ENVIRONMENTAL CONSULTING Pty Ltd

DETAILED SITE INVESTIGATION

PLANNING PROPOSAL

July 2023

NIMBLE ESTATES PTY LTD

Lot 42 DP 868366 & Lot 1 DP 957677
1055 Bruxner Highway
Goonellabah NSW

HMC2022.1106.03

RE: Lot 42 DP 868366 & Lot 1 DP 957677, 1055 Bruxner Highway, Goonellabah NSW.

HMC Environmental Consulting Pty Ltd is pleased to present our report for a Detailed Site Investigation for the abovementioned site.

We trust this report meets with your requirements. If you require further information, please contact HMC Environmental Consulting directly on the numbers provided.

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Title:	Detailed Site Investigation		
Job No:	2022.1106.03		
Client:	Nimble Estates Pty Ltd		

Document Record:				
Version	Date	Prepared by	Checked by	Approved for issue by
Draft Issue A	10.07.2023	MF		KH

Distribution List	Date	Version	Comments
N. Ejupi (Nimble Estates)	10.07.2023	Draft Issue A	For Review
N. Ejupi (Nimble Estates)	14.07.2023	Final Issue A	Final

This report should be cited as '*HMC Environmental Consulting (2023). Detailed Site Investigation, Planning Proposal, Lot 42 DP 868366 & Lot 1 DP 957677, 1055 Bruxner Highway, Goonellabah NSW. Report No. HMC2022.1106.03.*'

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EXECUTIVE SUMMARY

BACKGROUND

A Planning Proposal for the rural landholding located at 1055 Bruxner Highway, Goonellabah NSW, would amend the *Lismore Local Environmental Plan 2012* (LLEP) to enable mixed use development including residential, commercial, industrial, and public open space land use within the site. The site forms a dogleg configuration with the northern area proposed to support approximately 218 residential lots and the southern and south-eastern area supporting 117 industrial lots. An 80m vegetated buffer would be provided on the eastern boundary between the proposed residential zoned area, and the existing macadamia land use on the adjoining land.

A Preliminary Site Investigation (PSI) was completed including a detailed desktop investigation and a soil investigation across two identified Areas of Concern where sheds, and a dairy may have contained petroleum hydrocarbons, metals, and organochlorine/organophosphorus chemicals. Existing and demolished structures were also suspected of containing hazardous building materials. Two soil sampling rounds were completed to provide information on the presence of asbestos containing material (ACM) and the presence and concentration of soil lead. The second sampling round provided information on the lateral and vertical extent of the soil lead exceeding the investigation criteria for the proposed residential land use.

Lismore City Council (LCC) issued a request for further information on 8 December 2022, an extract is reproduced as follows:

> *"As discussed, the site has been used in the past for agriculture which is a potentially contaminating activity. Because of the historical land use, a detailed site investigation (DSI) supported by a preliminary systematic sampling design & analysis quality plan must be submitted to Lismore City Council for consideration with the current planning proposal prior to gateway. The assessment must be carried out by a suitably qualified professional and in accordance with the requirements of the NSW EPA Consultants Reporting on Contaminated Land - Contaminated Land Guidelines 2020, NSW Managing Land Contamination, Planning Guidelines and SEPP (Resilience and Hazards) Remediation of Land and Lismore City Council Regional Policy for the Management of Contaminated Land, June 2007."*

HMC sought clarification with Council's officer in December 2022 and provided additional verbal information, and further clarification from LCC to the client was forwarded to HMC on 13 January 2023. An extract is shown below:

> *"I have now spoken with our environmental health officer on the matter of contamination. We stand by our request for further sampling prior to Gateway. That being said, we do not require a full DSI in line with the EPA guidelines, rather the DSI should value add to the PSI – it needs to include broad systematic sampling across the site to get a better understanding of the risk across the Ag land, comply with SEPP 55 and enable Council's decision. Agricultural land, while low risk, is listed as a potentially contaminating activity within appendix 1 of the NSW Contaminated Land Planning Guidelines and within Councils Regional Policy for the Management of Contaminated Land, June 2007.*
>
> *While we have relied on PSI only in the past, since 2021 we have been requiring further evidence where a site has the risk of being contaminated. Below are some points that influence our decision:*

1. *In 2021, while assessing the East Lismore Planning Proposal, "Council resolved to require a Preliminary Contaminated Land Investigation to be undertaken, following the issue of a Gateway determination. However, this is contrary to recent case law. In the case of Moorebank Recyclers Pty Ltd v Tanlane Pty Ltd [2018] NSWCA 304, the Court of Appeal held that clause 6 of SEPP 55 must be complied with at the*

time that a planning proposal is prepared, and this must be done prior to forwarding the planning proposal for Gateway determination." Paras 97-99 of the court's report clarifies that contamination reporting needs to be done prior to community consultation, therefore – in my view, if the further sampling takes place post-gateway this will delay us commencing our community consultation, additionally, para 100 speaks directly to requiring the evidence prior to gateway.

"97. The structure of Div 4 of Part 3 of the EPA Act set out at [73] makes clear that the critical step of the assessment of contamination must occur prior to the community consultation provided for by s 57 of the EPA Act. The statutory object of public participation in environmental planning and assessment is reflected in s 57.

98. The only statutory step applying to the Council after the community consultation in s 57 is the requirement in s 58 to consider whether to vary the planning proposal as a consequence of any submission or report during the community consultation or to make a request to the Minister that the planning proposal not proceed.

99. It is difficult to see how this consultation could be meaningful if consideration of contamination issues was not part of that consultation, as would be the case if cl 6 of SEPP 55 only needed to be addressed immediately prior to the "making" of an environmental planning instrument.

100. There is nothing impractical in requiring a planning authority to take steps to consider the issue of contamination of land as required by cl 6 of SEPP 55 before forwarding a planning proposal to the Department under s 56 of the EPA Act. There is every reason to think that the objects of SEPP 55, which include remediation of contaminated land "for the purpose of reducing the risk of harm to human health or any other aspect of the environment", are enhanced by requiring consideration by the Council of contamination issues before forwarding a planning proposal to the Department."

2. *The technical information that accompanies the NSW Planning Proposal Guide includes the following note regarding the LGA requesting a detailed investigation.*

Contamination and Acid Sulphate Soils			
A contamination and acid sulphate soil assessment may be required to provide sufficient information that the site is suitable in its current state, or if contaminated that it can be appropriately remediated and made suitable for the proposed land use. This report may be required particularly when the site has been used, or contains, contaminants, like on industrial or highly contaminated agricultural lands.			
• Preliminary site investigation and report that: o assesses the potential for widespread contamination and/or acid sulphate soils on the site based on current and historical site activities o considers the suitability of the site for the purpose and/or land use for which the planning proposal envisages will be carried out in the future, based on the potential contamination of the site and extent of acid sulphate soils, and whether the land is suitable in its contaminated state (or will be suitable, after remediation) for the purpose for which the development is proposed to be carried out) Note: A council may require the proponent to carry out, and provide a report on, a detailed investigation (as referred to in the contaminated land planning guidelines) if it considers that the findings of the preliminary investigation warrant such an investigation.	Not required	May be required	Likely to be required

3. *The Contaminated Land Planning Guidelines state the below; prelim investigations indicate contamination and current info is insufficient for decision making. Ministerial Direction 4.4 references these guidelines:*

> **Detailed Site Investigation**
>
> A detailed site investigation is required when the results of the preliminary site investigation indicate that contamination is present, or is likely to be present, and the information available is insufficient for planning authorities to make planning decisions or to allow site management strategies to be devised.

I believe the consultants have already spoken directly with our environmental health officer however if they would like to speak further with him regarding the additional sampling and their sampling regime, please do let them know they are welcome to call him again.

After further discussions between the client and LCC, to address the RFI, HMC has been engaged to design a Sampling and Analysis Quality Plan (SAQP) and undertake additional site investigation including soil investigation generally across the vacant grazing land.

OBJECTIVES

The objectives of the Detailed Site Investigation are to:

- Based on the previous Preliminary Site Investigation (HMC2022.1106.02) provide additional information on areas of concern including areas subject to potentially contaminating activities including historic grazing land.
- Based on the previous Preliminary Site Investigation and the current investigation including soil sampling assess whether the investigation area is suitable for the proposed residential and industrial/commercial land use and, if not, whether remediation work is able to make the land suitable.

SCOPE OF WORKS

The scope of work undertaken during the investigation included the following:

- Review the existing information, including that of the desktop investigation and the results from the 2 sampling rounds.
- Address the data gaps in the soil investigation.
- An additional detailed site inspection.
- Preparation of a Detailed Site Investigation report including:
  - review of available land use history information, and results of the site inspection.
  - assessment of potentially contaminating activities, potential contaminants of concern (PCoC) and areas of concern (AoC).
  - preparation of a soil and analysis quality plan (SAQP).
  - collection of nineteen (19) additional primary soil samples (+ 2 x QA/QC samples) and analysis for potential contaminants of concern (PCoC) associated with historic agricultural land use.
  - evaluation of laboratory results for compliance with investigation criteria.
  - conclusions and recommendations including suitability of the investigation area for the proposed development and need for further investigation and remediation.

CONCLUSIONS/RECOMMENDATIONS

The Detailed Site Investigation conclusions are based on the information described in this report and Appendices and should be read in conjunction with the complete report, including Section 0 Limitations.

A Planning Proposal for the rural landholding located at 1055 Bruxner Highway, Goonellabah NSW, would amend the *Lismore Local Environmental Plan 2012* (LLEP) to enable mixed use development including residential, commercial, industrial, and public open space land use within the site. The site forms a dogleg configuration with the northern area proposed to support approximately 218 residential lots and the southern and south-eastern area supporting 117 industrial lots. An 80m vegetated buffer would be provided on the eastern boundary between the proposed residential zoned area, and the existing macadamia land use on the adjoining land. A Preliminary Site Investigation (PSI) was completed by HMC including a detailed desktop investigation and a soil investigation across two identified Areas of Concern where sheds, and a dairy may have contained petroleum hydrocarbons, metals, and organochlorine/organophosphorus chemicals. Existing and demolished structures were also suspected of containing hazardous building materials. Following the submission of the Planning Proposal, Lismore City Council released a request for further information stating that the historic land use of intermittent livestock grazing is a potentially contaminating activity and a Detailed Site Investigating, including a soil investigation of the grazing land, was required.

A Sampling and Analysis Quality Plan was prepared and implemented to assess total soil concentrations of potential contaminants of concern including organochlorine and organophosphorus chemicals, and metals, across the historic grazing land within the scope of the Planning Proposal. Laboratory results recorded all organochlorine and organophosphorus results, along with arsenic, cadmium, and lead, below the laboratory level of reporting and, therefore, below the investigation criteria for industrial/commercial land use. Other metal results were generally typical of background levels, and in all cases, below the investigation criteria. The results of the soil investigation do not indicate any further investigation is required for the grazing land.

Further delineation of the lead-impacted soil and bonded asbestos containing material located in surface soil around the existing structures on the northern part of the site was not undertaken and would be required prior to any remediation associated with a development application.

Based on the information presented, in relation to potential site contamination associated with the current and former land use, the proposed Planning Proposal site, located on Lot 42 DP 868366 & Lot 1 DP 9576771055, 1055 Bruxner Highway, Goonellabah NSW, as shown in Appendix 2 of this report, is considered suitable for the proposed future mixed-use development subject to the recommendations proposed as part of the *Preliminary Site Investigation* (HMC2022.1106.02) including:

1. Prior to the submission of a development application for development in the area shown as AoC 1 and AoC 2 in this report, a Detailed Site Investigation is to be prepared by a suitably qualified environmental consultant to further delineate the potential contaminants of concern identified in and around the existing dwellings and associated structures.

2. Following the preparation of the Detailed Site Investigation in 1 above, a Remedial Action Plan is to be prepared providing details on required remediation and validation of lead-impacted soil and other identified potential contaminants of concern.

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ABBREVIATIONS/ACRONYMS

ACM	Asbestos containing material
ANZECC	Australian and New Zealand Environment and Conservation Council
AoPC	Area of potential concern
ARMCANZ	Agricultural and Resource Management Council of Australia and New Zealand
AS	Australian Standard
ASC NEPM	National Environment Protection (Assessment of Site Contamination) Measure 1999 (amended 2013)
Client	Nimble Estates Pty Ltd
CLM Act	*Contaminated Land Management Act 1997*
CSM	Conceptual site model
DQO	Data quality objective
DSI	Detailed Site Investigation
EIL	Ecological Investigation Level
EPA	Environment Protection Authority
HIL	Health Investigation Level
HMC	HMC Environmental Consulting
Investigation Area	Area within Planning Proposal
LCC	Lismore City Council
LLEP 2012	Lismore Local Environmental Plan 2012
LOR	Laboratory Level of Reporting
mBGL	Metres below ground level
OEH	[NSW] Office of Environment and Heritage
PCoC	Potential Contaminants of Concern
PSI	Preliminary Site Investigation
Site	Lot 42 DP 868366 & Lot 1 DP 957677, 1055 Bruxner Highway, Goonellabah NSW

1 INTRODUCTION

1.1 BACKGROUND

A Planning Proposal for the rural landholding located at 1055 Bruxner Highway, Goonellabah NSW, would amend the *Lismore Local Environmental Plan 2012* (LLEP) to enable mixed use development including residential, commercial, industrial, and public open space land use within the site. The site forms a dogleg configuration with the northern area proposed to support approximately 218 residential lots and the southern and south-eastern area supporting 117 industrial lots. An 80m vegetated buffer would be provided on the eastern boundary between the proposed residential zoned area, and the existing macadamia land use on the adjoining land.

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I believe the consultants have already spoken directly with our environmental health officer however if they would like to speak further with him regarding the additional sampling and their sampling regime, please do let them know they are welcome to call him again.

After further discussions between the client and LCC, to address the RFI, HMC has been engaged to design a Sampling and Analysis Quality Plan (SAQP) and undertake additional site investigation including soil investigation generally across the vacant grazing land.

Preliminary Site Investigation

HMC during the preparation of the Preliminary Site Investigation completed a preliminary soil investigation around existing structures including two existing dilapidated dwellings, dairy and associated structures in two isolated locations in the northern, central part of the site.

Elevated concentrations of soil lead were recorded around several of the structures and fragments of asbestos containing material (ACM) on the soil surface were also recorded in several locations where demolition activities would be required.

To provide further information on the lateral and vertical extent of the soil lead concentrations, additional soil samples were collected on 5 September 2022. The results provided more detailed information on the soil lead concentrations in the AoCs. In some areas, the edge of the lead-impacted soil had not been confirmed, however, due to the topography, site, and soil conditions for the purpose of the proposed planning proposal for the future rezoning there did not appear to be a requirement for additional investigation at the time. There was adequate area available on this large, elevated rural landholding to be satisfied that any future remediation, if required, could be managed either on the site or transported off-site for treatment/disposal.

To address the current RFI, further soil investigation would be undertaken to identify the edge (lateral extent), and the depth (vertical extent) of the lead-impacted soil.

The RFI also noted that the former grazing land across the site had not been subject to any soil investigation, and that this area may have been subject to pesticide/herbicide agrichemical applications, a potentially contaminating activity.

In HMCs experience over many years, livestock grazing areas have not been subjected to applications of persistent (organochlorine) agrichemicals. Organophosphate, and other common agrichemicals, although in some cases toxic, do not have long half-lives (days-months) in the sub-tropical environment. The persistent, organochlorine chemicals, were de-registered in the 1980s, and very expensive. Broadacre applications of organochlorine chemicals over non-intensive grazing land native/exotic groundcover with no recognised target species, would have been very unlikely.

1.2 PROJECT DESCRIPTION

The Planning Proposal includes amending the LLEP 2012 for the rural property located at 1055 Bruxner Highway, Goonellabah NSW. The site is currently mapped as Primary Production (RU1) land and is proposed to be rezoned to allow for a future mixed-use subdivision including residential, commercial, industrial, and public open space lots. An indicative layout plan of the future development is included in Appendix 2.

The property is currently used for livestock grazing, with a number of dilapidated, abandoned structures existing onsite, including two dwellings, and former farming structures, all located on the northern portion of the property, accessible via the Bruxner Highway. The remainder of the property is currently primarily cleared grazing land with pasture grass and scattered vegetation.

1.3 OBJECTIVE OF THE INVESTIGATION

The objectives of the Detailed Site Investigation are to:

- Based on the previous Preliminary Site Investigation (HMC, 2022) provide additional information on areas of concern including areas subject to potentially contaminating activities including historic grazing land.
- Based on the previous Preliminary Site Investigation and the current investigation including soil sampling assess whether the investigation area is suitable for the proposed residential and industrial/commercial land use and, if not, whether remediation work is able to make the land suitable.

1.4 SCOPE OF WORKS

The scope of work undertaken during the investigation included the following:

- Review the existing information, including that of the desktop investigation and the results from the 2 sampling rounds.
- Address the data gaps in the soil investigation.
- An additional detailed site inspection.
- Preparation of a Detailed Site Investigation report including:
  - review of available land use history information, and results of the site inspection.
  - assessment of potentially contaminating activities, potential contaminants of concern (PCoC) and areas of concern (AoC).
  - preparation of a soil and analysis quality plan (SAQP).
  - collection of nineteen (19) additional primary soil samples (+ 2 x QA/QC samples) and analysis for potential contaminants of concern (PCoC) associated with historic agricultural land use.
  - evaluation of laboratory results for compliance with investigation criteria.
  - conclusions and recommendations including suitability of the investigation area for the proposed development and need for further investigation and remediation.

2 SITE INFORMATION

2.1 SITE IDENTIFICATION

Table 1 - Site Identification Summary

Street Address	1055 Bruxner Highway, Goonellabah NSW
Allotment Description	75.24 Hectares
Allotment size	Lot 42 DP 868366 & Lot 1 DP 957677
Property Number	26279 & 20265
Local Government	Lismore City
Parish	Lismore
County	Rous
Geographical Coordinates (MGA Zone 56)	Easting: 6812109.65 m E Northing: 534663.79 m S

		(Approximate centre of site).
Zoning		RU1 Primary Production
Land use - Existing		Agricultural – Livestock Grazing
Land use - Proposed		Mixed-use including residential, commercial, industrial & public open space
Site Services		Power
Surround Land Uses	North	Bruxner Highway, Agricultural (macadamia orchard), residential
	East	Agricultural (livestock grazing, macadamia orchard), rural living
	South	Agricultural (livestock grazing, macadamia orchard), residential
	West	Commercial/industrial, agricultural (livestock grazing), residential
Closest Sensitive Environment		South of Bruxner Highway an east-west drainage line bisects the site collecting site drainage and directing it west into the ephemeral Tucki Tucki Creek. North of the Bruxner Highway the site drainage is directed south and west and is collected via the street stormwater system.

Table 2 – Site Characteristics

Topography	The property is undulating, with moderate to steep sloping in areas, particularly towards Tucki Tucki Creek bisecting the centre of the property. The elevation is approximately 145m – 189m across the property. (ELVIS - https://elevation.fsdf.org.au/)
Regional Geology	Cenozoic Mafic Volcanic Rocks Rocks which erupted from widespread volcanic activity over the last 65 million years (Tweed Volcano). Includes basalt flows and eruptive products associated with the volcano.
Soil Landscape	Wollongbar (wo) soil landscape (Expected) Rolling and undulating hills on plateau surfaces of the Lismore Basalts. Soils are expected to be mostly deep well-drained Krasnozems with shallower stoner Krasnozems on crest/upper slope boundaries and Wet alluvial Krasnozems in drainage lines.
Australian Soil Classification	Ferrosols (FE) Soils with B2 horizons which are high in free iron oxide, and which lack strong texture contrast between A and B horizons These soils are almost entirely formed on either basic or ultrabasic igneous rocks, their metamorphic equivalents, or alluvium derived therefrom. Although these soils do not occupy large areas in Australia, they are widely recognised and often intensively used because of their favourable physical properties.
Regional Hydrogeology	Groundwater vulnerability is not mapped for the site. Groundwater flow would be expected to reflect surface flows with gradients towards the north away from the elevated areas to the south. The groundwater would be expected to be shallow (<5m) in areas of the undulating land.
Groundwater Database Search	The online NSW Office of Water groundwater mapping (http://allwaterdata.water.nsw.gov.au/water.stm) shows the nearest registered groundwater bore is GW052458, greater than 250m east of the site. The bore is registered for domestic use.

3 SUMMARY OF PREVIOUS INVESTIGATIONS

HMC Environmental Consulting completed at *Preliminary Site Investigation* (HMC2022.1106.03) in September 2022 to support the Planning Proposal. The report included a detailed site investigation, a desktop assessment of available information, and a soil investigation of potential areas of concern (AoC).

It was found during the desktop assessment and review of historic aerial photography indicated the property was used as a dairy and for cattle grazing since at least prior to 1942. There are a number of existing structures and a demolished structure location, found on the northern part of the site, however, given their apparent age, potentially contain historic hazardous building materials. Due to their dilapidated state and weathering, these materials may have caused contamination to the surrounding soils. The non-residential structures may also have been associated with the storage/mixing/spillage of agrichemicals and fuel.

A Soil and Analysis Quality Plan was prepared, and implemented, to assess total soil concentrations of potential contaminants of concern including pesticides, metals and petroleum hydrocarbons, in the immediate surrounds of the existing structures. Laboratory results recorded generally all organochlorine and organophosphorus chemicals, and petroleum hydrocarbons, below the laboratory level of reporting (LOR) and, therefore, below the investigation criteria. Other metal results were typical of background levels. A single total chromium result exceeded the speciated chromium (VI) criteria, however, it is unlikely chromium (VI) would be associated with this land use.

Elevated lead results were recorded in a number of locations across the site which exceeded the investigation criteria. An additional soil investigation delineated some of the locations, however additional investigation and delineation would be required prior to any remediation associated with a development application, however it is not required at the Planning Proposal stage. The identified lead-impacted soil and bonded asbestos containing material is located in surface soil around the existing structures on the northern part of the site, and any future remediation of the small areas of concern would be able to be managed effectively, with remediation options including reinterment on site, or removal off-site to an approved facility.

The report concluded:
"Based on the information presented, in relation to potential site contamination associated with the current and former land use, the proposed Planning Proposal site, located on Lot 42 DP 868366 & Lot 1 DP 9576771055, 1055 Bruxner Highway, Goonellabah NSW, as shown in Appendix 2 & 3 of this report, is considered suitable for the proposed future mixed-use development subject to:

1. *Prior to the submission of a development application for development in the area shown as AoC 1 and AoC 2 in this report, a Detailed Site Investigation is to be prepared by a suitably qualified environmental consultant to further delineate the potential contaminants of concern identified in and around the existing dwellings and associated structures.*

2. *Following the preparation of the Detailed Site Investigation in 1 above, a Remedial Action Plan is to be prepared providing details on required remediation and validation of lead-impacted soil and other identified potential contaminants of concern."*

4 SITE INSPECTION

Site inspections was completed as part of the PSI (HMC 2022) on 5th August 2022 by Mark Tunks, Matthew Flanagan and Taylah Richards of HMC, during the soil investigation (Round 1), and again on 5th September 2022 by Matthew Flanagan during the additional soil sampling (Round 2). The site was attended again on the 27th of June 2023 as part of this current investigation by Mark Tunks of HMC. The property was accessible via the Bruxner Highway to the north. A vehicle track is existing extending from the northern boundary to the existing structures on the northern portion of the site. There are two existing dwellings on the property. The northern dwelling (No 2) is a weatherboard structure with an outhouse/laundry structure existing to the

south, as well as an open carport structure adjacent. The southern weatherboard dwelling (No 1) had numerous structures existing surrounding it, including a garage to the north, two sheds to the east and dairy bales to the southeast. A stockpile of building materials remains on the site of the previously demolished farm storage shed to the southwest of dwelling No 1. All existing structures have been disused and are in a state of severe disrepair.

The property is undulating, with steep to moderate slopes grading towards the Tucki Tucki Creek which is transecting through the centre of the property. Scattered vegetation is existing on the property, particularly around the existing structures. The remainder of the site is generally pasture grass cover. Cattle are present on the property.

4.1 Summary of site conditions

Table 3 provides a summary of observations during the site inspection.

4.2 Site photographs

See Appendix 5.

4.3 Site layout

The details of the site inspections are shown in Table 3.

4.4 Site features

Table 3 - Site Features Indicating Potential Contamination

Features of Contamination	Comments
Disturbed, discoloured, or stained soil	No disturbed, discoloured, or stained soil noted.
Disturbed or distressed vegetation	No disturbed or distressed vegetation.
Surface water quality	Tucki Tucki Creek appears to have been of good water quality.
Agrichemical Storage/Use	None recorded on the property.
Other chemical/fuel storage	None recorded.
Waste storage	None recorded.
Asbestos Waste or Use in Structures	Bonded ACM may be present in the eaves soffit, and internal linings to the dwellings. Lead flashing and paint may also be present.
Fill from unapproved source	None recorded.
Other	No blue bags, cropping contours or trellis remnants were recorded.

5 IDENTIFIED AREAS OF CONCERN AND CONTAMINANTS OF POTENTIAL CONCERN

In addition to the previously investigated areas of concern around the existing dwellings, Lismore City Council's RFI identified the historic grazing land, stating that it may have been subject to pesticide/herbicide agrichemical applications, a potentially contaminating activity.

Table 4 - List of Potential Contaminants of Concern (PCoC) and Areas of Concern (AoC)

AoPC	PCoC	Description and common relationship
Historic grazing land	Heavy metals - arsenic (As), cadmium (Cd), copper (Cu), chromium (Cr), nickel (Ni), lead (Pb), zinc (Zn), mercury (Hg)	Potential pesticide/herbicide agrichemical applications.
	Organochlorine/organophosphorus pesticides	

6 APPLICABLE INVESTIGATION LEVELS AND INVESTIGATION CRITERIA

6.1 SOIL CRITERIA

The proposed planning proposal and future mixed-use subdivision would provide a change of use from a vacant rural grazing property to a multi-lot residential and commercial/industrial land use with significantly more people occupying the site with potential associated exposure to potential contaminants of concern.

Final exposure would depend on the presence, and concentration, of soil PCoC, and the likely use of the land. The applicable exposure settings for potential exposure of persons to soil, and soil disturbance associated with the potential land use, in and around the investigation area would be:

Residential Land Use

- **Health investigation level (HIL A)** residential with garden/accessible soil (home grown produce <10% fruit and vegetable intake, (no poultry), also includes children's day care centres, preschools, and primary schools.
- **Ecological investigation level (EIL)** Urban residential/public open space is broadly equivalent to the HIL A, HIL B and HIL C land use scenarios.

Commercial/Industrial Land Use

- **Health investigation level (HIL D)** commercial/industrial such as shops, offices, factories and industrial sites.
- **Ecological investigation level (EIL)** Commercial/Industrial is equivalent to the HIL D land use scenario.

The following guidance notes were considered in the preparation of this report:

- *National Environmental Protection (Assessment of Site Contamination) Measure 1999* (April 2013), EPHC 2013, Canberra.

  (Schedule B)

- *(1) Guidelines on the Investigation Levels for Soil and Groundwater, and*
- *(2) Guidelines on Site Characterisation*

In NSW the Measure is now being implemented by way of endorsement under section 105 of the Contaminated Land Management Act 1997. This will provide expanded technical guidance to site auditors, contaminated land consultants, planning authorities and the public when assessing a contaminated site.

- NSW EPA (2022) *Sampling design part 1 - application–Contaminated Land guidelines* were followed during design of the sampling and analysis plan and predetermination of data quality objectives (DQOs).
- SEPP (2021) *State Environmental Planning Policy (Resilience and Hazards)*– provided guidance on project objectives.'
- NSW EPA (2020) *Consultants reporting on contaminated land - Contaminated land guidelines* were followed throughout the investigations and during preparation of this report.

Table 5 - Investigation Criteria (Soil & Sediment)

Analyte	Residential		Commercial/Industrial	
	HIL A (1)	EIL (2)	HIL D (3)	EIL (4)
Metals/Metalloids (mg/kg)				
Arsenic	100	100	3000	160
Chromium	100 (VI)	400 (III)	3600	660 (III)
Copper	6000	210	240000	300
Nickel	400	270	6000	460
Zinc	7400	270	400000	420
Cadmium	20		900	
Lead	300	1100	1500	1800
Mercury (inorganic)	40		730	
Organochlorine/Organophosphorus Chemicals (mg/kg)				
Chlordane	50		530	
Dieldrin + Aldrin	6		45	
DDT+DDD+DDE	240	180	3600	640
Heptachlor	6		50	
Chlorpyrifos	160		2000	
Endosulfan	270		2000	
Endrin	10		100	

(1) Health Investigation Levels for residential "A" land use (HIL A) as stated in Table 1A (1) of Schedule B (1) Guideline of Investigation Levels for Soil and Groundwater within the National Environment Protection (Assessment of Site Contamination) Measure 1999 as amended and in force from 16 May 2013

(2) Ecological Investigation Levels (EILs) for Residential as stated in Tables 1B(1)-1B(5) of Schedule B (1) Guideline of Investigation Levels for Soil and Groundwater within the National Environment Protection (Assessment of Site Contamination) Measure 1999 as amended and in force from 16 May 2013

(3) Health Investigation Levels for Commercial/Industrial "D" land use (HIL D) as stated in Table 1A (1) of *Schedule B (1) Guideline of Investigation Levels for Soil and Groundwater* within the *National Environment Protection (Assessment of Site Contamination) Measure 1999* as amended and in force from 16 May 2013

(4) Ecological Investigation Levels (EILs) for Commercial/industrial as stated in Tables 1B(1)-1B(5) of *Schedule B (1) Guideline of Investigation Levels for Soil and Groundwater* within the *National Environment Protection (Assessment of Site Contamination) Measure 1999*

6.2 RELEVANT ENVIRONMENTAL MEDIA

Based on the site history, topography and soils, the relevant environmental media would generally be the surface soil, within the proposed development area, where soil might be disturbed during earthworks associated with the construction of the development, or subject to movement due to erosion (rain) or wind (dust). In this circumstance, the upper part of the soil profile would be most likely to be disturbed.

6.3 INVESTIGATION CRITERIA

The investigation criteria are based on the Health Investigation Level deemed relevant for the proposed land use in clayey soil.

Groundwater was expected to be at more than 5m depth near the investigation area with clay soil. No groundwater investigation was completed during this preliminary investigation. If surface soil investigation recorded elevated PCoC exceeding investigation criteria then the groundwater regime would be further assessed and, if warranted, groundwater investigation, including collection of representative samples, would be implemented. No groundwater use for domestic purposes is proposed and the nearest registered bore is 300m north (assumed upgradient) of the site.

ASC NEPM (2013) recommends that "*at the very least, the maximum and the 95% UCL of the arithmetic mean contaminant concentration should be compared to the relevant Tier 1 screening criteria*" and also that "*the results should also meet the following criteria:*

- *the standard deviation of the results should be less than 50% of the relevant investigation or screening level, and*
- *no single value should exceed 250% of the relevant investigation or screening level*".

The 95% UCL of the arithmetic mean provides a 95% confidence level that the true population mean will be less than, or equal to, this value. The 95% UCL is a useful mechanism to account for uncertainty in whether the data set is large enough for the mean to provide a reliable measure of central tendency.

6.4 Data quality objectives

- State the Problem
  - The existing large rural landholding is subject to a planning proposal to rezone the land to provide a residential and industrial commercial. A PSI including a detailed site history and site inspection revealed the site had been used as a dairy, and livestock grazing property. A dairy, two existing dwellings and associated dilapidated/demolished structures were located in 2 locations, each centred around a dwelling. A visual and soil investigation indicated hazardous building materials (lead and asbestos containing material) were located in and around structures located in the 2 AoC. A second sampling round provided additional information on the lateral and vertical extent of the lead-impacted soil.
  - An RFI from LCC stated that soil investigation is required across the grazing to be undertaken to ensure there is no soil contamination that is potentially harmful to construction workers, future landowners, business owners/staff, or visitors or, if present, is able to be remediated to make the site suitable for the proposed land use.
- Identify the Decisions/Goals
  - Soil concentrations of PCoC to meet adopted investigation criteria based on future commercial/industrial land use.
- Identify Information Inputs
  - Soil organochlorine, organophosphate, and metal concentrations

- Sampling depth and location [0-150mm based on NSW EPA (2022) – Sampling design part 1 – application (section 5.3.1)
- Soil texture
- Field measurements - visual and olfactory
- Investigation criteria generally based on residential and commercial/industrial land use for clay (fine) soil (<2m depth) as shown in Table 5.

- Define the Study Boundaries
  - The boundaries of the study area are the proposed subdivision boundaries within the site.
  - Stratified sampling (S5.2.4 NSW EPA, 2020) would be undertaken with low density systematic sampling across the grazing areas. The large size of the landholding places a limit on the sampling intensity for the grazing areas, where potentially contaminating activities were not likely to have occurred. Representative systematic samples would be collected across the existing open, broadacre pasture areas to confirm that agrichemical concentrations are not present or if detected the concentrations are below the investigation area.
- Develop the Analytical Approach
  - If the results exceeded the investigation criteria, then the soil would require further investigation/remediation.
  - If the results were below the investigation criteria, then the soil can remain in-situ, and the investigation area would be suitable for the proposed residential and commercial/industrial land use.
- Specify the Acceptance Criteria
  - Investigation criteria – 95% UCL <HIL & EIL, Standard Deviation <50% HIL & EIL, maximum sample concentration <250% HIL & EIL - see Table 5.
- Investigation Criteria
  - See Table 5.
- Optimise the Design
  - Vary design based on site conditions and results.

7 SAMPLING AND ANALYSIS PLAN AND SAMPLING METHODOLOGY

7.1 SAMPLING, ANALYSIS AND DATA QUALITY OBJECTIVES

The following sampling, analysis and data quality objectives have been adopted for this site investigation:

- To collect the minimum number of targeted soil samples across the AoC (hotspots) to assess whether concentrations of PCoC are present and meet the soil investigation criteria for the proposed land use.
- To employ quality assurance when sampling, assessing, and during evaluation of the subject soils.
- To ensure that decontamination techniques are applied during the sampling procedure and that no cross contamination of samples occurs.

7.2 SOIL SAMPLING AND ANALYSIS PROGRAM

A sampling and analysis quality plan (SAQP), and a sampling and analysis program, were developed to assess the site for PCoC associated with agrichemical applications on grazing land.

Nineteen systematic, primary soil sample locations were assessed at the locations of the identified AoC (hotspots).

Surface soil sampling was adopted as any soil exposure would be to the surface soil within the investigation area.

The following basic measures were undertaken by HMC Environmental Consulting to conform to the minimum standards for field quality assurance and quality control procedures for the samples collected:

- Soil sampling was undertaken by M. Tunks of HMC Environmental Consulting, with experience in site contamination investigations on 27 July 2023.
- Dedicated, clean stainless-steel trowels were used to collect samples from immediately below the root zone and detritus layer, where present, (0-150mm) using disposable nitrile gloves.
- Visual observations of staining depth were noted.
- The trowels were decontaminated before sampling by pressure cleaning (12V) thoroughly with clean water, scrubbing with Decon 90 cleanser, and finally re-rinsing with clean water.
- Field quality assurance and quality control (QA/QC) protocols implemented included details of collection and analysis of field duplicate and triplicate samples.
- Chain of custody documentation was completed.
- The laboratory results and quality assurance and quality control reports including a description of the analytical methods used and reporting for surrogates was also completed.

8 QUALITY ASSURANCE AND QUALITY CONTROL

Sampling was undertaken in accordance with the SAQP (see section 7).

Table 6 – Soil Quality Control Samples

Primary Sample ID	Type	Quality Control Sample ID	Laboratory	Analytes
L15A	Duplicate	LDUP	ALS, Brisbane	OCs, OPs and Metals
	Triplicate	LTRIP	ALS, Sydney	OCs, OPs and Metals

The laboratory results and quality control reports include a description of the analytical methods used and reporting for surrogates used by ALS Environmental.

Table 7 - Data Quality Indicators

Data Quality Indicator	Criteria	Comment
Precision		
Laboratory matrix duplicate relative percentage differences (RPDs) within criteria	Limits set by the laboratory: Soil results <10 times the laboratory level of reporting (LOR): No limit Soil results between 10-20 times the LOR: RPD must lie between 0-50% Soil results >20 times the LOR: RPD must lie between 0-30%	All soil results recorded an RPD within the prescribed limits.
Field duplicate RPDs within criteria	In accordance with AS4482.1 (2005), RPD results ≥50% will be considered to exceed the data quality objectives (DQO) of the assessment. However, based on industry best practice, RPD results will be discounted if both sample results used to calculate the RPD are below the laboratory's limit of reporting (LOR) or less than 10 times the LOR.	Generally all field duplicate and triplicate <50% RPD or the results was less than 10 times the LOR.
Accuracy		
Matrix spike sample results reported with prescribed limits	Limits set by the laboratory: Results to be between 70-130%.	All results were all between 70-130%.
Surrogate spike sample results reported with prescribed limits	Limits set by the laboratory: Recoveries must lie between 50-150%.	Surrogate spike sample results reported within the prescribed limits.
Laboratory method blanks	Concentrations of targeted parameters should be below the laboratory's limit of	Laboratory method blanks reported with prescribed limits.

reported with prescribed limits	reporting (LOR).	
All analysis NATA accredited	Analysis to be completed by a NATA accredited laboratory.	All analysis NATA accredited
Representativeness		
Samples delivered to laboratory within sample holding times, chilled and with correct preservative	Target temp <4°C. Samples to be submitted to the laboratory within the designated holding times. Different holding times exist for different parameters. Samples to meet the preservation requirements set by the laboratory.	Samples delivered to laboratory within sample holding times, chilled and with correct preservative
Required number of field duplicates and sample blanks taken	Intra and inter laboratory duplicates are to be collected at a ratio of one duplicate pair per 20 samples. One rinse blank and field blank to be collected per day as required. One trip blank to be collected per cooler where analysis of volatile compounds is proposed.	Required number of field duplicates and sample blanks taken. Dedicated stainless steel trowels but rinsate collected prior to sampling to check HMC implement cleaning.
Sample blanks reported results below detection limits	Concentrations of targeted parameters to be below the laboratory's limit of reporting (LOR).	The sample blank results were below the LOR
Samples collected in accordance with regulatory and HMC procedures	Samples to be collected in general accordance with standard operating procedures (SOPs) which are based on applicable regulatory guidance and industry best practice.	Samples collected in accordance with regulatory and HMC procedures
Comparability		
Same standard operation procedures (SOPs) applied during each sampling event	The same SOPs to be adopted for each sampling event.	Same standard operation procedures (SOPs) applied during each sampling event
LORs below the adopted assessment criteria	The laboratory's LOR is to be below the adopted assessment criteria.	LORs below the adopted assessment criteria
LORs below the adopted assessment criteria	The sampler is to be a Suitably Qualified Person (SQP)	SQP collected samples
Same type of sample preservation and	The same type of sample preservation and analysis techniques are to be applied to all samples. This information is to be provided	Same type of sample preservation and analysis techniques applied to all samples

analysis techniques	within laboratory reports.	
Completeness		
All laboratory data reviewed and presented in the report (i.e., COCs, SRNs, COAs and QCRs)	All information provided by the laboratory is to be provided in the final report.	All laboratory data reviewed and presented in the report
All sample results reported	All sample results are to be reported and discussed.	All sample results reported
Sample blanks data reported	All sample blank data is to be reported.	Sample blanks not required
Relative percent differences (RPDs) calculated	RPDs to be calculated for all sets of field duplicates.	Relative percent differences (RPDs) calculated
Laboratory duplicates reported	All laboratory duplicate results are to be reported.	Laboratory duplicates/triplicates reported
NATA stamp on reports	NATA stamps to be shown on all laboratory reports.	NATA stamp on reports

9 FIELD AND ANALYTICAL RESULTS

9.1 FIELDWORK

Systematic field sampling was conducted by experienced environmental scientists on 27 July 2023.

Table 8 – Sample Locations

Primary Sample	Location	Depth (mm)	ID	Soil Description	Laboratory Program
L1A	Stratified systematic low density broadacre sampling across the proposed residential zoned area.	0 - 150mm	Primary	Brown, moist clayey soils	OCs, OPs, and Metals
L3A					
L4A					
L5A					
L6A					
L7A					
L7B					
L8A					
L8B					
L9A					

L9B					
L10A					
L13A	Stratified systematic low density broadacre sampling across the proposed industrial/commercial zoned area.				
L14A					
L15A					
L16A					
L17A					
L18A					
L19A					
LDUP	QA/QC Samples		Duplicate QA/QC		
LTRIP			Triplicate QA/QC		

A total of 19 primary surface soil samples (plus 2 x QA/QC) were recovered and placed in laboratory supplied glass jars. The primary samples, together with the QA/QC samples were transported to the HMC office for refrigerated storage prior to delivery to ALS Environmental laboratory Brisbane for analysis for PCoC.

Refer to Appendix 7 for the site plan and sampling locations.

9.2 ANALYTICAL TESTING

Laboratory analytical services were provided by ALS Environmental, Brisbane.

9.3 SOIL PROGRAM

A total of 19 primary samples were taken across the investigation area and submitted for analysis for the following:

- Metals - arsenic (As), cadmium (Cd), copper (Cu), chromium (Cr), nickel (Ni), lead (Pb), zinc (Zn), mercury (Hg)
- Organochlorine/organophosphorus pesticides (OCPs/OPPs)

9.4 PRIMARY AND REPLICATE RESULTS

The laboratory analysis of the selected primary samples is summarised in Table 9.

Table 9 – Laboratory Results Summary (27 July 2023)

Parameter	Number of primary samples	LOR (mg/kg)	Criteria Exceedances	Range (mg/kg)	Typical Background (Olszowy et al, 1995) mg/kg
Metals/Metalloids					
Arsenic	19	5	0	<5	5-53
Chromium	19	2	0	36 - 101	5-56
Copper	19	5	0	10 – 17	3-412
Nickel	19	2	0	9 – 17	5-38
Zinc	19	5	0	24 – 68	5-92
Cadmium	19	1	0	<1	nd
Lead	19	5	0	<5	5-56
Mercury (inorganic)	19	0.1	0	<0.1 – 0.1	Nd
Organochlorine/Organophosphorus					
Chlorine	19	0.05	0	<0.05	
Dieldrin + Aldrin	19	0.05	0	<0.05	
DDT + DDD + DDE	19	0.05	0	<0.05	
Heptachlor	19	0.05	0	<0.05	
Chlorpyrifos	19	0.05	0	<0.05	
Endosulfan	19	0.05	0	<0.05	
Endrin	19	0.05	0	<0.05	

* **Bold** indicates a criteria exceedance

10 QA/QC LABORATORY DATA REVIEW

10.1 RELATIVE PERCENT DIFFERENCE (RPD)

The results show good correlation between the primary sample (L15A) and the field replicate (LDUP) with generally all results below 50% RPD. The results showed very good correlation between the primary sample and the field triplicate (LTRIP).

10.1.1 Rinsate

All results were below the laboratory level of reporting (LOR) and, therefore, indicative of sampling technique and field QA/QC.

10.1.2 Statistical Analysis

All PCoC results (total concentrations) for the investigation area were below the investigation criteria and, therefore, statistical analysis was not required.

10.2 SOIL INVESTIGATION CONCLUSIONS

The Soil and Analysis Quality Plan was implemented, and all organochlorine and organophosphorus results, along with arsenic, cadmium, and lead, were below the LOR and, therefore, below the investigation criteria.

There were concentrations exceeding LOR in other metal results, however, the results were all below the investigation criteria. Elevated chromium was detected at some locations, with L13A recording a result of 101mg/kg, however it was significantly below the HIL D investigation criteria of 3600mg/kg for industrial/commercial land use.

11 CONCEPTUAL SITE MODEL

Table 10 - Conceptual Site Model

POTENTIAL SOURCE	PATHWAY	EXPOSURE ROUTE	RECEPTOR	OUTCOME
Potential application of persistent agrichemicals to intermittent grazing land (former dairy	Surface water runoff	Chemical/sediment entering local water ways	Ecological receptors	The detailed site investigation found all laboratory results from the soil investigation were below the investigation criteria.
	Exposed surface soil	Dermal contact to exposed soil during earthworks, proposed building occupation	Site worker, Occupier, Visitor	
	Atmospheric dispersion	Inhalation of soil exposed during earthworks		
	Leaching to groundwater	Groundwater movement off-site to beneficial users or ecological receptors	Beneficial users/Ecological receptor	

12 DISCUSSION

The review of the Preliminary Site Investigation (HMC 2022), and a detailed site inspection, indicated the site appears to have been used for historic intermittent livestock grazing land since prior to 1958. A request for further information from Lismore City Council following the submission of the Planning Proposal stated that this is a potentially contaminating activity and therefore required further investigation including a soil investigation of the former grazing land.

HMC developed a SAQP and conducted systematic low density broadacre soil sampling across the subject property for potential contaminants of concern associated with the potential application of persistent agrichemicals. The recorded results showed that all the potential contaminants of concern were below the laboratory level of reporting and therefore suitable for the planning proposal.

Further delineation of the identified lead contaminated soil around the existing structures during the *Preliminary Site Investigation* (HMC2022.1106.02) was not conducted as part of this investigation and would need to occur prior to the submission of any development application associated with the works associated with the Planning Proposal, as agreed upon in meetings with Lismore City Council during the development of the SAQP.

13 CONCLUSIONS AND RECOMMENDATIONS

The Detailed Site Investigation conclusions are based on the information described in this report and Appendices and should be read in conjunction with the complete report, including Section 0 Limitations.

A Planning Proposal for the rural landholding located at 1055 Bruxner Highway, Goonellabah NSW, would amend the *Lismore Local Environmental Plan 2012* (LLEP) to enable mixed use development including residential, commercial, industrial, and public open space land use within the site. The site forms a dogleg configuration with the northern area proposed to support approximately 218 residential lots and the southern and south-eastern area supporting 117 industrial lots. An 80m vegetated buffer would be provided on the eastern boundary between the proposed residential zoned area, and the existing macadamia land use on the adjoining land. A Preliminary Site Investigation (PSI) was completed by HMC including a detailed desktop investigation and a soil investigation across two identified Areas of Concern where sheds, and a dairy may have contained petroleum hydrocarbons, metals, and organochlorine/organophosphorus chemicals. Existing and demolished structures were also suspected of containing hazardous building materials. Following the submission of the Planning Proposal, Lismore City Council released a request for further information stating that the historic land use of intermittent livestock grazing is a potentially contaminating activity and a Detailed Site Investigating, including a soil investigation of the grazing land, was required.

A Sampling and Analysis Quality Plan was prepared and implemented to assess total soil concentrations of potential contaminants of concern including organochlorine and organophosphorus chemicals, and metals, across the historic grazing land within the scope of the Planning Proposal. Laboratory results recorded all organochlorine and organophosphorus results, along with arsenic, cadmium, and lead, below the laboratory level of reporting and, therefore, below the investigation criteria for industrial/commercial land use. Other metal results were generally typical of background levels, and in all cases, below the investigation criteria. The results of the soil investigation do not indicate any further investigation is required for the grazing land.

Further delineation of the lead-impacted soil and bonded asbestos containing material located in surface soil around the existing structures on the northern part of the site was not undertaken and would be required prior to any remediation associated with a development application. would be required prior to any remediation associated with a development application.

Based on the information presented, in relation to potential site contamination associated with the current and former land use, the proposed Planning Proposal site, located on Lot 42 DP 868366 & Lot 1 DP 9576771055, 1055 Bruxner Highway, Goonellabah NSW, as shown in Appendix 2 of this report, is considered suitable for the proposed future mixed-use development subject to the recommendations proposed as part of the *Preliminary Site Investigation* (HMC2022.1106.02) including:

1. Prior to the submission of a development application for development in the area shown as AoC 1 and AoC 2 in this report, a Detailed Site Investigation is to be prepared by a suitably qualified environmental consultant to further delineate the potential contaminants of concern identified in and around the existing dwellings and associated structures.

2. Following the preparation of the Detailed Site Investigation in 1 above, a Remedial Action Plan is to be prepared providing details on required remediation and validation of lead-impacted soil and other identified potential contaminants of concern.

14 LIMITATIONS

Any conclusions presented in this report are relevant to the site condition at the time of inspection and legislation enacted as at date of this report. Actions or changes to the site after time of inspection or in the future will void this report as will changes in relevant legislation.

The findings of this report are based on the objectives and scope of work outlined in Section 1. HMC Environmental has performed the services in a manner consistent with the normal level of care and expertise exercised by members of the environmental assessment profession. No warranties or guarantees expressed or implied, are given. This report does not comment on any regulatory issues arising from the findings, for which a legal opinion should be sought. This report relates only to the objectives and scope of work stated and does not relate to any other works undertaken for the client. The report and conclusions are based on the information obtained at the time of the assessment.

The site history and associated uses, areas of use, and potential contaminants were determined based on the activities described in the scope of work. Additional site information held by the client, regulatory authorities or in the public domain, which was not provided to HMC Environmental or was not sourced by HMC Environmental under the scope of work, may identify additional uses, areas of use and/or potential contaminants. The information sources referenced have been used to determine the site history.

Whilst HMC Environmental has used reasonable care to avoid reliance on data and information that is inaccurate and unsuitable, HMC Environmental is not able to verify the accuracy or completeness of all information and data made available. Further chemicals or categories of chemicals may exist at the sites, which were not identified in the site history, and which may not be expected at the site. The absence of any identified hazardous or toxic materials on the subject land should not be interpreted as a warranty or guarantee that such materials do not exist on the site. If additional certainty is required, additional site history or desktop studies, or environmental sampling and analysis should be commissioned.

The results of this assessment are based upon site inspections and fieldwork conducted by HMC Environmental personnel and information provided by the client. All conclusions regarding the property area are the professional opinions of the HMC Environmental personnel involved with the project, subject to the qualifications made above. HMC Environmental assume no responsibility or liability for errors in any data obtained from regulatory agencies, information from sources outside of HMC Environmental, or developments resulting from situations outside the scope of this project.

15 SIGNATURE

This report has been prepared by Mark Tunks of HMC Environmental Consulting, a suitably qualified environmental consultant, in accordance with the NSW EPA (2020) *Consultants reporting on contaminated land – Contaminated land guidelines*. Note that HMC Environmental Consulting holds current Professional Indemnity Insurance to 4th August 2024.

Mark Tunks
Principal

14 July 2023
Completion Date

16 REFERENCES

Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites (ANZECC guidelines) published by the Australian and New Zealand Environment and Conservation Council/National Health and Medical Research Council, January 1992

Hashimoto T.R & Troedson A.I. 2008 *Tweed Heads 1:100 000 and 1:25 000, Coastal Quaternary Geology Map Series*. Geological Survey of New South Wales, Maitland

Morand, D.T., Soil Landscapes of the Murwillumbah-Tweed Heads 1:100 000 Sheet, 1996

NEPC, 2013. National Environment Protection (Assessment of Site Contamination) Measure 1999 Schedule B (1) Guideline on the Investigation Levels for Soil and Groundwater, National Environment Protection Council Service Corporation, as amended 16 May 2013

NSW Environment Protection Authority (2020) Consultants reporting on contaminated land - Contaminated land guidelines.

State Environmental Planning Policy (Resilience and Hazards) 2021

17 GLOSSARY

Added contaminant limit (ACL) is the added concentration of a contaminant above which further appropriate investigation and evaluation of the impact on ecological values will be required. ACL values are generated in the process of deriving ecological investigation levels (EILs).

Ambient background concentration (ABC) of a contaminant is the soil concentration in a specified locality that is the sum of the naturally occurring background and the contaminant levels that have been introduced from diffuse or non-point sources by general anthropogenic activity not attributable to industrial, commercial or agricultural activities.

An **area of ecological significance** is one where the planning provisions or land use designation is for the primary intention of conserving and protecting the natural environment. This would include national parks, state parks, and wilderness areas and designated conservation areas.

Bioavailability is a generic term defined as the fraction of a contaminant that is absorbed into the body following dermal contact, ingestion or inhalation.

Bonded asbestos-cement-material (bonded ACM) comprises bonded asbestos containing material which is in sound condition (although possibly broken or fragmented) and is restricted to material that cannot pass a 7 mm x 7 mm sieve. This sieve size is selected as it approximates the thickness of common asbestos cement sheeting and for fragments to be smaller than this would imply a high degree of damage and potential for fibre release.

Conceptual site model (CSM) is a description of a site including the environmental setting, geological, hydrogeological and soil characteristics together with the nature and distribution of contaminants. Potentially exposed populations and exposure pathways are identified. Presentation is usually graphical or tabular with accompanying explanatory text.

Contamination means the condition of land or water where any chemical substance or waste has been added as a direct or indirect result of human activity at above background level and represents, or potentially represents, an adverse health or environmental impact.

Ecological investigation levels (EILs) are the concentrations of contaminants above which further appropriate investigation and evaluation will be required. EILs depend on specific soil physicochemical properties and land use scenarios and generally apply to the top 2 m of soil. EILs may also be referred to as soil quality guidelines in Schedules B5b and B5c.

Health investigation levels (HILs) are the concentrations of a contaminant above which further appropriate investigation and evaluation will be required. HILs are generic to all soil types and generally apply to the top 3 m of soil.

Health risk assessment (HRA) is the process of estimating the potential impact of a chemical, biological or physical agent on a specified human population system under a specific set of conditions.

Investigation levels and **screening levels** are the concentrations of a contaminant above which further appropriate investigation and evaluation will be required. Investigation and screening levels provide the basis of Tier 1 risk assessment.

Multiple-lines-of-evidence approach is the process for evaluating and integrating information from different sources of data and uses best professional judgement to assess the consistency and plausibility of the conclusions which can be drawn.

Risk assessment is the process of estimating the potential impact of a chemical, physical, microbiological or psychosocial hazard on a specified human population or ecological system under a specific set of conditions and for a certain timeframe.

Risk management is a decision-making process involving consideration of political, social, economic and technical factors with relevant risk assessment information relating to a hazard to determine an appropriate course of action.

Screening is the process of comparison of site data to screening criteria to obtain a rapid assessment of contaminants of potential concern.

Tier 1 assessment is a risk-based analysis comparing site data with investigation and screening levels for various land uses to determine the need for further assessment or development of an appropriate management strategy.

18 APPENDICES

See following pages

APPENDIX 1 - LOCATION MAPS

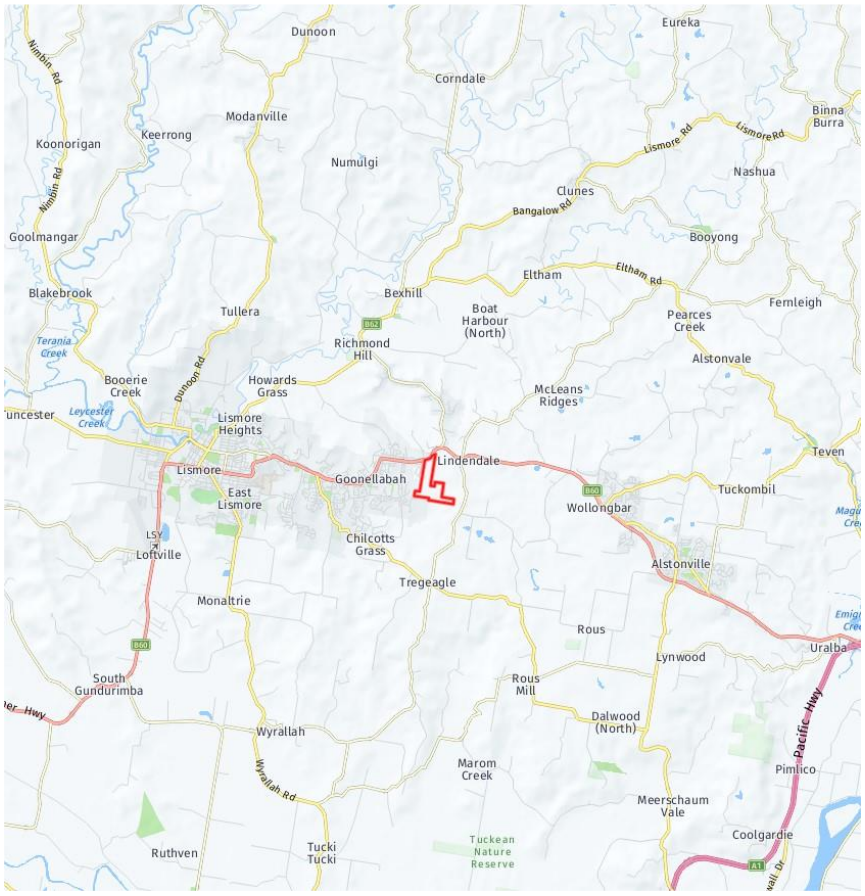
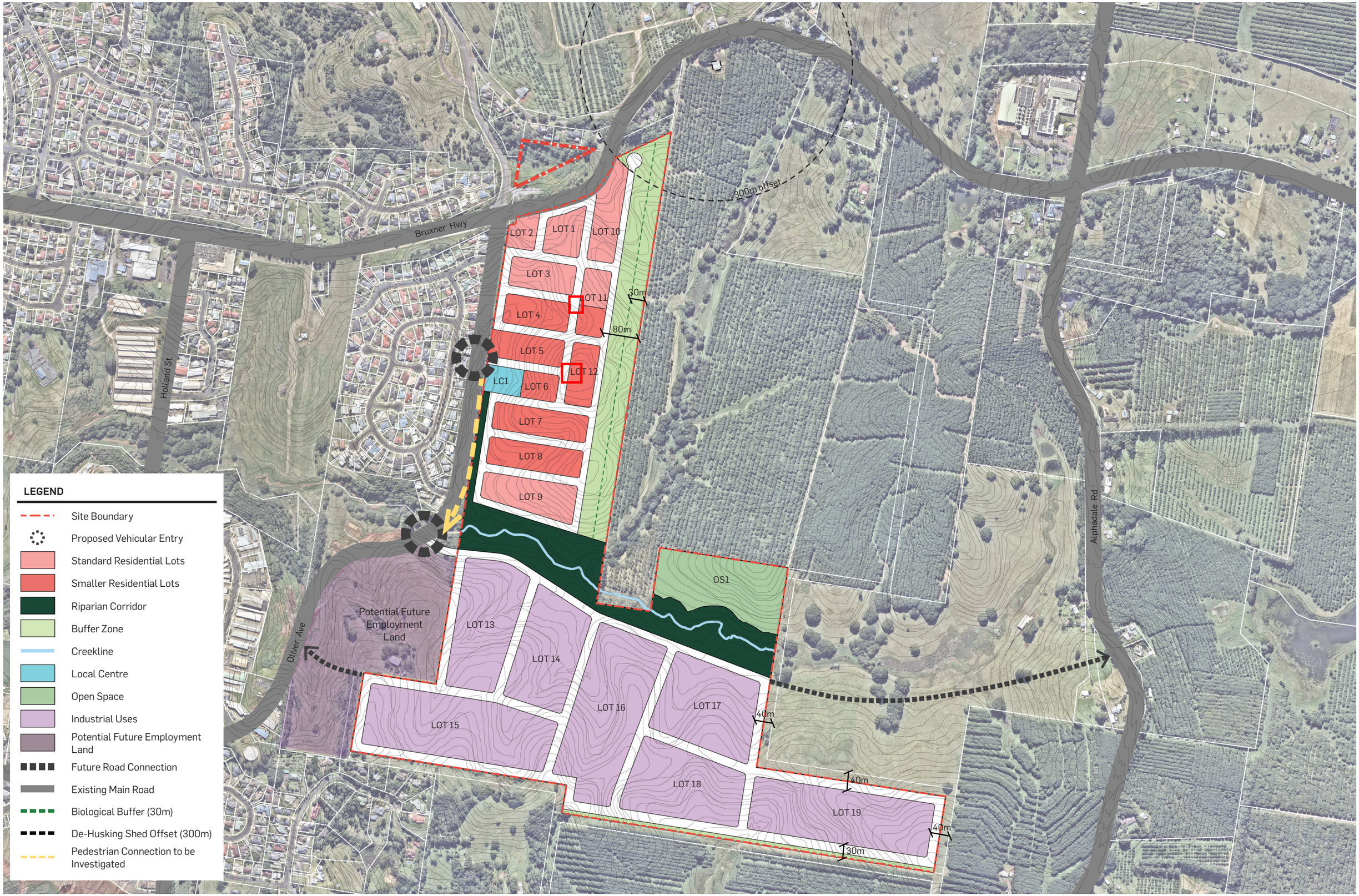


Figure 1 - Surrounding Area (Source: Nearmap 2022)

Figure 2 – Subject Site (Source: Nearmap 2022)

APPENDIX 2 - SITE PLAN PROPOSED DEVELOPMENT



URBIS

OLIVER AVE, LISMORE GOONELLABAH
ILLUSTRATIVE CONCEPT PLAN

DISCLAIMER:

This plan is conceptual and is for discussion purposes only and is subject to further detail study, Council approval, engineering input, and survey. Cadastral boundaries, areas and dimensions are approximate only. Written figured dimensions shall take preference to scaled dimensions.

DATE: 11 JUL 2022
JOB NO: P0040564

1:7,500 @ A3

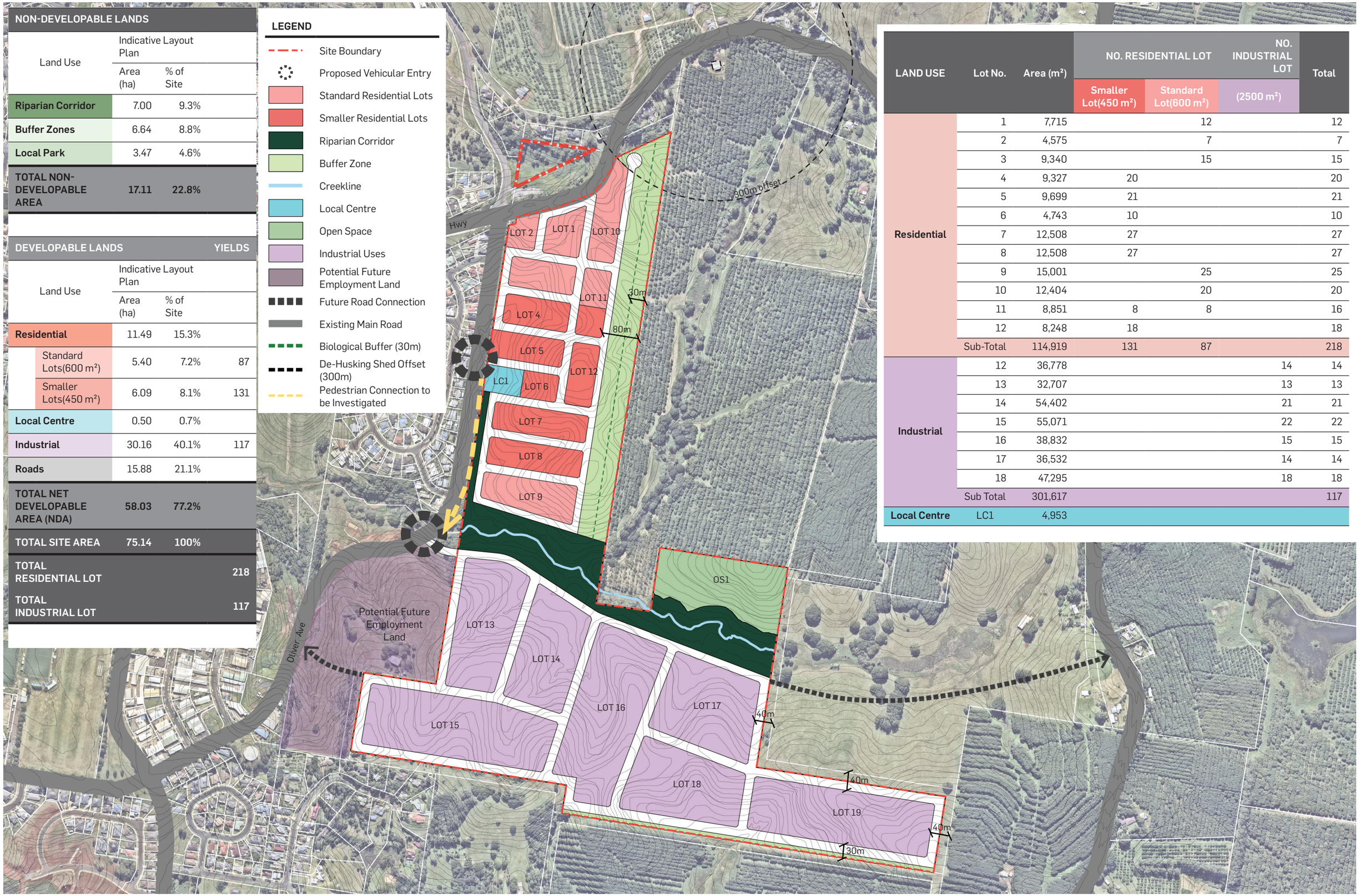
0 100 200 300 400

NON-DEVELOPABLE LANDS	Indicative Layout Plan	
Land Use	Area (ha)	% of Site
Riparian Corridor	7.00	9.3%
Buffer Zones	6.64	8.8%
Local Park	3.47	4.6%
TOTAL NON-DEVELOPABLE AREA	**17.11**	**22.8%**

DEVELOPABLE LANDS	Indicative Layout Plan		YIELDS
Land Use	Area (ha)	% of Site	
Residential	11.49	15.3%	
Standard Lots(600 m²)	5.40	7.2%	87
Smaller Lots(450 m²)	6.09	8.1%	131
Local Centre	0.50	0.7%	
Industrial	30.16	40.1%	117
Roads	15.88	21.1%	
TOTAL NET DEVELOPABLE AREA (NDA)	**58.03**	**77.2%**	
TOTAL SITE AREA	**75.14**	**100%**	
TOTAL RESIDENTIAL LOT			**218**
TOTAL INDUSTRIAL LOT			**117**

LEGEND

- Site Boundary
- Proposed Vehicular Entry
- Standard Residential Lots
- Smaller Residential Lots
- Riparian Corridor
- Buffer Zone
- Creekline
- Local Centre
- Open Space
- Industrial Uses
- Potential Future Employment Land
- Future Road Connection
- Existing Main Road
- Biological Buffer (30m)
- De-Husking Shed Offset (300m)
- Pedestrian Connection to be Investigated



LAND USE	Lot No.	Area (m²)	NO. RESIDENTIAL LOT		NO. INDUSTRIAL LOT	Total
			Smaller Lot(450 m²)	Standard Lot(600 m²)	(2500 m²)	
Residential	1	7,715		12		12
	2	4,575		7		7
	3	9,340		15		15
	4	9,327	20			20
	5	9,699	21			21
	6	4,743	10			10
	7	12,508	27			27
	8	12,508	27			27
	9	15,001		25		25
	10	12,404		20		20
	11	8,851	8	8		16
	12	8,248	18			18
	Sub-Total	114,919	131	87		218
Industrial	12	36,778			14	14
	13	32,707			13	13
	14	54,402			21	21
	15	55,071			22	22
	16	38,832			15	15
	17	36,532			14	14
	18	47,295			18	18
	Sub Total	301,617				117
Local Centre	LC1	4,953				

OLIVER AVE, LISMORE GOONELLABAH
ILLUSTRATIVE CONCEPT PLAN

URBIS

DISCLAIMER:

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DATE: 11 JUL 2022
JOB NO: P0040564

1:7,500 @ A3

0 100 200 300 400

APPENDIX 3 - GEOLOGY AND SOIL LANDSCAPE

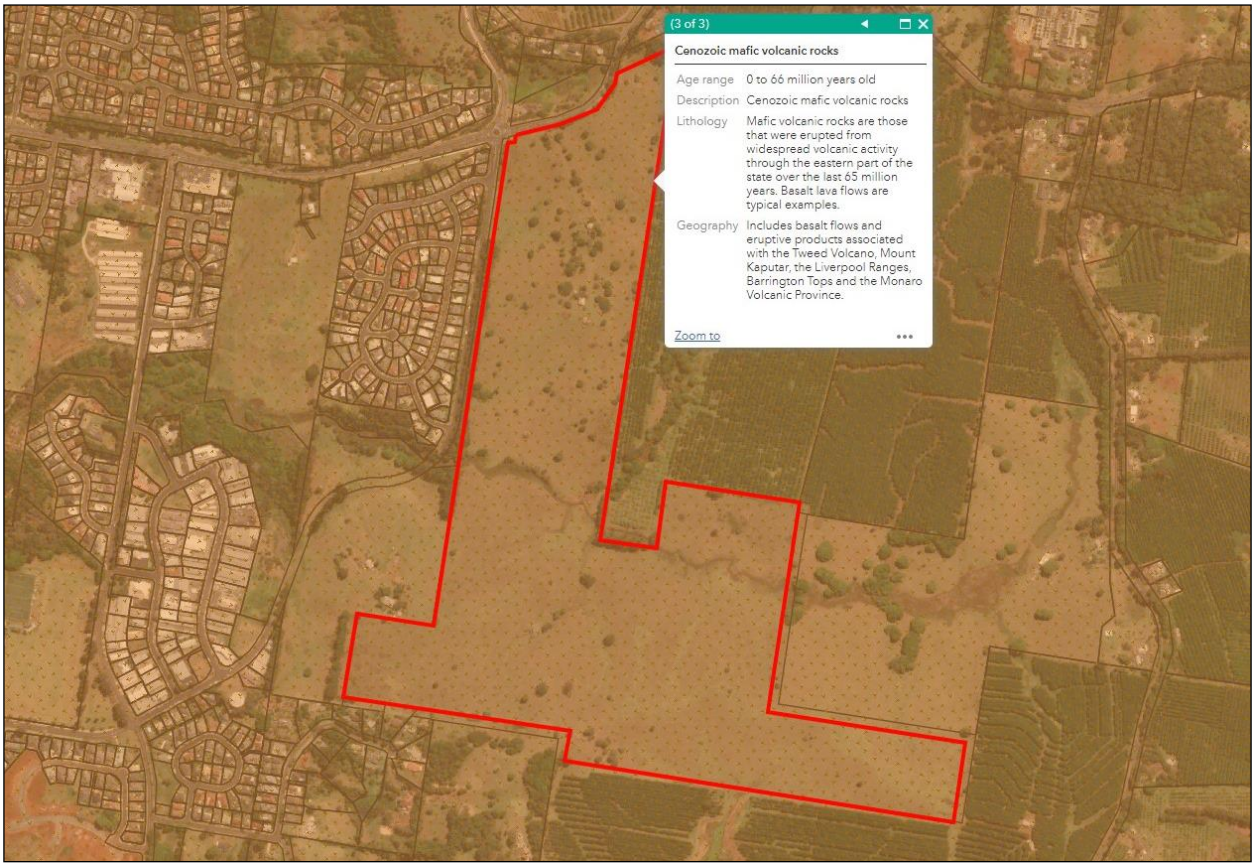


Figure 3 - Geology Map (Source: Geoscience Australia)

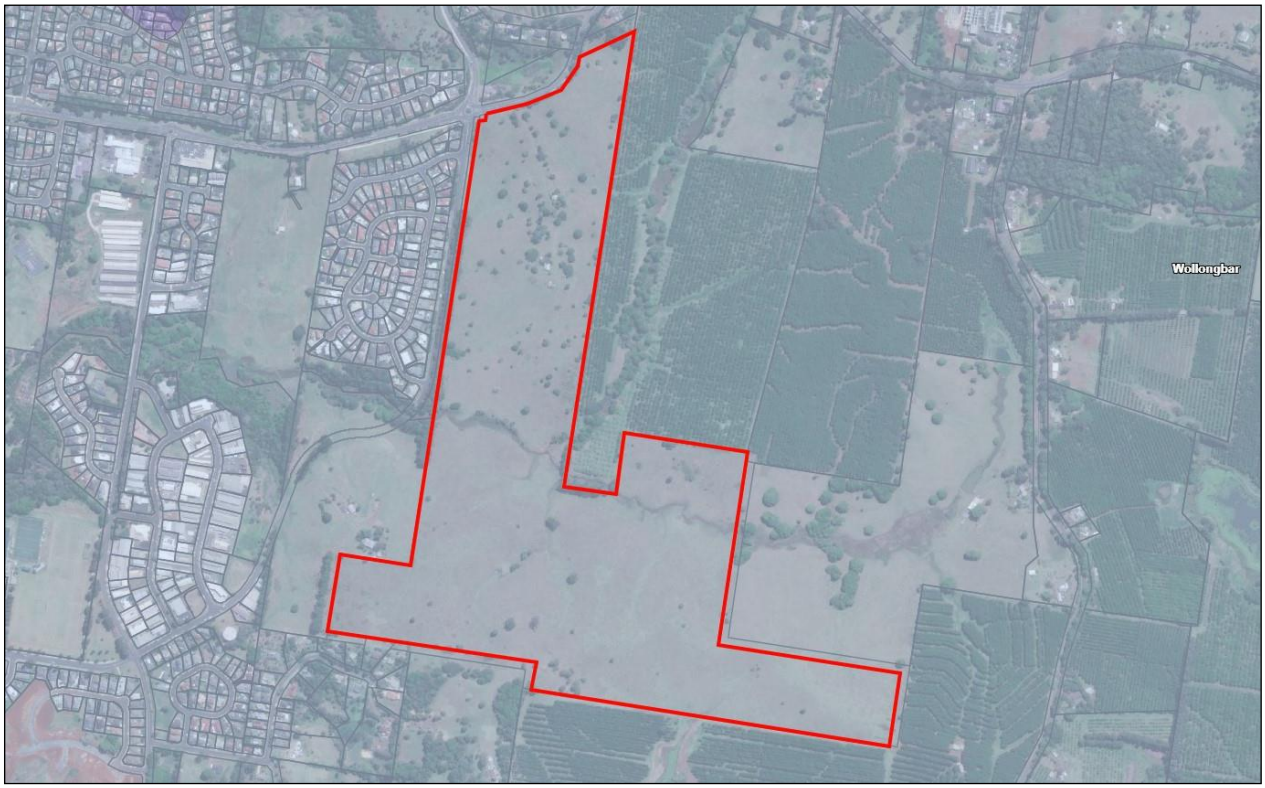


Figure 4 - Soil Landscape (Source: eSPADE NSW)

APPENDIX 4 - ZONE MAPPING

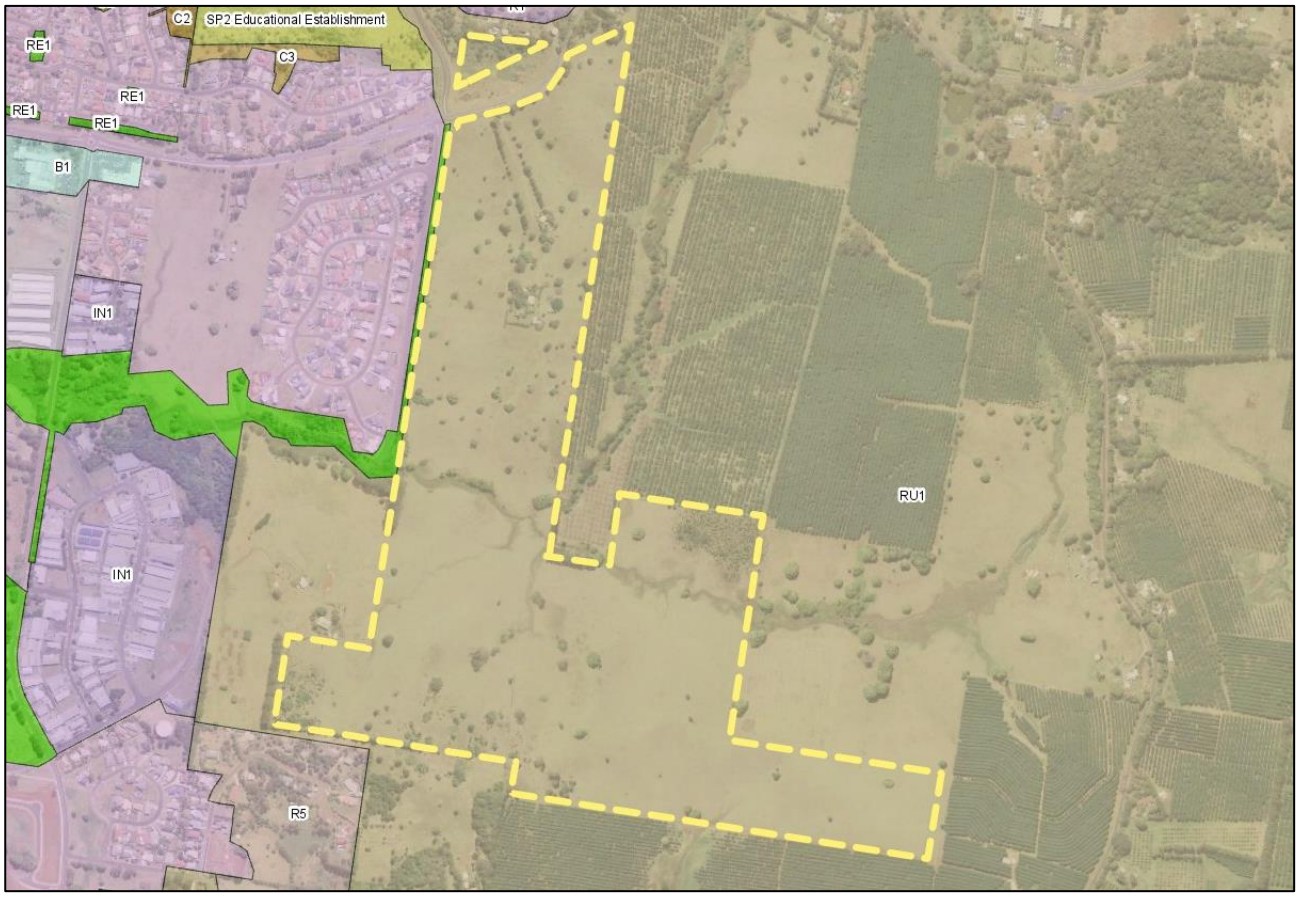


Figure 5 – NSW Legislation Zone Plan

(Source: http://www.legislation.nsw.gov.au/maintop/view/inforce/epi+177+2014+cd+0+N)

APPENDIX 5 - PHOTOGRAPHIC LOG

Photo No. 1	Date 05/08/2022

Description:
View S overlooking the existing Dwelling No 1 (southern dwelling).

Photo No. 2	Date 05/08/2022

Description:
View S overlooking the existing garage adjacent to Dwelling No 1.

Photo No. 3	Date 13/01/2023

Description:
View S overlooking the existing diary bales to the southeast of Dwelling No 1.

Photo No. 4	Date 05/08/2022

Description:
View NE overlooking the dilapidated shed to the west of Dwelling No 1.

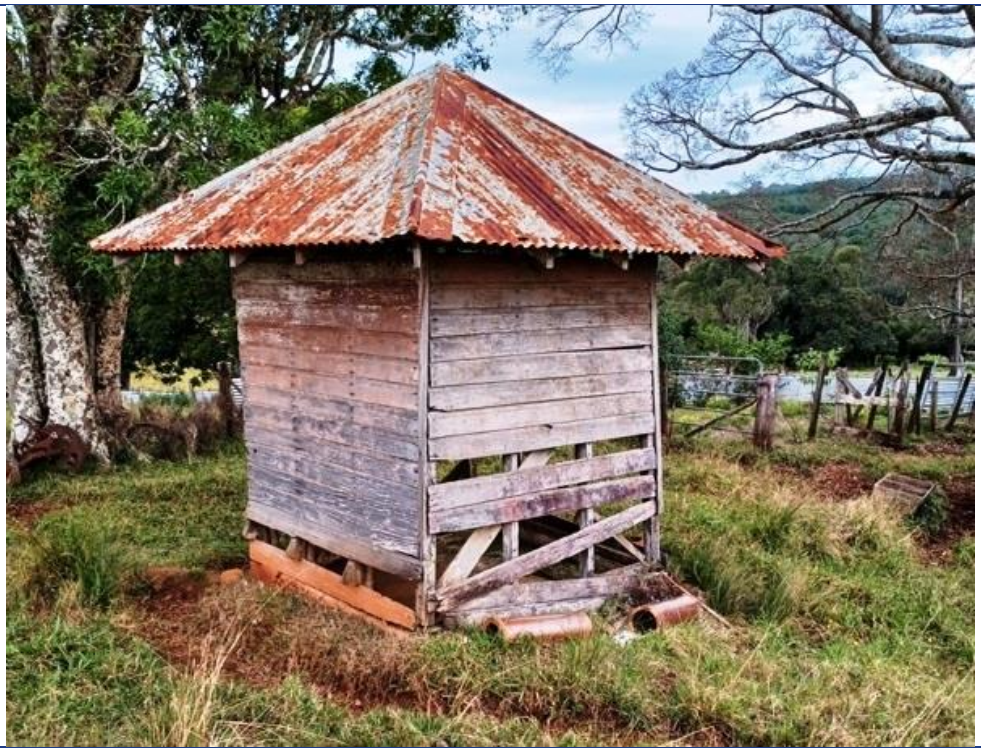
Photo No. 5	Date 05/08/2022
Description: View NE overlooking the former meat safe to the west of Dwelling No 1.	

Photo No. 6	Date 05/09/2022
Description: View NE overlooking a stockpile of building material on the site of the previously demolished storeshed, to the southwest of Dwelling No1.	

Photo No. 7	Date 05/08/2022

Description:
View SE overlooking the existing Dwelling No 2 (northern dwelling).

Photo No. 8	Date 05/08/2022

Description:
View NW overlooking the detached outhouse/laundry behind Dwelling No 2.

Photo No. 9	Date 05/08/2022
Description: View SE overlooking the existing Dwelling No 2 (northern dwelling).	

Photo No. 10	Date 05/08/2022
Description: View NW overlooking the detached outhouse/laundry behind Dwelling No 2.	

Photo No. 11	Date 05/08/2022

Description:
View NW overlooking the detached outhouse/laundry behind Dwelling No 2.

APPENDIX 6 - LABORATORY RESULTS SUMMARY & RPD

Table 11 – Systematic Sampling Laboratory Results

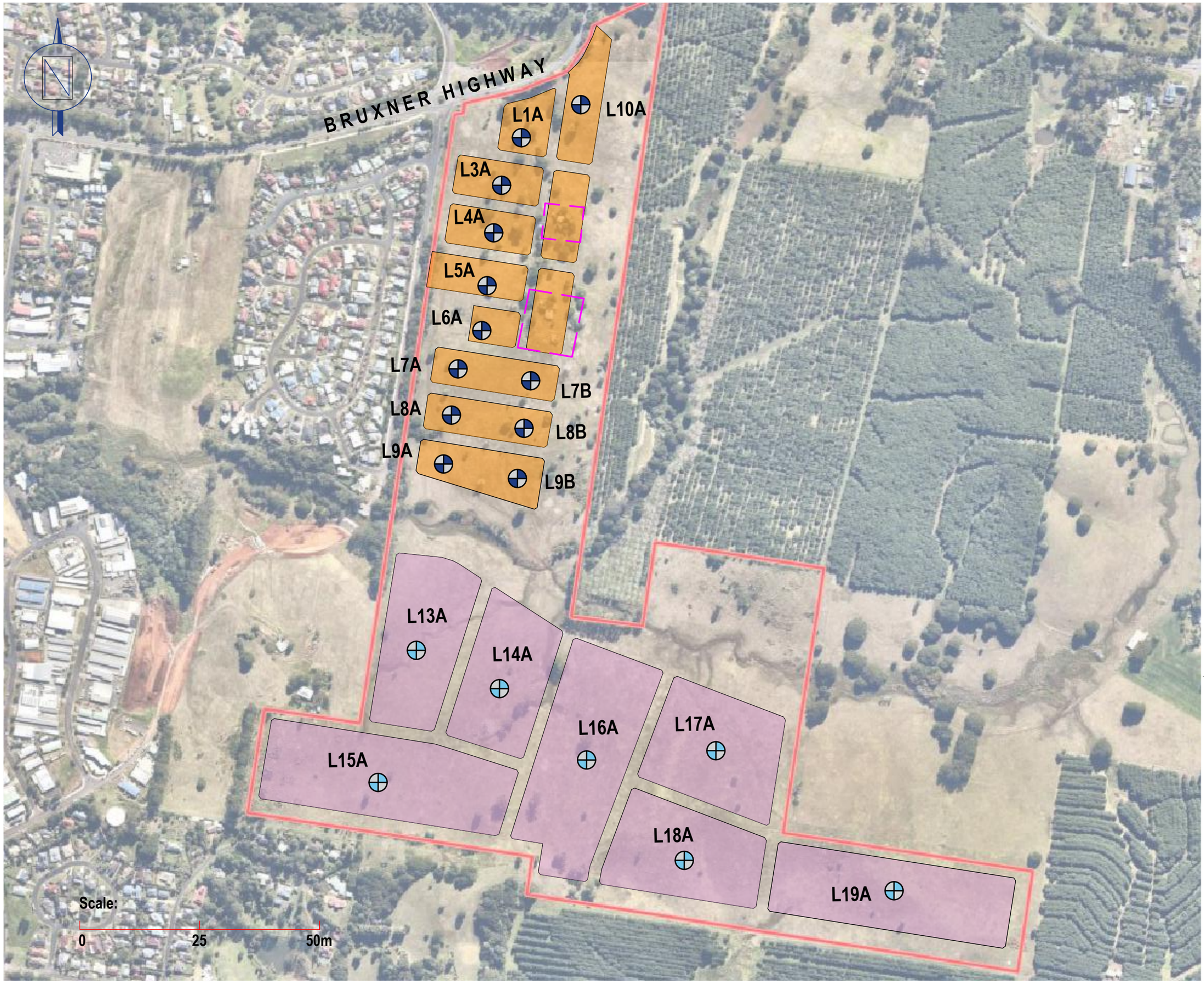
Analyte (mg/kg)	L1A	L3A	L4A	L5A	L6A	L7A	L7B	L8A	L8B	L9A	L9B
Metals/Metalloids											
Arsenic	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chromium (total)	48	53	56	64	49	54	52	49	52	97	69
Copper	12	16	15	15	14	16	10	16	17	16	9
Nickel	13	16	16	10	14	15	10	14	16	9	10
Zinc	25	26	24	60	60	68	40	32	42	35	32
Cadmium	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Lead	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Mercury (inorganic)	<0.1	0.1	0.1	<0.1	0.1	0.1	<0.1	0.1	0.1	<0.1	<0.1
Organochlorine/Organophosphorus											
Chlordane	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin + Aldrin	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
DDT + DDD + DDE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Analyte (mg/kg)	L10A	L13A	L14A	L15A	L16A	L17A	L18A	L19A	LDUP	LTRIP
Metals/Metalloids										
Arsenic	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chromium (total)	41	64	101	56	48	71	46	36	53	56
Copper	12	14	17	17	12	11	11	12	15	19
Nickel	10	10	14	13	14	13	11	12	15	13
Zinc	31	45	60	30	30	25	36	44	24	34
Cadmium	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Lead	<5	5	<5	<5	<5	<5	<5	<5	<5	<5
Mercury (inorganic)	<0.1	0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1
Organochlorine/Organophosphorus										
Chlordane	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin + Aldrin	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
DDT + DDD + DDE	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Table 12 – Relative Percentage Difference (RPD%)

Analyte	L15A	LDUP	Mean	RPD%	L15A	LTRIP	Mean	RPD%
Metals/Metalloids (mg/kg)								
Arsenic	<5	<5	<5	-	<5	<5	<5	-
Chromium (total)	56	53	54.5	5.5	56	56	56	-
Copper	17	15	16	12.5	17	19	18	11.1
Nickel	13	15	14	14.3	13	13	13	-
Zinc	30	24	27	22.2	30	34	32	12.5
Cadmium	<1	<1	<1	-	<1	<1	<1	-
Lead	<5	<5	<5	-	<5	<5	<5	-
Mercury (inorganic)	<0.1	0.1	<0.1	-	<0.1	<0.1	<0.1	-

APPENDIX 7 - INVESTIGATION AREA - SAMPLING LOCATIONS PLAN



DETAILED SITE INVESTIGATION

SAMPLING LOCATIONS

HMC Sampling Locations within Proposed Residential Areas
27.06.2023

HMC Sampling Locations within Proposed Industrial Areas
27.06.2023

Proposed Residential Lots

Proposed Industrial/ Commercial Lots

Area previously investigated by HMC during the *Preliminary Site Investigation (HMC2022.1106.02)*

Job: HMC2022.1106.03
DWG: HMCDWG2022.1106
Date: July 2023
Revised: 07/07/2023
Drawn: MF

Lot 42 DP 868366 &
Lot 1 DP 957677
1055 Bruxner Highway
Goonellabah NSW

HMC Environmental Consulting Pty Ltd
Tweed Heads NSW
0755368863
www.hmcenvironment.com.au
admin@hmcenvironment.com.au

APPENDIX 8 - CHAIN OF CUSTODY

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ADELAIDE 3/1 Burma Road Pooraka SA 5095 Ph: 08 8162 5130 E: adelaide@alsglobal.com

☐BRISBANE 2 Byth Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com

☐GLADSTONE 48 Callemondah Drive Gladstone QLD 4680 Ph: 07 4978 7944 E: ALSEnviro.Gladstone@alsglobal.com

☐MACKAY Unit 2/20 Caterpillar Drive Paget QLD 4740 Ph: 07 4952 5795 E: ALSEnviro.Mackay@alsglobal.com

☐MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com

☐MUDGEE 1/29 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com

☐NEWCASTLE 5/585 Maitland Road Mayfield West NSW 2304 Ph: 02 4014 2500 E: samples.newcastle@alsglobal.com

☐NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 02 4423 2063 E: nowra@alsglobal.com

☐PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com

☐SYDNEY 277-289 Woodpark Road Smithfield NSW 2164 Ph: 02 8784 8555 E: samples.sydney@alsglobal.com

☐TOWNSVILLE 14-15 Desma Court Bohle QLD 4818 Ph: 07 4796 0600 E: ALSEnviro.Townsville@alsglobal.com

☐WOLLONGONG 1/19-21 Ralph Black Drive, Nth Wollongong NSW 2500 Ph: 02 4225 3125 E: wollongong@alsglobal.com

CLIENT: HMC Environmental Consulting Pty Ltd	**TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g., Ultra Trace Organics)	☑ Standard TAT **(List due date):**	**FOR LABORATORY USE ONLY (Circle)**
OFFICE: Tweed Heads		☐ Non Standard or urgent TAT **(List due date):**	Custody Seal Intact? Yes No N/A
PROJECT:Bruxner Highway GOONELLABAH PROJECT NO.:	**ALS QUOTE NO.:**	**COC SEQUENCE NUMBER (Circle)**	Free ice / frozen ice bricks present upon receipt? Yes No N/A
ORDER NUMBER: HMC2022.1106	**COUNTRY OF ORIGIN:**	COC: 1 2 3 4 5 6 7	Random Sample Temperature on Receipt: °C
PROJECT MANAGER: MARK TUNKS	**CONTACT PH: 0755 368863**	OF: 1 2 3 4 5 6 7	Other comment:
SAMPLER: Mark Tunks HMC	**SAMPLER MOBILE: 0408 279212**	**RELINQUISHED BY:**	**RECEIVED BY:**
COC Emailed to ALS? (NO)	**EDD FORMAT (or default):**	DATE/TIME: 27/6/2023 12.30	DATE/TIME: 28/6/23 12:00
Email Reports to (will default to PM if no other addresses are listed): admin@hmcenvironment.com.au		**RELINQUISHED BY:**	**RECEIVED BY:**
Email Invoice to (will default to PM if no other addresses are listed): admin@hmcenvironment.com.au		DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify **Total** (unfiltered bottle required) or **Dissolved** (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE *(refer to codes below)*	TOTAL BOTTLES	S-12 (OC/OP)	S-2 (METALS)							
1	L1A	27/06/2023 0:00	S	ST	1	X	X							
2	L3A	27/06/2023 0:00	S	ST	1	X	X							
3	L4A	27/06/2023 0:00	S	ST	1	X	X							
4	L5A	27/06/2023 0:00	S	ST	1	X	X							
5	L6A	27/06/2023 0:00	S	ST	1	X	X							
6	L7A	27/06/2023 0:00	S	ST	1	X	X							
7	L7B	27/06/2023 0:00	S	ST	1	X	X							
8	L8A	27/06/2023 0:00	S	ST	1	X	X							
9	L8B	27/06/2023 0:00	S	ST	1	X	X							
10	L9A	27/06/2023 0:00	S	ST	1	X	X							
11	L9B	27/06/2023 0:00	S	ST	1	X	X							
12	L10A	27/06/2023 0:00	S	ST	1	X	X							
13	L13A	27/06/2023 0:00	S	ST	1	X	X							
				TOTAL	13	13	13							

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag; LI = Lugols Iodine Preserved Bottles; STT = Sterile Sodium Thiosulfate Preserved Bottles.

Environmental Division
Brisbane
Work Order Reference
EB2319467

Telephone : + 61-7-3243 7222

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ADELAIDE 3/1 Burma Road Pooraka SA 5095 Ph: 08 8162 5130 E: adelaide@alsglobal.com

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☐WOLLONGONG 1/19-21 Ralph Black Drive, Nth Wollongong NSW 2500 Ph: 02 4225 3125 E: wollongong@alsglobal.com

CLIENT: HMC Environmental Consulting Pty Ltd	**TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g., Ultra Trace Organics)	☑ Standard TAT **(List due date):**	**FOR LABORATORY USE ONLY (Circle)**
OFFICE: Tweed Heads		☐ Non Standard or urgent TAT **(List due date):**	Custody Seal Intact? Yes No N/A
PROJECT: Bruxner Highway GOONELLABAH **PROJECT NO.:**	**ALS QUOTE NO.:**	**COC SEQUENCE NUMBER (Circle)**	Free ice / frozen ice bricks present upon receipt? Yes No N/A
ORDER NUMBER: HMC2022.1106	**COUNTRY OF ORIGIN:**	COC: (1) 2 3 4 5 6 7	Random Sample Temperature on Receipt: °C
PROJECT MANAGER: MARK TUNKS	**CONTACT PH:** 0755 368863	OF: (1) 2 3 4 5 6 7	Other comment:
SAMPLER: Mark Tunks HMC	**SAMPLER MOBILE:** 0408 279212	**RELINQUISHED BY:**	**RECEIVED BY:**
COC Emailed to ALS? (NO)	**EDD FORMAT (or default):**	DATE/TIME: 23/6/2023	DATE/TIME: 28/6/23 12:00
Email Reports to (will default to PM if no other addresses are listed): admin@hmcenvironment.com.au		**RELINQUISHED BY:**	**RECEIVED BY:**
Email Invoice to (will default to PM if no other addresses are listed): admin@hmcenvironment.com.au		DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE *(refer to codes below)*	TOTAL BOTTLES	S-12 (OC/OP)	S-2 (METALS)	W-2T (METALS)	W-12 (OC/OP)					Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
14	L14A	26/06/2023 0:00	S	ST	1	X	X							
15	L15A	26/06/2023 0:00	S	ST	1	X	X							
16	L16A	26/06/2023 0:00	S	ST	1	X	X							
17	L17A	26/06/2023 0:00	S	ST	1	X	X							
18	L18A	26/06/2023 0:00	S	ST	1	X	X							
19	L19A	26/06/2023 0:00	S	ST	1	X	X							
20	LDUP	26/06/2023 0:00	S	ST	1	X	X							
21	LTRIP	26/06/2023 0:00	S	ST	1	X	X							INTERLAB
22 21	LRS1	26/06/2023 0:00	W	N,AG	2			X	X					
				TOTAL	10	8	8	1	1					

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag; LI = Lugols Iodine Preserved Bottles; STT = Sterile Sodium Thiosulfate Preserved Bottles.

APPENDIX 9 - LABORATORY CERTIFICATES

CERTIFICATE OF ANALYSIS

Work Order	: **EB2319467**	Page	: 1 of 13
Client	: **HMC ENVIRONMENTAL**	Laboratory	: Environmental Division Brisbane
Contact	: MARK TUNKS	Contact	: Customer Services EB
Address	: SUITE 29, LEVEL 2 75-77 WHARF STREET TWEED HEADS 2485	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: 07 5536 8863	Telephone	: +61-7-3243 7222
Project	: Bruxner Highway GOONELLABAH	Date Samples Received	: 28-Jun-2023 12:00
Order number	: HMC2022.1106	Date Analysis Commenced	: 29-Jun-2023
C-O-C number	: ----	Issue Date	: 04-Jul-2023 15:02
Sampler	: MARK TUNKS		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 21		
No. of samples analysed	: 21		

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, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Keegan Mullane	Senior Chemist - Organics	Brisbane Organics, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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 Contract 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: Where reported, Total Chlordane (sum) is the sum of the reported concentrations of cis-Chlordane and trans-Chlordane at or above the LOR.
- EP068: Where reported, Total OCP is the sum of the reported concentrations of all Organochlorine Pesticides at or above LOR.
- EG035T (Total Mercury): Sample L3A(EB2319467-002) shows poor matrix spike recovery due to sample heterogeneity. Confirmed by visual inspection.
- EG005T (Total Metals by ICP-AES): L3A (EB2319467-002) shows poor matrix spike recovery due to sample heterogeneity. This has been confirmed by visual inspection.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	L1A	L3A	L4A	L5A	L6A
			Sampling date / time	27-Jun-2023 00:00	27-Jun-2023 00:00	27-Jun-2023 00:00	27-Jun-2023 00:00	27-Jun-2023 00:00
Compound	CAS Number	LOR	Unit	EB2319467-001	EB2319467-002	EB2319467-003	EB2319467-004	EB2319467-005
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	33.1	26.0	26.6	27.0	25.2
EG005(ED093)T: 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	53	56	64	49
Copper	7440-50-8	5	mg/kg	12	16	15	15	14
Lead	7439-92-1	5	mg/kg	<5	<5	<5	<5	<5
Nickel	7440-02-0	2	mg/kg	13	16	16	10	14
Zinc	7440-66-6	5	mg/kg	25	26	24	30	30
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	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
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

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	L1A	L3A	L4A	L5A	L6A
				Sampling date / time	27-Jun-2023 00:00	27-Jun-2023 00:00	27-Jun-2023 00:00	27-Jun-2023 00:00	27-Jun-2023 00:00
Compound	CAS Number	LOR	Unit		EB2319467-001	EB2319467-002	EB2319467-003	EB2319467-004	EB2319467-005
					Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued									
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
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		**108**	**109**	**109**	**108**	**109**
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		**108**	**91.6**	**106**	**110**	**109**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	L7A	L7B	L8A	L8B	L9A
			Sampling date / time	27-Jun-2023 00:00	27-Jun-2023 00:00	27-Jun-2023 00:00	27-Jun-2023 00:00	27-Jun-2023 00:00
Compound	CAS Number	LOR	Unit	EB2319467-006	EB2319467-007	EB2319467-008	EB2319467-009	EB2319467-010
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	**21.7**	**33.3**	**26.0**	**21.7**	**31.0**
EG005(ED093)T: 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	**54**	**52**	**49**	**52**	**97**
Copper	7440-50-8	5	mg/kg	**16**	**10**	**16**	**17**	**16**
Lead	7439-92-1	5	mg/kg	<5	<5	<5	<5	<5
Nickel	7440-02-0	2	mg/kg	**15**	**10**	**14**	**16**	**9**
Zinc	7440-66-6	5	mg/kg	**38**	**40**	**32**	**42**	**35**
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	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
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

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	L7A	L7B	L8A	L8B	L9A
			Sampling date / time	27-Jun-2023 00:00	27-Jun-2023 00:00	27-Jun-2023 00:00	27-Jun-2023 00:00	27-Jun-2023 00:00
Compound	CAS Number	LOR	Unit	EB2319467-006	EB2319467-007	EB2319467-008	EB2319467-009	EB2319467-010
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued								
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
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.05	%	**109**	**98.4**	**106**	**108**	**103**
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.05	%	**110**	**102**	**107**	**110**	**102**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	L9B	L10A	L13A	L14A	L15A
			Sampling date / time	27-Jun-2023 00:00	27-Jun-2023 00:00	27-Jun-2023 00:00	26-Jun-2023 00:00	26-Jun-2023 00:00
Compound	CAS Number	LOR	Unit	EB2319467-011	EB2319467-012	EB2319467-013	EB2319467-014	EB2319467-015
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	**34.0**	**29.2**	**30.4**	**30.6**	**31.3**
EG005(ED093)T: 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	**69**	**41**	**64**	**101**	**56**
Copper	7440-50-8	5	mg/kg	**9**	**12**	**14**	**17**	**17**
Lead	7439-92-1	5	mg/kg	<5	<5	**5**	<5	<5
Nickel	7440-02-0	2	mg/kg	**10**	**10**	**10**	**14**	**13**
Zinc	7440-66-6	5	mg/kg	**32**	**31**	**45**	**60**	**30**
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	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
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

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	L9B	L10A	L13A	L14A	L15A
			Sampling date / time	27-Jun-2023 00:00	27-Jun-2023 00:00	27-Jun-2023 00:00	26-Jun-2023 00:00	26-Jun-2023 00:00
Compound	CAS Number	LOR	Unit	EB2319467-011	EB2319467-012	EB2319467-013	EB2319467-014	EB2319467-015
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued								
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
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.05	%	**96.1**	**102**	**98.6**	**98.3**	**100.0**
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.05	%	**100**	**105**	**103**	**103**	**102**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	L16A	L17A	L18A	L19A	LDUP
			Sampling date / time	26-Jun-2023 00:00	26-Jun-2023 00:00	26-Jun-2023 00:00	26-Jun-2023 00:00	26-Jun-2023 00:00
Compound	CAS Number	LOR	Unit	EB2319467-016	EB2319467-017	EB2319467-018	EB2319467-019	EB2319467-020
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	**30.0**	**32.8**	**34.8**	**34.1**	**23.6**
EG005(ED093)T: 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**	**71**	**46**	**36**	**53**
Copper	7440-50-8	5	mg/kg	**12**	**11**	**11**	**12**	**15**
Lead	7439-92-1	5	mg/kg	<5	<5	<5	<5	<5
Nickel	7440-02-0	2	mg/kg	**14**	**13**	**11**	**12**	**15**
Zinc	7440-66-6	5	mg/kg	**30**	**25**	**36**	**44**	**24**
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	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
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

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	L16A	L17A	L18A	L19A	LDUP
			Sampling date / time	26-Jun-2023 00:00	26-Jun-2023 00:00	26-Jun-2023 00:00	26-Jun-2023 00:00	26-Jun-2023 00:00
Compound	CAS Number	LOR	Unit	EB2319467-016	EB2319467-017	EB2319467-018	EB2319467-019	EB2319467-020
				Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued								
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
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.05	%	**112**	**104**	**97.6**	**98.2**	**103**
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.05	%	**118**	**107**	**98.6**	**104**	**103**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	LRS	----	----	----	----
				Sampling date / time	26-Jun-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		EB2319467-021	--------	--------	--------	--------
					Result	----	----	----	----
EG020T: Total Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		<0.001	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	----	----	----	----
Chromium	7440-47-3	0.001	mg/L		<0.001	----	----	----	----
Copper	7440-50-8	0.001	mg/L		<0.001	----	----	----	----
Nickel	7440-02-0	0.001	mg/L		<0.001	----	----	----	----
Lead	7439-92-1	0.001	mg/L		<0.001	----	----	----	----
Zinc	7440-66-6	0.005	mg/L		<0.005	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	----	----	----	----
EP068A: Organochlorine Pesticides (OC)									
alpha-BHC	319-84-6	0.5	µg/L		<0.5	----	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.5	µg/L		<0.5	----	----	----	----
beta-BHC	319-85-7	0.5	µg/L		<0.5	----	----	----	----
gamma-BHC	58-89-9	0.5	µg/L		<0.5	----	----	----	----
delta-BHC	319-86-8	0.5	µg/L		<0.5	----	----	----	----
Heptachlor	76-44-8	0.5	µg/L		<0.5	----	----	----	----
Aldrin	309-00-2	0.5	µg/L		<0.5	----	----	----	----
Heptachlor epoxide	1024-57-3	0.5	µg/L		<0.5	----	----	----	----
trans-Chlordane	5103-74-2	0.5	µg/L		<0.5	----	----	----	----
alpha-Endosulfan	959-98-8	0.5	µg/L		<0.5	----	----	----	----
cis-Chlordane	5103-71-9	0.5	µg/L		<0.5	----	----	----	----
Dieldrin	60-57-1	0.5	µg/L		<0.5	----	----	----	----
4.4`-DDE	72-55-9	0.5	µg/L		<0.5	----	----	----	----
Endrin	72-20-8	0.5	µg/L		<0.5	----	----	----	----
beta-Endosulfan	33213-65-9	0.5	µg/L		<0.5	----	----	----	----
4.4`-DDD	72-54-8	0.5	µg/L		<0.5	----	----	----	----
Endrin aldehyde	7421-93-4	0.5	µg/L		<0.5	----	----	----	----
Endosulfan sulfate	1031-07-8	0.5	µg/L		<0.5	----	----	----	----
4.4`-DDT	50-29-3	2.0	µg/L		<2.0	----	----	----	----
Endrin ketone	53494-70-5	0.5	µg/L		<0.5	----	----	----	----
Methoxychlor	72-43-5	2.0	µg/L		<2.0	----	----	----	----
^ **Total Chlordane (sum)**	----	0.5	µg/L		<0.5	----	----	----	----
^ **Sum of DDD + DDE + DDT**	72-54-8/72-55-9/50-29-3	0.5	µg/L		<0.5	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	LRS	----	----	----	----
				Sampling date / time	26-Jun-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		EB2319467-021	--------	--------	--------	--------
					Result	----	----	----	----
EP068A: Organochlorine Pesticides (OC) - Continued									
^ **Sum of Aldrin + Dieldrin**	309-00-2/60-57-1	0.5	µg/L		<0.5	----	----	----	----
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.5	µg/L		<0.5	----	----	----	----
Demeton-S-methyl	919-86-8	0.5	µg/L		<0.5	----	----	----	----
Monocrotophos	6923-22-4	2.0	µg/L		<2.0	----	----	----	----
Dimethoate	60-51-5	0.5	µg/L		<0.5	----	----	----	----
Diazinon	333-41-5	0.5	µg/L		<0.5	----	----	----	----
Chlorpyrifos-methyl	5598-13-0	0.5	µg/L		<0.5	----	----	----	----
Parathion-methyl	298-00-0	2.0	µg/L		<2.0	----	----	----	----
Malathion	121-75-5	0.5	µg/L		<0.5	----	----	----	----
Fenthion	55-38-9	0.5	µg/L		<0.5	----	----	----	----
Chlorpyrifos	2921-88-2	0.5	µg/L		<0.5	----	----	----	----
Parathion	56-38-2	2.0	µg/L		<2.0	----	----	----	----
Pirimphos-ethyl	23505-41-1	0.5	µg/L		<0.5	----	----	----	----
Chlorfenvinphos	470-90-6	0.5	µg/L		<0.5	----	----	----	----
Bromophos-ethyl	4824-78-6	0.5	µg/L		<0.5	----	----	----	----
Fenamiphos	22224-92-6	0.5	µg/L		<0.5	----	----	----	----
Prothiofos	34643-46-4	0.5	µg/L		<0.5	----	----	----	----
Ethion	563-12-2	0.5	µg/L		<0.5	----	----	----	----
Carbophenothion	786-19-6	0.5	µg/L		<0.5	----	----	----	----
Azinphos Methyl	86-50-0	0.5	µg/L		<0.5	----	----	----	----
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.5	%		**96.4**	----	----	----	----
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.5	%		**97.9**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	10	138
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	23	134

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	45	139
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	45	139

CERTIFICATE OF ANALYSIS

Work Order	: **ES2321862**	Page	: 1 of 5
Client	: **HMC ENVIRONMENTAL**	Laboratory	: Environmental Division Sydney
Contact	: MARK TUNKS	Contact	: Customer Services ES
Address	: SUITE 29, LEVEL 2 75-77 WHARF STREET TWEED HEADS 2485	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: 07 5536 8863	Telephone	: +61-2-8784 8555
Project	: Bruxner Highway GOONELLABAH	Date Samples Received	: 30-Jun-2023 14:00
Order number	: HMC2022.1106	Date Analysis Commenced	: 04-Jul-2023
C-O-C number	: ----	Issue Date	: 06-Jul-2023 13:46
Sampler	: MARK TUNKS		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 1		
No. of samples analysed	: 1		

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, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Evie Sidarta	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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 Contract 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: Where reported, Total Chlordane (sum) is the sum of the reported concentrations of cis-Chlordane and trans-Chlordane at or above the LOR.
- EP068: Where reported, Total OCP is the sum of the reported concentrations of all Organochlorine Pesticides at or above LOR.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	LTRIP	----	----	----	----
			Sampling date / time	26-Jun-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2321862-001	--------	--------	--------	--------
				Result	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	**22.6**	----	----	----	----
EG005(ED093)T: 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	**56**	----	----	----	----
Copper	7440-50-8	5	mg/kg	**19**	----	----	----	----
Lead	7439-92-1	5	mg/kg	<5	----	----	----	----
Nickel	7440-02-0	2	mg/kg	**13**	----	----	----	----
Zinc	7440-66-6	5	mg/kg	**34**	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	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	----	----	----	----
4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	----	----	----	----
Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	LTRIP	----	----	----	----
			Sampling date / time	26-Jun-2023 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2321862-001	--------	--------	--------	--------
				Result	----	----	----	----
EP068A: Organochlorine Pesticides (OC) - Continued								
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	----	----	----	----
EP068S: Organochlorine Pesticide Surrogate								
Dibromo-DDE	21655-73-2	0.05	%	**103**	----	----	----	----
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.05	%	**87.9**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **SOIL**		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	49	147
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	35	143