384-001	Anonymous	EG035T: Mercury	7439-97-6	5 mg/kg	98.1	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1277857)							
ES1729769-017	45880-17	EG035T: Mercury	7439-97-6	5 mg/kg	98.9	70	130
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 1271302)							
ES1729769-001	45880-1	EP066: Total Polychlorinated biphenyls	----	1 mg/kg	104	70	130
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 1271343)							
ES1729737-001	Anonymous	EP066: Total Polychlorinated biphenyls	----	1 mg/kg	112	70	130
EP068A: Organochlorine Pesticides (OC) (QCLot: 1271301)							
ES1729769-001	45880-1	EP068: gamma-BHC	58-89-9	0.5 mg/kg	87.9	70	130
		EP068: Heptachlor	76-44-8	0.5 mg/kg	89.1	70	130
		EP068: Aldrin	309-00-2	0.5 mg/kg	81.0	70	130
		EP068: Dieldrin	60-57-1	0.5 mg/kg	77.3	70	130
		EP068: Endrin	72-20-8	2 mg/kg	88.9	70	130
		EP068: 4.4`-DDT	50-29-3	2 mg/kg	89.6	70	130
EP068A: Organochlorine Pesticides (OC) (QCLot: 1271342)							
ES1729737-001	Anonymous	EP068: gamma-BHC	58-89-9	0.5 mg/kg	88.5	70	130
		EP068: Heptachlor	76-44-8	0.5 mg/kg	92.2	70	130
		EP068: Aldrin	309-00-2	0.5 mg/kg	87.0	70	130
		EP068: Dieldrin	60-57-1	0.5 mg/kg	101	70	130

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP068A: Organochlorine Pesticides (OC) (QCLot: 1271342) - continued							
ES1729737-001	Anonymous	EP068: Endrin	72-20-8	2 mg/kg	91.1	70	130
		EP068: 4.4`-DDT	50-29-3	2 mg/kg	91.7	70	130
EP068B: Organophosphorus Pesticides (OP) (QCLot: 1271301)							
ES1729769-001	45880-1	EP068: Diazinon	333-41-5	0.5 mg/kg	106	70	130
		EP068: Chlorpyrifos-methyl	5598-13-0	0.5 mg/kg	77.2	70	130
		EP068: Pirimphos-ethyl	23505-41-1	0.5 mg/kg	85.3	70	130
		EP068: Bromophos-ethyl	4824-78-6	0.5 mg/kg	82.1	70	130
		EP068: Prothiofos	34643-46-4	0.5 mg/kg	92.2	70	130
EP068B: Organophosphorus Pesticides (OP) (QCLot: 1271342)							
ES1729737-001	Anonymous	EP068: Diazinon	333-41-5	0.5 mg/kg	75.9	70	130
		EP068: Chlorpyrifos-methyl	5598-13-0	0.5 mg/kg	86.3	70	130
		EP068: Pirimphos-ethyl	23505-41-1	0.5 mg/kg	83.7	70	130
		EP068: Bromophos-ethyl	4824-78-6	0.5 mg/kg	88.6	70	130
		EP068: Prothiofos	34643-46-4	0.5 mg/kg	80.2	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1271300)							
ES1729769-001	45880-1	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	116	70	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	115	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1271340)							
ES1729737-001	Anonymous	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	89.5	70	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	86.8	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1271143)							
ES1729769-001	45880-1	EP080: C6 - C9 Fraction	----	32.5 mg/kg	103	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1271149)							
ES1729768-001	Anonymous	EP080: C6 - C9 Fraction	----	32.5 mg/kg	102	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1271299)							
ES1729769-001	45880-1	EP071: C10 - C14 Fraction	----	523 mg/kg	74.0	73	137
		EP071: C15 - C28 Fraction	----	2319 mg/kg	100	53	131
		EP071: C29 - C36 Fraction	----	1714 mg/kg	113	52	132
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1271341)							
ES1729737-001	Anonymous	EP071: C10 - C14 Fraction	----	523 mg/kg	107	73	137
		EP071: C15 - C28 Fraction	----	2319 mg/kg	110	53	131
		EP071: C29 - C36 Fraction	----	1714 mg/kg	124	52	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1271143)							
ES1729769-001	45880-1	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	97.8	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1271149)							
ES1729768-001	Anonymous						

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1271149) - continued							
ES1729768-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	97.8	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1271299)							
ES1729769-001	45880-1	EP071: >C10 - C16 Fraction	----	860 mg/kg	86.5	73	137
		EP071: >C16 - C34 Fraction	----	3223 mg/kg	111	53	131
		EP071: >C34 - C40 Fraction	----	1058 mg/kg	109	52	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1271341)							
ES1729737-001	Anonymous	EP071: >C10 - C16 Fraction	----	860 mg/kg	104	73	137
		EP071: >C16 - C34 Fraction	----	3223 mg/kg	114	53	131
		EP071: >C34 - C40 Fraction	----	1058 mg/kg	121	52	132
EP080: BTEXN (QCLot: 1271143)							
ES1729769-001	45880-1	EP080: Benzene	71-43-2	2.5 mg/kg	96.2	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	95.6	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	93.3	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	95.0	70	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	96.3	70	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	92.2	70	130
EP080: BTEXN (QCLot: 1271149)							
ES1729768-001	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	102	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	90.5	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	97.2	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	101	70	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	97.3	70	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	88.1	70	130

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES1729769**	Page	: 1 of 11
Client	: **SESL Australia Pty Ltd**	Laboratory	: Environmental Division Sydney
Contact	: Harrison Leake (SUBSAMPLES)	Telephone	: +61-2-8784 8555
Project	: 45880	Date Samples Received	: 24-Nov-2017
Site	: ----	Issue Date	: 01-Dec-2017
Sampler	: ----	No. of samples received	: 28
Order number	: ----	No. of samples analysed	: 28

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content (Dried @ 105-110°C)							
Soil Glass Jar - Unpreserved (EA055)							
45880-1, 45880-2, 45880-3, 45880-4, 45880-5, 45880-6, 45880-7, 45880-8, 45880-9, 45880-10, 45880-11, 45880-12, 45880-13, 45880-14, 45880-15, 45880-16, 45880-17, 45880-18, 45880-19, 45880-20, 45880-21, 45880-22, 45880-23, 45880-24, 45880-25, 45880-26, 45880-27, 45880-28	**24-Nov-2017**	**----**	----	----	**28-Nov-2017**	08-Dec-2017	✓
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples							
Snap Lock Bag - Subsampled by ALS (EA200)							
45880-8, 45880-11, 45880-12, 45880-13, 45880-14, 45880-27	**24-Nov-2017**	**----**	----	----	**29-Nov-2017**	23-May-2018	✓
EA200: AS 4964 - 2004 Identification of Asbestos in Soils							
Snap Lock Bag - Subsampled by ALS (EA200)							
45880-8, 45880-11, 45880-12, 45880-13, 45880-14, 45880-27	**24-Nov-2017**	**----**	----	----	**29-Nov-2017**	23-May-2018	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG005T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T)							
45880-1, 45880-2, 45880-3, 45880-4, 45880-5, 45880-6, 45880-7, 45880-8, 45880-9, 45880-10, 45880-11, 45880-12, 45880-13, 45880-14, 45880-15, 45880-16, 45880-17, 45880-18, 45880-19, 45880-20, 45880-21, 45880-22, 45880-23, 45880-24, 45880-25, 45880-26, 45880-27, 45880-28	**24-Nov-2017**	**29-Nov-2017**	23-May-2018	✓	**29-Nov-2017**	23-May-2018	✓
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T)							
45880-1, 45880-2, 45880-3, 45880-4, 45880-5, 45880-6, 45880-7, 45880-8, 45880-9, 45880-10, 45880-11, 45880-12, 45880-13, 45880-14, 45880-15, 45880-16, 45880-17, 45880-18, 45880-19, 45880-20, 45880-21, 45880-22, 45880-23, 45880-24, 45880-25, 45880-26, 45880-27, 45880-28	**24-Nov-2017**	**29-Nov-2017**	22-Dec-2017	✓	**29-Nov-2017**	22-Dec-2017	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP066: Polychlorinated Biphenyls (PCB)							
Soil Glass Jar - Unpreserved (EP066)							
45880-1, 45880-2, 45880-3, 45880-4, 45880-5, 45880-6, 45880-7, 45880-8, 45880-9, 45880-10, 45880-11, 45880-12, 45880-13, 45880-14, 45880-15, 45880-16, 45880-17, 45880-18, 45880-19, 45880-20	**24-Nov-2017**	**28-Nov-2017**	08-Dec-2017	✓	**28-Nov-2017**	07-Jan-2018	✓
Soil Glass Jar - Unpreserved (EP066)							
45880-21, 45880-22, 45880-23, 45880-24, 45880-25, 45880-26, 45880-27, 45880-28	**24-Nov-2017**	**28-Nov-2017**	08-Dec-2017	✓	**29-Nov-2017**	07-Jan-2018	✓
EP068A: Organochlorine Pesticides (OC)							
Soil Glass Jar - Unpreserved (EP068)							
45880-1, 45880-2, 45880-3, 45880-4, 45880-5, 45880-6, 45880-7, 45880-8, 45880-9, 45880-10, 45880-11, 45880-12, 45880-13, 45880-14, 45880-15, 45880-16, 45880-17, 45880-18, 45880-19, 45880-20	**24-Nov-2017**	**28-Nov-2017**	08-Dec-2017	✓	**28-Nov-2017**	07-Jan-2018	✓
Soil Glass Jar - Unpreserved (EP068)							
45880-21, 45880-22, 45880-23, 45880-24, 45880-25, 45880-26, 45880-27, 45880-28	**24-Nov-2017**	**28-Nov-2017**	08-Dec-2017	✓	**29-Nov-2017**	07-Jan-2018	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP068B: Organophosphorus Pesticides (OP)							
Soil Glass Jar - Unpreserved (EP068)							
45880-1, 45880-2, 45880-3, 45880-4, 45880-5, 45880-6, 45880-7, 45880-8, 45880-9, 45880-10, 45880-11, 45880-12, 45880-13, 45880-14, 45880-15, 45880-16, 45880-17, 45880-18, 45880-19, 45880-20	**24-Nov-2017**	**28-Nov-2017**	08-Dec-2017	✓	**28-Nov-2017**	07-Jan-2018	✓
Soil Glass Jar - Unpreserved (EP068)							
45880-21, 45880-22, 45880-23, 45880-24, 45880-25, 45880-26, 45880-27, 45880-28	**24-Nov-2017**	**28-Nov-2017**	08-Dec-2017	✓	**29-Nov-2017**	07-Jan-2018	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075(SIM))							
45880-1, 45880-2, 45880-3, 45880-4, 45880-5, 45880-6, 45880-7, 45880-8, 45880-9, 45880-10, 45880-11, 45880-12, 45880-13, 45880-14, 45880-15, 45880-16, 45880-17, 45880-18, 45880-19, 45880-20, 45880-21, 45880-22, 45880-23, 45880-24, 45880-25, 45880-26, 45880-27, 45880-28	**24-Nov-2017**	**28-Nov-2017**	08-Dec-2017	✓	**28-Nov-2017**	07-Jan-2018	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP080)							
45880-1, 45880-2, 45880-3, 45880-4, 45880-5, 45880-6, 45880-7, 45880-8, 45880-9, 45880-10, 45880-11, 45880-12, 45880-13, 45880-14, 45880-15, 45880-16, 45880-17, 45880-18, 45880-19, 45880-20	**24-Nov-2017**	**27-Nov-2017**	08-Dec-2017	✓	**28-Nov-2017**	08-Dec-2017	✓
Soil Glass Jar - Unpreserved (EP080)							
45880-1, 45880-2, 45880-3, 45880-4, 45880-5, 45880-6, 45880-7, 45880-8, 45880-9, 45880-10, 45880-11, 45880-12, 45880-13, 45880-14, 45880-15, 45880-16, 45880-17, 45880-18, 45880-19, 45880-20, 45880-21, 45880-22, 45880-23, 45880-24, 45880-25, 45880-26, 45880-27, 45880-28	**24-Nov-2017**	**28-Nov-2017**	08-Dec-2017	✓	**28-Nov-2017**	08-Dec-2017	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved (EP080)							
45880-1, 45880-2, 45880-3, 45880-4, 45880-5, 45880-6, 45880-7, 45880-8, 45880-9, 45880-10, 45880-11, 45880-12, 45880-13, 45880-14, 45880-15, 45880-16, 45880-17, 45880-18, 45880-19, 45880-20	**24-Nov-2017**	**27-Nov-2017**	08-Dec-2017	✓	**28-Nov-2017**	08-Dec-2017	✓
Soil Glass Jar - Unpreserved (EP080)							
45880-1, 45880-2, 45880-3, 45880-4, 45880-5, 45880-6, 45880-7, 45880-8, 45880-9, 45880-10, 45880-11, 45880-12, 45880-13, 45880-14, 45880-15, 45880-16, 45880-17, 45880-18, 45880-19, 45880-20, 45880-21, 45880-22, 45880-23, 45880-24, 45880-25, 45880-26, 45880-27, 45880-28	**24-Nov-2017**	**28-Nov-2017**	08-Dec-2017	✓	**28-Nov-2017**	08-Dec-2017	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080)							
45880-1, 45880-2, 45880-3, 45880-4, 45880-5, 45880-6, 45880-7, 45880-8, 45880-9, 45880-10, 45880-11, 45880-12, 45880-13, 45880-14, 45880-15, 45880-16, 45880-17, 45880-18, 45880-19, 45880-20	**24-Nov-2017**	**27-Nov-2017**	08-Dec-2017	✓	**28-Nov-2017**	08-Dec-2017	✓
Soil Glass Jar - Unpreserved (EP080)							
45880-21, 45880-22, 45880-23, 45880-24, 45880-25, 45880-26, 45880-27, 45880-28	**24-Nov-2017**	**28-Nov-2017**	08-Dec-2017	✓	**28-Nov-2017**	08-Dec-2017	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Moisture Content	EA055	6	59	**10.17**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	4	38	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	4	38	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
PAH/Phenols (SIM)	EP075(SIM)	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	2	38	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	2	38	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
PAH/Phenols (SIM)	EP075(SIM)	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	2	38	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	2	38	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	2	38	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	2	38	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM (2013) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
Asbestos Identification in Soils	EA200	SOIL	AS 4964 - 2004 Method for the qualitative identification of asbestos in bulk samples Analysis by Polarised Light Microscopy including dispersion staining
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (2013) Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2) (Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Polychlorinated Biphenyls (PCB)	EP066	SOIL	In house: Referenced to USEPA SW 846 - 8270D Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 504)
Pesticides by GCMS	EP068	SOIL	In house: Referenced to USEPA SW 846 - 8270D Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This technique is compliant with NEPM (2013) Schedule B(3) (Method 504,505)
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015A Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40. Compliant with NEPM amended 2013.
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270D. Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 502 and 507)
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260B. Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. Compliant with NEPM amended 2013.

Preparation Methods	Method	Matrix	Method Descriptions
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM (2013) Schedule B(3) (Method 202)
Methanolic Extraction of Soils for Purge and Trap	* ORG16	SOIL	In house: Referenced to USEPA SW 846 - 5030A. 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.

Preparation Methods	Method	Matrix	Method Descriptions
Tumbler Extraction of Solids	ORG17	SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.

Chain of Custody

SESL AUSTRALIA
Environment & Soil Sciences

CoC N°: 25234 | QUOTE N°: sy60713 | SESL PO #: | BATCH N°: 46092

REPORTING REQUIREMENTS			RELINQUISHED BY:	DISPATCH TO::
REPORT FORMAT:	☐ Hardcopy (mail) ☒ Email PDF ☒ Email Excel ☐ Fax		NAME: SESL Sample Receipt	Jennifer Cullen
SEND REPORT TO:	Harrison Leake	subsamples@sesl.com.au	OF: SESL Australia	ALS Laboratory Group
CC TO:	Andrew Jacovides	andrewj@sesl.com.au	DATE: 11-12-17	277-289 Woodpark Rd
URGENCY REQ'D:	Urgent	DATE REQ'D: Tue, 12 Dec 2017 By 4pm	TIME: 8:30:55 AM	Smithfield NSW 2164

SAMPLE DESCRIPTION	DATE SAMPLED	MATRIX	TEMP °C	PRES.	CONTAINER TYPE*	CONTAINER N°	ANALYSIS REQUIRED
1 : 46092 - BH1A Surface	11/12/2017	Soil	18.00	Ice	G	1	1 - S-16
2 : 46092 - BH2A Surface	11/12/2017	Soil				1	2 - S-16
3 : 46092 - BH3A Surface	11/12/2017	Soil				1	3 - S-16, EA200
4 : 46092 - BH3A 300	11/12/2017	Soil				1	4 - S-16
5 : 46092 - BH4A Surface	11/12/2017	Soil				1	5 - S-16
6 : 46092 - BH4A 500	11/12/2017	Soil				1	6 - S-16
7 : 46092 - BH5A Surface	11/12/2017	Soil				1	7 - S-16
8 : 46092 - BH6A Surface	11/12/2017	Soil				1	8 - S-16
9 : 46092 - BH7A Surface	11/12/2017	Soil				1	9 - S-16
10 : 46092 - BH8A Surface	11/12/2017	Soil				1	10 - S-16
11 : 46092 - BH9A Surface	11/12/2017	Soil				1	11 - S-16
12 : 46092 - BH10A Surface	11/12/2017	Soil				1	12 - S-16
13 : 46092 - BH11A Surface	11/12/2017	Soil				1	13 - S-16
14 : 46092 - BH12A Surface	11/12/2017	Soil				1	14 - S-16
15 : 46092 - BH13A Surface	11/12/2017	Soil				1	15 - S-16
16 : 46092 - BH14A Surface	11/12/2017	Soil				1	16 - S-16
17 : 46092 - BH15A Surface	11/12/2017	Soil				1	17 - S-16
18 : 46092 - BH16A Surface	11/12/2017	Soil				1	18 - S-16
19 : 46092 - BH17A Surface	11/12/2017	Soil				1	19 - S-16
20 : 46092 - BH18A Surface	11/12/2017	Soil				1	20 - S-16

Environmental Division Sydney
Work Order Reference
ES1731292

Telephone : +61-2-8784 8555

TAT

Subcon / Forward Lab / Split WO
Lab / Analysis: Asbestos → Newcastle
Organised By / Date:
Relinquished By / Date:
Courier:

ALL WATER FOR METALS, OCP/OPP LOW LEVEL in ug/L
WO No:
Attach Material Sheet:

RECEIVED BY:		SAMPLE CONDITION	*Containers Guide:	
NAME: Jessie	DATE: 11/12/17	SAMPLE CONTAINERS: ☐ Intact ☐ Broken	Bot ..... Bottle, amber glass	G ..... Glass jar
COMPANY: ALS	TIME: 09:45	TEMPERATURE: ☐ Cold ☐ Room ☐ Other	Bo2 ..... Bottle, plastic	S ..... Sterile
			Bg1 ..... Bag, plastic	V ..... Vial
			Bg2 ..... Bag, paper	O ..... Other

Chain of Custody

SESL AUSTRALIA
Environment & Soil Sciences

CoC N°: 25235 | QUOTE N°: sy60713 | SESL PO #: | BATCH N°: 46092

REPORTING REQUIREMENTS			RELINQUISHED BY:	DISPATCH TO::
REPORT FORMAT:	☐ Hardcopy (mail) ☒ Email PDF ☒ Email Excel ☐ Fax		NAME: SESL Sample Receipt	Jennifer Cullen
SEND REPORT TO:	Harrison Leake	subsamples@sesl.com.au	OF: SESL Australia	ALS Laboratory Group
CC TO:	Andrew Jacovides	andrewj@sesl.com.au	DATE: 11-12-17	277-289 Woodpark Rd
URGENCY REQ'D:	Urgent	DATE REQ'D: Tue, 12 Dec 2017 By 4pm	TIME: 8:30:55 AM	Smithfield NSW 2164

SAMPLE DESCRIPTION	DATE SAMPLED	MATRIX	TEMP °C	PRES	CONTAINER TYPE*	CONTAINER N°	ANALYSIS REQUIRED
21 : 46092 - BH19A Surface	11/12/2017	Soil	18.00	Ice	G	1	21 - S-16
22 : 46092 - BH20A Surface	11/12/2017	Soil				1	22 - S-16
23 : 46092 - BH21A Surface	11/12/2017	Soil				1	23 - S-16
24 : 46092 - BH22A Surface	11/12/2017	Soil				1	24 - S-16
25 : 46092 - BH23A Surface	11/12/2017	Soil				1	25 - S-16, EA200
26 : 46092 - BH24A Surface	11/12/2017	Soil				1	26 - S-16
27 : 46092 - BH25A Surface	11/12/2017	Soil				1	27 - S-16
28 : 46092 - BH26A Surface	11/12/2017	Soil				1	28 - S-16
29 : 46092 - QA1	11/12/2017	Soil				1	29 - S-16
30 : 46092 - QA2	11/12/2017	Soil				1	30 - S-16, EA200
31 : 46092 - QA3	11/12/2017	Soil				1	31 - S-16
32 : 46092 - Rinsate	11/12/2017	Water				1	32 - W-18

ALL WATER FOR METALS, OCP/OPP LOW LEVEL in ug/L

RECEIVED BY:		SAMPLE CONDITION	*Containers Guide
NAME:	DATE:	SAMPLE CONTAINERS: ☐ Intact ☐ Broken	Bo1 ..... Bottle, amber glass G ..... Glass jar
COMPANY:	TIME:	TEMPERATURE: ☐ Cold ☐ Room ☐ Other_____	Bo2 ..... Bottle, plastic S ..... Sterile
			Bg1 ..... Bag, plastic V ..... Vial
			Bg2 ..... Bag, paper O ..... Other

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1731292**	Page	: 1 of 32
Client	: **SESL Australia Pty Ltd**	Laboratory	: Environmental Division Sydney
Contact	: Harrison Leake (SUBSAMPLES)	Contact	: Customer Services ES
Address	: PO BOX 357 PENNANT HILLS NSW, AUSTRALIA 1715	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9980 6554	Telephone	: +61-2-8784 8555
Project	: 46092	Date Samples Received	: 11-Dec-2017 09:45
Order number	: ----	Date Analysis Commenced	: 11-Dec-2017
C-O-C number	: 25234	Issue Date	: 12-Dec-2017 19:13
Sampler	: ----		
Site	: ----		
Quote number	: SYBQ/404/17		
No. of samples received	: 32		
No. of samples analysed	: 32		

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

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

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Descriptive Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Shaun Spooner	Asbestos Identifier	Newcastle - Asbestos, Mayfield West, NSW

General Comments

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

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

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

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

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

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

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

- EP068: Positive results has been confirmed by re-extraction and re-analysis.
- EP068: Particular samples required dilution due to sample matrix interferences. LOR values have been adjusted accordingly.
- EA200 'Am' Amosite (brown asbestos)
- EA200 'Cr' Crocidolite (blue asbestos)
- EA200 'Trace' - Asbestos fibres ("Free Fibres") detected by trace analysis per AS4964. The result can be interpreted that the sample contains detectable 'respirable' asbestos fibres
- EA200: Asbestos Identification Samples were analysed by Polarised Light Microscopy including dispersion staining.
- EA200 Legend
- EA200 'Ch' Chrysotile (white asbestos)
- EA200: 'UMF' Unknown Mineral Fibres. "-" indicates fibres detected may or may not be asbestos fibres. Confirmation by alternative techniques is recommended.
- EA200: Negative results for vinyl tiles should be confirmed by an independent analytical technique.
- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EA200: For samples larger than 30g, the <2mm fraction may be sub-sampled prior to trace analysis as outlined in ISO23909:2008(E) Sect 6.3.2-2
- EA200: 'Yes' - Asbestos detected by polarised light microscopy including dispersion staining.
- EA200: 'No*' - No asbestos found, at the reporting limit of 0.1g/kg, by polarised light microscopy including dispersion staining. Asbestos material was detected and positively identified at concentrations estimated to be below 0.1g/kg.
- EA200: 'No' - No asbestos found at the reporting limit 0.1g/kg, by polarised light microscopy including dispersion staining.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	46092-1	46092-2	46092-3	46092-4	46092-5
				Client sampling date / time	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00
Compound	CAS Number	LOR	Unit		ES1731292-001	ES1731292-002	ES1731292-003	ES1731292-004	ES1731292-005
					Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		11.5	12.8	8.8	8.9	9.3
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples									
Asbestos (Trace)	1332-21-4	5	Fibres		----	----	No	----	----
EA200: AS 4964 - 2004 Identification of Asbestos in Soils									
Asbestos Detected	1332-21-4	0.1	g/kg		----	----	No	----	----
Asbestos Type	1332-21-4	-	--		----	----	-	----	----
Sample weight (dry)	----	0.01	g		----	----	16.5	----	----
APPROVED IDENTIFIER:	----	-	--		----	----	S.SPOONER	----	----
EG005T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		<5	<5	7	<5	<5
Cadmium	7440-43-9	1	mg/kg		<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg		67	58	14	37	36
Copper	7440-50-8	5	mg/kg		32	40	59	29	32
Lead	7439-92-1	5	mg/kg		70	69	126	5	6
Nickel	7440-02-0	2	mg/kg		50	40	7	42	44
Zinc	7440-66-6	5	mg/kg		198	142	84	62	76
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
EP066: Polychlorinated Biphenyls (PCB)									
Total Polychlorinated biphenyls	----	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
EP068A: Organochlorine Pesticides (OC)									
alpha-BHC	319-84-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	46092-1	46092-2	46092-3	46092-4	46092-5
				Client sampling date / time	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00
Compound	CAS Number	LOR	Unit		ES1731292-001	ES1731292-002	ES1731292-003	ES1731292-004	ES1731292-005
					Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued									
4.4`-DDE	72-55-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	72-20-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
beta-Endosulfan	33213-65-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ Endosulfan (sum)	115-29-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDD	72-54-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Demeton-S-methyl	919-86-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Monocrotophos	6923-22-4	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Dimethoate	60-51-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Diazinon	333-41-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion-methyl	298-00-0	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	121-75-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenthion	55-38-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion	56-38-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorfenvinphos	470-90-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Bromophos-ethyl	4824-78-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenamiphos	22224-92-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Prothiofos	34643-46-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Ethion	563-12-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Carbophenothion	786-19-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Azinphos Methyl	86-50-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	**0.5**	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	46092-1	46092-2	46092-3	46092-4	46092-5
				Client sampling date / time	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00
Compound	CAS Number	LOR	Unit		ES1731292-001	ES1731292-002	ES1731292-003	ES1731292-004	ES1731292-005
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	**3.5**	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	**12.8**	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	**4.5**	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		**0.5**	**0.6**	**27.6**	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg		**0.6**	**0.6**	**29.7**	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	**14.5**	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	**13.9**	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	**17.9**	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	**6.5**	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	**12.9**	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	**6.4**	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	**1.5**	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	**7.9**	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		**1.1**	**1.2**	**160**	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	**19.1**	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**0.6**	**0.6**	**19.1**	**0.6**	**0.6**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	**1.2**	**19.1**	**1.2**	**1.2**
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	**380**	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	<100	**270**	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	**650**	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	**570**	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	**180**	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	**750**	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	<50

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	46092-1	46092-2	46092-3	46092-4	46092-5
				Client sampling date / time	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00
Compound	CAS Number	LOR	Unit		ES1731292-001	ES1731292-002	ES1731292-003	ES1731292-004	ES1731292-005
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ **Sum of BTEX**	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ **Total Xylenes**	1330-20-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		**94.0**	**84.2**	**83.6**	**122**	**115**
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		**133**	**111**	**90.4**	**122**	**116**
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		**77.9**	**86.9**	**80.3**	**71.5**	**91.0**
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**84.7**	**85.3**	**83.8**	**85.6**	**85.4**
2-Chlorophenol-D4	93951-73-6	0.5	%		**81.3**	**82.1**	**77.5**	**82.8**	**81.7**
2.4.6-Tribromophenol	118-79-6	0.5	%		**97.1**	**100**	**103**	**88.3**	**97.3**
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**79.4**	**86.7**	**86.2**	**94.9**	**102**
Anthracene-d10	1719-06-8	0.5	%		**88.5**	**91.7**	**87.9**	**98.5**	**92.2**
4-Terphenyl-d14	1718-51-0	0.5	%		**85.7**	**83.2**	**85.4**	**88.3**	**85.8**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**104**	**101**	**111**	**110**	**92.2**
Toluene-D8	2037-26-5	0.2	%		**120**	**118**	**123**	**125**	**117**
4-Bromofluorobenzene	460-00-4	0.2	%		**109**	**107**	**117**	**114**	**106**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	46092-6	46092-7	46092-8	46092-9	46092-10
			Client sampling date / time	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00
Compound	CAS Number	LOR	Unit	ES1731292-006	ES1731292-007	ES1731292-008	ES1731292-009	ES1731292-010
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	9.8	14.4	7.4	11.2	11.6
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	39	34	32	34	32
Copper	7440-50-8	5	mg/kg	32	32	31	33	28
Lead	7439-92-1	5	mg/kg	5	10	12	7	8
Nickel	7440-02-0	2	mg/kg	45	40	39	44	38
Zinc	7440-66-6	5	mg/kg	63	118	95	78	91
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.25	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.25	<0.05	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.25	<0.05	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.25	<0.05	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.25	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.25	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.25	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.25	<0.05	<0.05	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.25	<0.05	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.25	<0.05	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.25	<0.05	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.25	<0.05	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.25	<0.05	<0.05	<0.05
4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.25	<0.05	<0.05	<0.05
Endrin	72-20-8	0.05	mg/kg	<0.05	<0.25	<0.05	<0.05	<0.05
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.25	<0.05	<0.05	<0.05
^ Endosulfan (sum)	115-29-7	0.05	mg/kg	<0.05	<0.25	<0.05	<0.05	<0.05
4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.25	<0.05	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.25	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.25	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	46092-6	46092-7	46092-8	46092-9	46092-10
				Client sampling date / time	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00
Compound	CAS Number	LOR	Unit		ES1731292-006	ES1731292-007	ES1731292-008	ES1731292-009	ES1731292-010
					Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued									
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	<1.0	<0.2	<0.2	<0.2
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	<0.25	<0.05	<0.05	<0.05
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	<1.0	<0.2	<0.2	<0.2
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg		<0.05	<0.25	<0.05	<0.05	<0.05
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg		<0.05	<0.25	<0.05	<0.05	<0.05
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg		<0.05	<0.25	<0.05	<0.05	<0.05
Demeton-S-methyl	919-86-8	0.05	mg/kg		<0.05	<0.25	<0.05	<0.05	<0.05
Monocrotophos	6923-22-4	0.2	mg/kg		<0.2	<1.0	<0.2	<0.2	<0.2
Dimethoate	60-51-5	0.05	mg/kg		<0.05	<0.25	<0.05	<0.05	<0.05
Diazinon	333-41-5	0.05	mg/kg		<0.05	<0.25	<0.05	<0.05	<0.05
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		<0.05	<0.25	<0.05	<0.05	<0.05
Parathion-methyl	298-00-0	0.2	mg/kg		<0.2	<1.0	<0.2	<0.2	<0.2
Malathion	121-75-5	0.05	mg/kg		<0.05	<0.25	<0.05	<0.05	<0.05
Fenthion	55-38-9	0.05	mg/kg		<0.05	<0.25	<0.05	<0.05	<0.05
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	<0.25	<0.05	<0.05	<0.05
Parathion	56-38-2	0.2	mg/kg		<0.2	<1.0	<0.2	<0.2	<0.2
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		<0.05	<0.25	<0.05	<0.05	<0.05
Chlorfenvinphos	470-90-6	0.05	mg/kg		<0.05	<0.25	<0.05	<0.05	<0.05
Bromophos-ethyl	4824-78-6	0.05	mg/kg		<0.05	<0.25	<0.05	<0.05	<0.05
Fenamiphos	22224-92-6	0.05	mg/kg		<0.05	<0.25	<0.05	<0.05	<0.05
Prothiofos	34643-46-4	0.05	mg/kg		<0.05	<0.25	<0.05	<0.05	<0.05
Ethion	563-12-2	0.05	mg/kg		<0.05	<0.25	<0.05	<0.05	<0.05
Carbophenothion	786-19-6	0.05	mg/kg		<0.05	<0.25	<0.05	<0.05	<0.05
Azinphos Methyl	86-50-0	0.05	mg/kg		<0.05	<0.25	<0.05	<0.05	<0.05
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	46092-6	46092-7	46092-8	46092-9	46092-10
				Client sampling date / time	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00
Compound	CAS Number	LOR	Unit		ES1731292-006	ES1731292-007	ES1731292-008	ES1731292-009	ES1731292-010
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		0.6	0.6	0.6	0.6	0.6
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		1.2	1.2	1.2	1.2	1.2
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	1820	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	3720	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	5540	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	130	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	4360	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	3520	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	8010	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	130	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	46092-6	46092-7	46092-8	46092-9	46092-10
				Client sampling date / time	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00
Compound	CAS Number	LOR	Unit		ES1731292-006	ES1731292-007	ES1731292-008	ES1731292-009	ES1731292-010
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	1330-20-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		117	110	111	111	108
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		123	89.6	116	62.7	116
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		72.1	89.5	96.3	89.0	102
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		86.1	85.4	87.8	88.3	83.4
2-Chlorophenol-D4	93951-73-6	0.5	%		81.3	79.8	84.1	81.2	78.2
2.4.6-Tribromophenol	118-79-6	0.5	%		85.5	93.2	89.6	97.7	102
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		92.4	90.0	93.1	92.1	91.1
Anthracene-d10	1719-06-8	0.5	%		96.5	95.1	99.0	96.5	94.1
4-Terphenyl-d14	1718-51-0	0.5	%		88.8	84.6	85.2	88.2	86.5
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		95.0	98.3	106	104	112
Toluene-D8	2037-26-5	0.2	%		122	118	124	117	121
4-Bromofluorobenzene	460-00-4	0.2	%		112	102	114	108	112

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	46092-11	46092-12	46092-13	46092-14	46092-15
				Client sampling date / time	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00
Compound	CAS Number	LOR	Unit		ES1731292-011	ES1731292-012	ES1731292-013	ES1731292-014	ES1731292-015
					Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		3.7	3.8	17.3	15.5	6.5
EG005T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg		<1	<1	1	<1	<1
Chromium	7440-47-3	2	mg/kg		26	24	27	32	11
Copper	7440-50-8	5	mg/kg		20	18	24	22	12
Lead	7439-92-1	5	mg/kg		5	6	11	177	7
Nickel	7440-02-0	2	mg/kg		32	30	32	27	13
Zinc	7440-66-6	5	mg/kg		57	55	318	184	50
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
EP066: Polychlorinated Biphenyls (PCB)									
Total Polychlorinated biphenyls	----	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
EP068A: Organochlorine Pesticides (OC)									
alpha-BHC	319-84-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg		<0.05	<0.05	<0.05	0.11	<0.05
4.4`-DDE	72-55-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	72-20-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
beta-Endosulfan	33213-65-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ Endosulfan (sum)	115-29-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDD	72-54-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	46092-11	46092-12	46092-13	46092-14	46092-15
				Client sampling date / time	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00
Compound	CAS Number	LOR	Unit		ES1731292-011	ES1731292-012	ES1731292-013	ES1731292-014	ES1731292-015
					Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued									
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg		<0.05	<0.05	<0.05	**0.11**	<0.05
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Demeton-S-methyl	919-86-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Monocrotophos	6923-22-4	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Dimethoate	60-51-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Diazinon	333-41-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion-methyl	298-00-0	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	121-75-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenthion	55-38-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion	56-38-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorfenvinphos	470-90-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Bromophos-ethyl	4824-78-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenamiphos	22224-92-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Prothiofos	34643-46-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Ethion	563-12-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Carbophenothion	786-19-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Azinphos Methyl	86-50-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	46092-11	46092-12	46092-13	46092-14	46092-15
				Client sampling date / time	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00
Compound	CAS Number	LOR	Unit		ES1731292-011	ES1731292-012	ES1731292-013	ES1731292-014	ES1731292-015
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		0.6	0.6	0.6	0.6	0.6
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		1.2	1.2	1.2	1.2	1.2
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	46092-11	46092-12	46092-13	46092-14	46092-15
				Client sampling date / time	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00
Compound	CAS Number	LOR	Unit		ES1731292-011	ES1731292-012	ES1731292-013	ES1731292-014	ES1731292-015
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	1330-20-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		112	80.7	111	119	108
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		120	136	106	97.6	114
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		104	104	85.5	94.0	108
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		87.9	94.4	90.4	95.9	93.4
2-Chlorophenol-D4	93951-73-6	0.5	%		83.9	84.0	80.2	86.4	86.1
2.4.6-Tribromophenol	118-79-6	0.5	%		93.1	82.5	85.5	92.3	96.3
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		93.5	88.0	86.0	92.0	89.6
Anthracene-d10	1719-06-8	0.5	%		95.7	95.8	91.6	96.3	96.7
4-Terphenyl-d14	1718-51-0	0.5	%		93.6	86.9	84.7	89.5	91.0
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		109	112	101	101	105
Toluene-D8	2037-26-5	0.2	%		118	126	114	113	120
4-Bromofluorobenzene	460-00-4	0.2	%		102	114	106	103	106

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	46092-16	46092-17	46092-18	46092-19	46092-20
				Client sampling date / time	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00
Compound	CAS Number	LOR	Unit		ES1731292-016	ES1731292-017	ES1731292-018	ES1731292-019	ES1731292-020
					Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		20.6	18.2	10.2	12.7	11.4
EG005T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg		<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg		48	40	38	39	34
Copper	7440-50-8	5	mg/kg		45	40	30	35	28
Lead	7439-92-1	5	mg/kg		8	8	9	9	8
Nickel	7440-02-0	2	mg/kg		54	47	35	39	28
Zinc	7440-66-6	5	mg/kg		93	90	98	108	85
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
EP066: Polychlorinated Biphenyls (PCB)									
Total Polychlorinated biphenyls	----	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1
EP068A: Organochlorine Pesticides (OC)									
alpha-BHC	319-84-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDE	72-55-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	72-20-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
beta-Endosulfan	33213-65-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ Endosulfan (sum)	115-29-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDD	72-54-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	46092-16	46092-17	46092-18	46092-19	46092-20
				Client sampling date / time	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00
Compound	CAS Number	LOR	Unit		ES1731292-016	ES1731292-017	ES1731292-018	ES1731292-019	ES1731292-020
					Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued									
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Demeton-S-methyl	919-86-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Monocrotophos	6923-22-4	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Dimethoate	60-51-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Diazinon	333-41-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion-methyl	298-00-0	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	121-75-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenthion	55-38-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion	56-38-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorfenvinphos	470-90-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Bromophos-ethyl	4824-78-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenamiphos	22224-92-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Prothiofos	34643-46-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Ethion	563-12-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Carbophenothion	786-19-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Azinphos Methyl	86-50-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	46092-16	46092-17	46092-18	46092-19	46092-20
				Client sampling date / time	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00
Compound	CAS Number	LOR	Unit		ES1731292-016	ES1731292-017	ES1731292-018	ES1731292-019	ES1731292-020
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		0.6	0.6	0.6	0.6	0.6
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		1.2	1.2	1.2	1.2	1.2
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	46092-16	46092-17	46092-18	46092-19	46092-20
				Client sampling date / time	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00
Compound	CAS Number	LOR	Unit		ES1731292-016	ES1731292-017	ES1731292-018	ES1731292-019	ES1731292-020
					Result	Result	Result	Result	Result
EP080: BTEXN - Continued									
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	1330-20-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		119	102	106	98.7	120
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		112	116	130	111	103
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		92.9	111	104	94.8	73.8
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		86.8	90.4	92.7	87.2	92.4
2-Chlorophenol-D4	93951-73-6	0.5	%		79.4	82.9	86.4	81.2	85.8
2.4.6-Tribromophenol	118-79-6	0.5	%		98.2	99.3	93.8	99.4	98.8
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		92.1	92.3	97.0	90.2	90.1
Anthracene-d10	1719-06-8	0.5	%		96.5	95.9	101	94.8	98.1
4-Terphenyl-d14	1718-51-0	0.5	%		89.2	89.8	95.1	87.6	88.5
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		103	106	118	119	119
Toluene-D8	2037-26-5	0.2	%		118	119	132	123	106
4-Bromofluorobenzene	460-00-4	0.2	%		108	108	121	112	113

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	46092-21	46092-22	46092-23	46092-24	46092-25
			Client sampling date / time	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00
Compound	CAS Number	LOR	Unit	ES1731292-021	ES1731292-022	ES1731292-023	ES1731292-024	ES1731292-025
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	9.8	18.4	9.9	12.3	3.6
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples								
Asbestos (Trace)	1332-21-4	5	Fibres	----	----	----	----	No
EA200: AS 4964 - 2004 Identification of Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	----	----	----	----	No
Asbestos Type	1332-21-4	-	--	----	----	----	----	-
Sample weight (dry)	----	0.01	g	----	----	----	----	35.8
APPROVED IDENTIFIER:	----	-	--	----	----	----	----	S.SPOONER
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	38	21	40	39	28
Copper	7440-50-8	5	mg/kg	30	24	31	36	33
Lead	7439-92-1	5	mg/kg	9	11	9	12	10
Nickel	7440-02-0	2	mg/kg	34	21	35	40	70
Zinc	7440-66-6	5	mg/kg	98	153	112	129	71
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	46092-21	46092-22	46092-23	46092-24	46092-25
				Client sampling date / time	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00
Compound	CAS Number	LOR	Unit		ES1731292-021	ES1731292-022	ES1731292-023	ES1731292-024	ES1731292-025
					Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued									
4.4`-DDE	72-55-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	72-20-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
beta-Endosulfan	33213-65-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ Endosulfan (sum)	115-29-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDD	72-54-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Demeton-S-methyl	919-86-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Monocrotophos	6923-22-4	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Dimethoate	60-51-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Diazinon	333-41-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion-methyl	298-00-0	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	121-75-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenthion	55-38-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion	56-38-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorfenvinphos	470-90-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Bromophos-ethyl	4824-78-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenamiphos	22224-92-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Prothiofos	34643-46-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Ethion	563-12-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Carbophenothion	786-19-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Azinphos Methyl	86-50-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	46092-21	46092-22	46092-23	46092-24	46092-25
				Client sampling date / time	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00
Compound	CAS Number	LOR	Unit		ES1731292-021	ES1731292-022	ES1731292-023	ES1731292-024	ES1731292-025
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**0.6**	**0.6**	**0.6**	**0.6**	**0.6**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	**1.2**	**1.2**	**1.2**	**1.2**
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	<50

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	46092-21	46092-22	46092-23	46092-24	46092-25
				Client sampling date / time	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00
Compound	CAS Number	LOR	Unit		ES1731292-021	ES1731292-022	ES1731292-023	ES1731292-024	ES1731292-025
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ **Sum of BTEX**	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ **Total Xylenes**	1330-20-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		**123**	**80.5**	**74.0**	**80.2**	**100**
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		**130**	**111**	**104**	**114**	**89.4**
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		**92.5**	**90.3**	**93.0**	**101**	**74.4**
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**97.5**	**94.4**	**101**	**101**	**98.8**
2-Chlorophenol-D4	93951-73-6	0.5	%		**94.5**	**92.1**	**97.7**	**98.5**	**96.1**
2.4.6-Tribromophenol	118-79-6	0.5	%		**95.5**	**96.3**	**101**	**103**	**94.0**
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**95.2**	**94.4**	**100.0**	**99.7**	**97.3**
Anthracene-d10	1719-06-8	0.5	%		**97.8**	**97.8**	**102**	**101**	**97.8**
4-Terphenyl-d14	1718-51-0	0.5	%		**90.6**	**91.2**	**95.2**	**94.4**	**91.6**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**109**	**109**	**108**	**115**	**107**
Toluene-D8	2037-26-5	0.2	%		**117**	**115**	**118**	**123**	**117**
4-Bromofluorobenzene	460-00-4	0.2	%		**116**	**116**	**118**	**122**	**115**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	46092-26	46092-27	46092-28	46092-29	46092-30
			Client sampling date / time	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00
Compound	CAS Number	LOR	Unit	ES1731292-026	ES1731292-027	ES1731292-028	ES1731292-029	ES1731292-030
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	20.4	19.8	11.7	11.8	3.2
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples								
Asbestos (Trace)	1332-21-4	5	Fibres	----	----	----	----	No
EA200: AS 4964 - 2004 Identification of Asbestos in Soils								
Asbestos Detected	1332-21-4	0.1	g/kg	----	----	----	----	No
Asbestos Type	1332-21-4	-	--	----	----	----	----	-
Sample weight (dry)	----	0.01	g	----	----	----	----	34.9
APPROVED IDENTIFIER:	----	-	--	----	----	----	----	S.SPOONER
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	18	35	28	40	28
Copper	7440-50-8	5	mg/kg	34	37	26	36	34
Lead	7439-92-1	5	mg/kg	43	44	18	11	11
Nickel	7440-02-0	2	mg/kg	18	36	28	39	75
Zinc	7440-66-6	5	mg/kg	1300	164	220	126	70
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	46092-26	46092-27	46092-28	46092-29	46092-30
				Client sampling date / time	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00
Compound	CAS Number	LOR	Unit		ES1731292-026	ES1731292-027	ES1731292-028	ES1731292-029	ES1731292-030
					Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued									
4.4`-DDE	72-55-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	72-20-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
beta-Endosulfan	33213-65-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ Endosulfan (sum)	115-29-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDD	72-54-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Demeton-S-methyl	919-86-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Monocrotophos	6923-22-4	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Dimethoate	60-51-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Diazinon	333-41-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion-methyl	298-00-0	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	121-75-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenthion	55-38-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion	56-38-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorfenvinphos	470-90-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Bromophos-ethyl	4824-78-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenamiphos	22224-92-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Prothiofos	34643-46-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Ethion	563-12-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Carbophenothion	786-19-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Azinphos Methyl	86-50-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	46092-26	46092-27	46092-28	46092-29	46092-30
				Client sampling date / time	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00
Compound	CAS Number	LOR	Unit		ES1731292-026	ES1731292-027	ES1731292-028	ES1731292-029	ES1731292-030
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg		**0.5**	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		**0.5**	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**0.6**	**0.6**	**0.6**	**0.6**	**0.6**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	**1.2**	**1.2**	**1.2**	**1.2**
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		**100**	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		**230**	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		**330**	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		**280**	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		**180**	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		**460**	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	<50

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	46092-26	46092-27	46092-28	46092-29	46092-30
				Client sampling date / time	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00
Compound	CAS Number	LOR	Unit		ES1731292-026	ES1731292-027	ES1731292-028	ES1731292-029	ES1731292-030
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ **Sum of BTEX**	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ **Total Xylenes**	1330-20-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		**90.4**	**73.0**	**76.2**	**72.8**	**97.1**
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		**101**	**104**	**111**	**106**	**95.2**
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		**74.3**	**85.9**	**96.5**	**105**	**62.4**
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**92.1**	**94.2**	**93.7**	**95.9**	**99.7**
2-Chlorophenol-D4	93951-73-6	0.5	%		**89.9**	**91.1**	**90.0**	**91.6**	**96.7**
2.4.6-Tribromophenol	118-79-6	0.5	%		**101**	**96.1**	**87.6**	**99.1**	**97.0**
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**94.6**	**90.8**	**94.1**	**96.9**	**98.6**
Anthracene-d10	1719-06-8	0.5	%		**96.9**	**93.8**	**96.1**	**99.6**	**99.7**
4-Terphenyl-d14	1718-51-0	0.5	%		**90.1**	**87.4**	**89.8**	**93.0**	**93.0**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**91.9**	**112**	**110**	**114**	**115**
Toluene-D8	2037-26-5	0.2	%		**109**	**119**	**119**	**119**	**124**
4-Bromofluorobenzene	460-00-4	0.2	%		**109**	**120**	**119**	**119**	**123**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	46092-31	----	----	----	----
			Client sampling date / time	11-Dec-2017 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1731292-031	--------	--------	--------	--------
				Result	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	**20.2**	----	----	----	----
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	----	----	----	----
Cadmium	7440-43-9	1	mg/kg	<1	----	----	----	----
Chromium	7440-47-3	2	mg/kg	**17**	----	----	----	----
Copper	7440-50-8	5	mg/kg	**31**	----	----	----	----
Lead	7439-92-1	5	mg/kg	**40**	----	----	----	----
Nickel	7440-02-0	2	mg/kg	**16**	----	----	----	----
Zinc	7440-66-6	5	mg/kg	**1160**	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	----	----	----	----
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	----	----	----	----
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	----	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	----	----	----	----
beta-BHC	319-85-7	0.05	mg/kg	<0.05	----	----	----	----
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	----	----	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	----	----	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	----	----	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	----	----	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	----	----	----	----
^ **Total Chlordane (sum)**	----	0.05	mg/kg	<0.05	----	----	----	----
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	----	----	----	----
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	----	----	----	----
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	----	----	----	----
Dieldrin	60-57-1	0.05	mg/kg	<0.05	----	----	----	----
4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	----	----	----	----
Endrin	72-20-8	0.05	mg/kg	<0.05	----	----	----	----
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	----	----	----	----
^ **Endosulfan (sum)**	115-29-7	0.05	mg/kg	<0.05	----	----	----	----
4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	----	----	----	----
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	----	----	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	46092-26	46092-27	46092-28	46092-29	46092-30
				Client sampling date / time	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00
Compound	CAS Number	LOR	Unit		ES1731292-026	ES1731292-027	ES1731292-028	ES1731292-029	ES1731292-030
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg		**0.5**	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		**0.5**	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**0.6**	**0.6**	**0.6**	**0.6**	**0.6**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	**1.2**	**1.2**	**1.2**	**1.2**
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		**100**	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		**230**	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		**330**	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		**280**	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		**180**	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		**460**	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	<50

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	46092-26	46092-27	46092-28	46092-29	46092-30
				Client sampling date / time	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00	11-Dec-2017 00:00
Compound	CAS Number	LOR	Unit		ES1731292-026	ES1731292-027	ES1731292-028	ES1731292-029	ES1731292-030
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ **Sum of BTEX**	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ **Total Xylenes**	1330-20-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		**90.4**	**73.0**	**76.2**	**72.8**	**97.1**
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		**101**	**104**	**111**	**106**	**95.2**
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		**74.3**	**85.9**	**96.5**	**105**	**62.4**
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**92.1**	**94.2**	**93.7**	**95.9**	**99.7**
2-Chlorophenol-D4	93951-73-6	0.5	%		**89.9**	**91.1**	**90.0**	**91.6**	**96.7**
2.4.6-Tribromophenol	118-79-6	0.5	%		**101**	**96.1**	**87.6**	**99.1**	**97.0**
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**94.6**	**90.8**	**94.1**	**96.9**	**98.6**
Anthracene-d10	1719-06-8	0.5	%		**96.9**	**93.8**	**96.1**	**99.6**	**99.7**
4-Terphenyl-d14	1718-51-0	0.5	%		**90.1**	**87.4**	**89.8**	**93.0**	**93.0**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**91.9**	**112**	**110**	**114**	**115**
Toluene-D8	2037-26-5	0.2	%		**109**	**119**	**119**	**119**	**124**
4-Bromofluorobenzene	460-00-4	0.2	%		**109**	**120**	**119**	**119**	**123**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	46092-31	----	----	----	----
			Client sampling date / time	11-Dec-2017 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES1731292-031	--------	--------	--------	--------
				Result	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	**20.2**	----	----	----	----
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	----	----	----	----
Cadmium	7440-43-9	1	mg/kg	<1	----	----	----	----
Chromium	7440-47-3	2	mg/kg	**17**	----	----	----	----
Copper	7440-50-8	5	mg/kg	**31**	----	----	----	----
Lead	7439-92-1	5	mg/kg	**40**	----	----	----	----
Nickel	7440-02-0	2	mg/kg	**16**	----	----	----	----
Zinc	7440-66-6	5	mg/kg	**1160**	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	----	----	----	----
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	----	----	----	----
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	----	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	----	----	----	----
beta-BHC	319-85-7	0.05	mg/kg	<0.05	----	----	----	----
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	----	----	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	----	----	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	----	----	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	----	----	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	----	----	----	----
^ **Total Chlordane (sum)**	----	0.05	mg/kg	<0.05	----	----	----	----
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	----	----	----	----
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	----	----	----	----
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	----	----	----	----
Dieldrin	60-57-1	0.05	mg/kg	<0.05	----	----	----	----
4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	----	----	----	----
Endrin	72-20-8	0.05	mg/kg	<0.05	----	----	----	----
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	----	----	----	----
^ **Endosulfan (sum)**	115-29-7	0.05	mg/kg	<0.05	----	----	----	----
4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	----	----	----	----
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	----	----	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	46092-31	----	----	----	----
				Client sampling date / time	11-Dec-2017 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1731292-031	--------	--------	--------	--------
					Result	----	----	----	----
EP068A: Organochlorine Pesticides (OC) - Continued									
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	----	----	----	----
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	----	----	----	----
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	----	----	----	----
^ **Sum of Aldrin + Dieldrin**	309-00-2/60-57-1	0.05	mg/kg		<0.05	----	----	----	----
^ **Sum of DDD + DDE + DDT**	72-54-8/72-55-9/50-2	0.05	mg/kg		<0.05	----	----	----	----
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg		<0.05	----	----	----	----
Demeton-S-methyl	919-86-8	0.05	mg/kg		<0.05	----	----	----	----
Monocrotophos	6923-22-4	0.2	mg/kg		<0.2	----	----	----	----
Dimethoate	60-51-5	0.05	mg/kg		<0.05	----	----	----	----
Diazinon	333-41-5	0.05	mg/kg		<0.05	----	----	----	----
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		<0.05	----	----	----	----
Parathion-methyl	298-00-0	0.2	mg/kg		<0.2	----	----	----	----
Malathion	121-75-5	0.05	mg/kg		<0.05	----	----	----	----
Fenthion	55-38-9	0.05	mg/kg		<0.05	----	----	----	----
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	----	----	----	----
Parathion	56-38-2	0.2	mg/kg		<0.2	----	----	----	----
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		<0.05	----	----	----	----
Chlorfenvinphos	470-90-6	0.05	mg/kg		<0.05	----	----	----	----
Bromophos-ethyl	4824-78-6	0.05	mg/kg		<0.05	----	----	----	----
Fenamiphos	22224-92-6	0.05	mg/kg		<0.05	----	----	----	----
Prothiofos	34643-46-4	0.05	mg/kg		<0.05	----	----	----	----
Ethion	563-12-2	0.05	mg/kg		<0.05	----	----	----	----
Carbophenothion	786-19-6	0.05	mg/kg		<0.05	----	----	----	----
Azinphos Methyl	86-50-0	0.05	mg/kg		<0.05	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	----	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	----	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	----	----	----	----
Fluorene	86-73-7	0.5	mg/kg		<0.5	----	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	----	----	----	----
Anthracene	120-12-7	0.5	mg/kg		<0.5	----	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	----	----	----	----
Pyrene	129-00-0	0.5	mg/kg		<0.5	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	46092-31	----	----	----	----
				Client sampling date / time	11-Dec-2017 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1731292-031	--------	--------	--------	--------
					Result	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	----	----	----	----
Chrysene	218-01-9	0.5	mg/kg		<0.5	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**0.6**	----	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	----	----	----	----
C10 - C14 Fraction	----	50	mg/kg		<50	----	----	----	----
C15 - C28 Fraction	----	100	mg/kg		**130**	----	----	----	----
C29 - C36 Fraction	----	100	mg/kg		**290**	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg		**420**	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	----	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	----	----	----	----
>C10 - C16 Fraction	----	50	mg/kg		<50	----	----	----	----
>C16 - C34 Fraction	----	100	mg/kg		**360**	----	----	----	----
>C34 - C40 Fraction	----	100	mg/kg		**240**	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		**600**	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	----	----	----	----
Toluene	108-88-3	0.5	mg/kg		<0.5	----	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	----	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Client sample ID	46092-31	----	----	----	----
				Client sampling date / time	11-Dec-2017 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1731292-031	--------	--------	--------	--------
					Result	----	----	----	----
EP080: BTEXN - Continued									
^ Sum of BTEX	----	0.2	mg/kg		<0.2	----	----	----	----
^ Total Xylenes	1330-20-7	0.5	mg/kg		<0.5	----	----	----	----
Naphthalene	91-20-3	1	mg/kg		<1	----	----	----	----
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		**74.9**	----	----	----	----
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		**100**	----	----	----	----
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		**74.8**	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**96.6**	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%		**95.5**	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%		**105**	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**98.7**	----	----	----	----
Anthracene-d10	1719-06-8	0.5	%		**99.2**	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%		**92.2**	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**97.2**	----	----	----	----
Toluene-D8	2037-26-5	0.2	%		**113**	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.2	%		**111**	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	46092-32	----	----	----	----
				Client sampling date / time	11-Dec-2017 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES1731292-032	--------	--------	--------	--------
					Result	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	----	----	----	----
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	20	µg/L		<20	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	----	----	----	----
Toluene	108-88-3	2	µg/L		<2	----	----	----	----
Ethylbenzene	100-41-4	2	µg/L		<2	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	----	----	----	----
ortho-Xylene	95-47-6	2	µg/L		<2	----	----	----	----
^ **Total Xylenes**	1330-20-7	2	µg/L		<2	----	----	----	----
^ **Sum of BTEX**	----	1	µg/L		<1	----	----	----	----
Naphthalene	91-20-3	5	µg/L		<5	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**106**	----	----	----	----
Toluene-D8	2037-26-5	2	%		**107**	----	----	----	----
4-Bromofluorobenzene	460-00-4	2	%		**104**	----	----	----	----

Analytical Results

Descriptive Results

Sub-Matrix: **SOIL**

Method: Compound	Client sample ID - Client sampling date / time	Analytical Results
EA200: AS 4964 - 2004 Identification of Asbestos in Soils		
EA200: Description	46092-3 - 11-Dec-2017 00:00	Mid brown sandy soil.
EA200: Description	46092-25 - 11-Dec-2017 00:00	Mid brown sandy soil.
EA200: Description	46092-30 - 11-Dec-2017 00:00	Mid brown clay soil.

Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP066S: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	39	149
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	49	147
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	35	143
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2.4.6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **ES1731292**	Page	: 1 of 20
Client	: **SESL Australia Pty Ltd**	Laboratory	: Environmental Division Sydney
Contact	: Harrison Leake (SUBSAMPLES)	Contact	: Customer Services ES
Address	: PO BOX 357 PENNANT HILLS NSW, AUSTRALIA 1715	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9980 6554	Telephone	: +61-2-8784 8555
Project	: 46092	Date Samples Received	: 11-Dec-2017
Order number	: ----	Date Analysis Commenced	: 11-Dec-2017
C-O-C number	: 25234	Issue Date	: 12-Dec-2017
Sampler	: ----		
Site	: ----		
Quote number	: SYBQ/404/17		
No. of samples received	: 32		
No. of samples analysed	: 32		

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

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

This Quality Control Report contains the following information:

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Shaun Spooner	Asbestos Identifier	Newcastle - Asbestos, Mayfield West, NSW

General Comments

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

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

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

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

Laboratory Duplicate (DUP) Report

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

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 1306088)									
ES1731262-003	Anonymous	EA055: Moisture Content	----	1	%	25.4	25.7	0.968	0% - 20%
ES1731292-002	46092-2	EA055: Moisture Content	----	1	%	12.8	10.2	22.9	0% - 50%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 1306089)									
ES1731292-011	46092-11	EA055: Moisture Content	----	1	%	3.7	4.3	16.6	No Limit
ES1731292-022	46092-22	EA055: Moisture Content	----	1	%	18.4	20.4	10.5	0% - 20%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 1306090)									
ES1731292-031	46092-31	EA055: Moisture Content	----	1	%	20.2	20.7	2.68	0% - 20%
ES1731313-007	Anonymous	EA055: Moisture Content	----	1	%	11.0	10.8	2.26	0% - 50%
EG005T: Total Metals by ICP-AES (QC Lot: 1306156)									
ES1730948-001	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	6	4	37.5	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	<2	<2	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	9	10	0.00	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	7	5	33.9	No Limit
ES1731292-009	46092-9	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	34	34	0.00	0% - 50%
		EG005T: Nickel	7440-02-0	2	mg/kg	44	43	0.00	0% - 20%
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	33	33	0.00	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	7	8	0.00	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	78	78	0.00	0% - 50%
EG005T: Total Metals by ICP-AES (QC Lot: 1306159)									

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EG005T: Total Metals by ICP-AES (QC Lot: 1306159) - continued									
ES1731292-019	46092-19	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	39	37	3.11	0% - 50%
		EG005T: Nickel	7440-02-0	2	mg/kg	39	38	0.00	0% - 50%
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	35	35	0.00	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	9	9	0.00	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	108	105	2.46	0% - 20%
ES1731292-029	46092-29	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	40	39	0.00	0% - 50%
		EG005T: Nickel	7440-02-0	2	mg/kg	39	39	0.00	0% - 50%
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	36	36	0.00	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	11	11	0.00	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	126	126	0.00	0% - 20%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 1306157)									
ES1730948-001	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
ES1731292-009	46092-9	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 1306158)									
ES1731292-019	46092-19	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
ES1731292-029	46092-29	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EP066: Polychlorinated Biphenyls (PCB) (QC Lot: 1305227)									
ES1731292-001	46092-1	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
ES1731292-011	46092-11	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EP066: Polychlorinated Biphenyls (PCB) (QC Lot: 1305281)									
ES1731292-021	46092-21	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
ES1731292-029	46092-29	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
EP068A: Organochlorine Pesticides (OC) (QC Lot: 1305226)									
ES1731292-001	46092-1	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP068A: Organochlorine Pesticides (OC) (QC Lot: 1305226) - continued									
ES1731292-001	46092-1	EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
ES1731292-011	46092-11	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
EP068A: Organochlorine Pesticides (OC) (QC Lot: 1305280)									
ES1731292-021	46092-21	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP068A: Organochlorine Pesticides (OC) (QC Lot: 1305280) - continued									
ES1731292-021	46092-21	EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
ES1731292-029	46092-29	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 1305226)									
ES1731292-001	46092-1	EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 1305226) - continued									
ES1731292-001	46092-1	EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
ES1731292-011	46092-11	EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 1305280)									
ES1731292-021	46092-21	EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report					
				LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 1305280) - continued									
ES1731292-021	46092-21	EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
ES1731292-029	46092-29	EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	0.00	No Limit
		EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 1305224)									
ES1731292-001	46092-1	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	0.5	0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	0.6	0.6	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 1305224) - continued									
ES1731292-001	46092-1	EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	1.1	1.1	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
ES1731292-011	46092-11	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 1305279)									
ES1731292-021	46092-21	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 1305279) - continued									
ES1731292-021	46092-21	EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
ES1731292-029	46092-29	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1305223)									
ES1731292-001	46092-1	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
ES1731292-011	46092-11	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1305267)									
ES1731292-001	46092-1	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
ES1731292-011	46092-11	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1305278)									
ES1731292-021	46092-21	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
ES1731292-029	46092-29	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1306062)									
ES1731092-001	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
ES1731292-026	46092-26	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1305223)									
ES1731292-001	46092-1	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
ES1731292-011	46092-11	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1305267)									
ES1731292-001	46092-1	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
ES1731292-011	46092-11	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1305278)									
ES1731292-021	46092-21	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
ES1731292-029	46092-29	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.00	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1306062)									
ES1731092-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
ES1731292-026	46092-26	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.00	No Limit
EP080: BTEXN (QC Lot: 1305267)									
ES1731292-001	46092-1	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP080: BTEXN (QC Lot: 1305267) - continued									
ES1731292-001	46092-1	EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
ES1731292-011	46092-11	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
EP080: BTEXN (QC Lot: 1306062)									
ES1731092-001	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit
ES1731292-026	46092-26	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.00	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.00	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1306757)									
ES1731351-005	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	40	40	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1306757)									
ES1731351-005	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	40	40	0.00	No Limit
EP080: BTEXN (QC Lot: 1306757)									
ES1731351-005	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit

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

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

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005T: Total Metals by ICP-AES (QCLot: 1306156)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	93.4	86	126
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	93.8	83	113
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	93.8	76	128
EG005T: Copper	7440-50-8	5	mg/kg	<5	32 mg/kg	94.2	86	120
EG005T: Lead	7439-92-1	5	mg/kg	<5	40 mg/kg	95.1	80	114
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55 mg/kg	99.6	87	123
EG005T: Zinc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	103	80	122
EG005T: Total Metals by ICP-AES (QCLot: 1306159)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	93.5	86	126
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	95.4	83	113
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	96.1	76	128
EG005T: Copper	7440-50-8	5	mg/kg	<5	32 mg/kg	102	86	120
EG005T: Lead	7439-92-1	5	mg/kg	<5	40 mg/kg	96.1	80	114
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55 mg/kg	102	87	123
EG005T: Zinc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	103	80	122
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1306157)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	72.5	70	105
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1306158)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	72.9	70	105
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 1305227)								
EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	1 mg/kg	97.0	62	126
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 1305281)								
EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	1 mg/kg	103	62	126
EP068A: Organochlorine Pesticides (OC) (QCLot: 1305226)								
EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.5 mg/kg	87.9	69	113
EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	0.5 mg/kg	90.0	65	117
EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	0.5 mg/kg	84.6	67	119
EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	0.5 mg/kg	87.0	68	116
EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	78.4	65	117
EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.5 mg/kg	84.3	67	115
EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	0.5 mg/kg	80.8	69	115
EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.5 mg/kg	85.5	62	118
EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	0.5 mg/kg	83.9	63	117

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP068A: Organochlorine Pesticides (OC) (QCLot: 1305226) - continued								
EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	0.5 mg/kg	86.5	66	116
EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	0.5 mg/kg	83.2	64	116
EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	0.5 mg/kg	85.2	66	116
EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	0.5 mg/kg	86.0	67	115
EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	0.5 mg/kg	83.0	67	123
EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	0.5 mg/kg	86.5	69	115
EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	0.5 mg/kg	88.1	69	121
EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	0.5 mg/kg	87.7	56	120
EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.5 mg/kg	83.3	62	124
EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	0.5 mg/kg	78.5	66	120
EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	0.5 mg/kg	87.5	64	122
EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	0.5 mg/kg	78.6	54	130
EP068A: Organochlorine Pesticides (OC) (QCLot: 1305280)								
EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.5 mg/kg	96.8	69	113
EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	0.5 mg/kg	98.2	65	117
EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	0.5 mg/kg	91.2	67	119
EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	0.5 mg/kg	95.7	68	116
EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	86.8	65	117
EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.5 mg/kg	93.4	67	115
EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	0.5 mg/kg	90.1	69	115
EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.5 mg/kg	88.8	62	118
EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	0.5 mg/kg	86.8	63	117
EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	0.5 mg/kg	89.9	66	116
EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	0.5 mg/kg	85.8	64	116
EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	0.5 mg/kg	88.8	66	116
EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	0.5 mg/kg	96.6	67	115
EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	0.5 mg/kg	85.5	67	123
EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	0.5 mg/kg	92.1	69	115
EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	0.5 mg/kg	92.4	69	121
EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	0.5 mg/kg	90.1	56	120
EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.5 mg/kg	86.4	62	124
EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	0.5 mg/kg	80.5	66	120
EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	0.5 mg/kg	90.1	64	122
EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	0.5 mg/kg	81.0	54	130
EP068B: Organophosphorus Pesticides (OP) (QCLot: 1305226)								
EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	0.5 mg/kg	81.5	59	119
EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	92.6	62	128
EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	0.5 mg/kg	94.2	54	126
EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	0.5 mg/kg	87.1	67	119

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP068B: Organophosphorus Pesticides (OP) (QCLot: 1305226) - continued								
EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	0.5 mg/kg	80.8	70	120
EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	0.5 mg/kg	76.6	72	120
EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	0.5 mg/kg	76.5	68	120
EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	0.5 mg/kg	82.2	68	122
EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	0.5 mg/kg	83.1	69	117
EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	0.5 mg/kg	83.9	76	118
EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	0.5 mg/kg	79.1	64	122
EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	0.5 mg/kg	80.5	70	116
EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	0.5 mg/kg	79.2	69	121
EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	0.5 mg/kg	81.1	66	118
EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	0.5 mg/kg	76.4	68	124
EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	0.5 mg/kg	85.7	62	112
EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	0.5 mg/kg	81.8	68	120
EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	0.5 mg/kg	78.2	65	127
EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	0.5 mg/kg	69.7	41	123
EP068B: Organophosphorus Pesticides (OP) (QCLot: 1305280)								
EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	0.5 mg/kg	75.4	59	119
EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	87.6	62	128
EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	0.5 mg/kg	86.3	54	126
EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	0.5 mg/kg	95.6	67	119
EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	0.5 mg/kg	86.6	70	120
EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	0.5 mg/kg	82.9	72	120
EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	0.5 mg/kg	82.5	68	120
EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	0.5 mg/kg	89.4	68	122
EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	0.5 mg/kg	87.1	69	117
EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	0.5 mg/kg	89.0	76	118
EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	0.5 mg/kg	84.1	64	122
EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	0.5 mg/kg	82.8	70	116
EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	0.5 mg/kg	85.0	69	121
EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	0.5 mg/kg	84.0	66	118
EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	0.5 mg/kg	78.7	68	124
EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	0.5 mg/kg	90.0	62	112
EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	0.5 mg/kg	86.0	68	120
EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	0.5 mg/kg	80.4	65	127
EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	0.5 mg/kg	82.4	41	123
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1305224)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	90.5	77	125
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	91.0	72	124
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	89.0	73	127

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
				Result	Concentration	LCS	Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1305224) - continued								
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	89.4	72	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	88.5	75	127
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	94.1	77	127
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	94.1	73	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	91.6	74	128
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	86.9	69	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	91.5	75	127
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	6 mg/kg	94.7	68	116
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	92.7	74	126
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	89.9	70	126
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	86.3	61	121
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	92.7	62	118
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	87.9	63	121
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1305279)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	88.7	77	125
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	81.7	72	124
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	84.8	73	127
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	86.0	72	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	87.1	75	127
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	89.9	77	127
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	85.8	73	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	86.8	74	128
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	81.6	69	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	90.0	75	127
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	6 mg/kg	82.8	68	116
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	92.0	74	126
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	81.2	70	126
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	81.0	61	121
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	78.3	62	118
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	80.8	63	121
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1305223)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	200 mg/kg	104	75	129
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	300 mg/kg	102	77	131
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	200 mg/kg	95.9	71	129
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1305267)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	79.0	68	128

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1305278)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	200 mg/kg	101	75	129
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	300 mg/kg	98.0	77	131
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	200 mg/kg	102	71	129
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1306062)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	110	68	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1305223)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	250 mg/kg	106	77	125
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	350 mg/kg	107	74	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	150 mg/kg	96.0	63	131
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1305267)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	79.7	68	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1305278)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	250 mg/kg	104	77	125
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	350 mg/kg	101	74	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	150 mg/kg	95.2	63	131
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1306062)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	109	68	128
EP080: BTEXN (QCLot: 1305267)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	85.7	62	116
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	84.3	67	121
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	80.1	65	117
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	81.2	66	118
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	83.0	68	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	93.3	63	119
EP080: BTEXN (QCLot: 1306062)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	109	62	116
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	113	67	121
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	111	65	117
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	112	66	118
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	115	68	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	107	63	119

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1306757)								

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1306757) - continued								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	97.1	75	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1306757)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	97.9	75	127
EP080: BTEXN (QCLot: 1306757)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	104	70	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	97.2	69	123
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	96.5	70	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	96.0	69	121
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	100	72	122
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	108	70	120

Matrix Spike (MS) Report

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

Sub-Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
EG005T: Total Metals by ICP-AES (QCLot: 1306156)							
ES1730948-001	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	96.4	70	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	97.7	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	94.0	70	130
		EG005T: Copper	7440-50-8	250 mg/kg	98.3	70	130
		EG005T: Lead	7439-92-1	250 mg/kg	97.8	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	98.2	70	130
		EG005T: Zinc	7440-66-6	250 mg/kg	98.9	70	130
EG005T: Total Metals by ICP-AES (QCLot: 1306159)							
ES1731292-019	46092-19	EG005T: Arsenic	7440-38-2	50 mg/kg	89.9	70	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	94.8	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	83.8	70	130
		EG005T: Copper	7440-50-8	250 mg/kg	98.5	70	130
		EG005T: Lead	7439-92-1	250 mg/kg	95.9	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	87.3	70	130
		EG005T: Zinc	7440-66-6	250 mg/kg	92.4	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1306157)							
ES1730948-001	Anonymous	EG035T: Mercury	7439-97-6	5 mg/kg	92.9	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1306158)							

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG035T: Total Recoverable Mercury by FIMS (QCLot: 1306158) - continued							
ES1731292-019	46092-19	EG035T: Mercury	7439-97-6	5 mg/kg	94.1	70	130
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 1305227)							
ES1731292-001	46092-1	EP066: Total Polychlorinated biphenyls	----	1 mg/kg	105	70	130
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 1305281)							
ES1731292-021	46092-21	EP066: Total Polychlorinated biphenyls	----	1 mg/kg	105	70	130
EP068A: Organochlorine Pesticides (OC) (QCLot: 1305226)							
ES1731292-001	46092-1	EP068: gamma-BHC	58-89-9	0.5 mg/kg	96.4	70	130
		EP068: Heptachlor	76-44-8	0.5 mg/kg	86.4	70	130
		EP068: Aldrin	309-00-2	0.5 mg/kg	95.4	70	130
		EP068: Dieldrin	60-57-1	0.5 mg/kg	83.0	70	130
		EP068: Endrin	72-20-8	2 mg/kg	88.4	70	130
		EP068: 4.4`-DDT	50-29-3	2 mg/kg	92.6	70	130
EP068A: Organochlorine Pesticides (OC) (QCLot: 1305280)							
ES1731292-021	46092-21	EP068: gamma-BHC	58-89-9	0.5 mg/kg	92.0	70	130
		EP068: Heptachlor	76-44-8	0.5 mg/kg	97.4	70	130
		EP068: Aldrin	309-00-2	0.5 mg/kg	85.3	70	130
		EP068: Dieldrin	60-57-1	0.5 mg/kg	92.8	70	130
		EP068: Endrin	72-20-8	2 mg/kg	83.8	70	130
		EP068: 4.4`-DDT	50-29-3	2 mg/kg	95.0	70	130
EP068B: Organophosphorus Pesticides (OP) (QCLot: 1305226)							
ES1731292-001	46092-1	EP068: Diazinon	333-41-5	0.5 mg/kg	88.4	70	130
		EP068: Chlorpyrifos-methyl	5598-13-0	0.5 mg/kg	85.3	70	130
		EP068: Pirimphos-ethyl	23505-41-1	0.5 mg/kg	89.6	70	130
		EP068: Bromophos-ethyl	4824-78-6	0.5 mg/kg	85.9	70	130
		EP068: Prothiofos	34643-46-4	0.5 mg/kg	94.7	70	130
EP068B: Organophosphorus Pesticides (OP) (QCLot: 1305280)							
ES1731292-021	46092-21	EP068: Diazinon	333-41-5	0.5 mg/kg	79.7	70	130
		EP068: Chlorpyrifos-methyl	5598-13-0	0.5 mg/kg	91.4	70	130
		EP068: Pirimphos-ethyl	23505-41-1	0.5 mg/kg	81.9	70	130
		EP068: Bromophos-ethyl	4824-78-6	0.5 mg/kg	105	70	130
		EP068: Prothiofos	34643-46-4	0.5 mg/kg	81.4	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1305224)							
ES1731292-001	46092-1	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	91.9	70	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	97.6	70	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1305279)							
ES1731292-021	46092-21	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	106	70	130

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 1305279) - continued							
ES1731292-021	46092-21	EP075(SIM): Pyrene	129-00-0	10 mg/kg	107	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1305223)							
ES1731292-001	46092-1	EP071: C10 - C14 Fraction	----	523 mg/kg	86.0	73	137
		EP071: C15 - C28 Fraction	----	2319 mg/kg	104	53	131
		EP071: C29 - C36 Fraction	----	1714 mg/kg	114	52	132
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1305267)							
ES1731292-001	46092-1	EP080: C6 - C9 Fraction	----	32.5 mg/kg	106	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1305278)							
ES1731292-021	46092-21	EP071: C10 - C14 Fraction	----	523 mg/kg	83.7	73	137
		EP071: C15 - C28 Fraction	----	2319 mg/kg	100	53	131
		EP071: C29 - C36 Fraction	----	1714 mg/kg	105	52	132
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1306062)							
ES1731092-001	Anonymous	EP080: C6 - C9 Fraction	----	32.5 mg/kg	109	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1305223)							
ES1731292-001	46092-1	EP071: >C10 - C16 Fraction	----	860 mg/kg	94.0	73	137
		EP071: >C16 - C34 Fraction	----	3223 mg/kg	105	53	131
		EP071: >C34 - C40 Fraction	----	1058 mg/kg	112	52	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1305267)							
ES1731292-001	46092-1	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	102	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1305278)							
ES1731292-021	46092-21	EP071: >C10 - C16 Fraction	----	860 mg/kg	98.0	73	137
		EP071: >C16 - C34 Fraction	----	3223 mg/kg	103	53	131
		EP071: >C34 - C40 Fraction	----	1058 mg/kg	101	52	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1306062)							
ES1731092-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	97.0	70	130
EP080: BTEXN (QCLot: 1305267)							
ES1731292-001	46092-1	EP080: Benzene	71-43-2	2.5 mg/kg	101	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	98.9	70	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	96.3	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	97.6	70	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	98.1	70	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	101	70	130
EP080: BTEXN (QCLot: 1306062)							
ES1731092-001	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	114	70	130
		EP080: Toluene	108-88-3	2.5 mg/kg	114	70	130

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES1731292**	Page	: 1 of 11
Client	: **SESL Australia Pty Ltd**	Laboratory	: Environmental Division Sydney
Contact	: Harrison Leake (SUBSAMPLES)	Telephone	: +61-2-8784 8555
Project	: 46092	Date Samples Received	: 11-Dec-2017
Site	: ----	Issue Date	: 12-Dec-2017
Sampler	: ----	No. of samples received	: 32
Order number	: ----	No. of samples analysed	: 32

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content (Dried @ 105-110°C)							
Soil Glass Jar - Unpreserved (EA055)							
46092-1, 46092-2, 46092-3, 46092-4, 46092-5, 46092-6, 46092-7, 46092-8, 46092-9, 46092-10, 46092-11, 46092-12, 46092-13, 46092-14, 46092-15, 46092-16, 46092-17, 46092-18, 46092-19, 46092-20, 46092-21, 46092-22, 46092-23, 46092-24, 46092-25, 46092-26, 46092-27, 46092-28, 46092-29, 46092-30, 46092-31	**11-Dec-2017**	**----**	----	----	**11-Dec-2017**	25-Dec-2017	✓
EA200: AS 4964 - 2004 Identification of Asbestos in bulk samples							
Snap Lock Bag - Subsampled by ALS (EA200)							
46092-3, 46092-25, 46092-30	**11-Dec-2017**	**----**	----	----	**12-Dec-2017**	09-Jun-2018	✓
EA200: AS 4964 - 2004 Identification of Asbestos in Soils							
Snap Lock Bag - Subsampled by ALS (EA200)							
46092-3, 46092-25, 46092-30	**11-Dec-2017**	**----**	----	----	**12-Dec-2017**	09-Jun-2018	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG005T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T)							
46092-1, 46092-2, 46092-3, 46092-4, 46092-5, 46092-6, 46092-7, 46092-8, 46092-9, 46092-10, 46092-11, 46092-12, 46092-13, 46092-14, 46092-15, 46092-16, 46092-17, 46092-18, 46092-19, 46092-20, 46092-21, 46092-22, 46092-23, 46092-24, 46092-25, 46092-26, 46092-27, 46092-28, 46092-29, 46092-30, 46092-31	**11-Dec-2017**	**11-Dec-2017**	09-Jun-2018	✓	**11-Dec-2017**	09-Jun-2018	✓
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T)							
46092-1, 46092-2, 46092-3, 46092-4, 46092-5, 46092-6, 46092-7, 46092-8, 46092-9, 46092-10, 46092-11, 46092-12, 46092-13, 46092-14, 46092-15, 46092-16, 46092-17, 46092-18, 46092-19, 46092-20, 46092-21, 46092-22, 46092-23, 46092-24, 46092-25, 46092-26, 46092-27, 46092-28, 46092-29, 46092-30, 46092-31	**11-Dec-2017**	**11-Dec-2017**	08-Jan-2018	✓	**11-Dec-2017**	08-Jan-2018	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP066: Polychlorinated Biphenyls (PCB)							
Soil Glass Jar - Unpreserved (EP066)							
46092-1, 46092-2, 46092-3, 46092-4, 46092-5, 46092-6, 46092-7, 46092-8, 46092-9, 46092-10, 46092-11, 46092-12, 46092-13, 46092-14, 46092-15, 46092-16, 46092-17, 46092-18, 46092-19, 46092-20, 46092-21, 46092-22, 46092-23, 46092-24, 46092-25, 46092-26, 46092-27, 46092-28, 46092-29, 46092-30, 46092-31	**11-Dec-2017**	**11-Dec-2017**	25-Dec-2017	✓	**11-Dec-2017**	20-Jan-2018	✓
EP068A: Organochlorine Pesticides (OC)							
Soil Glass Jar - Unpreserved (EP068)							
46092-1, 46092-2, 46092-3, 46092-4, 46092-5, 46092-6, 46092-7, 46092-8, 46092-9, 46092-10, 46092-11, 46092-12, 46092-13, 46092-14, 46092-15, 46092-16, 46092-17, 46092-18, 46092-19, 46092-20, 46092-21, 46092-22, 46092-23, 46092-24, 46092-25, 46092-26, 46092-27, 46092-28, 46092-29, 46092-30, 46092-31	**11-Dec-2017**	**11-Dec-2017**	25-Dec-2017	✓	**11-Dec-2017**	20-Jan-2018	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP068B: Organophosphorus Pesticides (OP)							
Soil Glass Jar - Unpreserved (EP068)							
46092-1, 46092-2, 46092-3, 46092-4, 46092-5, 46092-6, 46092-7, 46092-8, 46092-9, 46092-10, 46092-11, 46092-12, 46092-13, 46092-14, 46092-15, 46092-16, 46092-17, 46092-18, 46092-19, 46092-20, 46092-21, 46092-22, 46092-23, 46092-24, 46092-25, 46092-26, 46092-27, 46092-28, 46092-29, 46092-30, 46092-31	**11-Dec-2017**	**11-Dec-2017**	25-Dec-2017	✓	**11-Dec-2017**	20-Jan-2018	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075(SIM))							
46092-1, 46092-2, 46092-3, 46092-4, 46092-5, 46092-6, 46092-7, 46092-8, 46092-9, 46092-10, 46092-11, 46092-12, 46092-13, 46092-14, 46092-15, 46092-16, 46092-17, 46092-18, 46092-19, 46092-20, 46092-21, 46092-22, 46092-23, 46092-24, 46092-25, 46092-26, 46092-27, 46092-28, 46092-29, 46092-30, 46092-31	**11-Dec-2017**	**11-Dec-2017**	25-Dec-2017	✓	**11-Dec-2017**	20-Jan-2018	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP080)							
46092-1, 46092-2, 46092-3, 46092-4, 46092-5, 46092-6, 46092-7, 46092-8, 46092-9, 46092-10, 46092-11, 46092-12, 46092-13, 46092-14, 46092-15, 46092-16, 46092-17, 46092-18, 46092-19, 46092-20, 46092-21, 46092-22, 46092-23, 46092-24, 46092-25, 46092-26, 46092-27, 46092-28, 46092-29, 46092-30, 46092-31	**11-Dec-2017**	**11-Dec-2017**	25-Dec-2017	✓	**11-Dec-2017**	25-Dec-2017	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved (EP080)							
46092-1, 46092-2, 46092-3, 46092-4, 46092-5, 46092-6, 46092-7, 46092-8, 46092-9, 46092-10, 46092-11, 46092-12, 46092-13, 46092-14, 46092-15, 46092-16, 46092-17, 46092-18, 46092-19, 46092-20, 46092-21, 46092-22, 46092-23, 46092-24, 46092-25, 46092-26, 46092-27, 46092-28, 46092-29, 46092-30, 46092-31	**11-Dec-2017**	**11-Dec-2017**	25-Dec-2017	✓	**11-Dec-2017**	25-Dec-2017	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080)							
46092-1, 46092-2, 46092-3, 46092-4, 46092-5, 46092-6, 46092-7, 46092-8, 46092-9, 46092-10, 46092-11, 46092-12, 46092-13, 46092-14, 46092-15, 46092-16, 46092-17, 46092-18, 46092-19, 46092-20, 46092-21, 46092-22, 46092-23, 46092-24, 46092-25, 46092-26, 46092-27, 46092-28, 46092-29, 46092-30, 46092-31	**11-Dec-2017**	**11-Dec-2017**	25-Dec-2017	✓	**11-Dec-2017**	25-Dec-2017	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Petroleum Hydrocarbons							
Amber VOC Vial - Sulfuric Acid (EP080)							
46092-32	**11-Dec-2017**	**11-Dec-2017**	25-Dec-2017	✓	**11-Dec-2017**	25-Dec-2017	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber VOC Vial - Sulfuric Acid (EP080)							
46092-32	**11-Dec-2017**	**11-Dec-2017**	25-Dec-2017	✓	**11-Dec-2017**	25-Dec-2017	✓
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080)							
46092-32	**11-Dec-2017**	**11-Dec-2017**	25-Dec-2017	✓	**11-Dec-2017**	25-Dec-2017	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Moisture Content	EA055	6	60	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	4	36	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	4	33	**12.12**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	4	33	**12.12**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	4	37	**10.81**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	4	37	**10.81**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	4	38	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	4	39	**10.26**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
PAH/Phenols (SIM)	EP075(SIM)	2	36	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	2	33	**6.06**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	2	33	**6.06**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	37	**5.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	37	**5.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	38	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	39	**5.13**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
PAH/Phenols (SIM)	EP075(SIM)	2	36	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	2	33	**6.06**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	2	33	**6.06**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	37	**5.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	37	**5.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	38	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	39	**5.13**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	2	36	**5.56**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	2	33	**6.06**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	2	33	**6.06**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	37	**5.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	37	**5.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	38	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	39	**5.13**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
TRH Volatiles/BTEX	EP080	1	7	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
TRH Volatiles/BTEX	EP080	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
TRH Volatiles/BTEX	EP080	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
TRH Volatiles/BTEX	EP080	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM (2013) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
Asbestos Identification in Soils	EA200	SOIL	AS 4964 - 2004 Method for the qualitative identification of asbestos in bulk samples Analysis by Polarised Light Microscopy including dispersion staining
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (2013) Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2) (Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (2013) Schedule B(3)
Polychlorinated Biphenyls (PCB)	EP066	SOIL	In house: Referenced to USEPA SW 846 - 8270D Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 504)
Pesticides by GCMS	EP068	SOIL	In house: Referenced to USEPA SW 846 - 8270D Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This technique is compliant with NEPM (2013) Schedule B(3) (Method 504,505)
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015A Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40. Compliant with NEPM amended 2013.
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270D. Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM (2013) Schedule B(3) (Method 502 and 507)
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260B. Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. Compliant with NEPM amended 2013.
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM (2013) Schedule B(3) (Method 202)

Preparation Methods	Method	Matrix	Method Descriptions
Methanolic Extraction of Soils for Purge and Trap	* ORG16	SOIL	In house: Referenced to USEPA SW 846 - 5030A. 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids	ORG17	SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080: BTEXN (QCLot: 1306062) - continued							
ES1731092-001	Anonymous	EP080: Ethylbenzene	100-41-4	2.5 mg/kg	113	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	115	70	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	114	70	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	104	70	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1306757)							
ES1731351-005	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	106	70	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1306757)							
ES1731351-005	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	104	70	130
EP080: BTEXN (QCLot: 1306757)							
ES1731351-005	Anonymous	EP080: Benzene	71-43-2	25 µg/L	101	70	130
		EP080: Toluene	108-88-3	25 µg/L	102	70	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	103	70	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	102	70	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	105	70	130
		EP080: Naphthalene	91-20-3	25 µg/L	104	70	130