Site Audit Report

0503-2006

Tarago Rail Corridor
Tarago NSW

29 October 2021

58643-141,760 (Rev 0)

JBS&G Australia Pty Ltd

www.jbsg.com.au

NSW Site Auditor Scheme

Site Audit Statement

A site audit statement summarises the findings of a site audit. For full details of the site auditor's findings, evaluations and conclusions, refer to the associated site audit report.

This form was approved under the *Contaminated Land Management Act 1997* on 12 October 2017.

For information about completing this form, go to Part IV.

Part I: Site audit identification

Site audit statement no. 0503-2006

This site audit is a:

☑ statutory audit

❑ non-statutory audit

within the meaning of the *Contaminated Land Management Act 1997*.

Site auditor details

(As accredited under the *Contaminated Land Management Act 1997*)

Name	**Andrew Lau**	
Company	**JBS&G**	
Address	**Level 1, 50 Margaret St**	
	Sydney	Postcode **2000**
Phone	**02 8245 0300**	
Email	**ALau@jbsg.com.au**	

Site details

Address	**Part of the Tarago Station Rail Corridor**	
	Tarago NSW	Postcode **2580**

Property description

(Attach a separate list if several properties are included in the site audit.)

Part of Lot 22 DP1202608

Local government area	**Goulburn-Mulwaree Shire**
Area of site (include units, e.g. hectares)	**7.7 ha**
Current zoning	**RU2 Rural Landscape**

Regulation and notification

To the best of my knowledge:

☑ **the site is** the subject of a declaration, order, agreement, proposal or notice under the *Contaminated Land Management Act 1997* or the *Environmentally Hazardous Chemicals Act 1985,* as follows: (provide the no. if applicable)

- ☑ Declaration no. **20201103**
- ☐ ~~Order no.~~
- ☐ ~~Proposal no.~~
- ☐ ~~Notice no.~~

☐ ~~**the site is not** the subject of a declaration, order, proposal or notice under the *Contaminated Land Management Act 1997* or the *Environmentally Hazardous Chemicals Act 1985*.~~

To the best of my knowledge:

☑ the site **has** been notified to the EPA under section 60 of the *Contaminated Land Management Act 1997*

☐ ~~the site **has not** been notified to the EPA under section 60 of the *Contaminated Land Management Act 1997*.~~

Site audit commissioned by

Name	**Michael Hooper**	
Company	**John Holland Rail**	
Address	**Level 1, 20 Smith St**	
	Parramatta NSW	Postcode **2150**
Phone	**0427 167 650**	
Email	**Michael.Hooper@jhg.com.au**	

Contact details for contact person (if different from above)

Name

Nature of statutory requirements (not applicable for non-statutory audits)

☑ Requirements under the *Contaminated Land Management Act* 1997 (e.g. management order; please specify, including date of issue)

Voluntary Management Plan: Notice Number 20201711, Area 3455

dated: 25/5/2020

☐ ~~Requirements imposed by an environmental planning instrument (please specify, including date of issue)~~

☐ ~~Development consent requirements under the *Environmental Planning and Assessment Act 1979* (please specify consent authority and date of issue)~~

☐ ~~Requirements under other legislation (please specify, including date of issue)~~

Purpose of site audit

❑ **A1** To determine land use suitability

Intended uses of the land:

OR

❑ **A2** To determine land use suitability subject to compliance with either an active or passive environmental management plan

Intended uses of the land:

OR

(Tick all that apply)

❑ **B1** To determine the nature and extent of contamination

☑ **B2** To determine the appropriateness of:

❑ an investigation plan

☑ a remediation plan

❑ a management plan

❑ **B3** To determine the appropriateness of a **site testing plan** to determine if groundwater is safe and suitable for its intended use as required by the *Temporary Water Restrictions Order for the Botany Sands Groundwater Resource 2017*

☑ **B4** To determine the compliance with an approved:

☑ **voluntary management proposal** or

❑ **management order** under the *Contaminated Land Management Act 1997*

❑ **B5** To determine if the land can be made suitable for a particular use (or uses) if the site is remediated or managed in accordance with a specified plan.

Intended uses of the land:

Information sources for site audit

Consultancies which conducted the site investigations and/or remediation:

Ramboll Australia Pty Ltd.

McMahon Earth Science Pty Ltd

Titles of reports reviewed:

- *Tarago Loop Extension, Preliminary Human Health Risk Assessment,* Ramboll, September 2019.
- *Tarago Rail Corridor and Tarago Area Detailed Site Investigation,* Ramboll, July 2020.

- *Advice on risks to human health and the environment: Boyd Street and publicly accessible areas, Tarago NSW*, EnRisks, 1 December 2020.
- *Tarago Rail Corridor and Tarago Area Detailed Site Investigation Addendum*, Ramboll, 12 February 2021
- *Remediation Action Plan*, Ramboll, September 2021.
- *April 2021 Surface Water Monitoring, Tarago NSW*, Ramboll, June 2021.

Other information reviewed, including previous site audit reports and statements relating to the site:

- *Tarago Rail Siding Extension: Preliminary Contaminated Site Assessment,* McMahon 2015
- *Surface Water Monitoring – Tarago Rail Loop Expansion,* Ramboll August 2019
- *Tarago Loop Extension, Further Intrusive Assessment and Lead Management Plan,* Ramboll, September 2019
- *Tarago Rail Corridor Environmental Site Assessment, Ramboll*, October 2019
- *Tarago Loop Extension Remediation Action Plan,* September 2019.
- *Tarago Lead Management Action Plan*, Ramboll, July 2020
- *Tarago Air Quality Monitoring Report*, Ramboll, July 2021

Site audit report details

Title	***Site Audit Report, Tarago Rail Corridor, Tarago NSW***	
Report no.	**0503-2006**	Date 29 October 2021

Part II: Auditor's findings

Please complete either Section A1, Section A2 or Section B, not more than one section. (Strike out the irrelevant sections.)

- Use **Section A1** where site investigation and/or remediation has been completed and a conclusion can be drawn on the suitability of land uses **without the implementation** of an environmental management plan.
- Use **Section A2** where site investigation and/or remediation has been completed and a conclusion can be drawn on the suitability of land uses **with the implementation** of an active or passive environmental management plan.
- Use **Section B** where the audit is to determine:
    - (B1) the nature and extent of contamination, and/or
    - (B2) the appropriateness of an investigation, remediation or management plan[1], and/or
    - (B3) the appropriateness of a site testing plan in accordance with the *Temporary Water Restrictions Order for the Botany Sands Groundwater Source 2017*, and/or
    - (B4) whether the terms of the approved voluntary management proposal or management order have been complied with, and/or
    - (B5) whether the site can be made suitable for a specified land use (or uses) if the site is remediated or managed in accordance with the implementation of a specified plan.

[1] For simplicity, this statement uses the term 'plan' to refer to both plans and reports.

Section A1

I certify that, in my opinion:

The **site is suitable** for the following uses:

(Tick all appropriate uses and strike out those not applicable.)

☐ Residential, including substantial vegetable garden and poultry

☐ Residential, including substantial vegetable garden, excluding poultry

☐ Residential with accessible soil, including garden (minimal home-grown produce contributing less than 10% fruit and vegetable intake), excluding poultry

☐ Day care centre, preschool, primary school

☐ Residential with minimal opportunity for soil access, including units

☐ Secondary school

☐ Park, recreational open space, playing field

☐ Commercial/industrial

☐ Other (please specify):

_____

OR

☐ I certify that, in my opinion, the **site is not suitable** for any use due to the risk of harm from contamination.

Overall comments:

_____

_____

_____

_____

_____

_____

Section A2

I certify that, in my opinion:

Subject to compliance with the **attached** environmental management plan[2] (EMP), the site is suitable for the following uses:

(Tick all appropriate uses and strike out those not applicable.)

☐ Residential, including substantial vegetable garden and poultry

☐ Residential, including substantial vegetable garden, excluding poultry

☐ Residential with accessible soil, including garden (minimal home-grown produce contributing less than 10% fruit and vegetable intake), excluding poultry

☐ Day care centre, preschool, primary school

☐ Residential with minimal opportunity for soil access, including units

☐ Secondary school

☐ Park, recreational open space, playing field

☐ Commercial/industrial

☐ Other (please specify):

_____

EMP details

Title _____

Author _____

Date _____ No. of pages _____

EMP summary

This EMP (attached) is required to be implemented to address residual contamination on the site.

The EMP: (Tick appropriate box and strike out the other option.)

☐ requires operation and/or maintenance of **active** control systems[3]

☐ requires maintenance of **passive** control systems only[3].

[2] Refer to Part IV for an explanation of an environmental management plan.
[3] Refer to Part IV for definitions of active and passive control systems.

~~Purpose of the EMP:~~

~~Description of the nature of the residual contamination:~~

~~Summary of the actions required by the EMP:~~

~~How the EMP can reasonably be made to be legally enforceable:~~

~~How there will be appropriate public notification:~~

~~Overall comments:~~

Section B

Purpose of the plan[4] which is the subject of this audit:

The Remediation Action Plan (RAP) was prepared for the assessment and management of contamination identified along approx. one kilometre of the Goulburn – Bombala rail corridor at Tarago NSW, as shown on the attached map (Attachment A).

The RAP is attached as Attachment B.

~~**I certify that, in my opinion:**~~

~~(B1)~~

☐ ~~The nature and extent of the contamination **has** been appropriately determined~~

☐ ~~The nature and extent of the contamination **has not** been appropriately determined~~

AND/OR (B2)

☑ The investigation, remediation or management plan **is** appropriate for the purpose stated above

☐ ~~The investigation, remediation or management plan **is not** appropriate for the purpose stated above~~

~~AND/OR (B3)~~

☐ ~~The site testing plan:~~

- ☐ ~~**is** appropriate to determine~~
- ☐ ~~**is not** appropriate to determine~~

~~if groundwater is safe and suitable for its intended use as required by the *Temporary Water Restrictions Order for the Botany Sands Groundwater Resource 2017*~~

AND/OR (B4)

☑ The terms of the approved voluntary management proposal* ~~or management order**~~ (strike out as appropriate):

- ☑ **have** been complied with
- ☐ ~~**have not** been complied with.~~

*voluntary management proposal **no.20201711**

**~~management order no.~~

~~AND/OR (B5)~~

☐ ~~The site **can be made suitable** for the following uses:~~

~~(Tick all appropriate uses and strike out those not applicable.)~~

- ☐ ~~Residential, including substantial vegetable garden and poultry~~

[4] For simplicity, this statement uses the term 'plan' to refer to both plans and reports.

- ~~☐ Residential, including substantial vegetable garden, excluding poultry~~
- ~~☐ Residential with accessible soil, including garden (minimal home-grown produce contributing less than 10% fruit and vegetable intake), excluding poultry~~
- ~~☐ Day care centre, preschool, primary school~~
- ~~☐ Residential with minimal opportunity for soil access, including units~~
- ~~☐ Secondary school~~
- ~~☐ Park, recreational open space, playing field~~
- ~~☐ Commercial/industrial~~
- ~~☐ Other (please specify):~~

~~IF the site is remediated/managed* in accordance with the following plan (**attached**):~~

~~*Strike out as appropriate~~

~~Plan title~~

~~Plan author~~

~~Plan date~~ ~~No. of pages~~

~~SUBJECT to compliance with the following condition(s):~~

Overall comments:

The remediation action plan (RAP) features onsite excavation of contaminated material and transport to an off site facility for segregation. One stream (<20 mm) will be subject to immobilisation, and the >20 mm stream will be returned to site.

The RAP notes that a specific immobilisation approval application was submitted to the NSW EPA and approval has been received since the RAP was finalised. The auditor has received a copy of the approval.

An application for consent and environmental protection licence amendments will need to be made for the receiving landfill where the immobilisation activities will take place.

The return of ballast to the site after screening will likely require a Specific Resource Recovery Exemption. Further correspondence with the EPA is recommended to define the appropriate planning pathway.

Confirmation will need to be sought as to whether the works are determined to be Category 1 under SEPP55 due to the heritage status of the railway station.

The RAP describes controls that will be implemented during remediation with regards to surface water and dust monitoring.

The Stationmasters Cottage, 106 Goulburn St (Lot 1, DP816626) must not used for residential purposes until it can be demonstrated as safe for such use and the management of the residence should be included in the EMP for the rail corridor site.

Part III: Auditor's declaration

I am accredited as a site auditor by the NSW Environment Protection Authority (EPA) under the *Contaminated Land Management Act 1997.*

Accreditation no. **0503**

I certify that:

- I have completed the site audit free of any conflicts of interest as defined in the *Contaminated Land Management Act 1997,* and
- with due regard to relevant laws and guidelines, I have examined and am familiar with the reports and information referred to in Part I of this site audit, and
- on the basis of inquiries I have made of those individuals immediately responsible for making those reports and obtaining the information referred to in this statement, those reports and that information are, to the best of my knowledge, true, accurate and complete, and
- this statement is, to the best of my knowledge, true, accurate and complete.

I am aware that there are penalties under the *Contaminated Land Management Act 1997* for wilfully making false or misleading statements.

Date 29 October 2021

Part IV: Explanatory notes

To be complete, a site audit statement form must be issued with all four parts.

How to complete this form

Part I

Part I identifies the auditor, the site, the purpose of the audit and the information used by the auditor in making the site audit findings.

Part II

Part II contains the auditor's opinion of the suitability of the site for specified uses or of the appropriateness of an investigation, or remediation plan or management plan which may enable a particular use. It sets out succinct and definitive information to assist decision-making about the use or uses of the site or a plan or proposal to manage or remediate the site.

The auditor is to complete either Section A1 or Section A2 or Section B of Part II, **not** more than one section.

Section A1

In Section A1 the auditor may conclude that the land is *suitable* for a specified use or uses OR *not suitable* for any beneficial use due to the risk of harm from contamination.

By certifying that the site is *suitable*, an auditor declares that, at the time of completion of the site audit, no further investigation or remediation or management of the site was needed to render the site fit for the specified use(s). **Conditions must not be** imposed on a Section A1 site audit statement. Auditors may include **comments** which are key observations in light of the audit which are not directly related to the suitability of the site for the use(s). These observations may cover aspects relating to the broader environmental context to aid decision-making in relation to the site.

Section A2

In Section A2 the auditor may conclude that the land is *suitable* for a specified use(s) subject to a condition for implementation of an environmental management plan (EMP).

Environmental management plan

Within the context of contaminated sites management, an EMP (sometimes also called a 'site management plan') means a plan which addresses the integration of environmental mitigation and monitoring measures for soil, groundwater and/or hazardous ground gases throughout an existing or proposed land use. An EMP succinctly describes the nature and location of contamination remaining on site and states what the objectives of the plan are, how contaminants will be managed, who will be responsible for the plan's implementation and over what time frame actions specified in the plan will take place.

By certifying that the site is suitable subject to implementation of an EMP, an auditor declares that, at the time of completion of the site audit, there was sufficient information satisfying guidelines made or approved under the *Contaminated Land Management Act 1997*

(CLM Act) to determine that implementation of the EMP was feasible and would enable the specified use(s) of the site and no further investigation or remediation of the site was needed to render the site fit for the specified use(s).

Implementation of an EMP is required to ensure the site remains suitable for the specified use(s). The plan should be legally enforceable: for example, a requirement of a notice under the CLM Act or a development consent condition issued by a planning authority. There should also be appropriate public notification of the plan, e.g. on a certificate issued under s.149 of *the Environmental Planning and Assessment Act 1979*.

Active or passive control systems

Auditors must specify whether the EMP requires operation and/or maintenance of active control systems or requires maintenance of passive control systems only. Active management systems usually incorporate mechanical components and/or require monitoring and, because of this, regular maintenance and inspection are necessary. Most active management systems are applied at sites where if the systems are not implemented an unacceptable risk may occur. Passive management systems usually require minimal management and maintenance and do not usually incorporate mechanical components.

Auditor's comments

Auditors may also include **comments** which are key observations in light of the audit which are not directly related to the suitability of the site for the use(s). These observations may cover aspects relating to the broader environmental context to aid decision-making in relation to the site.

Section B

In Section B the auditor draws conclusions on the nature and extent of contamination, and/or suitability of plans relating to the investigation, remediation or management of the land, and/or the appropriateness of a site testing plan in accordance with the *Temporary Water Restrictions Order for the Botany Sands Groundwater Source 2017*, and/or whether the terms of an approved voluntary management proposal or management order made under the CLM Act have been complied with, and/or whether the site can be made suitable for a specified land use or uses if the site is remediated or managed in accordance with the implementation of a specified plan.

By certifying that a site *can be made suitable* for a use or uses if remediated or managed in accordance with a specified plan, the auditor declares that, at the time the audit was completed, there was sufficient information satisfying guidelines made or approved under the CLM Act to determine that implementation of the plan was feasible and would enable the specified use(s) of the site in the future.

For a site that *can be made suitable*, any **conditions** specified by the auditor in Section B should be limited to minor modifications or additions to the specified plan. However, if the auditor considers that further audits of the site (e.g. to validate remediation) are required, the auditor must note this as a condition in the site audit statement. The condition must not specify an individual auditor, only that further audits are required.

Auditors may also include **comments** which are observations in light of the audit which provide a more complete understanding of the environmental context to aid decision-making in relation to the site.

Part III

In **Part III** the auditor certifies their standing as an accredited auditor under the CLM Act and makes other relevant declarations.

Where to send completed forms

In addition to furnishing a copy of the audit statement to the person(s) who commissioned the site audit, statutory site audit statements must be sent to

- the **NSW Environment Protection Authority**:
  nswauditors@epa.nsw.gov.au or as specified by the EPA

  AND
- the **local council** for the land which is the subject of the audit.

Attachment A: Plan showing land which is the subject of this audit.

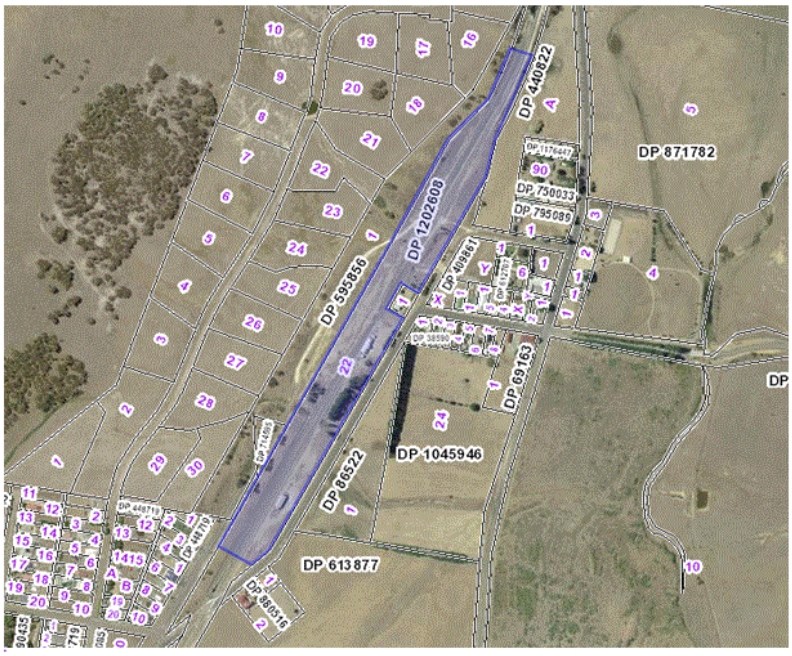

Image: Area of proposed declaration is coloured and highlighted blue. The proposed area of declaration forms part of Lot 22 DP1202608.

Attachment B *Remediation Action Plan*, Ramboll, September 2021.

Site Audit Report
0503-20066

Tarago Rail Corridor
Tarago NSW

29 October 2021

58643-141,760 (Rev 0)
JBS&G Australia Pty Ltd

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List of Tables

Appendices

Abbreviations

Term	Definition
ACM	Asbestos Containing Material
ADWG	Australian Drinking Water Guidelines
AFFF	Aqueous Film Forming Foams
AF/FA	Asbestos Fines / Fibrous Asbestos
AHD	Australian Height Datum
ANZECC	Australian and New Zealand Environment and Conservation Council
ANZG	Australian and New Zealand Governments
ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand
As	Arsenic
ASLP	Australian Standard Leachate Procedure
ASS	Acid Sulfate Soils
AST	Aboveground Storage Tank
BOM	Bureau of Meteorology
Cd	Cadmium
CLM	Contaminated Land Management
CLM Act	Contaminated Land Management Act
COC	Chain of Custody
COPC	Contaminants of Potential Concern
Cr	Chromium
CRC Care	Cooperative Research Centre for Contamination Assessment and Remediation of the Environment
CRN	Country Rail Network
CSM	Conceptual Site Model
Cu	Copper
BGL	Below Ground Level
BTEX	Benzene, Toluene, Ethylbenzene and Xylenes
B(a)P	Benzo(a) pyrene
DO	Dissolved oxygen
DP&E	NSW Department of Planning and Environment
DQI	Data Quality Indicators
DQO	Data Quality Objectives
DTW	Depth to water
EC	Electrical conductivity
EH	Redox potential
EIL	Ecological Investigation Level
EMP	Environmental Management Plan
EPA	New South Wales Environment Protection Authority
EPL	Environment Protection Licence
ESL	Ecological Screening Level
FID	Flame Ionisation Detector
GIL	Groundwater Investigation Levels
GME	Groundwater Monitoring Event
ha	hectare
Hg	Mercury
HHRA	Human Health Risk Assessment
HIL	Health Based Investigation Level

Term	Definition
HSL	Health Screening Levels
IEUBK	integrated exposure uptake biokinetic
JHR	John Holland Rail
LEL	Lower Explosive Limit
LNAPL	Light non-aqueous phase liquids
LOR	Limit of Reporting
m	Metre
MAH	Monocyclic Aromatic Hydrocarbon
mg/L	Milligrams per litre
mg/kg	Milligrams per kilogram
ML	Management Limits
MPVE	Multi-phase vacuum extraction
NATA	National Association of Testing Authorities
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measure
NHMRC	National Health and Medical Research Council
Ni	Nickel
OCP	Organochlorine Pesticide
OLC	Ore loadout complex
ORP	Oxidation-Reduction Potential
PAH	Polycyclic Aromatic Hydrocarbons
PID	Photo-ionisation Detector
Pb	Lead
PCB	Polychlorinated Biphenyls
POEO Act	Protection of the Environment, Operations Act
ppm	Parts per million
PASS	Potential Acid Sulfate Soils
QA/QC	Quality Assurance/Quality Control
RAP	Remediation Action Plan
RPD	Relative Percentage Difference
RSL	Regional Screening Levels
SAR	Site Audit Report
SAS	Site Audit Statement
SIA	Specific Immobilisation Approval
SIL	Site Investigation Level
SSTL	Site Specific Trigger Level
SWL	Standing Water Level
TCLP	Toxicity Characteristic Leachate Procedure
TEQ	Toxic Equivalent Quotient
TfNSW	Transport for NSW
TOC	Top of Casing
TPH	Total Petroleum Hydrocarbons
TRH	Total Recoverable Hydrocarbons
TSP	Total Suspended Particulates
USCS	Unified Soil Classification System
UST	Underground Storage Tank
µg/L	Micrograms per litre
VMP	Voluntary Management Plan
VOC	Volatile Organic Compounds

Term	Definition
Zn	Zinc

1. Introduction

1.1 Introduction and Background

Andrew Lau of JBS&G Australia Pty Ltd (JBS&G), was engaged on the 16 April 2020 by John Holland Rail Pty Ltd (JHR, the client) to conduct a site audit at land that falls within the Goulburn – Bombala rail corridor at Tarago, and is part of the Tarago Station Rail Corridor, Tarago, NSW 2580.

The subject site ("the rail corridor site") is identified as Part of Lot 22 DP1202608, occupying an area of approx. 7.7 ha and is owned by Transport for NSW (TfNSW). The location of the rail corridor site and the extent of the site area are shown in **Figure 1 and Figures 2a – 2e,** included in **Appendix C**.

The rail corridor site was notified to the EPA under section 60 of the *Contaminated Land Management Act 1997* (CLM Act 1997) in November 2019 and has been declared to be significantly contaminated land by the NSW EPA (Declaration Number 20201103; Area Number 3455, dated 25 March 2020, "the declaration") with the contaminating substance identified as lead.

Reasons for the declaration provided by the EPA are as follows:

- "lead concentrations in soil within the rail corridor (Lot 22 DP1202608) exceed national guideline values for the protection of human health and the environment;
- "lead contamination has impacted adjacent land at 106 Goulburn Street, Tarago (Lot 1 DP816626), with soil also found to contain lead at concentrations exceeding national guideline values for the protection of human health and the environment;
- "there are complete exposure pathways to lead for occupants of 106 Goulburn Street, as well as potentially complete exposure pathways for persons working within the rail corridor; and
- "there are potentially complete exposure pathways for onsite and offsite ecological receptors."

In response to the declaration, TfNSW have entered into a Voluntary Management Proposal (VMP) (Notice Number 20201711) with the EPA. A copy of the VMP is presented in **Appendix F.** A requirement of the VMP is the appointment of a NSW EPA accredited auditor. Andrew Lau is a Site Auditor accredited by the NSW Environment Protection Authority (EPA) under the CLM Act 1997 (Accreditation Number 0503).

The VMP requires works to be conducted at the rail corridor site within deadlines that have been specified and this letter has been prepared to assess works conducted under the following requirements:

- T1: Investigation of Contaminant (lead) at or originating from the rail corridor site, and
- T2: Development of an Action Plan to mitigate risks from the Contaminant originating from the rail corridor site to offsite receptors.

The rail corridor site forms part of the rail corridor between Goulburn and Bombala and consists of the land occupied by a former ore loadout complex ("OLC") which was located to the west of the railway tracks. The former OLC was used to load ore concentrate extracted from the nearby Woodlawn Mine. The railway line runs in a north east to south west direction. The rail corridor site includes the following structures: the Tarago railway station, a goods shed to the south of the railway station and an ancillary shed adjacent to the railway line at the southern end, that appears to house rail signalling infrastructure.

The rail corridor site is surrounded by Stewart St then agricultural paddocks to the north and west, a residence (106 Goulburn St) to the east thence Goulburn Street and more residences, and paddocks and thence residences to the south. Tarago Public School is located less than 200 m to the north east

of the rail corridor site. The residence at 106 Goulburn St is located off the rail corridor site and is to the north of the railway station. It is known as the "stationmasters cottage" and has been identified in the VMP as "…impacted adjacent land at 106 Goulburn Street, Tarago (Lot 1 DP816626), with soil found to contain lead at concentrations exceeding national guideline values for the protection of human health and the environment." The stationmaster's cottage is not within the VMP declaration area.

No previous Site Audit Statements (SAS) or Site Audit Reports (SAR) are known to exist for the rail corridor site.

Andrew Lau is a Site Auditor accredited by the NSW Environment Protection Authority (EPA) under the Contaminated Land Management Act 1997 (CLM Act 1997) (Accreditation Number 0503). The audit was completed with the assistance of Sara Arthur and Sahani Gunatunge, two of JBS&G's trained and experienced audit assistants. Further expert technical support was provided by Dr Sim Ooi and Mr Matt Parkinson in the field of human health risk assessment. The audit reference number is 0503-2006.

1.2 Objectives of the Site Audit

The objectives of this site audit were to:

- Independently review a Detailed Site Investigation (DSI); and remedial action plan (RAP); and
- As described in R4 of the VMP, prepare a Section B SAS to determine the adequacy of the DSI in assessing the risks associated with the contaminant (lead) at or originating from the rail corridor site and the suitability of the RAP to mitigate these identified risks.

In accordance with the requirements of the CLM Act 1997, the site audit was undertaken with consideration to:

- The provisions of the CLM Act, Regulations and subsequent amendments;
- The provisions of any environmental planning instruments applying to the rail corridor site; and
- Relevant guidelines made or approved by the EPA (**Appendix A**).

1.3 Type of Audit

The audit is being undertaken in response to a legal requirement imposed by the EPA (the VMP) so is a statutory audit within the meaning of the *Contaminated Land Management Act (1997)* ('the CLM Act').

1.4 Documents Reviewed

The following documentation was reviewed as part of the site audit:

- *Tarago Loop Extension, Preliminary Human Health Risk Assessment, Ramboll, September 2019 (Ramboll 2019a);*
- *Tarago Rail Corridor and Tarago Area Detailed Site Investigation*, Ramboll, July 2020 and earlier drafts (Ramboll, 2020a, 'the DSI');
- *Advice on risks to human health and the environment: Boyd Street and publicly accessible areas, Tarago NSW*, EnRisks, 1 December 2020 (EnRisks, 2020);
- *Tarago Rail Corridor and Tarago Area Detailed Site Investigation Addendum*, Ramboll, 12 February 2021 and an earlier draft (Ramboll, 2021a 'the DSI addendum');
- *Remediation Action Plan*, Ramboll, September 2021 and earlier drafts (Ramboll, 2021b, 'the RAP', attached as **Appendix H**); and

- *April 2021 Surface Water Monitoring, Tarago NSW*, Ramboll, June 2021 (Ramboll, 2021c).

The following documents were also considered during the site audit for monitoring plans or assessment criteria:

- *Tarago Lead Management Action Plan*, Ramboll, July 2020, (Ramboll 2020b); and
- *Tarago Air Quality Monitoring Report,* Ramboll, July 2021, (Ramboll, 2021d).

The auditor has previously issued an interim audit advice letter regarding the site:

- *L001 Interim Audit Advice (0503-2006-001) – Tarago*, 28 August 2020.

Additional correspondence relating to the site audit is provided in **Appendix B**.

1.5 Site Inspections

Table 1.1: Summary of Audit Inspections

Date	Attendance	Purpose
18 June 2020	Andrew Lau (JBS&G) and Jonathan Tasker (TfNSW)	Site inspection to observe site layout and condition.

1.6 Chronology of Site Assessment Works

The process of the assessment and audits undertaken at the rail corridor site has been chronologically listed in **Table 1.2**.

Table 1.2: Summary of Investigation and Audit Works Undertaken at the Rail Corridor Site

Date	Purpose
July 2019 to March 2020	Soil samples collected from the rail corridor site for sampling and analysis. Samples were collected from shallow surface soils to depths of 2.0 m BGL. Some samples were also subject to leachate analysis using the toxicity characteristics leaching procedure (TCLP) (acidic) test and the neutral leachate test. Samples of woodchips also collected for analysis.
August 2019 to April 2020	Surface water and sediment samples collected from the culverts that pass through the rail corridor site. Sampling included upstream and downstream locations.
March 2020	Assessment of soils by XRF, on the VMP site as well as haul route and publicly accessible locations around town.
18 – 20 March 2020	Groundwater well installation for MW1 - MW7.
2 April 2020	Groundwater sampled for MW1 – MW7.
15 April 2020	Groundwater wells gauged.
December 2019 to July 2020	Sampling and analysis of media (soil, dust, rainwater tank sediment and water, groundwater, internal dust, paint, sediment from drainage lines and dams) from off site properties. Preparation of communications with residents/stakeholders and provision of audit advice on each letter to off site residents.
3 April 2020	Commencement of site audit (0503-2006).
April 2020 to May 2021	Monthly Air Quality monitoring is undertaken and reported. The air quality monitoring program considers lead in particulate form, both for ambient air airborne fractions and deposited dust.
28 May 2020	The VMP between TfNSW and NSW EPA is finalised.
10 June 2020	Site Audit Notification (SAN) issued.
18 June 2020	Audit site inspection by Andrew Lau
31 July 2020	Issue of DSI. Auditor had provided comments on two earlier drafts.
31 July 2020	Issue of Tarago Lead Action Plan. Auditor had provided comments on two earlier drafts.
28 August 2020	Issue of Interim Audit Advice *L001 Interim Audit Advice (0503-2006-001) – Tarago*
1 December 2020	Issue of *Advice on risks to human health and the environment: Boyd Street and publicly accessible areas, Tarago NSW.*
2 December 2020	Issue of *DSI Addendum*. The auditor had provided comment on an earlier draft.
1 June 2021	Issue of *April 2021 Surface water monitoring, Tarago, NSW.* The auditor had provided comments on an earlier draft.
September 2021	Issue of RAP. Auditor had provided comments on two earlier drafts.
1 October 2021	RAP provided to NSW EPA.
29 October 2021	Issue of the Site Audit Report and Site Audit Statement.

The auditor has provided advice regarding a number of off-site properties that have been subject to assessment and cleaning for the removal of sediment/sludge from rainwater tanks and internal dust removal. The data within those assessment has been considered in general as part of this audit, to maintain the privacy of the residents. The exception is the property at 106 Goulburn St, Tarago, which is immediately adjacent to the rail corridor site and is described in the declaration. The property at 106 Goulburn St has been purchased by TfNSW.

2. Site Description

2.1 Site Identification

The VMP site details have been summarised in **Tables 2.1** and described in further detail in the following sections. A plan identifying the subject site has been presented in **Figure 1 Appendix C**. The rail corridor site location and layout is shown in **Figure 2a to Figure 2e, Appendix C**.

Table 2.1: Summary Site Details

Street Address	Part of the Tarago Station Rail Corridor, Tarago NSW 2580
Property Description	Part of Lot 22 DP1202608
Parish	Tarago
County	Argyle
Local Government Area	Goulburn-Mulwaree Shire
Property Size	Approximately 7.7 ha
Zoning	RU2 Rural Landscape
Previous Use	Rail corridor and Ore Loadout Complex
Current Use	Rail corridor
Proposed Use	Rail corridor

2.2 Site Condition

At the time of the detailed site investigation undertaken in 2020, Ramboll reported the following conditions at the rail corridor site.

The rail corridor site consists of the rail formation, the former OLC and unsealed access roads as well as vacant land surrounding the rail formation. The Tarago railway station is present on the rail corridor site to the east of the rail line.

The former OLC, rail formation and roads were observed to be free of vegetation while the remainder of the rail corridor site was grassed. Vegetative stress was evident but Ramboll considered this could be due to the recent drought, use of heavy equipment, low organic carbon content of the soil or to the contamination at the rail corridor site and Ramboll concluded that vegetative stress was not an indicator of contamination. Some trees were observed off site to the west along Stewart Street and the east of the rail line and south of Tarago station.

Ramboll reported that evidence of contamination from metal ore was observed at the rail corridor site surface and consisted of green and orange staining of silt within fouled ballast.

The rail corridor site was fenced on the western boundary and partially fenced on the eastern boundary, although access remained feasible from Tarago Station and Goulburn Street level.

2.3 Topography

Ramboll (2020a) reported that the rail corridor site is relatively flat with a slight slope towards the east. Elevation of the rail corridor site is approximately 688 m AHD.

2.4 Soils and Geology

Ramboll (2020a) conducted a search of the Australian Geoscience Information Network and identified the regional geology to be comprised of channel and flood plain alluvium (gravel, sand and clay), locally formed as calcrete, overlying quaternary sedimentary rock.

The rail corridor site has been found to be underlain by fill to various depths, comprising of clays with sand and gravel and railway line ballast rock. The natural materials underlying the fill was found to be clay with sand and gravel with one layer of gravel encountered at one investigation location.

Based on the borehole and testpit logs provided by Ramboll, the subsurface profile is summarised by the auditor in Table 2.2.

Table 2.2: Subsurface Profile

Depth (m BGL)	Sub surface Profile
0.0 – 2.0	FILL: Clay, orange-brown, brown or red-brown, with coarse gravel (ballast and sand/siltstone, sub angular) or with gravel/sand, fine to coarse. Occasional layers of gravel or sand, black/grey and occasional layer of asphalt at 1 m BGL. Occasional anthropogenic inclusions including steel reo and plastic fragments.
0.0 – 4.2	CLAY, brown, with some gravel, fine to coarse grained
1.1 – depth	CLAY, brown, stiff, medium grained sands or gravel, sometimes white-grey or yellow/brown with grey mottles. Occasional layers with more sand or gravel or sand/siltstone cobbles.
1.5 - depth	GRAVEL, clayey, coarse grained, occasional.

Greatest depth of investigation was 12 m BGL. Some testpits terminated at 2 m BGL in fill.

2.5 Acid Sulfate Soils

Ramboll (2020a) did not discuss acid sulfate soils.

2.6 Hydrology

Ramboll (2020a) noted ephemeral drainage/cess lines pass through the rail corridor site directing surface water flow towards three culverts where surface water flows beneath the railway lines:

- The northernmost culvert directs water flows off site towards a dam on adjacent rural land;
- The central culvert directs water flows towards a shallow pond within the corridor then off site through a causeway on Boyd Street thence partially into a drain on the eastern side of Boyd St and partially across adjacent rural land; and
- The southernmost culvert directs water towards a local water course is a tributary to the Mulwaree River that passes through rural land before discharging into the river.

Surface water flows towards the Mulwaree River approx. 500 – 550 m east of the rail corridor site.

2.7 Hydrogeology

Ramboll (2020a) noted that regionally the shallowest groundwater aquifer is encountered in gravel at 5.5 to 18.6 m BGL with some deeper aquifers present in fractures in the underlying shale, siltstone and limestone from 50 to 74 m BGL. Groundwater from the shallow aquifer is anticipated to flow to the east towards the Mulwaree River.

Borelogs within the DSI (Ramboll 2020a) indicated that groundwater was encountered at 6 - 8 m below ground level (BGL) during investigations, although the standing water levels in the wells on/closest to the rail corridor site ranged from 4.4 to 7 m below top of casing (bTOC), suggesting that the aquifer is semi-confined.

Water use surveys have been conducted in the area and groundwater is used by 20 property holders in the area for a range of uses from drinking water, washing, gardening, filling a swimming pool and irrigation for agriculture. Ramboll also noted that groundwater salinity is low.

2.8 Surrounding Environment

Ramboll (2020a) reported the following:

To the north and west is Stewart St then agricultural paddocks, to the east is a residence (106 Goulburn St, “the station master’s cottage”) and the Tarago railway station, thence Goulburn Street and residences, and to the south are paddocks and then residences. Tarago Public School is located less than 200 m to the north east of the rail corridor site.

2.9 Audit Findings

The information provided by Ramboll (2020a) regarding site condition and surrounding environment has been checked against, and generally meets the requirements of EPA 2020.

The auditor notes that other information pertaining to the rail corridor site and surrounding areas by the consultant was generally consistent with the observations made during the audit inspection outlined above in **Table 1.1.**

The auditor notes that Ramboll reported that the groundwater salinity is low, and the auditor concludes that groundwater in the area is fresh and potable.

Overall, the information provided by Ramboll and supplemented by observations made during the rail corridor site audit inspections and review of publicly available information in relation to the rail corridor site condition and the surrounding environment is considered adequate for the purposes of the site audit, with the exception that details of climate were not provided, nor was the result of a search for acid sulfate soils reported.

For completeness, the auditor conducted a review of Bureau of Meteorology (BoM) climate statistics for Goulburn Airport (Goulburn Airport AWS[1]) which indicated the following:

- Mean maximum temperatures ranging from 11.8 °C in July to 28.3 °C in January;
- Mean minimum temperatures ranging from 0.3°C in July to 12.9°C in January; and
- Mean monthly rainfall ranging from 25.9 mm in July to 57.4 mm in June, with an average annual rainfall of 534.8 mm.

In general, the climate of the rail corridor site area is described as comprising warm summers and cold winters, and rainfall was described as occurring throughout the year.

The auditor accessed the Australian Soil Resource Information System (ASRIS) on 2 September 2020 and the rail corridor site was identified as low probability of acid sulfate soils.

Overall, the information provided by Ramboll (2020a) in relation to site condition and the surrounding environment is considered adequately complete for the purposes of assessing the contamination status of the rail corridor site.

[1] http://www.bom.gov.au/climate/averages/tables/cw_070330.shtml, accessed 2 September 2020.

3. Site History

3.1 Site History Information Sources

Ramboll (2020a) undertook a desktop review of historical data available for the rail corridor site from the following sources:

- Goulburn Mulwaree Shire records;
- Interview with an employee who worked at the former OLC and who is a long term resident of Tarago;
- The website of the Woodlawn mine owner, Heron Resources Limited;
- Aerial photographs (1960, 1976, 1985, 1991, 1997 and 2005); and
- NSW EPA records.

Ramboll stated that no search of the SafeWork NSW Dangerous Goods register had been completed as all infrastructure associated with the former OLC had been removed.

A summary of relevant historical information for the rail corridor site was provided in the DSI (Ramboll 2020a) and is summarised below.

3.2 Goulburn Mulwaree Shire Records

Ramboll (2020a) considered that the Shire records relevant to the DSI were limited to the Environmental Impact Statement (EIS) for the Woodlawn Project. The EIS noted that four metal concentrate products would be exported from the mine via truck (approx. 35 truckloads per day) to the OLC on public roads. The metal concentrates were identified as lead, zinc and two different copper concentrates.

3.3 Interview with OLC employee

Ramboll interviewed a former employee at the OLC who provided details of the operations. The ore was transported to the OLC by truck, tipped at a dump station, transported via conveyor into the main building and then loaded onto rail cars using a frontend loader.

3.4 Heron Resources Website

Ramboll (2020a) indicated that documents available through the website showed that the Woodlawn deposit was mined between 1978 and 1988 through open pit and underground methods. The document on the website referred to a rail siding in Tarago that was historically used to rail concentrates to smelters in Newcastle and Port Kembla and a berth at Port Kembla. This siding is referred to as the "Woodlawn siding".

3.5 Aerial Photographs

Ramboll (2020a) reviewed historical aerial photographs relating to the rail corridor site and found that the infrastructure associated with the former OLC was constructed between 1976 and 1985 and removed between 1997 and 2005.

The photos indicate the OLC was located approx. 20 m north of Tarago Station on the western side of the rail formation. The OLC infrastructure was reported as including a loop road for truck access from the south, a truck dumping station, a conveyor from the dumping station to a larger square building and an undercover rail loading point extending over part of the rail formation.

3.6 EPA Records

Ramboll (2020a) identified an environment protection licence (EPL) for the rail corridor site held by JHR for the operation of the country rail network in NSW. In addition, Ramboll (2020a) notes that the rail corridor site was notified to the EPA under Section 60 of the CLM Act in November 2019.

The Auditor also notes that the declaration of significantly contaminated land and the Voluntary Management Proposal are both available on the EPA website in the contaminated land register.

3.7 Previous Reports

Ramboll (2020a) included a summary of reports previously prepared for the rail corridor site and works conducted for each report and a summary of conclusions are discussed below. These reports pre-date the commencement of the audit but some of the data from these reports have been included in the DSI (Ramboll 2020a) and have therefore been subject to the audit.

3.7.1 *Tarago Rail Siding Extension: Preliminary Contaminated Site Assessment,* McMahon 2015

Ramboll (2020a) reported an assessment of an investigation conducted in 2015. The investigation had identified lead impacts due to historic activities related to the use of the Woodlawn siding at Tarago for loading ore concentrates onto rolling stock, in the vicinity of Tarago station. Ramboll noted that further investigation for lead contamination was recommended.

3.7.2 Surface Water Monitoring – Tarago Rail Loop Expansion, Ramboll August 2019

The scope of works included inspection of the three culverts that cross the former OLC both upstream and downstream of the rail corridor site and collection of samples where water was observed. Water was only found at two locations, one upstream of the rail corridor site on the southern drainage line and one within the rail corridor site on the middle drainage line.

Analysis was performed for a range of analytes on the two samples and Ramboll found that all results were below human health criteria (recreational use) but were greater than ecological criteria at the downstream location for aluminium, cadmium, copper, lead, nickel and zinc. Results for phosphate and copper were also greater than the criteria for irrigation use.

Ramboll considered that the dry flow conditions and the location of the on site sampling location meant that "the implications for potential impacts on off site downstream receptors is unclear."

3.7.3 *Tarago Loop Extension, Further Intrusive Assessment and Lead Management Plan*, Ramboll, September 2019

Nine testpits were advanced on an approx. 100 m lineal increments through the Woodlawn siding along the 900 m where elevated lead concentrations were considered likely to exist. Soil conditions were logged and discrete soil samples were collected from each layer. All samples were analysed for lead and a limited number analysed for TRH/BTEXN/PAHs, metals and asbestos.

Shallow soil samples were collected from 51 locations within and the area surrounding the Woodlawn siding. All shallow soil samples were analysed for lead. In some instances where elevated lead was reported, analysis for lead in leachate was undertaken using both acidic and neutral conditions, via the toxicity characteristic leachate procedure (TCLP) and the Australian standard leachate procedure (ASLP), respectively for three samples each.

Field measurements for lead were made using an X-Ray fluorescence device (XRF) in 25 to 50 m lineal increments at 29 locations along the main line. These field measurements targeted fines between tracks and in the western shoulder of the main line formation and averaged the readings to obtain a representative value for impact at each location.

Ramboll reported that results for lead within site materials indicated the following:

- Fines in the ballast in the main and loop lines (CH:261.95 – 262.95);
- Ballast at the top of the Woodlawn siding formation;
- Soils to the west of the Woodlawn siding formation (CH: 261.98 – 262.88) with a distinct area with much higher lead concentrations observed (CH 262.09 – 262.70);

- Samples from the testpits indicated that capping material underlying the ballast in the Woodlawn siding had lead concentrations less than site criteria;
- Lead concentrations were highly variable over short distances with results varying by more than 3 orders of magnitude; and
- The pH of leachate from ASLP analysis was found to be moderately to highly acidic.

The short term lead management plan that was included in this report was prepared to mitigate lead exposure risks to workers associated with the proposed Tarago Loop Extension. Recommendations included:

- Excavation of lead impacted soils to temporary stockpile areas; and
- Practices to mitigate exposures while undertaking the works.

3.7.4 *Tarago Rail Corridor Environmental Site Assessment,* Ramboll, October 2019

The results of the sampling and analysis of 31 shallow soil samples collected in a grid from across the rail corridor site were reported. Targeted samples were also collected and analysed:

- Four samples collected from the boundary shared with the station master's cottage; and
- Two samples in the vicinity of TP4a (where previous samples were reported with extremely elevated concentrations).

The results were found to indicate that contaminant concentrations in soil that may present risk to human health or the environment are limited to lead and no other contaminants. Further, that the lead impacts did not appear to extend to the west outside of the rail corridor.

The results along the eastern boundary suggest the potential for off site impacts exceed the investigation levels for residential criterion (investigation level) for lead, that is the boundary shared with the station master's cottage, where the residential criterion applies. In addition, lead impacts along the eastern boundary potentially exceed the criterion for public open spaces, as relevant for other portions of the eastern boundary.

Ramboll also reported that soils outside of the rail formation are moderately acidic (pH 4.7 – 5.9).

3.7.5 Tarago Loop Extension Remedial Action Plan, Ramboll, September 2019

This plan was prepared to manage the risk to works during the completion of civil works associated with a loop extension. No impacted materials were taken off site during the works that followed.

3.8 Audit Findings

The site history information provided by the consultant (Ramboll, has been checked against, and generally meets the requirements of EPA 2020, with some minor exceptions as noted below.

The consultant did not undertake a search of relevant heritage databases. For completeness, the auditor undertook a search of the Australian and NSW Heritage databases on 2 October 2020 and the search records are provided in **Appendix E**.

The search identified Tarago Railway Station as an Historic item on the Register of the National Estate (place id: 1133). Tarago Railway Station is identified as being located on the rail corridor site.

The search also identified Tarago Railway Station group (listing number 01262) as being on the NSW State Heritage Register, which identified separate buildings within the complex/group, i.e. the goods shed, the signal box and the station building. All three structures appear to be within the boundaries of the rail corridor site.

The extent of site history information presented by Ramboll (2020a) in conjunction with the updated heritage database search completed as part of this audit, is considered adequately complete for the

purposes of identifying potential contamination issues at the rail corridor site as part of the rail corridor site investigation process.

4. Sampling Analytical and Quality Program

4.1 Overview

Sampling and analysis occurred over a number of campaigns, both on and off site. Different media were assessed, i.e. fill, soil, groundwater and surface water. In addition, sampling and analysis of water and sediment from rainwater tanks, and paint flakes at some off site premises was undertaken. While most analysis was undertaken in laboratories, some soil locations were assessed by X-ray fluorescence (XRF) and the QA/QC of this technique is also considered in Table 5.1, below.

An assessment of quality assurance and quality control (QA/QC) has been undertaken by the consultant (Ramboll 2020) by developing data quality indicators (DQIs), broadly based on the seven-step process referred to in NEPC 2013.

The auditor has undertaken a review of the QA/QC undertaken by the consultant, which has been summarised in **Tables 5.1** against the PARCC parameters (precision, accuracy, representativeness, comparability and completeness).

Table 4.1 Data Usability Assessment (Ramboll 2020a, 2021a,b and c)

Parameter	DQIs	Requirement	Auditor Assessment
Field and Lab QA/QC			
Precision	Intra-laboratory duplicates (blind)	Collected at a rate of 1 per 20 samples. Analysed for primary contaminants of concern. RPDs less than 50%.	During the on-site and off-site soil investigations, soil duplicates were collected at a rate of 2.5% and analysed for main COPC (i.e. lead). RPDs ranged from 1.2-66.7%. The consultant reported that RPD exceedances to project DQI (30%) was reported for the following: • Soil: TP8_0.0-0.1/ D_TP02_310320 (31.3%) • TP15_0.5-0.6/ D_TP03_010420 (52.2%) • P12_HA03_0.0_0.05/ D01_260320 (66.7%) The consultant reported that RPD exceedances were considered representative of the variable lead content within samples rather than sampling error, with variable lead content considered likely to be a function of a low variability in distribution of highly concentrated lead ore. The consultant further noted that uncertainty associated with results at any given location is offset by the high sampling density such that the general characterisation of lead distribution was considered reliable. Potential uncertainty in assessment of lead concentrations against assessment criteria was considered to be low and limited to the periphery of concentrated impacts where concentrations are within the same order of magnitude as the site assessment criteria. The consultant did not provide details of duplicates collected during onsite groundwater, surface water and sediment sampling. The auditor concurs with the consultant's findings and finds the isolated elevated soil RPD results to be indicative of heterogeneity of the fill and as such not to affect the overall reliability of the analytical data. The auditor notes that the number of intra-laboratory duplicates was below the recommended frequency. Whilst this is considered a non-conformance, it is noted that results of all sampling activities do not show a pattern of sustained elevated impact. As such, the concentrations in soil are considered representative of site conditions.

Parameter	DQIs	Requirement	Auditor Assessment
			During the assessment at off-site properties, dust sample duplicates were collected at a rate of 0.68% and rainwater tank water duplicates were collected at a rate of 4.3% and analysed for lead. Rainwater tank water duplicate RPDs ranged between 0-28.6% and were within the acceptable range. The consultant did not provide RPD results in relation to dust duplicate samples. The auditor calculated the RPD for reported duplicate pair DSWAB_2 (PS) and QA01_180520 as 73.6%. During the assessment of the surface water and sediment, intra-laboratory duplicates were collected at a rate of 11% or one per sampling event. This is adequate. For groundwater analysis, no intra-laboratory duplicates were collected; this is discussed further, below, in inter-laboratory duplicates. For dust, rainwater tank water and sediment samples, no intra-laboratory duplicates were collected. This is discussed further, below in inter-laboratory duplicates.
	Inter-laboratory duplicates (spilt)	Collected at a rate of 1 per 20 samples. Analysed for primary contaminants of concern. RPDs less than 50%.	During the on-site and off-site soil investigations, soil duplicates were collected at a rate of 2.5% and analysed for main COPC (i.e. lead). RPDs ranged from 0-69.5%. The consultant reported that RPD exceedances to Project DQI (30%) was reported for the following: • TP8_0.0-0.1/ T_TP02_310320 (55.2%) • P2_HA05_0.4/ T01_240320 (69.5%) • P4_HA03_0.3/ T03_240320(31.9%) • P12_HA03_0.0_0.05/ T01_260320 (48.2%) • MW6_0.05/ T02_200320 (40.0%) The consultant reported that RPD exceedances are considered representative of variable lead content within samples rather than sampling error, with variable lead content considered likely to be a function of a low variability in distribution of highly concentrated lead ore. The consultant further noted that uncertainty associated with results at any given location is offset by the high sampling density such that the general characterisation of lead distribution is considered reliable. Potential uncertainty in assessment of lead concentrations against assessment criteria was considered to be low and limited to the periphery of concentrated impacts where concentrations are within the same order of magnitude as the site assessment criteria. The auditor concurs with the consultant's findings and finds the isolated elevated RPD results to be indicative of heterogeneity of the fill and as such not to affect the overall reliability of the analytical data. The number of inter-laboratory duplicates was below the recommended frequency. Whilst this is considered a non-conformance, it is noted that results of all sampling activities do not show a pattern of sustained elevated impact. As such, the concentrations in soil are considered representative of site conditions. During the assessment of the surface water, inter-laboratory duplicates were collected at a rate of 11% during some events, and for some events there were none collected. In consideration of the entire dataset,

Parameter	DQIs	Requirement	Auditor Assessment
			this is adequate. For sediment results assessment, one inter-laboratory sample was collected, representing 5% frequency. For groundwater analysis, no inter-laboratory duplicates were collected. With regards the sediment analytical results, this breach is considered minor, as conclusions regarding the sediment data are supported by results from either the tank water or the surface water. For the groundwater results, it is considered to not affect conclusions about the dataset as a whole, because groundwater was collected from a number of different sources, on different days; for instance, from private bores as well as targeted monitoring wells. In considering the dataset as a whole, the auditor accepts the groundwater data.
	Laboratory duplicates	One per batch. RPDs less than 50%.	Laboratory duplicates were undertaken by the primary laboratory. The reported RPDs were within the DQI, however elevated RPDs were reported in the following lab reports: • 711674-W: Cadmium (filtered) (170%), Selenium (filtered) (37%). • 711464-W: Cadmium (52%), Cobalt (38%) • 710646-W: Zinc (53%) • 710520-W: Boron(filtered) (140%), Cobalt (filtered) (83%), Copper (filtered) (63%), Nickel (filtered) (51%) • 710643-W: Zinc (53%) • 710645-W: Zinc (53%) • 713315-S-V2: Lead (31%) • 710611-W: Boron(filtered) (140%), Cobalt (filtered) (83%), Copper (filtered) (63%), Nickel (filtered) (51%) • 710631-W: Zinc (53%) • 711568-W: Chromium (48%) • 711580-W: Chromium (48%) • 713315-W: Cadmium (52%), Cobalt (38%) • 711589-W: Arsenic (33%), Barium (34%), Cadmium (32%), Chromium (34%), Copper (38%), Lead (36%), Mercury (44%), Nickel (32%) • 724052-W: Zinc (140%) • 712462-W: Copper filtered (51%), Zinc(filtered) (160%) • 712441-S: Lead (49%) • 725971-S: Cobalt (75%) • 712460-W: Copper (filtered) (51%), Zinc(filtered) (160%) • 717025-W: Lead (120%) • 717025-S: Arsenic (44%), Chromium (35%), Lead (91%), Nickel (110%) • 717027-W: Lead (120%) • 717027-S: Cobalt (32%) • 725969-S: Arsenic (48%), Chromium (48%), Cobalt (67%), Copper (64%), Lead (59%), Nickel (64%), Zinc (62%) • 710517-W: Nickel (120%) • 713318-W: Aluminium (64%), Arsenic (70%), Chromium (43%), Copper (33%), Iron (63%) However, the laboratory reported that the above RPDs passes Eurofins QC - Acceptance Criteria.

Parameter	DQIs	Requirement	Auditor Assessment
			Further, elevated RPDs were reported in the following lab reports: • 710520-W: Manganese (filtered) (41%) • 710611-W: Manganese (filtered) (41%) • 725971-S: Manganese (100%) • 717025-S: Iron (36%), Barium (110%) • 716865-S: Manganese (31%), Iron (34%) • 717027-S: Manganese (40%) • 725969-S: Aluminium (61%), Barium (72%), Iron (48%), Manganese (65%) The laboratory reported that the above RPDs were outside the recommended acceptance criteria and further analysis indicated sample heterogeneity as the cause. The consultant reported that no qualifying code was provided in lab report 716878-W for Zinc duplicate RPD reported at 36%. Review of the laboratory report indicated that the RPD reported passes Eurofins QC - Acceptance Criteria. Ramboll stated that laboratory control assurance testing was undertaken at appropriate frequencies and did not comment on the laboratory quality control results for sediments, surface water and groundwater, rainwater tank water and sediment. The auditor has conducted checks of the data and has found that laboratory analysed duplicates at appropriate frequencies. Occasional elevated exceedances of RPDs were reported, including for sediment analysis, where results were low and close to or below the LOR. In the context of the dataset as a whole, the auditor is satisfied that these occasional exceedances do not affect the useability of the data.
Accuracy	Field rinsate blanks	Collected at a rate of 1 per piece of decontaminated sampling equipment. Analysed for primary contaminants of concern. Laboratory results below the laboratory limit of reporting (LOR).	Field rinsate blanks for soil analysis were collected by the consultant as follows: • R01_010420 and R02_010420 collected on 1 April 2020 • RB_25/3/2020 collected on 25 March 2020 • RB_26/3/202 collected on 26 March 2020 • R01_1803200 collected on 18 March 2020 • R01_2003200 collected on 20 March 2020 Concentrations reported in the field rinsate blanks were all below the LOR with exception of lead concentration in one sample reported at 0.002 mg/L. Summary tables presented by the consultant indicated further detections in samples RB_25/3/2020 and RB_26/3/2020 for Cadmium (0.0002mg/L) and Mercury (0.0001 mg/L). However, review of laboratory reports identified relevant metal concentrations to be below LOR. The consultant did not provide discussion relating to the above non-compliances. The auditor considers the sampling methods employed by the consultant are unlikely to have resulted in significant cross-contamination between sample locations and a review of the available analytical data does not indicate that this has occurred. Rinsate samples were not collected for surface water or sediment samples as samples were collected directly

Parameter	DQIs	Requirement	Auditor Assessment
			from the water or from the sediment using disposable equipment.
	Trip blanks	Collected at a rate of 1 per day of sampling where primary contaminants of concern include volatiles. Analysed for volatiles of concern. Laboratory results below laboratory LOR.	Laboratory prepared trip blanks were not submitted by the consultant, however, the auditor notes that COPCs for the investigation did not include volatile contaminants. This is satisfactory.
	Trip spike	Collected at a rate of 1 per batch where primary contaminants of concern include volatiles. Laboratory results / recovery within 30 % of the spiked concentration.	Laboratory prepared trip spikes were not submitted by the consultant, however, the auditor notes that COPCs for the investigation did not include volatile contaminants.
	Laboratory surrogate spikes	Surrogate spikes to be performed as required by NATA accreditation, generally per sample analysed. Recoveries to be within 70-130 % or 30-130 % (phenols only).	The consultant reported that surrogate spikes were undertaken by the laboratories, however, the auditor notes that organic analyses was not undertaken and hence surrogate spikes were not required.
	Laboratory method blanks	Laboratory method blanks to be performed as required by NATA accreditation, generally 1 blank per batch. Results to be below laboratory LOR.	All laboratory method blanks < LOR.
	Laboratory control samples (LCS)	LCS to be performed as required by NATA accreditation, generally one per 20 samples per batch. Recoveries to be within 70-130 % or 30-130 % (phenols only).	LCS recoveries were within the laboratory control limits.
	Laboratory matrix spikes (MS)	MS to be performed as required as NATA accreditation, generally one per 20 samples per batch. Recoveries to be within 70-130 % or 30-130 % (phenols only).	MS recoveries were within the laboratory control limits.
Soil Sampling and Analytical Schedule and Sampling Methodology			

Parameter	DQIs	Requirement	Auditor Assessment
Accuracy	Instrument calibration/ corrections	Calibration certificates	Calibration certificates for the water quality meters were included in the reports. Calibration certificates for the XRF instrument was included in the DSI report. A review of the certificates indicated that the instruments were calibrated satisfactorily.
		Corrections for ORP readings.	Groundwater: A review of the field data sheets and calibration certificate does not indicate if the ORP readings have been corrected for the difference between the reference electrode and the standard hydrogen electrode (SHE). Assuming the correction has not been performed and that the electrode used was Ag/AgCl with a platinum button, the auditor has calculated that the redox potential ranged from 42 (mildly oxidising) to 325 mV (highly oxidising). This is not considered to affect the useability of the data.
		Calibration of XRF with analytical results	Ramboll assessed the use of the XRF against laboratory analysed soil samples for approx. 10% of the XRF locations. Correlation graphs were prepared for arsenic, copper, lead and zinc. Ramboll presented a calculated R^2 (linear regression: coefficient of determination) and found that R^2 varied from 0.94 – 0.99. The auditor considers this to be satisfactory. The R^2 for lead, the contaminant of concern identified in the VMP is 0.95.
Representa-tiveness	Sampling locations	Samples to be collected on a representative basis consistent with the CSM.	Onsite The consultant (Ramboll 2020) reported that for the assessment of potential lead contamination within and around the rail corridor site, 20 systematic test pits (TP01-TP20) were advanced onsite and within the former OLC on an approximate 25 m triangular grid pattern. Targeted soil sampling was undertaken for the delineation of vertical extent of lead impact at boreholes advanced for the installation of groundwater monitoring wells (MW1-MW7). The total number of locations sampled by Ramboll (2020a) was more than 281 over the 7.7 ha site, exceeding the *Sampling Design Guidelines* sample frequency of 11 samples per hectare, which would require 85 samples. Some locations were targeted locations. Assessment of localised surface impacts was undertaken via field portable x-ray fluorescence (XRF) analyser at seven locations (PIA1-PIA7). Ten locations were selected for co-located sediment and surface water sampling onsite as further discussed below. The number of soil and sediment sampling locations and the rationale adopted by the consultant provided sufficient coverage for further characterisation of the rail corridor site and determine potential offsite migration pathways. Offsite properties and road reserves Additionally, soil sampling was undertaken at 43 discrete off-site properties at the request of the community. These included publicly accessed places such as the public school, town hall, Tarago CWA etc and 36 private residences. Specific identifiers for private residences were excluded from the DSI for

Parameter	DQIs	Requirement	Auditor Assessment
			confidentiality reasons. Sediment samples were also collected from rainwater tanks were present on 33 discrete properties with a total of 49 rainwater tank sediment samples (noting some rainwater tanks did not contain sediment at the time of sampling). Internal dust and paint sampling was completed at 26 properties. Assessment of local public road reserves including nature strips and road side verges within Tarago and along the route from the Woodlawn mine to the rail corridor was undertaken via XRF.
	Sampling depths and intervals	Sampling depths should be consistent with the anticipated distribution of contamination as detailed in the consultant's CSM.	<u>On site</u> Most samples were collected from the shallow surface soils, but some test pits advanced onsite and within the former loadout complex were advanced to a maximum depth of 2 m below ground level (BGL). Soil samples were collected from the surface, fill material, with selected samples also collected from the underlying natural soils. Boreholes were advanced to a maximum depth of 12 m with samples collected at depths of 0-0.05, 0.5, 1. 1.5, 2.4, 3.5 and 4.5 m below ground level (BGL). <u>Off site</u> Shallow soil sampling was undertaken at offsite properties via bore holes were predominantly advanced to a maximum depth of 0.3 m BGL with few sites incl. the Station Masters Cottage and P2 were advanced to a maximum depth of 0.5 m BGL. Samples from the bore holes were generally collected at 0-0.05 m BGL and 0.2-0.3 m BGL. The sampling depths and intervals at each of the sampling locations were appropriate given the identified potential contamination sources and the rail corridor site geology.
	Soil and sediment sampling methodology	Samples to be collected using a methodology which is appropriate for the primary contaminants of concern.	Onsite soil samples were collected either directly from the centre of the excavator bucket (test pit locations) or via solid flight auger (borehole locations). Onsite sediment samples were collected by hand, using a 32mm push-tube sampler from an approximate depth of surface to 0.1 m BGL. Shallow soil sampling was undertaken at offsite properties via use of hand tools. Rainwater tank sediment was generally collected using a micropurge pump lowered through inlets to the base of each tank. Approximately 5L of sediment laden water was removed from each tank to a plastic bucket and set aside to settle. After settling clear water was poured off and remnant sediment was poured (as a liquid) into sample bottles. At two properties, rainwater tank sediment was collected using a pole mounted sampling vessel. Internal dust sampling was undertaken via vacuum and/or swab.

Parameter	DQIs	Requirement	Auditor Assessment
			The auditor considers that the sampling methods adopted by the consultants are considered appropriate and are not likely to affect the representativeness of the soil data.
	Groundwater and surface water sampling locations	Groundwater sampling locations to assess areas of concern, allow for lateral delineation of contamination and assess the groundwater flow direction. Surface water sampling locations to assess areas of concern and allow for the lateral delineation of contamination.	The groundwater investigation included installation of seven monitoring wells installed as follows: • MW1 located up gradient location of the former load-out complex, on the western side rail corridor. • MW2 located within footprint of former load-out complex. • MW3 located down gradient of former load-out complex, on western side of rail corridor. • MW4 located immediately down gradient of former load-out complex, adjacent to southern boundary of the Station Masters Cottage. • MW5 located down gradient of former load-out complex, on eastern side of rail corridor near Boyd Street. • MW6 located down gradient of former load-out complex, located within grassed area adjacent to the Town Hall. • MW7 located down gradient of the rail corridor site along Lumley Road, near Mulwaree River. Additionally, groundwater sampling was undertaken at an existing well GW053976. The consultant reviewed records available on NSW Department of Planning Industry Environment MinView Portal which identified the well was installed in 1984 to a depth of 12.2 m BGL with a water bearing zone in sands from 7 m BGL. The records further indicated the well was constructed using 0.15m diameter steel casing with 2 mm wide vertical screen slots. The number and locations of monitoring wells installed was sufficient to provide an assessment of groundwater conditions at the rail corridor site and potential off-site impacts with respect to the nature and extent of lead contamination, particularly noting the potential areas of concern (i.e. the former LOC). Surface water samples (and co-located sediment samples) were collected from ten locations within the rail corridor site as follows: • SW1/SED1_UP (up-gradient sample, located on a western tributary of the Mulwaree River, approximately 100 m west of the rail corridor at CH. 262.600. • SW1/SED1 Adjacent to a culvert on the western side of the rail line at CH 262.600 on tributary of Mulwaree River. • SW2/SED2: Adjacent to a culvert on the eastern side of the rail line at CH 262.600 on tributary of Mulwaree River. • SW3/SED3: Adjacent to a culvert on the western side of the rail line at CH 262.300. • SW4/SED4: Adjacent to a culvert on the eastern side of the rail line at CH 262.300. • SW5/SED5: Adjacent to a culvert on the western side of the rail line at CH 262.000.

Parameter	DQIs	Requirement	Auditor Assessment
			• SW6/SED6: Adjacent to a culvert on the eastern side of the rail line at CH 262.000. • SW7/SED7: Dam located on rural land downgradient from the rail corridor site's northern rail culvert (forming part Lot A DP 440822). • SW8/SED8: Mulwaree River, near intersection with Lumley Road, downstream of the discharge of the • tributary. • SW9/SED9: Mulwaree River, upstream of the discharge of the tributary. Sample locations were selected targeting potential impacts downstream of the three culverts that receive runoff from contaminated areas onsite. Off-site assessments included sampling at existing groundwater bores present on ten discrete properties and sampling of rainwater tanks present on 33 discrete properties in targeted sampling investigations. The auditor is satisfied that coverage of the rail corridor site and relevant off site areas is adequate.
Representa-tiveness	Groundwater well construction	Wells to be constructed in accordance with the current version of the Minimum Constructions Requirements for Water Bores in Australia, and screened to target the likely contaminated portion of the water column.	The groundwater monitoring wells installed on site were screened between 5.5-11.2m BGL targeting the natural gravelly clay horizon. The groundwater monitoring wells were constructed with 50 mm PVC slotted well and casing. A graded 2 mm gravel pack was installed from the base, generally to 0.5 m above the top of the well screen in the annulus between the well screen/casing and the borehole wall. An annular seal consisting of at least 1 m of bentonite chips was installed on top of the gravel pack and the remaining annulus was grouted to surface with a cementitious grout slurry. Wells were completed with a flush mounted well cover (three public locations) or an above ground monument cover, set in a concrete plinth. The consultant provided borehole logs detailing well construction, which indicated bentonite plug was suitably installed preventing the infiltration of any seepage water from overlying fill materials. The consultant reviewed records available on NSW Department of Planning Industry Environment MinView Portal in relation to existing well GW053976 which identified the well was installed in 1984 to a depth of 12.2 m BGL with a water bearing zone in sands from 7 m BGL. The records further indicated the well was constructed using 0.15m diameter steel casing with 2 mm wide vertical screen slots. Taking the above into consideration, the auditor considers that the groundwater data are representative of site conditions.

Parameter	DQIs	Requirement	Auditor Assessment
	Groundwater and surface water sampling methodology	Groundwater samples to be collected approximately 7 days after well installation and development. Groundwater samples to be collected using low flow methods (where it can be demonstrated that this is appropriate), or by purging at least 3 well volumes, until field parameters have adequately stabilised. Field parameters to be recorded for all surface water samples collected.	The newly installed wells were allowed to settle at least overnight to allow for the grout to cure before being developed. Well development was carried out using disposable bailers. A minimum of 10 bore volumes were removed from each location with wells with lower yields were purged dry. The monitoring wells were surveyed to the by a licensed surveyor to determine groundwater flow directions. Following development, the monitoring wells allowed to equilibrate for a minimum of seven days prior to sampling. Prior to the commencement of sampling, the depth to groundwater and total depth of the monitoring well was gauged with an interface probe. The sampling was completed using a peristaltic pump. Field water quality parameters including temperature, pH, EC, redox potential, DO and TDS, were recorded using a water quality meter attached to a flow cell. Purging continued until the water quality parameters stabilised, prior to collection of samples. The consultant provided field notes with groundwater purging information. Taking into consideration the above, the auditor considers that the groundwater sampling method adopted by the consultants were generally considered appropriate and not likely to affect the representativeness of the data. Onsite surface water sampling was undertaken from a depth of approximately 0.1 m below the water surface using a clean container and placement into clean laboratory-supplied sample bottles, containing the appropriate preservative for the analysis required. Groundwater sampling at off-site discrete properties varied depending on the bore set up at the property. Where there were pumps already set up for the bore at the property (properties P1, P2, P10, P12, P14, P32, P39 and Tarago Public School) the depth to standing groundwater level was gauged, if possible. The tap connected to the bore was allowed to run for two minutes before the sample container was placed under the flow from the tap. Where there was no pump set up for the bore, sampling was undertaken using low flow-sampling techniques using a peristaltic pump. During the sapling of rainwater tanks within off-site discrete properties, the standing water level and total depth of tank was measured from the top of the tank. Water was extracted by lowering a low flow micro-purge pump or peristaltic pump tubing through tank inlets approximately one meter below the standing water level. Results for surface water samples were reported as filtered. AS5667.1:1998 does not recommend filtering of samples for surface waters for metal analysis. Ramboll did not discuss why the samples were filtered, but the auditor is satisfied that the filtering was in line with protocols described in ANZG 2018.

Parameter	DQIs	Requirement	Auditor Assessment
	Sampling containers	Soil and sediment samples to be collected into laboratory supplied, clean unpreserved Teflon lined jars. Groundwater and surface water samples to be collected into laboratory supplied, clean and appropriately preserved sampling containers.	Soil, sediment and water samples were placed into laboratory-supplied jars /bottles that were prepared preservatives where required. Water samples were placed on ice following collection and during transportation to the laboratory. Water samples to be analysed for dissolved metal(loids) were filtered to 0.45 µm in the field. Dust swabs and vacuum samples were collected in zip lock bags. Paint samples were collected in zip lock bags.
Representa-tiveness	Sampling equipment decontamination	Sampling equipment to be decontamination between sampling locations or between sampling depths; and monitoring well locations where significant contamination is encountered.	The consultant (Ramboll 2020) reported that decontamination of the sampling equipment was undertaken.. A copy of the work instructions were not provided, however, the consultant stated that phosphate free detergent was used to clean sampling instruments between sample locations throughout the soil and groundwater investigation program. The consultant reported that sampling instruments were rinsed with deionized water to minimize the potential for cross contamination to occur. The consultant stated that soil samples were collected directly from either the excavator bucket or by hand using dedicated nitrile gloves. The auditor considers the sampling methods employed by Ramboll during the investigation and validation works are unlikely to have resulted in significant cross-contamination between sample locations and a review of the available analytical data does not indicate that this has occurred.
	Soil sample contamination screening	Soil samples to be screened for contamination via visual / olfactory observations.	The consultant (Ramboll 2020) provided bore logs detailing observations of material types; visual and olfactory observations; sample depths; and groundwater observations.
	Sample storage and transport	Samples to be placed in an insulated container and chilled. Samples to be transported to laboratory under chain of custody conditions.	All samples were transported under chain of custody conditions, to laboratories that were NATA accredited for the analysis performed.
Representa-tiveness	Laboratory sample receipt advice	No damaged containers. No samples submitted in containers which have not been chilled. No samples to be submitted without sufficient times to	Laboratory sample receipt advice provided by the nominated laboratories confirmed that all samples were received in suitable condition, with completed chain of custody documentation provided in the reports.

Parameter	DQIs	Requirement	Auditor Assessment
		comply with recommended holding times.	
	Holding times	Samples to be extracted and analysed within recommended holding times.	A review of the consultant's COC documentation and laboratory reports indicates that all samples were analysed within their holding times for all analyses undertaken.
	Analytical Method	Samples to be analysed using NATA accredited methodology.	Laboratories used included: Eurofins (primary) and ALS (secondary). Laboratory certificates were NATA accredited.
Complete-ness	Sampling, analysis and quality plan completeness	100 % of sampling, analysis and quality plan to be implemented.	A sampling analysis and quality plan (SAQP) was not prepared or reviewed by the auditor prior to the Detailed Site Investigation (Ramboll 2020). The auditor satisfied with the SAQP implemented during the DSI and the works described in the DSI addendum.
	Field documentation	All relevant field documentation to be collated including sampling logs and calibration records.	The consultant (Ramboll 2020) provided borelogs, field screening results, calibration records, groundwater purging data and relevant field notes in the report.
	Laboratory documentation	All relevant laboratory documentation to be collated, including chain of custody records, sample receipt advice and analytical reports.	The consultant generally provided relevant laboratory documentation for the primary lab and secondary laboratories.
	Practical Quantification Limits	Limits of Reporting less than assessment criteria	Groundwater results: aluminium (ADWG) and mercury (ANZG 2018, freshwater) assessment criteria were less than the limit of reporting. Aluminium was not identified as a potential contaminant of concern, and mercury was not identified in soil at the rail corridor site at elevated concentrations, the auditor does not consider these will affect conclusions about the rail corridor site.
	Critical sample validity	All critical sample data to be valid.	The auditor considers that the data is considered reliable, for the purpose of the investigation.
	Sampling, analysis and quality approach	Adequately comparable sampling, analysis and quality approach to be used throughout the project.	The auditor considers that the data is comparable, as consistent sampling methods were employed throughout the direction of the investigation works and subsequent validation program. One consistent consultant was engaged for the entire investigation works. All laboratory analysis was undertaken by NATA accredited laboratories.
	Sampler	Samplers used throughout the project to have sufficient experience.	

4.2 Audit Findings

The quality assurance/quality control measures employed by Ramboll (2020a, 2021a and 2021b) were checked and found, overall, to adequately comply with the requirements outlined in EPA 2020, NEPC 2013 and EPA 2017. The laboratory QA/QC results have been reviewed and the results indicate that the analytical laboratories were achieving adequate levels of precision and accuracy.

As such, the sampling, analytical and quality protocols undertaken by Ramboll were considered to be adequately reliable for the purpose of assessing the contamination status of the rail corridor site; and is reliable and useable for the purpose of this audit.

5. Assessment Criteria

5.1 Soil Criteria

For the DSI, Ramboll (2020a) adopted criteria from the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended 2013 (NEPC 2013) for on site and off site assessments, based on the current and future use of the rail corridor site.

- Health Investigation Levels (HIL): HIL-A – Residential use (home grown produce< 10% fruit and vegetable intake (no poultry), also includes children's day care centres, preschools and primary schools.
- Health Investigation Levels (HIL): HIL-C – Recreational use such as parks, playgrounds, playing fields, secondary schools and footpaths. This does not include undeveloped public open space where the potential for exposure is lower and where a site specific assessment may be more appropriate.
- Health Investigation Levels (HIL): HILD – commercial/industrial such as shops, offices, factories and industrial sites. The HILs are applicable for assessing human health risk via all relevant pathways of exposure. The HILs are generic to all soil types and apply generally to a depth of 3 m below the surface for industrial use.
- EIL for urban recreational and public open space and EIL for commercial/ industrial use - ecological investigations levels applicable for assessing risk to terrestrial ecosystems. EILs depend on specific soil physicochemical properties and generally apply to the top 2 m of soil.

In addition, Ramboll determined a site-specific trigger level (SSTL) for lead, to be protective of current and future on site workers at the rail corridor site of 2,200 mg/kg.

5.2 Groundwater and Surface Water Criteria

Ramboll (2020a) conducted an assessment of environmental values and adopted groundwater criteria based on the following:

- National Environment Protection Council (NEPC), National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended 2013 (NEPM, 2013).
- National Health and Medical Research Council (NHMRC) (2001) National Resource Management Ministerial Council (NRMMC) Australian Drinking Water Guidelines 6, Version 3.5 updated August 2018, (ADWG 2011).
- National Health and Medical Research Council (NHMRC), National Resource Management Ministerial Council (NRMMC) Guidelines for Managing Risks in Recreational Water (NHMRC, 2008).
- Department of Environment and Conservation (DEC) Guidelines for the Assessment and Management of Groundwater Contamination (DEC, 2007).
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG 2018) (available at www.waterquality.gov.au/anz-guidelines).
- Australian and New Zealand Environment and Conservation Council (ANZECC) & Agriculture
- and Resource Management Council of Australia and New Zealand (ARMCANZ) Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC, 2000).

The DSI (Ramboll 2020a) reported that a groundwater usage survey had been conducted by JHR and reported that the beneficial uses and environmental values of the groundwater include:

- Irrigation of produce and stock watering;

- Freshwater ecosystems;
- Irrigation watering of fields; and
- Drinking water.

With regards surface water, Ramboll applied hardness correction factors for the following metals: cadmium, chromium, lead, nickel and zinc when considering protection of freshwater ecology, in line with procedures described ANZG 2018. EnRisks (2020) considered the risks posed by metals within surface waters passing through the site and towards the Mulwarre River.

The assessment criteria is considered in greater detail in **Section 8** where surface water results are assessed.

5.3 Dam, Drainage Line and River Sediment

Ramboll (2020a) compared results for sediments collected from the dam, drainage lines and the Mulwarre River with the default guideline values in ANZG (2018) – Ecological Investigation Criteria and cited both the Sediment default guideline value (DGV) and the guideline value – High (GV- high).

5.4 Rainwater Tank Water and Sediment

Ramboll (2020a) compared results for water from the rainwater tanks with the drinking water guidelines (NHMRC, updated August 2018), as per the groundwater and surface water criteria cited in **Section 6.3** (above).

Assessment criteria for sediment derived from the rainwater tanks was compared with HIL-A and HIL-C criteria (NEPC, 2013) cited for soils in **Section 6.2**, above.

5.5 Internal Dust

Ramboll (2020a) referenced two guidance documents regarding internal dust as shown:

- *Protect your family from lead in your home*. US Environmental Protection Agency – January 2020 (USEPA, 2020); and
- *Guide to lead paint management - Residential and commercial buildings*, Australian Standard: AS 4361.2-1998.

5.6 Air Quality

Ramboll (2021b, 2021d) provided air quality criteria for lead, total suspended particulates (TSP), $PM_{2.5}$ and PM_{10} and deposited dust. The averaging period for each criterion is set as either annual or over a 24 hour period. Ramboll referenced four guidance documents as shown:

- *National Environment Protection (Ambient Air Quality) Measure,* National Environment Protection Council, 1998;
- *Ambient Air Quality Goals Recommended by the National Health and Medical Research Council*, National Health and Medical Research Council, Canberra, NHMRC (1996).
- *Air Pollution from Surface Coal Mining: Measurement, Modelling and Community Perception, Project No. 921,* National Energy Research Development and Demonstration Council, Canberra, NERDDC (1988).
- National Environment Protection (Ambient Air Quality) Measure – as amended, Federal Register of Legislative Instruments F2016C00215, Department of the Environment, Canberra, DoE (2016)

5.7 Paint

Ramboll (2020a) reported that there was no specific guidance regarding assessment criteria for lead concentration in paint, but used a value of 0.1% that is cited within the following document:

- *Lead Alert: the six step guide to painting your home,* 5th Edition, Australian Government Department of the Environment, 2016.

5.8 Audit Findings

The soil, groundwater, surface water and air quality criteria adopted by the consultant (Ramboll 2020a) have been checked against, and were generally consistent with, criteria endorsed by the EPA. A site specific trigger level (SSTL) of 2200 mg/kg for lead was derived by Ramboll (2019a) to be protective of workers at the rail corridor site and was reviewed by the auditor's technical expert. The SSTL was found to be appropriate and conservative for the protection of construction and remediation workers at the site, requiring exposure controls.

With regards groundwater and surface water, Ramboll (2020a) applied the 95% freshwater species protection levels. Ramboll adopted the following assumptions: for aluminium, pH <6.5; for arsenic, the valent state was As(III) and for chromium, the valent state was Cr(VI).

The auditor is satisfied that the assumptions used by Ramboll are appropriate. A review of the groundwater field data collected during the investigations showed that pH is occasionally greater than pH 6.5, but the technical brief for Al indicates that toxicity increases at lower pH, so the assumption adopted by Ramboll is conservative.

The auditor accessed the ANZG website on 18 October 2021 and found the default guideline values (DGV) adopted by Ramboll to be correct.

For consideration of irrigation criteria, Ramboll adopted the less conservative short term trigger value, rather than the long term value. EnRisks (2020) noted that the surface water bodies were not permanent water supplies. The auditor considers this to be appropriate.

With regards sediment criteria for the dam, drainage lines and river, ANZG (2018) indicates that the sediment default guideline values (sediment DGV) provide the concentrations below which there is a low risk of unacceptable effects occurring while the GV-high values provide an indication of concentrations at which you might already expect to observe toxicity-related effects. Further, ANZG (2018) notes that, unlike the water quality default guideline values, the sediment DGVs cannot be adjusted for the level of protection based on the percentage of species protected, but the level of protection can be adjusted if sediment quality guideline values are based on reference site data.

With regards sediment criteria for rainwater tanks, the auditor notes that Ramboll considered the exposure pathway for human receptors following tank cleaning operations, whereby sediment removed from the tanks is deposited on soil/grass surface at the premises where the tank was cleaned, i.e. private residences or public facilities such as the community hall, which is common practice. The auditor considers this assumption to be reasonable.

With regards the guideline value in paint of 0.1%; the auditor notes that this value is used to indicate the presence of lead-based paint, rather than being indicative of a human health risk. The auditor considers this to be acceptable.

Overall, the auditor considers that the criteria used by Ramboll to be appropriate and justified.

6. Evaluation Soil Investigation Results

Ramboll (2020a) reported the collection and analysis of soil samples collected from both on site and from around properties in the vicinity of the rail corridor site. In addition, Ramboll (2020a) reported the results of soil samples assessed by XRF. On site sampling locations are shown in **Figures 2a to 2e and Figure 8 in Appendix C**. Off site sampling locations for the public properties and roads are shown in **Figures 6a, 6b and 7 in Appendix C.**

6.1 On Site Field Observations

A summary of field observations at the former OLC and more broadly across the rail corridor site made during the works summarised in the DSI (Ramboll 2020a) is provided below:

- Ore concentrate was visually observed at the surface in the north of the former OLC adjacent to a drainage channel upstream of the middle rail culvert.
- Evidence of contamination was identified at several locations near the eastern site boundary. Visible evidence of contamination was observed as green and orange staining of silt within fouled ballast in the areas of lead impact.
- The subsurface profile comprised of fill/clay to 2 m BGL, with occasional gravel and or sand. Anthropogenic inclusions were observed in the vicinity of the OLC. **Table 2.2** (above) summarises the sub-surface profile as noted in the bore logs included in the DSI (Ramboll 2020a).

6.2 Onsite Soil Analytical Results

Ramboll (2020a) provided summary tables (**Appendix D**) of historical data. In addition, the DSI provided summary tables of recently collected soil samples, and detailed laboratory reports and chain of custody documentation. Historically, sampling and analysis was performed for metals and a number of organic chemicals. While the VMP requires the auditor to consider the results for lead only, for completeness, the results for the other analytes have been assessed by the auditor as well.

A summary of the soil analytical results, in comparison to the adopted soil investigation levels (as provided in **Section 6.1**) is provided in **Table 6.1**, below.

Table 6.1: Summary of Onsite Soil Analytical Results (mg/kg)

Substance	N	Detections	Maximum concentration (mg/kg)	N > SIL (human health based)	N > SIL (ecological based)
Metals					
Lead	268	265	184,000	**44**	**48**
Arsenic	30	28	150	No exceedance	No exceedance
Cadmium	30	21	14	No exceedance	No exceedance
Chromium (total)	30	24	57	No exceedance	No exceedance
Copper	30	26	900	No exceedance	**11**
Nickel	30	12	17	No exceedance	No exceedance
Zinc	30	30	1600	No exceedance	**8**
Mercury	30	7	0.6	No exceedance	No exceedance
BTEX/TRH					
BTEX	30	0	<LOR	No exceedance	No exceedance
TRH C_6-C_{10}	30	0	<LOR	No exceedance	No exceedance
TRH C_6-C_{10} less BTEX (F1)	30	0	<LOR	No exceedance	No exceedance
TRH > C_{10}-C_{16}	30	2	92	No exceedance	NA
TRH > C_{10}-C_{16} less naphthalene (F2)	30	2	92	No exceedance	NA
TRH > C_{16}-C_{34}	30	11	310	No exceedance	NA
TRH > C_{34}-C_{40}	30	9	506	No exceedance	NA
PAHs					
Benzo(a)pyrene (TEQ)	30	4	1.4	No exceedance	NA

Substance	N	Detections	Maximum concentration (mg/kg)	N > SIL (human health based)	N > SIL (ecological based)
Naphthalene	30	0	<LOR	No exceedance	NA
Total PAHs	30	4	6	No exceedance	NA

N number of samples
NA not applicable

6.3 On site XRF Results

Ramboll (2020a) reported XRF results collected from the rail corridor site for arsenic, copper, lead, nickel and zinc at 11 locations. Results for lead ranged from 33.66 to 15,510 mg/kg, with four locations exceeding the SSTL.

6.4 Off site Field Observations

Off site soil samples were collected from surface soils only, for samples collected from properties in the vicinity of the rail corridor site. Field observations were not provided in the DSI (Ramboll 2020a).

Off site groundwater wells MW6 and MW7 were installed downgradient of the rail corridor site and provided subsurface profiles to the east of the rail corridor site. These consisted of clay to 1.5 m BGL at MW6 the clayey gravel to depth. The borelog for MW7 indicated gravelly clay to depth.

6.5 Off site Analytical Results

Soil samples were collected from private residences as well as public premises, such as Tarago Public School and the community centre, as well as being collected from streets in Tarago and along the haul road from the mine. Samples were collected from the shallow surface soil.

These were laboratory analysed for lead, only and **Table 6.2** summarises the results.

Table 6.2: Summary of Offsite Soil Analytical Results (mg/kg)

Location	N	Detections	Maximum concentration (mg/kg)	N > SIL (human health based)	N > SIL (ecological based)
Goulburn St	10	10	880	**1**	No exceedance
Stationmaster's Cottage	6	6	1200	**5**	No exceedance
Tarago railway station	25	25	2400	**3**	**3**
Tarago Public School	10	10	240	No exceedance	No exceedance
Tarago Town Hall (P3)	9	9	400	No exceedance	No exceedance
Tarago pre-school (P5)	6	5	67	No exceedance	No exceedance
Tarago Country Women's Association (P8)	4	4	290	No exceedance	No exceedance
Tarago Rural Fire Service (P9)	10	10	46	No exceedance	No exceedance
Tarago Sports Ground (P6)	16	16	430	No exceedance	No exceedance
Tarago Showground (P11)	12	9	12	No exceedance	No exceedance

Other private properties were assessed for lead and the results indicate that lead was not found in soils above criteria, other than the Stationmaster's Cottage. The results are presented in **Appendix D**.

6.6 Off site XRF Results

Ramboll reported results collected using the XRF in public places such as the streets of Tarago. More than 200 locations were assessed and the results reported exceedances for Tier 1 screening criteria for human health open space use for arsenic, copper, lead and zinc and ecological criteria for arsenic, copper, lead and zinc. The results are presented in **Appendix D**.

6.7 Leachate results

Ramboll (2020a) reported the results of leachate analyses performed on soil samples from the rail corridor site performed for waste classification purposes. Three samples were collected from surface soils (TP1 0.1-0.5), (TP5 0.1-0.45) and (TP7 0.1-0.4) and subjected to the toxicity characteristic leachate procedure (TCLP) test. Another three surface soil samples were collected (TPXX and subjected to the Australian Standard Leachate Procedure (ASLP).

Ramboll noted the following:

- pH during ASLP was reported at 4.7 – 4.3, indicating that soils impacted by ore concentrate are moderately to highly acidic;
- Lead concentration in the TCLP leachate ranged from 4.3 – 32 mg/L; and
- Lead concentration in the ASLP leachate ranged from <LOR – 1.1 mg/L.

6.8 Sleeper Results

The DSI assessed four railway sleeper samples for a range of analytes and classified the material as general solid waste.

6.9 Audit Findings

The auditor has considered the soil field observations and analytical results and notes the following:

- The main contaminants of concern reported at the rail corridor site were metals, in particular lead. As reported in the DSI, of 268 samples analysed, 44 (16%) exceeded the SSTL of 2200 mg/kg and 48 (18%) exceeded the EIL for lead. Some copper and zinc were also reported at concentrations exceeding the EIL; seven of 12 samples which exceeded criteria for zinc and/or copper also exceeded the criteria for lead.
- For lead, the laboratory results for surface samples exhibit a high level of variability over a short lateral distance. For instance, HA02 and SS32 are approx. 3 m apart and the results vary by six-fold with values of 450 and 2800 mg/kg, respectively. Other examples include SS39 and MW3 which are approx. 12 m apart and vary by two orders of magnitude (2900 and 25 mg/kg, respectively) and SS15 and SS16 which are approx. 4 m apart and vary by more than 40-fold with results of 350 and 15,000 mg/kg, respectively. The auditor considers this reflects the nature of the contaminating material and the mechanism of contamination, that is, ore concentrate (a variable material) deposited as a dust, with dispersal behaviour being highly variable.
- Very high lead concentrations were reported in shallow soils (<0.5 m BGL). The only exception was MW2 where elevated lead concentrations were reported at a depth of 1 m BGL. It is understood MW2 is located in the former OLC footprint which was capped, and 1 m BGL was the rail corridor site surface during operation of the OLC which was subsequently capped.
- The elevated metal results reported in local public road reserves were considered in terms of their distribution relative to the site. Ramboll (2021b) noted that the detections were unrelated to the rail corridor site, with the exception of Boyd St results where surface water flows from the site were reported. The auditor agrees with this assessment.
- The auditor has considered the leachate analytical results and notes that lead from the lead ore and surface soils appears to be slightly leachable and therefore potentially can be transported off site via surface water; investigations are discussed in **Section 8**, below. The auditor also notes that the potential exists for lead to be transported via groundwater; investigations are reported in **Section 7**, below.

7. Evaluation of Groundwater Investigation Results

Ramboll (2020a) installed and developed seven groundwater monitoring wells (MW1 – MW7) and collected samples from each in March 2020. In addition, Ramboll collected a sample from an old well (GW053976) located in the rail corridor in the southern portion, as shown in **Figure 5 in Appendix C.**

In addition, Ramboll used the results of an earlier water use survey to identify any groundwater bores from discrete property bores, in the vicinity of the rail corridor site. With permission of the property owners, groundwater samples from these bores were obtained and laboratory analysed.

7.1 Field Observations (MW1 – MW7 and GW053976)

During groundwater sampling for MW1 – MW7 and GW053976, Ramboll noted the following:

- Depth to groundwater ranged from 1.21 m BGL at MW7 to 6.955 m BGL at MW2;
- Groundwater at the rail corridor site varied in colour from light brown to brown and from low turbidity to medium-high turbidity, except for on site well GW053976, which was found to be clear with no turbidity;
- No odour was reported in the groundwater from any of the wells;
- pH was neutral, ranging from pH6.77 to pH7.55;
- Electrical conductivity (EC) ranged from 476 to 1020 µS/cm, indicative of fresh water; and
- Redox potential was reported to range from -72 to 126 mV and Ramboll stated that it ranged from reducing to oxidising conditions.

7.2 Groundwater Analytical Results (MW1 – MW7 and GW053976)

The eight groundwater samples were analysed for a range of metals and metalloids and Ramboll provided summary tables (**Appendix D**) in addition to detailed laboratory reports and chain of custody documentation. While the VMP requires the auditor to consider the results for lead only, the results for the other analytes have been included for completeness.

A summary of the groundwater analytical results, in comparison to the adopted groundwater investigation levels (as provided in **Section 6.2**) is provided in **Table 7.1**, as follows.

Table 7.1: Summary of Groundwater Analytical Results (µg/L)

Substance	N	Detections	Minimum concentration	Maximum concentration	Exceedance of GIL
Lead	8		<LOR	0.005	**1**: GW053976 (0.005) > ANZG 2018
Aluminium	5	0	<LOR	<LOR	No exceedance
Arsenic	8	2	<LOR	0.005	No exceedance
Barium	5	5	0.05	0.16	No exceedance
Berylium	8	0	<LOR	<LOR	No exceedance
Boron	3	0	<LOR	<LOR	No exceedance
Cadmium	8	2	<LOR	0.003	**1:** MW5 (0.0003) >ANZG 2018
Chromium	8	1	<LOR	0.002	**1:** MW4 (0.002) >ANZG 2018
Cobalt	8	5	<LOR	0.029	**5**: MW1 (0.004), MW2 (0.006), MW3 (0.029), MW4 (0.006), MW7 (0.006). All >ANZG 2018
Copper	8	1	<LOR	0.003	**1**: GW053976 (0.003) > ANZG 2018
Manganese	8	8	0.02	2	**1**: MW3 (2.0) >ANZG 2018
Mercury	8	0	<LOR	<LOR	No exceedance
Nickel	8	6	<LOR	0.004	No exceedance
Selenium	3	0	<LOR	<LOR	No exceedance

Substance	N	Detections	Minimum concentration	Maximum concentration	Exceedance of GIL
Zinc	8	7	<LOR	0.044	**6**: MW1 (0.01), MW2 (0.011), MW3 (0.022), MW4 (0.011), GW053976 (0.27) MW5 (0.044). All >ANZG 2018

N number of samples
<LOR less than limit of reporting

7.3 Groundwater Analytical Results (Discrete Property Bores)

Ramboll collected samples from nine groundwater bores in the Tarago area, where water is extracted at private residences and public properties, including Tarago Public School. The samples were analysed for lead and the results compared with relevant criteria (drinking water, irrigation water and stock watering) as required.

All results were less than the limit of reporting with occasional exceptions where results greater than the limit of reporting were found, they were reported as less than criteria.

7.4 Audit Findings

The auditor has considered the groundwater field observations and analytical results (MW1 – MW7 and GW053976) and notes the following:

- Ramboll noted that construction details for GW053976 were not available. For completeness, the auditor reviewed the Australian Groundwater Explorer and the Water NSW websites[2]. These showed well GW053976 to be 12.2 m deep. The underlying subsurface was described as being fill to 0.6 m BGL, then clay to 7.0 m BGL then sand/gravel water supply from 7.6 to 12.2 m BGL and the well was slotted from 7.6 to 12.2 m BGL. Nearby MW4 was completed in gravelly clay at 9.6 m BGL.
- Lead was detected in groundwater from the on site wells GW053976 and MW5, only. The remainder of the wells reported non-detects. The concentration at GW053976 was marginally above the ANZG 2018 assessment criterion, but below all other criteria. The detection at MW5 was less than all criteria.
- When considering the results for groundwater from local groundwater bores, the auditor notes that all results are less than criteria.
- Ramboll has reported some infrequent and low detections of lead in groundwater at the rail corridor site and in the surrounding area. The values range from <LOR to 0.005 mg/L for detections. The auditor has concluded that contamination of the groundwater from lead at the rail corridor site has not occurred. A secondary line of evidence is the regional stratigraphy; a layer of clay in the subsurface has potentially acted as an aquitard and prevented the migration of lead contamination from the surface to the underlying aquifer.

[2] http://www.bom.gov.au/water/groundwater/explorer/map.shtml and https://realtimedata.waternsw.com.au/ accessed 22 October 2020

8. Evaluation of Surface Water and Sediment Results

Ramboll (2020a) collected surface water and sediment results at locations at the rail corridor site and offsite towards the Mulwarre River to the east of the rail corridor site, as well as from the Mulwarre River. One location to the west of the rail corridor site was included in the program, which provided a background location. Sampling locations are shown in **Figure 3, Appendix C.**

8.1 Field Observations

Ramboll (2021a, 2021c) described rainfall in the preceding month prior to surface water sampling. A range of conditions were encountered, from dry to wet months preceding sampling and some sampling events were conducted with no rainfall immediately precedent to the sampling to high rainfall events immediately prior to the sampling.

For some sampling events, water was not present at every location. Ramboll collected physico-chemical parameters at each location where water was present, and the following summarises the results for all samples, including the three locations from the Mulwarre River.

- Temperatures ranged from 7.3 to 25 °C depending on the season.
- Conductivity ranged from 95 to 1007 µS/cm and total dissolved solids ranged from 62 to 263 mg/L indicating brackish to freshwater and potable with regards conductivity and salinity.
- Dissolved oxygen ranged from 0.04 to 16.8 mg/L and oxidation-reduction potential ranged from -41 to 227 mV. The values for these parameters varied according to rainfall and the presence/absence of water. ORP was rarely within the
- Measurements for pH ranged from 5.8 to 8.9 indicating mildly acidic to alkaline conditions.

8.2 Surface Water Analytical Results

The results of the surface water sampling are shown in **Appendix D** and summarised below.

Ramboll (2021c) considered the results as two datasets, onsite and near site surface water locations, and the Mulwarre River results. The sampling conducted over eight monitoring events (Ramboll (2021a and 2021c).

With regards the onsite and near site results, Ramboll reported all results were less than the health-based screening criteria (recreational waters), except for one detection of aluminium (of 35 samples), two detections of cadmium (of 36 samples), five of iron (of 35 samples), two of lead (of 41 samples) and one of nickel (of 36 samples).

8.3 Sediment Analytical Results

Sediment samples were collected onsite within drainage lines and offsite along the three culverts that lead to Mulwarre River. Sediment samples were collected from the Mulwarre River.

As the three culverts and drainage lines are ephemeral until they meet the river, sediment and soil guideline values are considered when assessing the risks posed by metals in the offsite culvert drainage lines, while sediment guideline values are applied for tier one screening purposes for the samples collected from the Mulwarre River.

Ramboll (2021a) reported that sediment concentrations were greater than criteria for metals on site, and there was evidence of off site migration of metals at concentrations which exceeded tier one criteria. Ramboll reported that the sediments collected from the Mulwarre River were less than criteria.

8.4 Risk Assessment for Surface Water and Sediment Results

A risk assessment was prepared by EnRisks (2021) which developed site specific criteria, based on where the locations of the drainage lines/culverts and relevant site uses.

The risk assessment considered the following:

- Rainfall in the lead up to the surface water and sediment sampling so that seasonal variation was considered;
- If water flowed regularly in the culverts or whether they were ephemeral in nature;
- Current land use and potential land use for each of the sites; and
- Both ecological and human health receptors.

By considering the site specific criteria for surface water and sediment, EnRisks concluded that existing risks are expected to be low and acceptable.

8.5 Audit Findings

With regards the site specific risk assessment, the auditor accepts the site specific criteria developed by EnRisks, noting that the integrated exposure uptake biokinetic (IEUBK) model was used to develop the site specific criteria for lead, in accordance with the NEPM. The auditor agrees with EnRisk's conclusions regarding the surface water and sediment data.

9. Evaluation of Rainwater Tanks, Dust and Paint Results

Samples of different environmental media were collected from both public and private properties on the rail corridor site and off site around Tarago.

9.1 Rainwater Tanks

Analysis for metals from the rainwater tanks found no results greater than human health criteria for the water within the tanks. In some instances elevated detections of metals were found in the sediment within the tanks and cleaning and validation works were conducted. The auditor received documentation provided to property owners regarding these activities and is satisfied the works have been adequately carried out.

9.2 Dust

Interior dust samples were collected from a number of properties and were found to exceed criteria. Ramboll reported cleaning of these premises and the results of validation sampling conducted at the time of cleaning. The auditor received copies of the documentation provided to property owners regarding these activities and is satisfied the works have been adequately carried out.

9.3 Paint

Household paint samples were collected from six properties as 10 discrete samples. Results indicated that results were greater than the derived criteria for six of discrete samples. Paint samples were collected as paint in deteriorating condition was identified at a number of properties. The analysis for lead in paint samples suggested that it might be a source of lead in dust within some properties, rather than dust from the rail corridor site.

9.4 Audit Findings

The auditor is satisfied that air borne dust potentially emanating from the site and settling on roofs has not had an appreciable effect on metal concentrations in rainwater tank water. The auditor notes that sediment within the tanks was compared was found to exceed site criteria in some instances and advice was given on removal and management in those circumstances.

With regards dust and paint results, the auditor is satisfied that locations where lead results were found to be above criteria that appropriate remedial activities were performed and the results have been communicated to property owners.

10. Evaluation of Conceptual Site Model

The National Environment Protection (Assessment of Site Contamination) Measure, NEPC, 1999 (as amended 2013, NEPC 2013) identifies a conceptual site model (CSM) as a representation of site related information regarding contamination sources, receptors, and exposure pathways between those sources and receptors. The development of a CSM is an essential part of all site assessments and remediation activities.

NEPC (2013) identified the essential elements of a CSM as including:

- Known and potential sources of contamination and contaminants of concern including the mechanism(s) of contamination;
- Potentially affected media (soil, sediment, groundwater, surface water, indoor and ambient air);
- Human and ecological receptors;
- Potential and complete exposure pathways; and
- Any potential preferential pathways for vapour migration (if potential for vapours identified).

Based on the known contamination, each of the elements of the CSM are discussed as follows.

Ramboll (2020a) presented a preliminary CSM prior to conducting investigation works reported in the DSI and this was assessed by the auditor in Interim Audit Advice Letter 01. The CSM was further refined in the RAP (2021b) and is assessed below.

10.1 Source of Contamination

Ramboll identified the primary source of the lead contamination as being ore concentrate, which was unloaded at the former OLC within the rail corridor site and then deposited at the OLC and within adjacent shallow soils. Two secondary sources were identified, namely surface water and sediment in drainage lines onsite and in the local offsite receiving environment; and dust that had accumulated within buildings and as sediment in rainwater.

Based on the identified sources of contamination, Ramboll (2021b) identified the following heavy metals, and in particular lead as the contaminants of potential concern. Laboratory sampling and analysis confirmed that lead is the primary contaminant of concern, as stated in the VMP.

The RAP also noted that there were several instances of localised lead contamination that were geographically separated from the rail corridor site and identified on private properties. In these instances, lead based paints were observed to be present and in poor condition and it was assessed that the lead contamination was not sourced from the rail corridor site in these instances.

10.2 Potentially Affected Media

The RAP considered the following media as being potentially contaminated with lead:

- Soil and sediment (onsite and offsite);
- Surface water (onsite and offsite) both directly and via rainwater tanks; and
- Groundwater (onsite and offsite).

10.3 Potential Exposure Pathways

Ramboll (2021b) identified human exposure pathways included direct contact with soils, incidental ingestion of soils, inhalation of dust, consumption and direct contact with water. Ecological exposure pathways were generally the same as the human pathways, and also included root uptake.

10.4 Potential Human and Ecological Receptors

Ramboll (2021b) considered a number of potential receptors including onsite workers and ecological receptors. Offsite, the RAP considered residents, those participating in community activities, offsite workers and ecological receptors as well as irrigated crops and livestock.

10.5 Complete Source – Pathway – Receptor linkages

The RAP presented a matrix whereby each affected media was considered, such as soil and sediment, surface water, groundwater, dust, rain tank water and rain tank sediment. This was further divided into exposure routes specific to the affected media, such as direct contact, inhalation, incidental ingestion, potable use such as drinking and root uptake. This was displayed with a consideration of each of the potential receptors, on whether a complete linkage from source to receptor was possible, not possible or not applicable.

Based on the main exposure pathways identified by the RAP, onsite workers and ecological receptors, were identified as exposed receptors. This was based on high results within the soils at the site. All other linkages were not considered complete and justification was provided as described below.

- Offsite soil and sediment results were less than tier 2 human health and ecological criteria;
- Concentrations of copper, lead and zinc in the Mulwarre River are consistent both upstream and downstream of site discharge points;
- Contaminant concentrations in surface water between the site and the Mulwarre River are below the adopted assessment criteria and are acceptable;
- Contaminant concentrations in groundwater were found to be less than human health criteria. Some metals exceeded ecological criteria onsite, but did not exceed ecological criteria at the offsite locations;
- Contamination migration via airborne dust had occurred at several locations but this has been removed and was reported in a number of letters to residents. The auditor has reviewed these letters. In addition, air quality monitoring indicated that levels of air borne dust has been low since dust removal occurred;
- Rain tank water was below criteria; and
- Sediment within rain tanks was tested and found to exceed soil criteria in some instances. The sediment was removed in these instances and the linkages no longer exist.

10.6 Audit Findings

The auditor considers that the identified potential contamination issues and potentially contaminated media and each of the pathways considered was appropriate with an exception described below. The auditor notes that a number of source – pathway – receptor linkages have been removed by household and rain tank cleaning. The remaining contamination at the rail corridor site is identified as lead within soils.

The one exception not discussed within the CSM within the RAP is that for the residents at 106 Goulburn St, the Stationmasters Cottage. However, the RAP notes that the former residence at 106 Goulburn St (Lot 1 DP 816626) has been bought by TfNSW as it is known to be impacted with lead, and is no longer used as a residence and therefore the potential receptors have been removed. The RAP states that the Stationmasters Cottage will be reintegrated into the rail corridor and will no longer be used for residential purposes, until it is demonstrated that it is suitable for this purpose.

The auditor recommends that the management of the Stationmasters Masters Cottage be included in the EMP for the rail corridor site.

11. Evaluation of Proposed Remediation and Validation Plan

11.1 Remediation Objectives

The RAP (Ramboll, 2021b) describes the objectives of the RAP is "…to define a remedial strategy to address the risk to human health and the environment from contamination at the site". The RAP states that this will be achieved by addressing the VMP principal features P8 – P10.

11.2 Remediation Options and Preferred Approach

The relevant portions of the VMP are listed below, together with a summary of the RAP's response and the auditor's findings are shown below in **Table 11.1.**

Table 11.1: Assessment of Remedial Options

Element of the VMP	Addressed in the RAP	Auditor Findings
P8: Assess remedial options to address risks from the Contaminant on, or originating from, the Site.	Section 11 of the RAP includes a remedial options assessment, which is pre-empted by a discussion of the extent of remediation required. The remedial options assessment matrix within the RAP considers three options: 1. Return of ore impacted materials from the site to Woodlawn Mine; 2. Onsite containment; 3. Offsite treatment and disposal; and 4. Continue current management option. The matrix includes a description of each method and site-specific issues. The RAP then ranks each option against environmental, economic and social sustainability to provide an overall ranking.	Adequate
P9: Select a preferred remedial option integrating consultation with the community and other stakeholders.	Remedial option 1 was not chosen as the Woodlawn mine was placed into care and maintenance mode and was no longer operational and not able to receive the impacted materials. Remedial option 2 was not chosen as the Tarago site was not suitable based on limitations to future development and functionality of the area. Alternate locations in the country rail network were considered but were found to be unsuitable to complexities arising from the NSW environmental planning pathways. Remedial option 3 was chosen as the preferred remedial strategy but notes that some remnant contamination within the rail formation will be required under an EMP. Remedial option 4 was not chosen due to likely recurring costs and because the local community had indicated a preference for the site to be remediated.	When reviewing earlier drafts of the RAP, the auditor has raised with Ramboll issues around the planning pathway complexities. During review of drafts of the RAP, the auditor raised concerns regarding the potential for dust generation at the rail corridor site during remediation using remedial option 3. This was addressed in the final RAP and is discussed in more detail, below. Final RAP is adequate.
P10. Prepare a RAP(s) to define how the selected remedial option will be implemented and validated.	Sections 12 – 14 of the RAP provide details of the implementation and validation of remedial option 3.	These are assessed, below.

11.3 Remediation Required

Based on the investigations previously completed Ramboll (2020a and 2021a) and the requirements of the VMP, lead contamination of soil, railway ballast and railway sleepers will be addressed by the remedial program.

11.4 Remediation Details

The RAP (Ramboll, 2021a) provided details of the proposed remediation works including the following:

1. Excavation of contaminated material from the rail corridor site;
2. Transport via road to a compound within a landfill site that is yet to be determined;
3. Mechanical screening of material, creating two streams:
    a. < 20 mm material to be immobilised using a pugmill then landfill disposed as general solid waste; and
    b. >20 mm material to be returned to the rail corridor site for beneficial reuse after demonstrating it meets validation criteria.

With regards the immobilisation process, the RAP included a Specific Immobilisation Approval Application with the RAP that had been submitted to the NSW EPA on 17 August 2021, for the materials described in step 3(a), above. The application indicated that the total volume/tonnes of material to be removed is approx. 4850 m^3 (8910 t) comprising of 100 m^3 of railway sleepers, 2,100 m^3 of soil, 2,000 m^3 of fouled ballast currently within the formation and a further 750 m^3 of fouled ballast currently stockpiled. Since the RAP was issued Ramboll received approval from the NSW EPA and a copy has been provided to the auditor as Approval number SIA2021-S-02 and it is valid for 12 months from the commencement date: on or after 30 September 2021 (**Appendix G**).

11.5 Validation Program

The remediation and validation program were presented within a Data Quality Objective framework. The auditor's assessment is below.

11.5.1 Validation Assessment

With regards the validation plan outlined in the RAP, the auditor notes the following:

- The remnant soils remaining at the rail corridor site will be validated using XRF measurements, indicating that lead concentrations in the excavation surface soil is <2200 mg/kg (SSTL);
- XRF measurements at the immobilisation compound will demonstrate that the 95% UCL of lead concentrations in remnant surface soils is below either the Tier 1 health investigation level for lead industrial land or the 95% UCL of lead concentrations in remnant surface soils before establishing the compound;
- Sampling density will be one sample per 100 m^2 across the excavation base and on 10 m increments along excavation walls. Similarly, the sampling density at the immobilisation compound will be 1/100 m^2;
- Screened ballast will be deemed suitable for reuse at the rail corridor site if 95% UCL of lead concentration is less than 1500 mg/kg (HIL-D);
- Ballast fines will be considered suitable for disposal as immobilised GSW if the 95% UCL of lead leachate (TCLP) is less than the limit for lead leachate in GSW defined in the NSW EPA Waste Classification Guidelines (TCLP1 – 5 mg/L);

- Sampling density of screened ballast and immobilised fines stockpiles will be sampled at a density of 1/25 m^3 with a minimum of three samples per stockpile;
- One round of surface water monitoring is proposed post-remediation; and
- Three months of continuous air quality monitoring are proposed post-remediation.

Criteria to be applied for the surface water and air quality monitoring are those described above in Section 5.

In addition to the above sampling and analysis reporting in the Validation Report, the RAP indicates the following:

- Some sampling has already occurred in areas where excavation of lead impacted soils has already occurred and been found to be less than criteria. These results will be included in the Validation Report;
- Material tracking will be undertaken to demonstrate appropriate and controlled movement of lead impacted materials. An example tracking spreadsheet was included in the RAP; and
- Lead impacted soils will remain onsite following remediation and will be managed under a long term environmental management plan (EMP).

11.5.2 Imported Fill Assessment

The RAP does not indicate whether any material will be imported to the rail corridor site, aside from the material returned to the rail corridor site after off site separation.

In the event that additional materials are required to be imported to the rail corridor site for site level purposes, the auditor require that these materials meet the following criteria:

- VENM (as per the definition specified in the POEO ACT 1997) and is based on anticipated background levels for inorganics, laboratory detection limits for organics and no asbestos (visually and laboratory).
- ENM (as per the Excavated Natural Materials exemption under the POEO (Waste) Regulation 2005 – General Exemption Under Part 6, Clause 51 and 51A) and is based on concentrations of contaminants assessed in the material that do not exceed the ENM assessment criteria, and the material does not contain asbestos.

11.5.3 Waste Classification

The RAP indicates that materials for disposal to landfill will be classified in accordance with NSW EPA (2014) and disposed to appropriately licensed facilities. The RAP indicated that material tracking records will be maintained including the identification of waste dockets for materials disposed to landfill. The RAP has indicated that an appropriate facility has not been identified.

The RAP included a waste classification report dated 26 March 2020 for the railway sleepers whereby the sleepers were pre-classified as general solid waste (GSW), based on chemical analysis of woodchips derived from the sleepers. The auditor notes that the waste sleeper stockpile should be reviewed prior to disposal to ensure that the material still meets the description made in the waste classification report.

11.5.4 Unexpected Finds

The RAP included a contingency plan that outlines procedures where unexpected site conditions or circumstances occur. The event and the action are shown below in **Table 11.2**.

Table 11.2: Unexpected Finds

Contingency Event	Contingency Action	Auditor Findings
Validation sampling indicates the screened	Further removal of contaminated fines or immobilisation and disposal	Adequate.

Contingency Event	Contingency Action	Auditor Findings
ballast is unsuitable for onsite reuse		
Validation sampling of immobilised material indicates not suitable for disposal as immobilised GSW	Further immobilisation will occur	The auditor notes that the treatment trials reported in the Specific Immobilisation Approval Application have shown concentration ranges from 350 to 29,000 mg/kg. The auditor notes that the unexpected finds protocol includes placing material through the pugmill again and further treatment with the Immobilisation reagents magnesium oxide (MgO) and monoammonium phosphate (MAP). Adequate.
Discovery of unexpected materials	Contact the Principal's representative, sort materials into a segregated stockpile and discuss possible disposal options with the Principal or the Principal's Representative	Adequate

11.5.5 Validation Report

The RAP indicates that following the completion of all remediation and validation activities, a validation report will be prepared by the environmental consultant in accordance with NSW EPA 2020, *Guidelines for Consultants Reporting on Contaminated Land*.

The validation report will include the following:

- Executive summary;
- Scope of work;
- Site identification;
- Summary of site history and previous investigations;
- Remediation activities undertaken, including the extent of the excavation works (survey information) and observations made during excavation works;
- Supporting factual evidence of the remediation work including photographic and field records and materials tracking data;
- Validation sampling and analysis results;
- Quality assurance/ quality control (QA/QC) protocols for field work and laboratory analysis; and
- A statement indicating the adequacy of the remediation completed, degree to which lead impacts have been removed and if / where impacts remain.

11.6 Remedial Action Works Plan

The RAP provided a summary of relevant site management and occupational health and safety controls that require implementation during remedial works and provided a guide to the minimum site management requirements that should be implemented during the remedial works. The works plan identified key personnel and their roles and responsibilities, noting that some roles were yet to be filled.

The RAP outlined that the following plans would be prepared prior to works commencing:

- A worker health and safety plan that includes the specific details for working with these materials;

- A construction environmental management plan, detailing the controls proposed to be implanted by the contractor to minimize impacts on the environment and the local community;
- The remediation contractor will prepare a soil and water management plan to manage soil and water during the works. The remediation contractor must define and implement controls to prevent offsite contaminant migration above criteria protective of the receiving environment, with regards to guidance provided in the *Lead Action Plan* (Ramboll 2020b). The auditor notes this indicates that surface water monitoring should occur on a quarterly basis and preferably after rainfall > 10 mm;
- The remediation contractor will prepare a noise management plan that complies with the requirements of the Country Rail Network (CRN). The RAP includes a list of control measures that should be considered;
- Material tracking will be performed from cradle to grave and will provide detailed information on the origin, quantity and fate of all materials excavated during remediation;
- Hours of operation where audible noise is generated at the nearest residential receptors (20 Stewart and 17 Wallace Sts) are limited to:
    - 7:00 am to 6:00 pm Monday to Friday.
    - 7:00 am to 1:00 pm Saturdays.
    - At no time on Sundays or public holidays.
- The remediation contractor will co-ordinate surveys of the excavated areas and remnant contamination; and
- Dust Management Plan is discussed in greater detail, below.

The RAP requires that a dust management plan will be prepared by the remediation contractor and must comply with requirements of the CRN. It must define and implement dust controls to prevent offsite contaminant migration of dust above criteria (Ramboll 202b). The RAP describes a number of features that relate to dust management that nclude the following features:

- The use of a watercart and maintain roads to remove spillages;
- Limiting speed and avoiding unsealed roads;
- Limit vehicle and mobile plant speeds within the work area and covering all loads when transporting material;
- Consider use of wind breaks or shielding around material and/or stockpiles and maintain stockpiles at the lowest practicable height is preferable;
- Avoid double-handling of material and optimise transfers to limit time stockpiled or handled;
- Visually observe dust levels to adapt operations; and
- Facilitate training and tool-box-talks addressing air quality management objectives, hazards, risks, controls, behaviours and consequences for inappropriate behaviour.

The dust management plan should include onsite air quality monitoring to include sampling of airborne dust or lead in total suspended particulates (TSP) in real time. The RAP provides details of monitoring that is required during remedial activities, and also describes trigger levels and subsequent actions in a three-level air quality alert system.

11.7 Regulatory Compliance

The RAP (Ramboll, 2021b) reported that the remediation works are likely to classify as Category 2 Remediation work, which do not require development consent, but will require notification to Goulburn Mulwaree Council a minimum of 30 days before commencement of remediation.

The auditor notes that Ramboll has received approval from the NSW EPA for the specific immobilisation plan. In addition, the RAP notes that immobilisation activities will need to occur off site and only at a waste facility with specific development consent and environmental protection licence (EPL) conditions allowing for these activities. To date a waste facility with the appropriate consent and licence has not been identified, and any facility will require modified development consents and EPL conditions. Finally, the RAP notes that a specific resource recovery exemption from the NSW EPA for return of the ballast to the rail corridor site will be required.

11.8 Long Term Site Management

Ramboll have indicated that a long term environmental management plan will be required to provide guidance for ongoing maintenance of remnant contamination and recommends that it be defined through a covenant to the land title.

11.9 Audit Findings

Ramboll's (2021b) nominated remediation objective is appropriate and consistent with the VMP. The auditor accepts the adopted remedial approach to be appropriate and consistent with relevant guidance.

The proposed validation assessment provided by the consultant is considered appropriate and in accordance with relevant guidelines.

The site management provisions appear to broadly control the potential impacts associated with the proposed remediation works and appear adequately protective of both the remediation workforce and the surrounding environment (including the neighbouring community). The auditor also notes that an appropriate dust management plan will need to be prepared and implemented as part of the rail corridor site construction works to prevent off site migration of dust during remedial activities. The proposed monitoring for dust during remedial works is considered adequate. The auditor notes that a stormwater management plan is to be prepared and will be compliant with the *Lead Action Plan* (Ramboll, 2020b). The auditor considers this to be adequate.

The auditor notes the proposed remedial strategy is subject to the following:

- Confirmation that the heritage status of the station (refer **Section 3.8**) does not trigger the remediation works being Category 1 under SEPP 55;
- Consent and EPL amendments for the receiving landfill; and
- Apply for and obtain a specific resource recovery exemption for material being returned to the rail corridor site.

An ongoing Environmental Management Plan (EMP), along with the final Validation Report, must be prepared upon completion of the remedial works and submitted to a site auditor for review. In accordance with relevant NSW EPA requirements, the EMP must reasonably be able to be made legally enforceable and there must be an appropriate public notification mechanism to inform interested parties as to the requirements relating to the management of contamination at the rail corridor site.

Based on the information contained in the RAP, the auditor considers that the proposed remediation:

- is technically feasible;
- is environmentally justifiable given the nature and extent of contamination at the rail corridor site; and
- is consistent with relevant laws, policies and guidelines.

Upon successful completion of the remediation and validation activities, Ramboll (2021b) stated that a validation report will be prepared in accordance with the requirements of EPA 2020. The auditor notes that the validation report must also be prepared in accordance with EPA 2017 and be provided to a Site auditor for review and endorsement, with the Site Audit Report and Site Audit Statement issued outlining compliance with the VMP.

12. Audit Summary Opinion

On the basis of the findings of the site audit, and subject to the limitations in **Section 13**, the following summary opinions are provided:

- The site assessment activities and proposed remediation and validation works are considered to have met the relevant requirements of the Contaminated Land Management: Guidelines for the NSW Site Auditor Scheme (3rd Edition) (EPA 2017).
- The site assessment report is considered to adequately characterise the degree and extent of the contaminant at the site and originating from the site, as required by the VMP.
- The RAP (Ramboll, 2021b) prepared for the site addressed the identified contamination issues as they relate to the VMP for the site, and is considered suitable to address the identified risks associated with the contaminant at the site and originating from the site.
- The RAP includes a *Specific Immobilisation Approval Application – Lead Impacted Material*, dated 17 August 2021 and Ramboll received an approval for this from NSW EPA. The approval is included in **Appendix G.**
- The remediation approach documented in the RAP was checked by the auditor and was found to be technically feasible, environmentally justifiable given the nature and extent of the identified contamination and consistent with relevant laws, policies and guidelines.

Prior to any remedial works commencing at the rail corridor site, the RAP indicates that the following regulatory approvals will be obtained:

  - Consent and EPL amendments for receiving landfill;
  - The return of ballast to the site after screening will likely require a Specific Resource Recovery Exemption. Further correspondence with the EPA is recommended to define the appropriate planning pathway; and
  - Development Consent, if the works are determined to be Category 1 under SEPP55 due to the heritage status of the railway station.

During all remedial site works, controls described in the RAP (Ramboll, 2021b) and the Lead Action Plan (Ramboll, 2020b) must be implemented, especially with regards to surface water and dust monitoring.

The Stationmasters Cottage, 106 Goulburn St (Lot 1, DP816626) must not used for residential purposes until it can be demonstrated as safe for such use and the management of the residence should be included in the EMP for the rail corridor site.

13. Limitations

This audit was conducted with a reasonable level of scrutiny, care and diligence on behalf of the client for the purposes outlined in the Contaminated Land Management Act 1997. The data used to support the conclusions reached in this audit were obtained by other consultants and the limitations which apply to the consultant's report(s) apply equally to this audit report.

Every reasonable effort has been made to identify and obtain all relevant data, reports and other information that provide evidence about the condition of the site, and those that were held by the client and the client's consultants, or that were readily available. No liability can be accepted for unreported omissions, alterations or errors in the data collected and presented by other consultants. Accordingly, the data and information presented by others are taken and interpreted in good faith.

Sampling and chemical analysis of environmental media is based on appropriate guidance documents made and approved by the relevant regulatory authorities. Conclusions arising from the review and assessment of environmental data are based on the sampling and analysis considered appropriate based on the regulatory requirements.

Limited sampling and laboratory analyses were undertaken as part of the investigations reviewed, as described herein. Ground conditions between sampling locations and media may vary, and this should be considered when extrapolating between sampling points. Chemical analytes are based on the information detailed in the site history. Further chemicals or categories of chemicals may exist at the site, which were not identified in the site history and which may not be expected at the site.

Changes to the subsurface conditions may occur subsequent to the investigations described herein, through natural processes or through the intentional or accidental addition of contaminants. The conclusions and recommendations reached in this audit are based on the information obtained at the time of the investigations.

This report does not provide a complete assessment of the environmental status of the site, and it is limited to the scope defined herein. Should information become available regarding conditions at the site including previously unknown sources of contamination, JBS&G and the Site Auditor reserve the right to review the report in the context of the additional information, subject to meeting relevant guideline requirements imposed by the EPA.

Appendix A Guidelines made or Approved by the EPA

Guidelines made or approved by the EPA (s.105 CLM Act 1997)

Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, Paper No 4, 2000 (ANZECC/ARMCANZ 2000) (for primary industries)

Assessment and Management of Hazardous Ground Gases: Contaminated Land Guidelines (EPA, 2019, amended 2020, EPA 2020a)

Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG, August 2018)

Australian Drinking Water Guidelines, National Health and Medical Research Council and Agriculture and Resource Management Council of Australia and New Zealand, 2011 (NHMRC/NRMMC 2011) updated in August 2018

Australian Water Quality Guidelines for Fresh and Marine Water Quality, Volume 3, Primary Industries – Rationale and Background Information (ANZECC & ARMCANZ, 2000)

Composite Sampling, Lock, W. H., National Environmental Health Forum Monographs, Soil Series No.3, 1996, SA Health Commission, (NEHF 1996)

Contaminated Sites: Sampling Design Guidelines, NSW EPA, 1995 (EPA 1995a)

Consultants Reporting on Contaminated Land: Contaminated Land Guidelines, NSW EPA, 2020 (EPA 2020b)

Contaminated Sites: Guidelines for Assessing Banana Plantation Sites, NSW EPA, 1997 (EPA 1997)

Contaminated Sites: Guidelines for Assessing Former Orchards and Market Gardens, NSW EPA, 2005 (EPA 2005)

Contaminated Sites: Guidelines for the Vertical Mixing of Soil on Former Broad-Acre Agricultural Land, NSW EPA, 1995 (EPA 1995b)

Contaminated Sites: Guidelines for the NSW Site Auditor Scheme (3rd Edition), NSW EPA, 2017 (EPA 2017)

Contaminated Sites: Guidelines for the Assessment and Management of Groundwater Contamination, NSW EPA, March 2007 (EPA 2007)

Contaminated Sites: Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997, NSW EPA, June 2009 (EPA 2009)

Environmental Health Risk Assessment: Guidelines for assessing human health risks from environmental hazards, Department of Health and Ageing and EnHealth Council, Commonwealth of Australia, June 2012 (EnHealth 2012)

Guidelines for the Assessment and Clean Up of Cattle Tick Dip Sites for Residential Purposes, NSW Agriculture and CMPS&F Environmental (February 1996)

National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended 2013, National Environment Protection Council (NEPC 2013)

Appendix B Audit Correspondence

JBS&G 58643- 131,875
L002 (Interim Advice 0503-2006-001 Rev 0)

28 August 2020

Michael Hooper
Manager- Environment
John Holland Country Regional Network
Via email: Michael.Hooper@jhg.com.au

L001 Interim Audit Advice (0503-2006-001) – Tarago

Dear Michael,

1. Introduction and Background

Andrew Lau of JBS&G Australia Pty Ltd (JBS&G), was engaged on the 16 April 2020 by John Holland Rail Pty Ltd (John Holland, the client) to conduct a site audit at land that falls within the Goulburn – Bombala rail corridor at Tarago, and is part of the Tarago Station Rail Corridor, Tarago, NSW 2580. The site is identified as Part of Lot 22 DP1202608, occupying an area of approx. 7.7 ha ('the site'). The site is owned by Transport for NSW (TfNSW) and is zoned RU2 "rural landscape". The location of the site and the extent of the site area are shown in Figures 1 – 3, included in **Attachment 2**.

The site forms part of the rail corridor between Goulburn and Bombala and was in part occupied by a former ore loadout complex (OLC) that was located to the west of the railway tracks; the Tarago railway station lies to the east of the tracks. The railway line runs in a north east to south west direction through the site. To the north and west is Stewart St then agricultural paddocks, to the east is a residence (106 Goulburn St, "the station master's cottage") and the Tarago railway station, thence Goulburn Street and residences, and to the south are paddocks and then residences. Tarago Public School is located less than 200 m to the north east of the site.

The site was notified to the EPA under section 60 of the *Contaminated Land Management Act 1997* (CLM Act 1997) in November 2019 and has been declared to be significantly contaminated land by the NSW EPA (Declaration Number 20201103; Area Number 3455, dated 25 March 2020) with the contaminating substance identified as lead. Reasons for the declaration provided by the EPA are as follows:

- "lead concentrations in soil within the rail corridor (Lot 22 DP1202608) exceed national guideline values for the protection of human health and the environment;
- "lead contamination has impacted adjacent land at 106 Goulburn Street, Tarago (Lot 1 DP816626), with soil also found to contain lead at concentrations exceeding national guideline values for the protection of human health and the environment;
- "there are complete exposure pathways to lead for occupants of 106 Goulburn Street, as well as potentially complete exposure pathways for persons working within the rail corridor; and
- "there are potentially complete exposure pathways for onsite and offsite ecological receptors."

In response to the declaration, TfNSW have entered into a Voluntary Management Proposal (VMP) (Notice Number 20201711) with the EPA. A requirement of the VMP is the appointment of a NSW

EPA accredited auditor. Andrew Lau is a Site Auditor accredited by the NSW Environment Protection Authority (EPA) under the CLM Act 1997 (Accreditation Number 0503).

The VMP requires works to be conducted at the site within deadlines that have been specified and this letter has been prepared to assess works conducted under the following requirements:

- T1: Investigation of Contaminant (lead) at or originating from the site, and
- T2: Development of an Action Plan to mitigate risks from the Contaminant originating from the Site to offsite receptors.

The documents reviewed in preparation of this interim audit advice are listed in **Attachment 3.**

2. Assessment of Investigations of Contaminant at or Originating from Site

A Detailed Site Investigation (DSI) has been prepared by Ramboll Australia (July 2020) (Ramboll (2020). The Auditor has assessed the DSI in accordance with *the Consultants Reporting on Contaminated Land: Contaminated Land Guidelines*, NSW EPA, 2020 (EPA 2020).

2.1 Site History

The site history indicates that the site was used as an ore loadout complex for mineral concentrates transported by truck from a local mine via public roads. These were identified as zinc, lead and copper sulfides, together with some other metal sulfides, including iron sulfide. Ramboll (2020) indicated that the concentrate materials were transported from the local Woodlawn mine, tipped out and stockpiled before being loaded onto rolling stock for transport to Newcastle and Port Kembla. This is understood to have occurred from approx. 1978 to 1988. The former ore loadout complex was purpose built for the receival, storage and loading of the ore concentrates. Aerial photo review suggests that the infrastructure associated with the former OLC was constructed between 1976 and 1985 and removed between 1997 and 2005.

2.2 Geology, Hydrogeology, Topography and Hydrology

Ramboll (2020) reported that the regional geology suggests that the site is underlain by channel and flood plain alluvium (gravel, sand and clay), locally formed as calcrete overlying quaternary sedimentary rock.

The site has been found to be underlain by fill to various depths, comprising of clays with sand and gravel and railway line ballast rock. The natural materials underlying the fill was found to be clay with sand and gravel with one layer of gravel encountered at one investigation location.

Ramboll (2020) noted that regionally the shallowest groundwater aquifer is encountered in gravel at 5.5 to 18.6 m BGL with some deeper aquifers present in fractures in the underlying shale, siltstone and limestone from 50 to 74 m BGL. Groundwater from the shallow aquifer is anticipated to flow to the east towards the Mulwaree River.

Borelogs within the DSI (Ramboll 2020) indicated that groundwater was encountered at 6 - 8 m below ground level (BGL) during investigations, although the standing water levels in the wells on/closest to the site ranged from 4.4 to 7 m below top of casing (bTOC), suggesting that the aquifer is semi-confined.

Water use surveys have been conducted in the area and groundwater is used by property holders in the area for a range of uses from drinking water, washing, gardening, filling a swimming pool and irrigation for agriculture, suggesting that the groundwater is fresh and potable with low salinity.

The site is relatively flat with a slight slope towards the east. Ephemeral drainage/cess lines pass through the site directing surface water flow towards three culverts where surface water flows beneath the railway lines:

- The northernmost culvert directs water flows off site towards a dam on adjacent rural land;
- The central culvert directs water flows towards a shallow pond within the corridor then off site through a causeway on Boyd Street thence partially into a drain on the eastern side of Boyd St and partially across adjacent rural land; and
- The southernmost culvert directs water towards a local water course is a tributary to the Mulwaree River that passes through rural land before discharging into the river.

Surface water flows towards the Mulwaree River approx. 550 m east of the site.

2.3 Previous Investigations

Analytical results for heavy metals and some other analytes from previous investigations were summarised by Ramboll in the DSI for soil sampling and analysis at the site. Results indicated that the site is impacted by metals, in particular lead. The lead concentrations in soil may present a risk to human health or the environment at the site and the potential exists for the offsite migration of lead, via surface water, groundwater and dust was also identified.

2.4 Conceptual Site Model

Ramboll present a preliminary conceptual site model (CSM) based on the site history and an assessment of the previous investigations. The preliminary CSM prepared by Ramboll included the following findings:

- Vertical migration of lead through soils appears to be limited to shallower soils due to heavy clay soils limiting infiltration, so the potential for groundwater to be impacted with lead from the site is considered to be low, despite test results showing elevated lead leachability;
- Analysis of dust samples at Tarago railway station showed the risk to users of the station to be low and acceptable;
- Analysis of dust samples from Goulburn Street showed the risk to pedestrians to be low and acceptable;
- Analysis of lead in internal and external dust and soil showed the risks to people at Tarago Public School from lead to be low and acceptable;
- Risks to residents of 106 Goulburn St (Stationmaster's cottage) were identified, due to exposure to lead in internal and external dust and in soil. Ramboll identified co-contribution from lead paint at the site;
- Residents in the Tarago area were potentially exposed to lead via outdoor dust inhalation and dermal contact with surface waters; and
- Potential risks to onsite ecological receptors (plants and animals) and off site ecological receptors (including livestock) were identified via dust/soil (dermal contact, incidental ingestion and outdoor dust inhalation) and via surface water (dermal contact, incidental ingestion and irrigation).

Some data gaps requiring further assessment were identified by Ramboll and included potential off site impacts of lead via groundwater and surface water pathways.

2.5 Investigations Reported in the DSI

To investigate the data gaps to inform action and management plans, Ramboll conducted a number of investigations including the following:

- Sampling and analysis of the footprint of the former OLC via advancement of 20 testpits through the fill profile including depths in the underlying natural material. The auditor notes

that the former OLC footprint is 1.5 ha of the total 7.7 ha site, that is the subject of the VMP. In addition to soil samples sent for laboratory analysis, assessment for lead was undertaken using a hand held X-Ray Fluoresence Spectrometer (XRF).

- Sampling and analysis at 43 separate properties in the vicinity of the site. Different media were assessed (soil, rainwater tank water and sediment, groundwater bore water, interior dust and paint). These included publicly accessed places such as the public school, town hall, Tarago CWA etc and 36 private residences.
- Assessment of nature strips and road verges within Tarago township and along the road from the Woodlawn mine to the former OLC.
- Surface water and sediment sampling at locations both on the VMP site and off site.
- Groundwater sampling and analysis from six on site wells and two off site wells to assess potential contamination and groundwater flow direction.

2.6 Ramboll Conclusions

In considering the results, Ramboll concluded the following:

- Lead had been delineated within the rail formation and adjacent shallow soils and drainage lines;
- Lead was found at depth within the soil at the former OLC but is not considered likely to present a risk to human health or the environment;
- Lead was found to not have impacted groundwater at the site, nor off site and no further investigation is warranted;
- Off site migration of lead and other metals has occurred via surface water;
- Surface water impacts of lead to the Mulwaree River were not observed;
- Off site migration of lead has occurred via air borne dust and elevated concentrations of lead in rainwater tank sediment and internal dust were identified close to the site;
- Dust monitoring has commenced and is ongoing;
- All contaminant concentrations measured in rainwater tanks at all locations were below the Australian Drinking Water Guidelines[1] and guidelines relevant for all potable uses and unimpacted by contamination from the site; and
- High metal concentrations have been identified in local public road reserves but appear to be unrelated to the rail corridor, with the exception of Boyd St.

2.7 Ramboll Recommendations

Ramboll made several recommendations as follows:

- Further investigation to confirm the extent of off site migration via surface water;
- Further investigation to delineate lead impacts at depth within the footprint of the former loadout complex buildings;
- Remediation is required on site and off site to address risks associated with lead contamination;

[1] Australian Drinking Water Guidelines, National Health and Medical Research Council and Agriculture and Resource Management Council of Australia and New Zealand, 2011 (NHMRC/NRMMC 2011)

- An Action Plan should be developed to mitigate risks associated with lead contamination until remediation can occur; and
- Ongoing monitoring of surface water and air quality should occur until a long term remedial strategy is implemented and proven to be effective.

2.8 Audit Opinion/Requested Actions

The auditor has reviewed the DSI and is satisfied with the conclusions and recommendations presented by Ramboll.

Ramboll have identified a number of data gaps and recommended that further works be undertaken to address the data gaps. The auditor requests that the scope(s) and any Sampling, Analysis and Quality Plans for these works be provided to the auditor for review prior to work commencing.

3. Assessment of the Action Plan

A remediation action plan (RAP) is being prepared by Ramboll as required by the VMP, but prior to its implementation impacts from contamination both on and off site require management. To this end, Ramboll have prepared *Tarago Lead Management Action Plan,* Ramboll, July 2020 ("the Action Plan"). The Action Plan defines a smaller area as "the site" than is covered by the VMP, and for this assessment, the smaller area will be referred to as 'the AP site'.

3.1 Objective

The objective of the Action Plan is to address risks from exposure to the lead from the AP site, due to the presence of lead containing ore. The Action Plan does not address other lead sources that may be present on site or in the community such as lead paint.

Specific actions outlined include the following:

- Measures to prevent further off site migration via air borne dust or surface water;
- Monitoring to assess the effectiveness of these measures;
- Removal of contaminated sediment from affected rainwater tanks surrounding the tanks;
- Measures to prevent members of the public from accessing the site; and
- Controls for rail workers accessing the site.

3.2 Interim Measures

The Action Plan tabulates the roles and responsibilities for managing the lead impact on the AP site, including TfNSW as site owner and John Holland Rail as contractor managing the AP site. In addition, the Action Plan details mitigation measures such as the use of PPE, dust suppression etc.

Measures described in the Action Plan for managing exposure to contamination on the AP site include the following:

- The creation of an exclusion zone around the rail formation and the footprint of the former OLC and the application of a polymer sealant over the lead impacted area;
- Contaminated sediments downstream of the rail culverts within the AP site boundary will be removed and the area validated by sampling;
- Installation of sediment controls and an inspection regime has been planned after rain of >10 mm;
- Provisions for any excavations within the contaminated areas of the site; and

- Controls for the existing stockpile.

The effectiveness of the Action Plan will be monitored through sampling and analysis of surface water and dust.

Measures described in the Action Plan for managing exposure to contamination off the AP site include the following:

- Removal of rainwater and sediment from tanks when specified trigger levels are exceeded. Tanks will be refilled with clean water and a letter will be provided stating that the water is suitable for use.
- Removal of dust from inside properties when specified trigger levels are exceeded, if the property is within 500 m of the rail corridor site.
- Further investigations of soil, sediment and surface water will occur where concentrations of lead are above applicable guidelines and/or a risk assessment concludes an unacceptable risk to be present to human health or the environment.

Other details provided in the Action Plan include stockpile management and material tracking.

3.3 Audit Opinion/Requested Actions

The Auditor is satisfied that the objectives described in the Action Plan are adequate for mitigating exposure to lead from the site and that the measures described in the Action Plan are adequate for meeting the objectives.

Please note that this interim advice does not constitute a Site Audit Statement or a Site Audit Report but is provided to assist in the assessment and management of contamination issues at the site in regard to requirements of the site audit. The information provided herein should not be considered pre-emptive of the final audit conclusions, but rather represent the findings of the audit based on a preliminary review of available site information. Furthermore, the interim advice should not be regarded as approval of any proposed investigations or remedial activities, as any such approval is beyond the scope of an independent auditor.

Should you require clarification, please contact the undersigned on 02 8245 0300 or by email alau@jbsg.com.au.

Yours sincerely:

Andrew Lau
NSW EPA Accredited Site Auditor
Accreditation Number 0503
JBS&G Australia Pty Ltd

Attachments (1) Limitations
(2) Site Plans
(3) Documentation Reviewed

Attachment 1 – Limitations

This audit was conducted with a reasonable level of scrutiny, care and diligence on behalf of the client for the purposes outlined in s.47 (1) of the *Contaminated Land Management Act 1997*. The data used to support the conclusions reached in this audit were obtained by other consultants and the limitations which apply to the consultant's report(s) apply equally to this audit report.

Every reasonable effort has been made to identify and obtain all relevant data, reports and other information that provide evidence about the condition of the site, and those that were held by the client and the client's consultants, or that were readily available. No liability can be accepted for unreported omissions, alterations or errors in the data collected and presented by other consultants. Accordingly, the data and information presented by others are taken and interpreted in good faith.

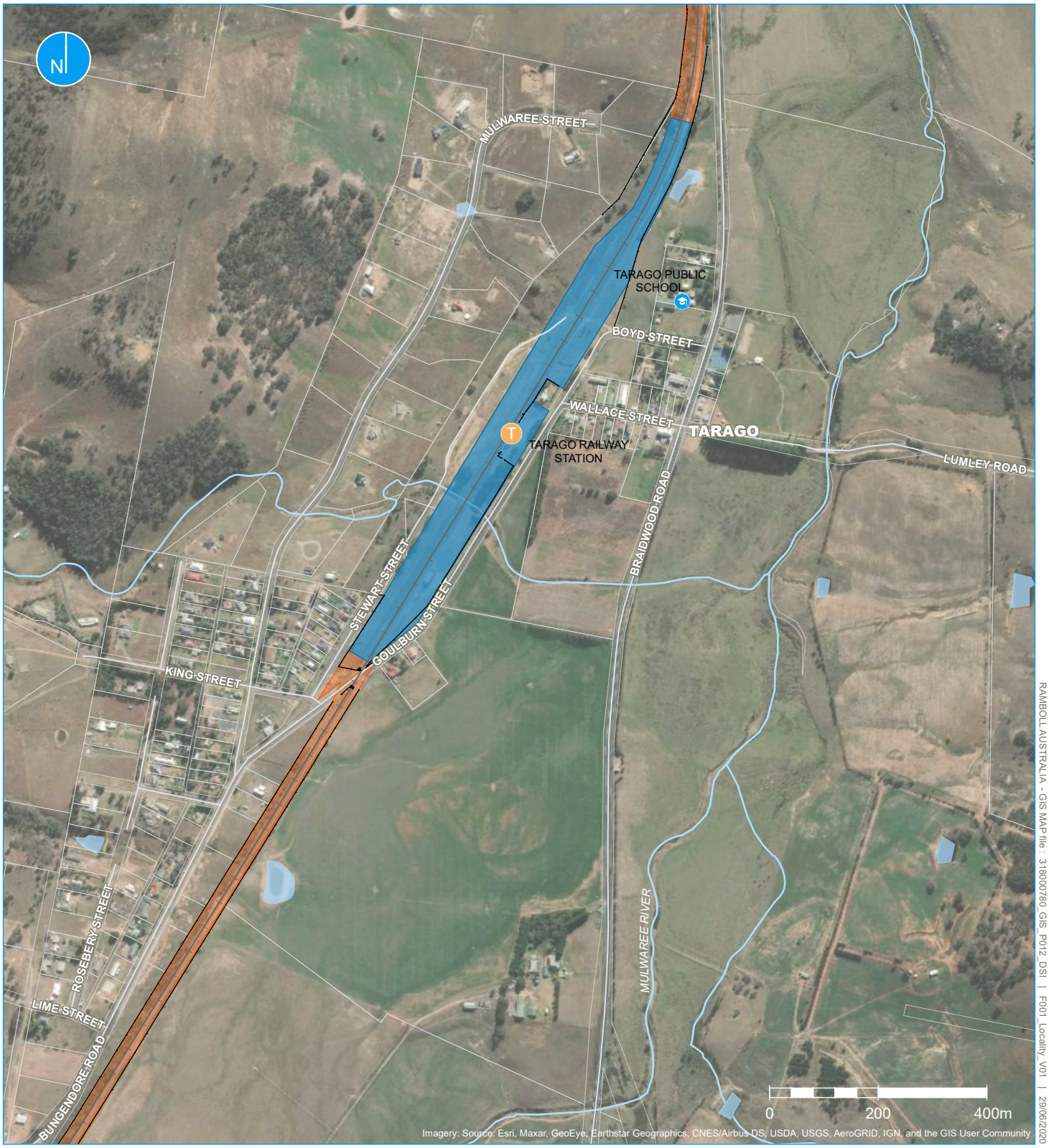
Sampling and chemical analysis of environmental media is based on appropriate guidance documents made and approved by the relevant regulatory authorities. Conclusions arising from the review and assessment of environmental data are based on the sampling and analysis considered appropriate based on the regulatory requirements. Limited sampling and laboratory analyses were undertaken as part of the investigations reviewed, as described herein. Ground conditions between sampling locations and media may vary, and this should be considered when extrapolating between sampling points. Chemical analytes are based on the information detailed in the site history. Further chemicals or categories of chemicals may exist at the site, which were not identified in the site history and which may not be expected at the site.

Changes to the subsurface conditions may occur subsequent to the investigations described herein, through natural processes or through the intentional or accidental addition of contaminants. The conclusions and recommendations reached in this audit are based on the information obtained at the time of the investigations.

Attachment 2 – Site Plans

Attachment 3 – Documents Reviewed

- Declaration of significantly contaminated land No 20201103, Area Number 3455, 25 March 2020 ('the declaration').
- Voluntary Management Proposal ('the VMP') (Notice Number 20201711), 25 May 2020
- *Tarago Rail Corridor and Tarago Area, Detailed Site Investigation*, Ramboll, July 2020
- *Tarago Lead Management Action Plan,* Ramboll, 31 July 2020



RAMBOLL AUSTRALIA - GIS MAP file : 318000780_GIS_P012_DSI | F001_Locality_V01 | 29/06/2020

Legend

- Site boundary
- Rail corridor
- Rail corridor fence

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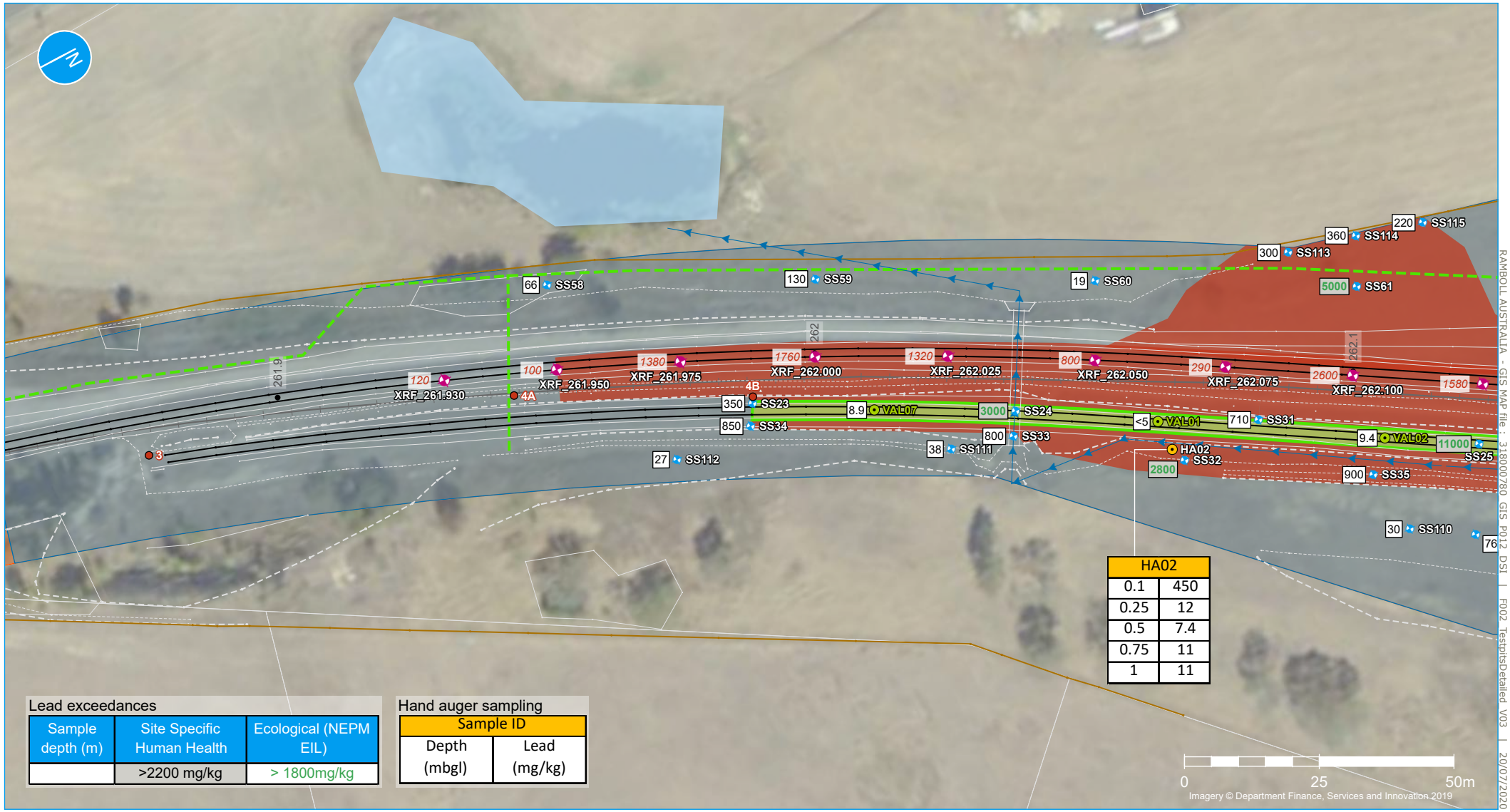
Figure 1 | Locality Plan



HA02

0.1	450
0.25	12
0.5	7.4
0.75	11
1	11

Lead exceedances

Sample depth (m)	Site Specific Human Health	Ecological (NEPM EIL)
	>2200 mg/kg	> 1800mg/kg

Hand auger sampling

Sample ID	
Depth (mbgl)	Lead (mg/kg)

Legend

- Site boundary
- Rail corridor fence
- 0.1km chainage point
- Signal trench (approximate)
- Surface water flow (indicative)

Survey lines

- Rail track
- Top of bank
- Bottom of bank
- Other elements

- X-Ray fluorescence sampling (Ramboll 2019, 2020)
- Previous sampling location (McMahon)
- Shallow soil (Ramboll 2019)
- Hand auger (Ramboll 2019)
- 1200 Lead concentration for XRF sample (mg/kg)
- Validation sample (Ramboll 2019)

- Lead impacted area
- Area of excavation during loop extension (no further excavation proposed)

Note: X-Ray fluorescence sampling results were conservatively assessed against a management threshold of 1200 mg/kg Pb to mitigate uncertainty associated with these.
Data relating to impacts on private properties has not been presented to maintain privacy for affected parties. Data for TP1 – TP9 and TP15 from the Woodlawn siding is presented in Appendix 3, Table H2 – H3. Data for TP1 – TP20 from the Loadout Complex Footprint is presented in Appendix 3, Table 7.

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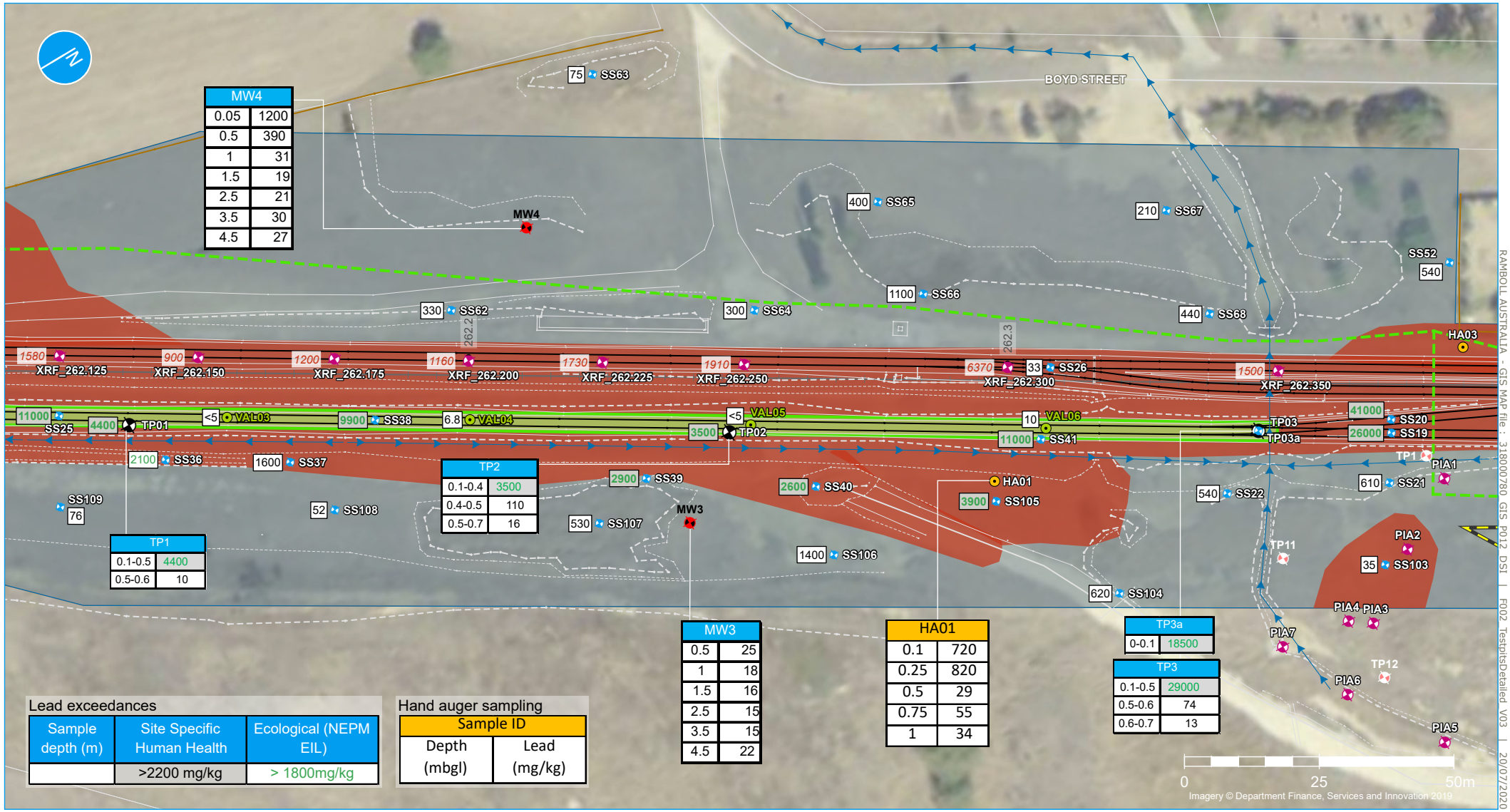
1:1,000

Figure 2a | Site Plan



Lead exceedances

Sample depth (m)	Site Specific Human Health	Ecological (NEPM EIL)
	>2200 mg/kg	> 1800mg/kg

Hand auger sampling

Sample ID	
Depth (mbgl)	Lead (mg/kg)

Legend

- Site boundary
- Rail corridor fence
- 0.1km chainage point
- Signal trench (approximate)
- Surface water flow (indicative)

Survey lines

- Rail track
- Top of bank
- Bottom of bank
- Other elements

- X-Ray fluorescence sampling (Ramboll 2019, 2020)
- Shallow soil (Ramboll 2019)
- Test pit (Ramboll 2019)
- Hand auger (Ramboll 2019)
- 1200 Lead concentration for XRF sample (mg/kg)
- Validation sample (Ramboll 2019)
- Groundwater monitoring location
- Test pit (loadout complex)

- Lead impacted area
- Area of excavation during loop extension (no further excavation proposed)
- Former loadout road (approximate)

Note: X-Ray fluorescence sampling results were conservatively assessed against a management threshold of 1200 mg/kg Pb to mitigate uncertainty associated with these.
Data relating to impacts on private properties has not been presented to maintain privacy for affected parties. Data for TP1 – TP9 and TP15 from the Woodlawn siding is presented in Appendix 3, Table H2 – H3. Data for TP1 – TP20 from the Loadout Complex Footprint is presented in Appendix 3, Table 7.

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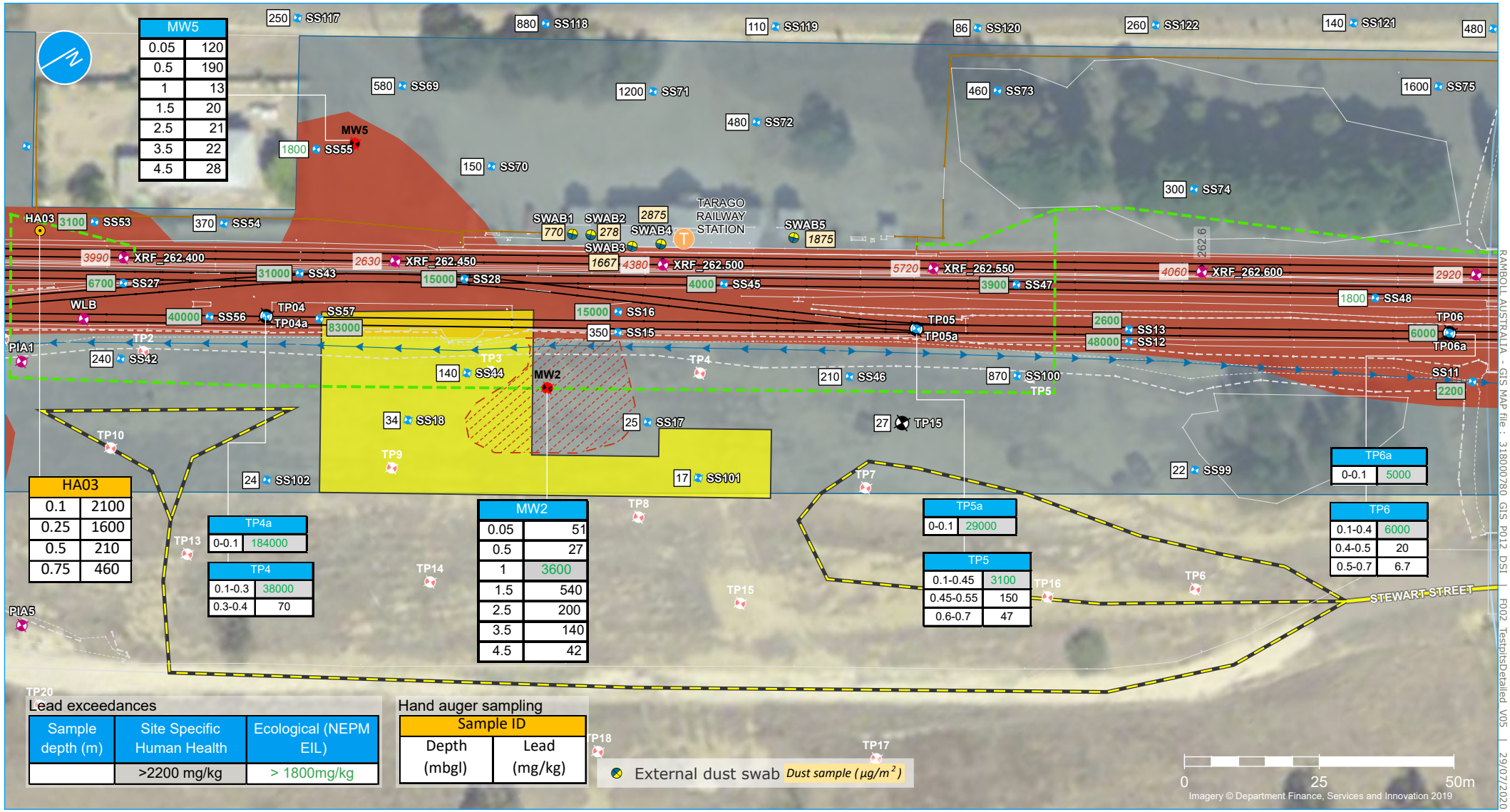
Location

Figure 2b | Site Plan



Legend

- Site boundary
- Rail corridor fence
- 0.1km chainage point
- Signal trench (approximate)
- Surface water flow (indicative)

Survey lines

- Rail track
- Top of bank
- Bottom of bank
- Other elements

- X-Ray fluorescence sampling (Ramboll 2019, 2020)
- Shallow soil (Ramboll 2019)
- Test pit (Ramboll 2019)
- Hand auger (Ramboll 2019)
- 1200 Lead concentration for XRF sample (mg/kg)
- Groundwater monitoring location
- Test pit (loadout complex)

- Lead impacted area
- Indicative lead impacted area
- Former loadout road (approximate)
- Former loadout complex building footprint
- Haul route

Note: X-Ray fluorescence sampling results were conservatively assessed against a management threshold of 1200 mg/kg Pb to mitigate uncertainty associated with these.
Data relating to impacts on private properties has not been presented to maintain privacy for affected parties. Data for TP1 – TP9 and TP15 from the Woodlawn siding is presented in Appendix 3, Table H2 – H3. Data for TP1 – TP20 from the Loadout Complex Footprint is presented in Appendix 3, Table 7.

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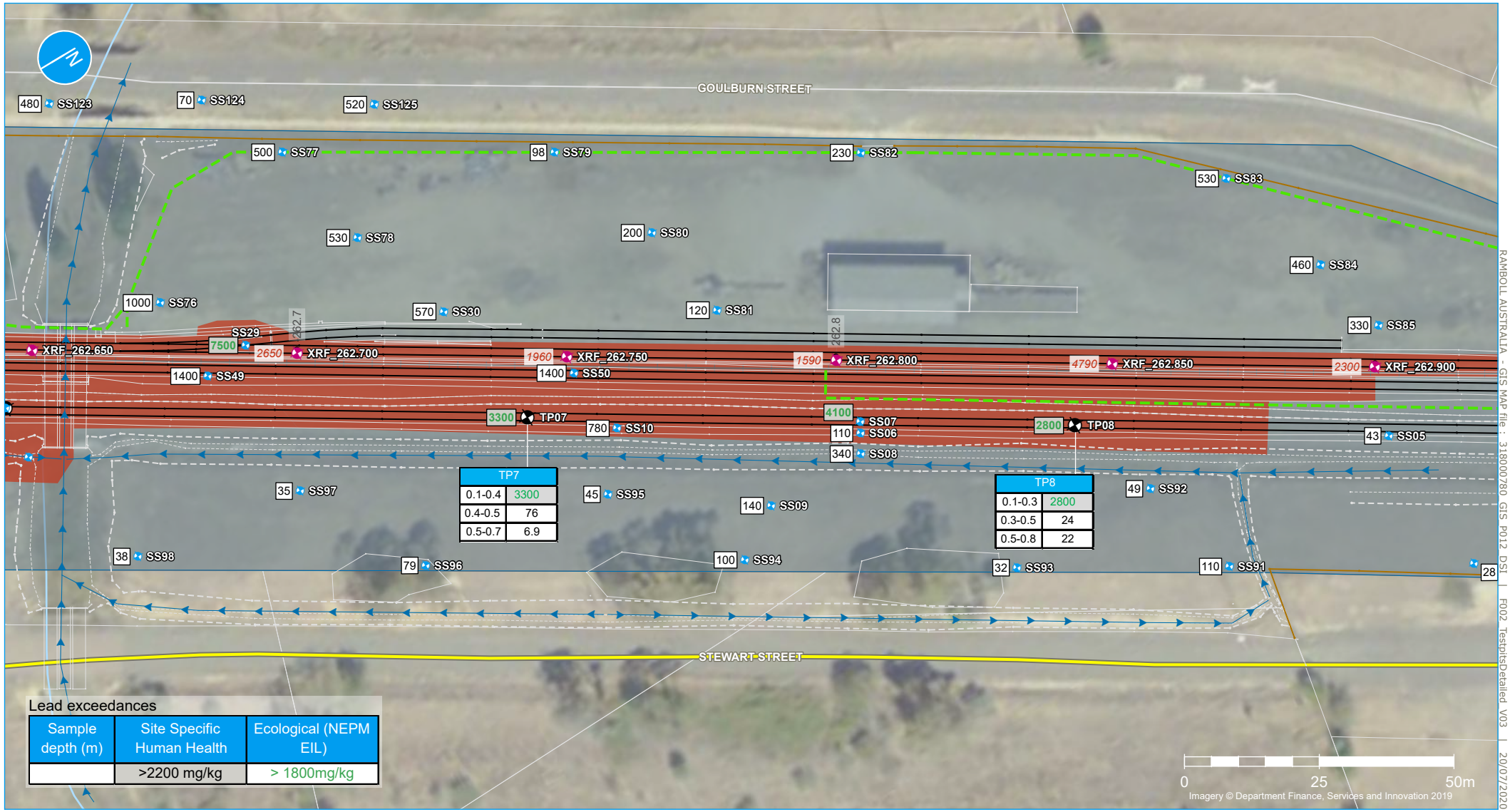
Location

Figure 2c | Site Plan



RAMBOLL AUSTRALIA - GIS MAP file : 318000780 GIS P012 DSI | F002 TestpitsDetailed V03 | 20/07/2020

Legend

- Site boundary
- Rail corridor fence
- 0.1km chainage point
- Signal trench (approximate)
- Surface water flow (indicative)

Survey lines

- Rail track
- Top of bank
- Bottom of bank
- Other elements

- X-Ray fluorescence sampling (Ramboll 2019, 2020)
- Shallow soil (Ramboll 2019)
- Test pit (Ramboll 2019)
- 1200 Lead concentration for XRF sample (mg/kg)

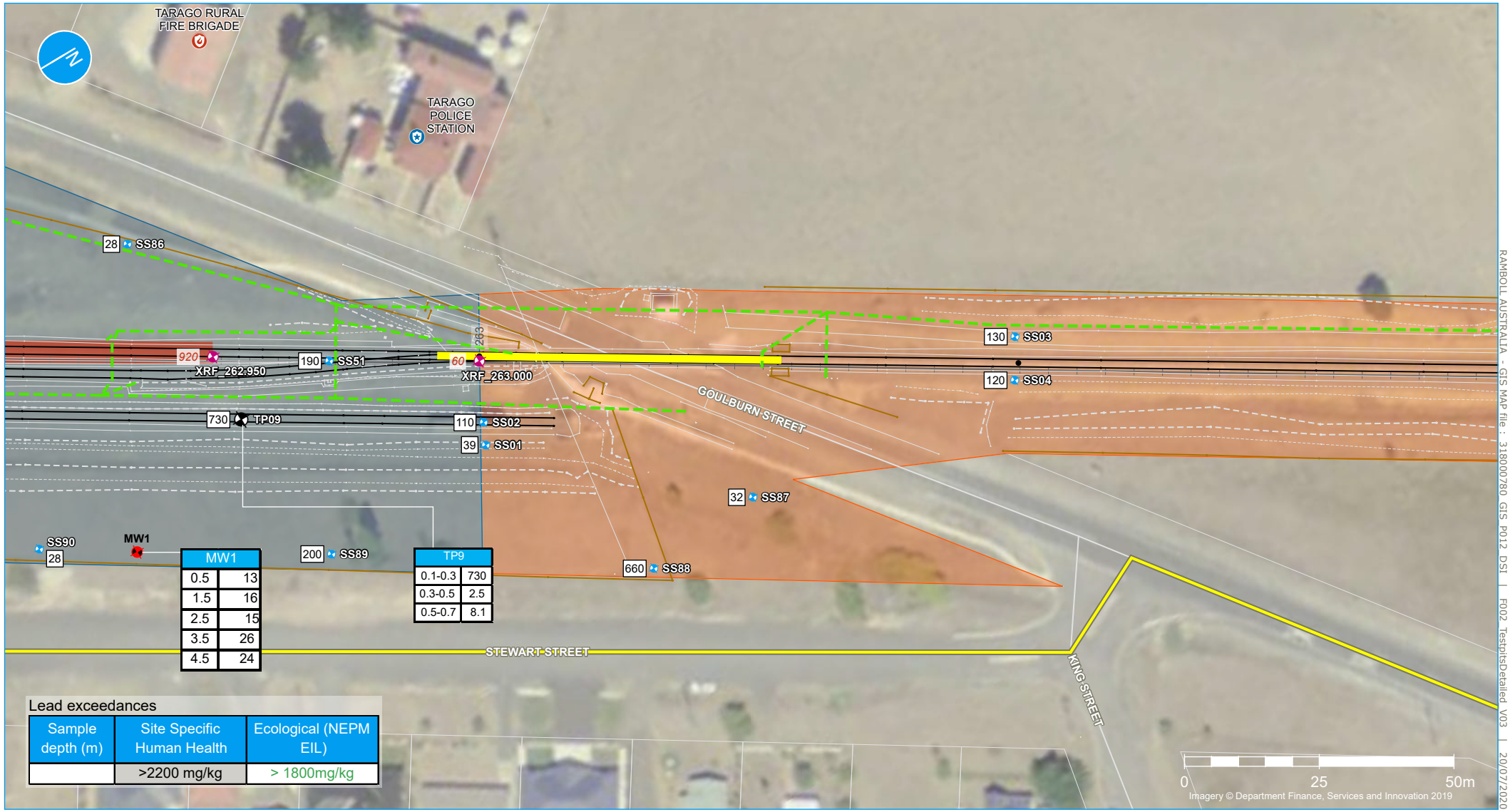
- Lead impacted area
- Haul route

A4 1:1,000

Location

Note: X-Ray fluorescence sampling results were conservatively assessed against a management threshold of 1200 mg/kg Pb to mitigate uncertainty associated with these.
Data relating to impacts on private properties has not been presented to maintain privacy for affected parties. Data for TP1 – TP9 and TP15 from the Woodlawn siding is presented in Appendix 3, Table H2 – H3. Data for TP1 – TP20 from the Loadout Complex Footprint is presented in Appendix 3, Table 7.

Figure 2d | Site Plan



RAMBOLL AUSTRALIA - GIS MAP file : 318000780 GIS P012 DSI | F002 TestpitsDetailed V03 | 20/07/2020

Legend

- Site boundary
- Rail corridor fence
- 0.1km chainage point
- Goulburn Street level crossing
- Signal trench (approximate)
- Surface water flow (indicative)

Survey lines

- Rail track
- Top of bank
- Bottom of bank
- Other elements

- X-Ray fluorescence sampling (Ramboll 2019, 2020)
- Shallow soil (Ramboll 2019)
- Test pit (Ramboll 2019)
- 1200 Lead concentration for XRF sample (mg/kg)
- Groundwater monitoring location

- Lead impacted area
- Haul route

Note: X-Ray fluorescence sampling results were conservatively assessed against a management threshold of 1200 mg/kg Pb to mitigate uncertainty associated with these.
Data relating to impacts on private properties has not been presented to maintain privacy for affected parties. Data for TP1 – TP9 and TP15 from the Woodlawn siding is presented in Appendix 3, Table H2 – H3. Data for TP1 – TP20 from the Loadout Complex Footprint is presented in Appendix 3, Table 7.

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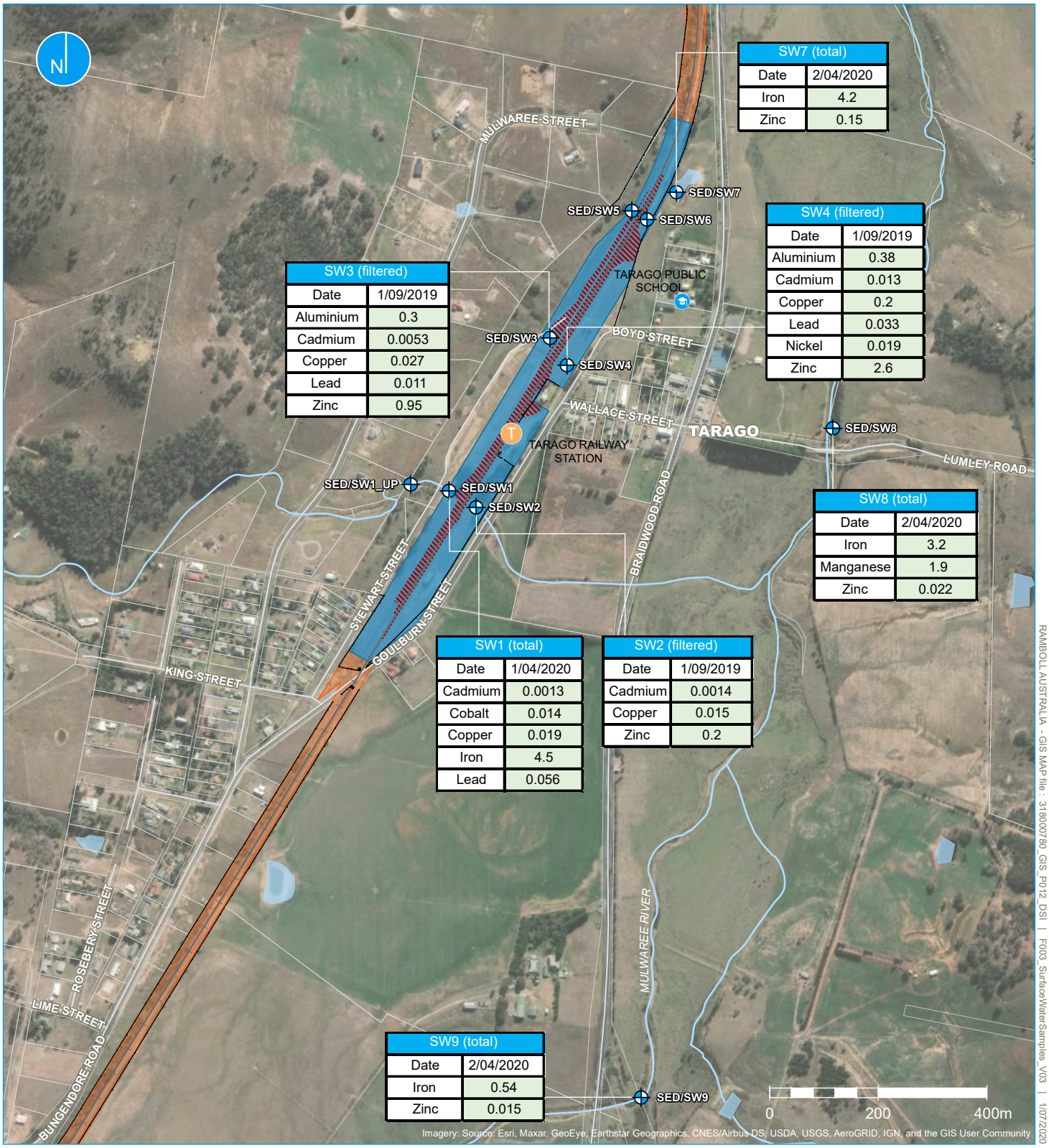
Figure 2e | Site Plan



SW7 (total)	
Date	2/04/2020
Iron	4.2
Zinc	0.15

SW4 (filtered)	
Date	1/09/2019
Aluminium	0.38
Cadmium	0.013
Copper	0.2
Lead	0.033
Nickel	0.019
Zinc	2.6

SW3 (filtered)	
Date	1/09/2019
Aluminium	0.3
Cadmium	0.0053
Copper	0.027
Lead	0.011
Zinc	0.95

SW8 (total)	
Date	2/04/2020
Iron	3.2
Manganese	1.9
Zinc	0.022

SW1 (total)	
Date	1/04/2020
Cadmium	0.0013
Cobalt	0.014
Copper	0.019
Iron	4.5
Lead	0.056

SW2 (filtered)	
Date	1/09/2019
Cadmium	0.0014
Copper	0.015
Zinc	0.2

SW9 (total)	
Date	2/04/2020
Iron	0.54
Zinc	0.015

RAMBOLL AUSTRALIA - GIS MAP file : 31800780_GIS_P012_DSI | F003_SurfaceWaterSamples_V03 | 1/07/2020

A4
1:10,000

Legend

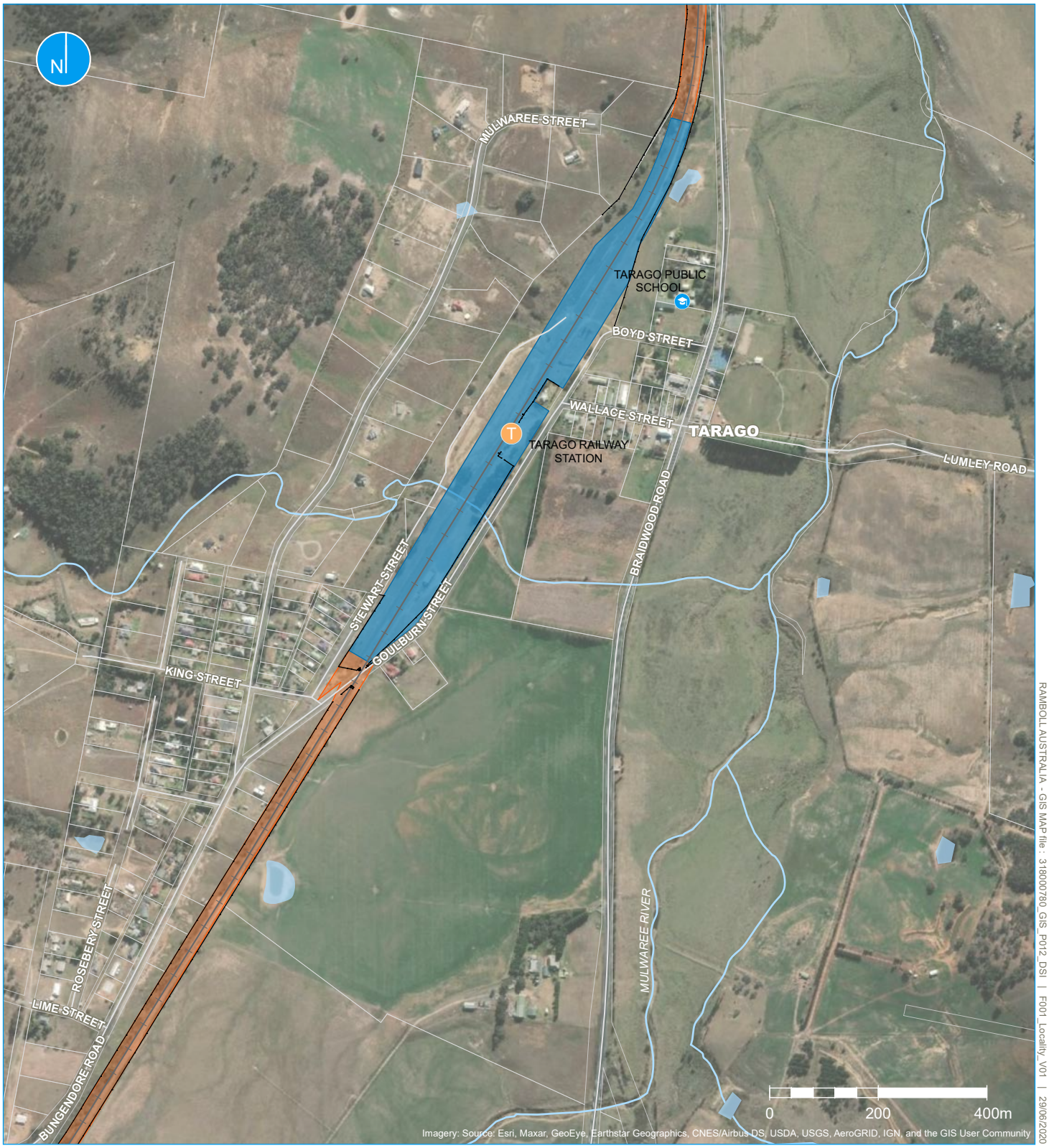
- Surface water and sediment sampling locations (co-located)
- Rail corridor
- Rail corridor fence
- Area of lead exceedance (within rail corridor)

Exceedances (surface water)

Contaminant (mg/L)	> ANZG 2018 Freshwater Ecosystems
Aluminium	0.055
Cadmium	0.0002
Cobalt	0.09
Copper	0.0014
Iron	0.3
Lead	0.0034
Manganese	1.9
Nickel	0.011
Zinc	0.008

Figure 3 | Surface water and sediment sampling locations

Appendix C Consultants Figures



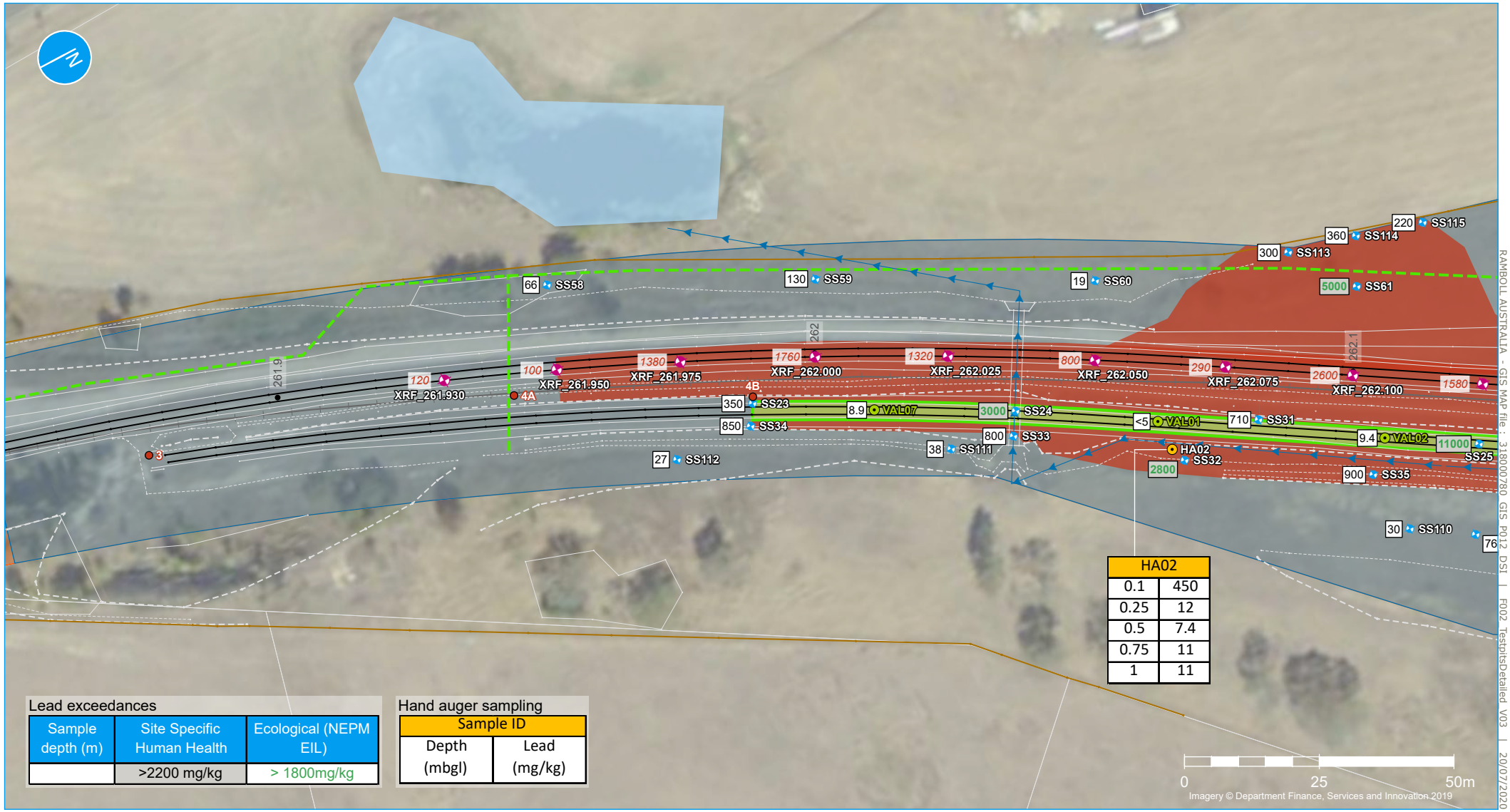
RAMBOLL AUSTRALIA - GIS MAP file : 318000780_GIS_P012_DSI | F001_Locality_V01 | 29/06/2020

Legend

- Site boundary
- Rail corridor
- Rail corridor fence

A4
1:10,000

Figure 1 | Locality Plan



HA02

0.1	450
0.25	12
0.5	7.4
0.75	11
1	11

Lead exceedances

Sample depth (m)	Site Specific Human Health	Ecological (NEPM EIL)
	>2200 mg/kg	> 1800mg/kg

Hand auger sampling

Sample ID	
Depth (mbgl)	Lead (mg/kg)

Legend

- Site boundary
- Rail corridor fence
- 0.1km chainage point
- Signal trench (approximate)
- Surface water flow (indicative)

Survey lines

- Rail track
- Top of bank
- Bottom of bank
- Other elements

- X-Ray fluorescence sampling (Ramboll 2019, 2020)
- Previous sampling location (McMahon)
- Shallow soil (Ramboll 2019)
- Hand auger (Ramboll 2019)
- 1200 Lead concentration for XRF sample (mg/kg)
- Validation sample (Ramboll 2019)

- Lead impacted area
- Area of excavation during loop extension (no further excavation proposed)

Note: X-Ray fluorescence sampling results were conservatively assessed against a management threshold of 1200 mg/kg Pb to mitigate uncertainty associated with these.
Data relating to impacts on private properties has not been presented to maintain privacy for affected parties. Data for TP1 – TP9 and TP15 from the Woodlawn siding is presented in Appendix 3, Table H2 – H3. Data for TP1 – TP20 from the Loadout Complex Footprint is presented in Appendix 3, Table 7.

A4
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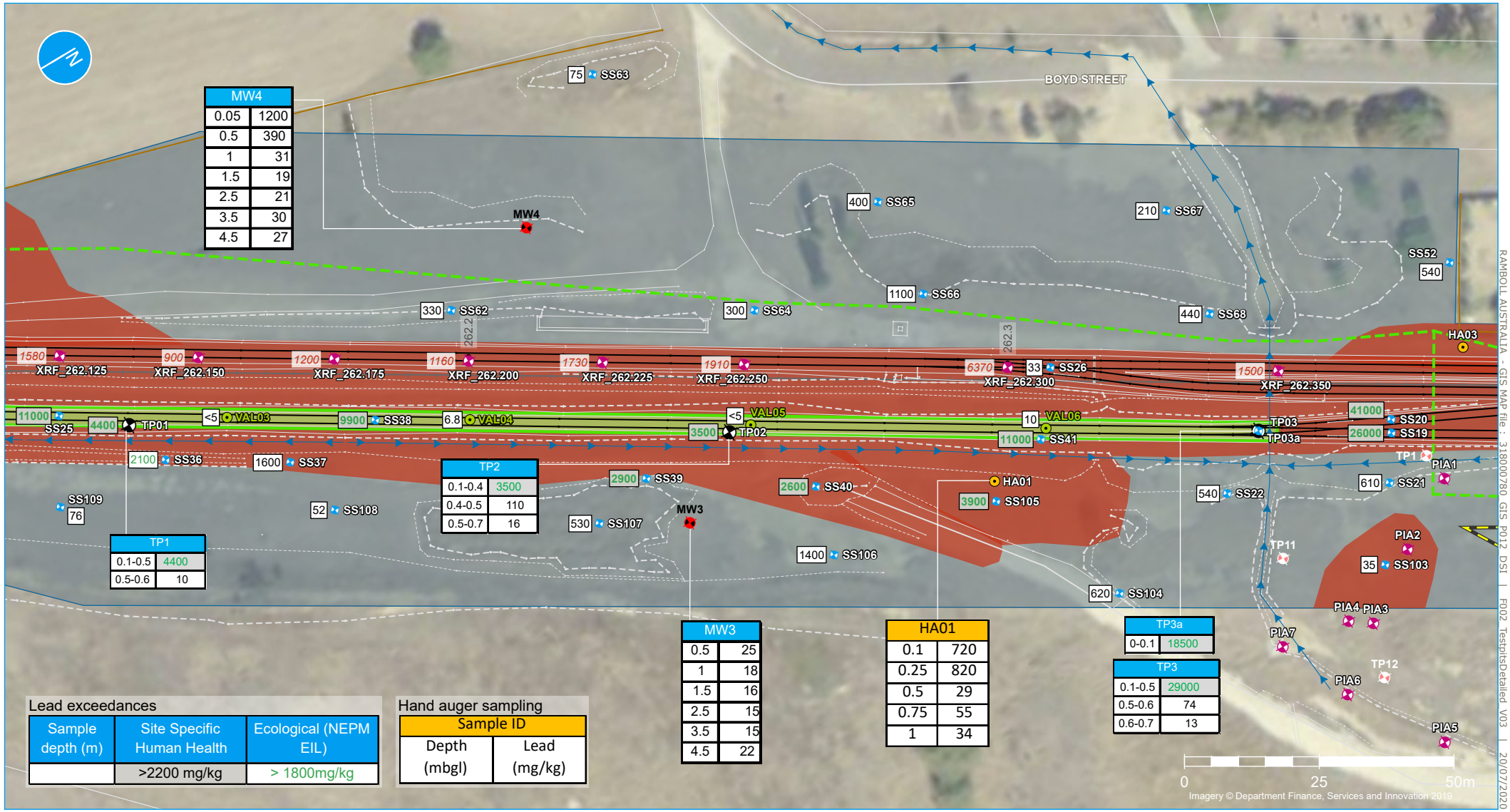
Figure 2a | Site Plan



Lead exceedances

Sample depth (m)	Site Specific Human Health	Ecological (NEPM EIL)
	>2200 mg/kg	> 1800mg/kg

Hand auger sampling

Sample ID	
Depth (mbgl)	Lead (mg/kg)

Legend

- Site boundary
- Rail corridor fence
- 0.1km chainage point
- Signal trench (approximate)
- Surface water flow (indicative)

Survey lines

- Rail track
- Top of bank
- Bottom of bank
- Other elements

- X-Ray fluorescence sampling (Ramboll 2019, 2020)
- Shallow soil (Ramboll 2019)
- Test pit (Ramboll 2019)
- Hand auger (Ramboll 2019)
- 1200 Lead concentration for XRF sample (mg/kg)
- Validation sample (Ramboll 2019)
- Groundwater monitoring location
- Test pit (loadout complex)

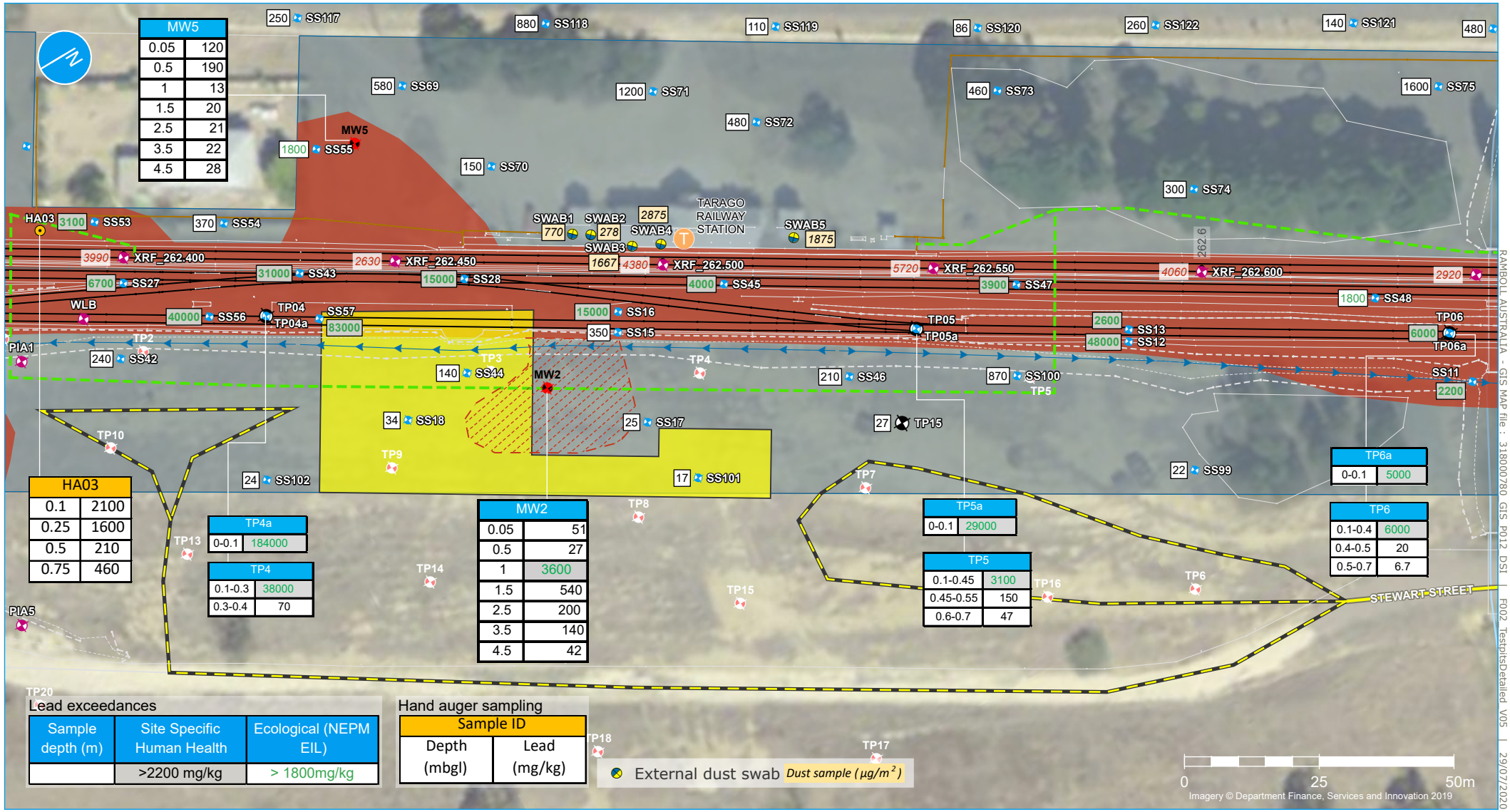
- Lead impacted area
- Area of excavation during loop extension (no further excavation proposed)
- Former loadout road (approximate)

Note: X-Ray fluorescence sampling results were conservatively assessed against a management threshold of 1200 mg/kg Pb to mitigate uncertainty associated with these.
Data relating to impacts on private properties has not been presented to maintain privacy for affected parties. Data for TP1 – TP9 and TP15 from the Woodlawn siding is presented in Appendix 3, Table H2 – H3. Data for TP1 – TP20 from the Loadout Complex Footprint is presented in Appendix 3, Table 7.

A4 1:1,000

Location

Figure 2b | Site Plan



Legend

- Site boundary
- Rail corridor fence
- 0.1km chainage point
- Signal trench (approximate)
- Surface water flow (indicative)

Survey lines

- Rail track
- Top of bank
- Bottom of bank
- Other elements

- X-Ray fluorescence sampling (Ramboll 2019, 2020)
- Shallow soil (Ramboll 2019)
- Test pit (Ramboll 2019)
- Hand auger (Ramboll 2019)
- 1200 Lead concentration for XRF sample (mg/kg)
- Groundwater monitoring location
- Test pit (loadout complex)

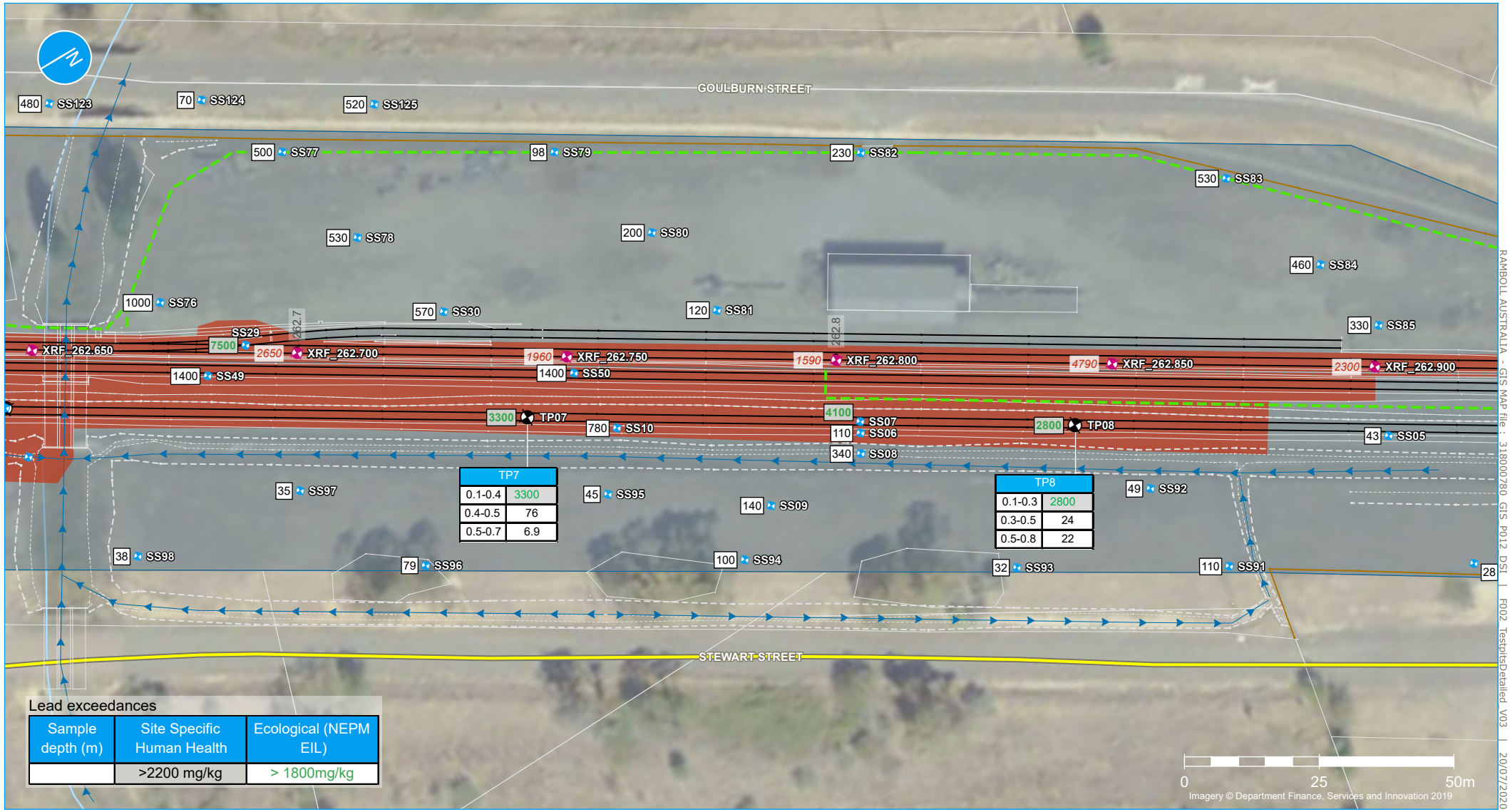
- Lead impacted area
- Indicative lead impacted area
- Former loadout road (approximate)
- Former loadout complex building footprint
- Haul route

Note: X-Ray fluorescence sampling results were conservatively assessed against a management threshold of 1200 mg/kg Pb to mitigate uncertainty associated with these.
Data relating to impacts on private properties has not been presented to maintain privacy for affected parties. Data for TP1 – TP9 and TP15 from the Woodlawn siding is presented in Appendix 3, Table H2 – H3. Data for TP1 – TP20 from the Loadout Complex Footprint is presented in Appendix 3, Table 7.

A4
1:1,000

Location

Figure 2c | Site Plan



RAMBOLL AUSTRALIA - GIS MAP file : 318000780 GIS P012 DSI | F002 TestpitsDetailed V03 | 20/07/2020

Legend

- Site boundary
- Rail corridor fence
- 0.1km chainage point
- Signal trench (approximate)
- Surface water flow (indicative)

Survey lines

- Rail track
- Top of bank
- Bottom of bank
- Other elements

- X-Ray fluorescence sampling (Ramboll 2019, 2020)
- Shallow soil (Ramboll 2019)
- Test pit (Ramboll 2019)
- 1200 Lead concentration for XRF sample (mg/kg)

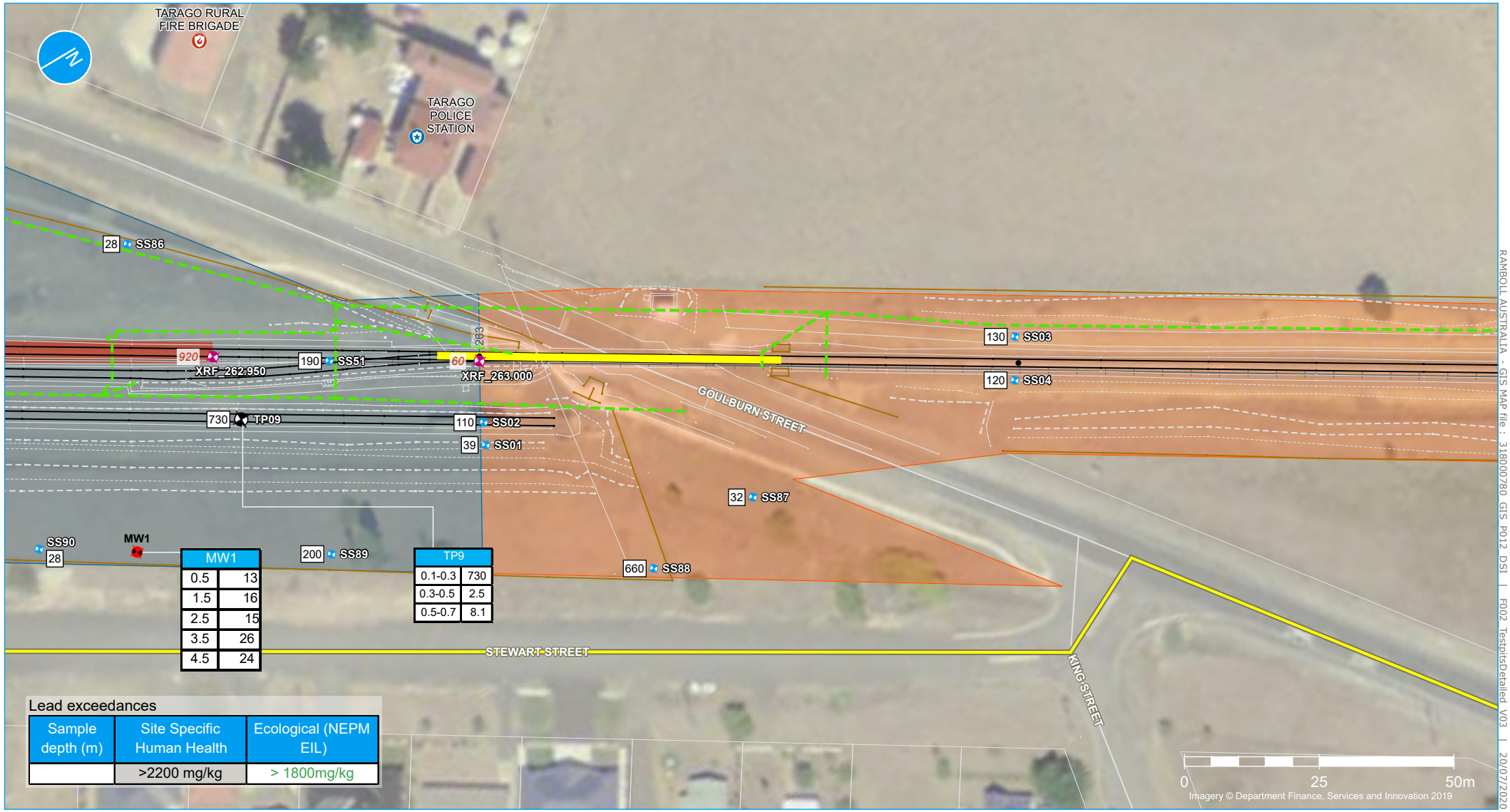
- Lead impacted area
- Haul route

A4 1:1,000

Location

Note: X-Ray fluorescence sampling results were conservatively assessed against a management threshold of 1200 mg/kg Pb to mitigate uncertainty associated with these.
Data relating to impacts on private properties has not been presented to maintain privacy for affected parties. Data for TP1 – TP9 and TP15 from the Woodlawn siding is presented in Appendix 3, Table H2 – H3. Data for TP1 – TP20 from the Loadout Complex Footprint is presented in Appendix 3, Table 7.

Figure 2d | Site Plan



RAMBOLL AUSTRALIA - GIS MAP file : 318000780 GIS P012 DSI | F002 TestpitsDetailed V03 | 20/07/2020

Legend

- Site boundary
- Rail corridor fence
- 0.1km chainage point
- Goulburn Street level crossing
- Signal trench (approximate)
- Surface water flow (indicative)

Survey lines

- Rail track
- Top of bank
- Bottom of bank
- Other elements

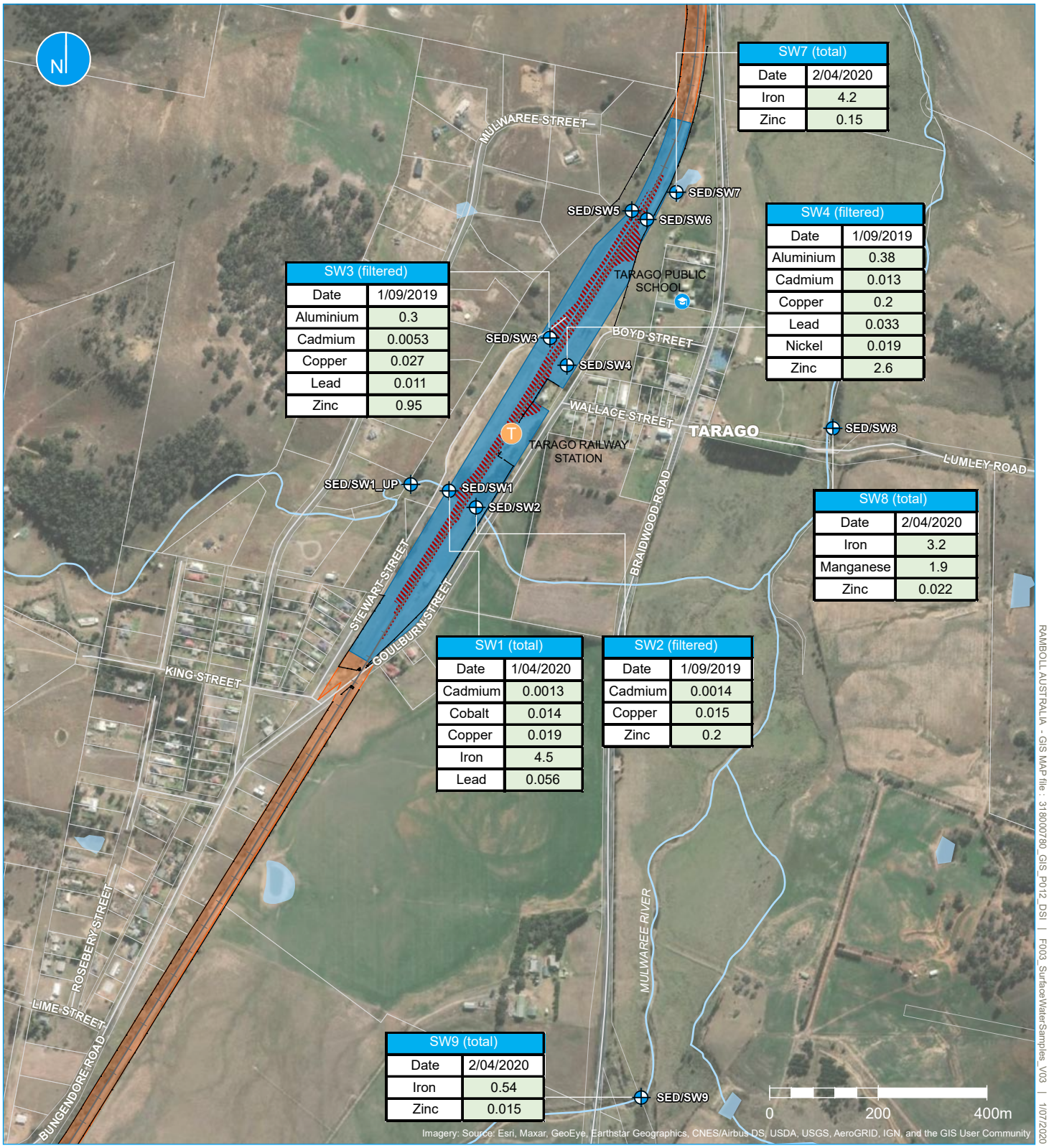
- X-Ray fluorescence sampling (Ramboll 2019, 2020)
- Shallow soil (Ramboll 2019)
- Test pit (Ramboll 2019)
- 1200 Lead concentration for XRF sample (mg/kg)
- Groundwater monitoring location

- Lead impacted area
- Haul route

Note: X-Ray fluorescence sampling results were conservatively assessed against a management threshold of 1200 mg/kg Pb to mitigate uncertainty associated with these.
Data relating to impacts on private properties has not been presented to maintain privacy for affected parties. Data for TP1 – TP9 and TP15 from the Woodlawn siding is presented in Appendix 3, Table H2 – H3. Data for TP1 – TP20 from the Loadout Complex Footprint is presented in Appendix 3, Table 7.

A4
1:1,000

Figure 2e | Site Plan



SW7 (total)	
Date	2/04/2020
Iron	4.2
Zinc	0.15

SW4 (filtered)	
Date	1/09/2019
Aluminium	0.38
Cadmium	0.013
Copper	0.2
Lead	0.033
Nickel	0.019
Zinc	2.6

SW3 (filtered)	
Date	1/09/2019
Aluminium	0.3
Cadmium	0.0053
Copper	0.027
Lead	0.011
Zinc	0.95

SW8 (total)	
Date	2/04/2020
Iron	3.2
Manganese	1.9
Zinc	0.022

SW1 (total)	
Date	1/04/2020
Cadmium	0.0013
Cobalt	0.014
Copper	0.019
Iron	4.5
Lead	0.056

SW2 (filtered)	
Date	1/09/2019
Cadmium	0.0014
Copper	0.015
Zinc	0.2

SW9 (total)	
Date	2/04/2020
Iron	0.54
Zinc	0.015

RAMBOLL AUSTRALIA - GIS MAP file : 31800780_GIS_P012_DSI | F003_SurfaceWaterSamples_V03 | 1/07/2020

A4
1:10,000

Legend

- Surface water and sediment sampling locations (co-located)
- Rail corridor
- Rail corridor fence
- Area of lead exceedance (within rail corridor)

Exceedances (surface water)

Contaminant (mg/L)	> ANZG 2018 Freshwater Ecosystems
Aluminium	0.055
Cadmium	0.0002
Cobalt	0.09
Copper	0.0014
Iron	0.3
Lead	0.0034
Manganese	1.9
Nickel	0.011
Zinc	0.008

Figure 3 | Surface water and sediment sampling locations

RAMBOLL AUSTRALIA - GIS MAP file : 318000780_GIS_P012_DSI | F004_AQMLocality_V03 | 29/06/2020

A4
1:5,000

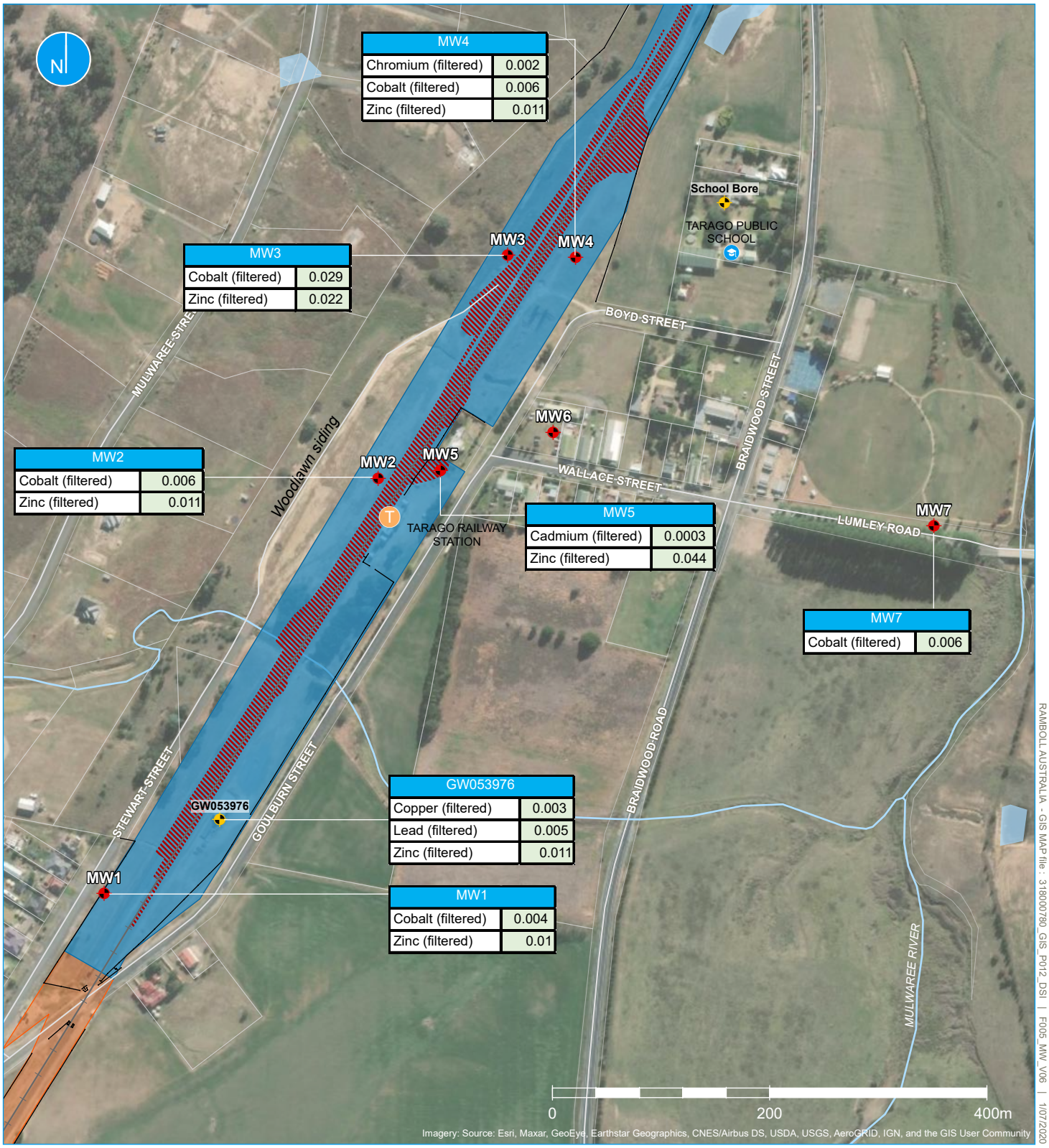
Legend

- Site boundary
- Rail corridor
- Rail corridor fence
- Area of lead contamination within the rail corridor

Sampling locations

- Deposited dust and lead (from dust deposition guage)
- TSP and lead (from high volume air samper)
- Continuous PM10 and PM2.5 (from particle counter)
- Regional meteorological monitoring from DPIE Air quality monitoring station (see location inset)

Figure 4 | Air quality monitoring locations



RAMBOLL AUSTRALIA - GIS MAP file - 318000780_GIS_P012_DSI | F005_MW_V06 | 1/07/2020

Legend

- Groundwater monitoring location
- Groundwater monitoring location (registered, approximate)
- Site boundary
- Rail corridor
- Rail corridor fence
- Area of lead contamination within the rail corridor

Exceedances

Contaminant (mg/L)	> ANZG 2018 Freshwater Ecosystems
Cadmium (filtered)	0.0002
Chromium (filtered)	0.001
Cobalt (filtered)	0.0014
Lead (filtered)	0.0034
Zinc (filtered)	0.008

A4
1:5,000

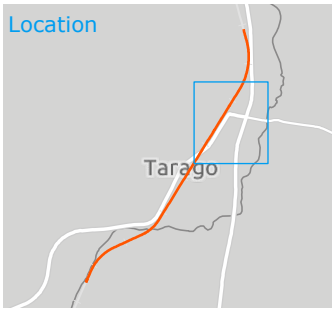
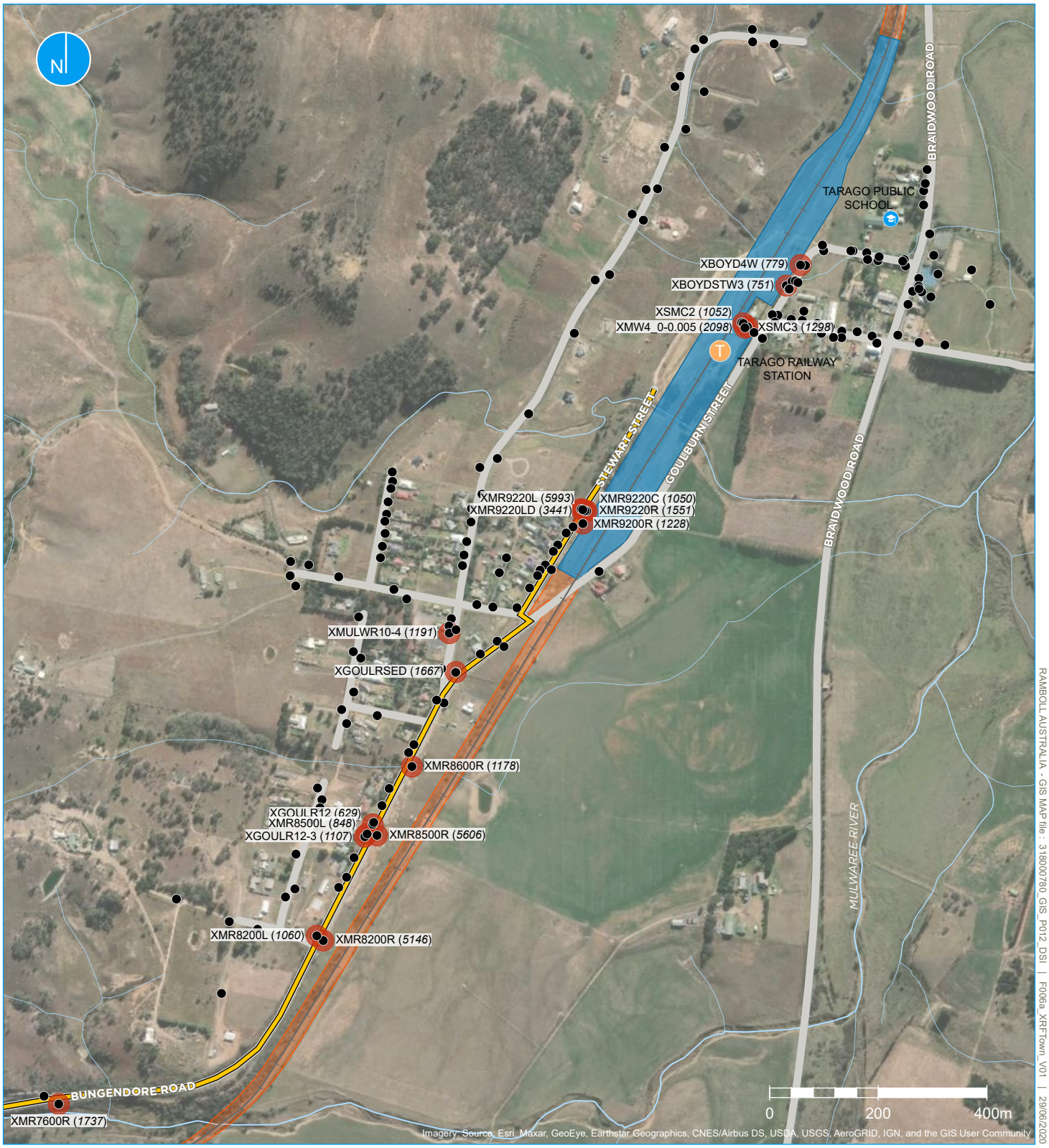


Figure 5 | Groundwater monitoring well locations



RAMBOLL AUSTRALIA - GIS MAP file : 318000780_GIS_P012_DSI | F006a_XRFTown_V01 | 29/06/2020

Legend

- Site boundary
- Rail corridor
- XRF (X-Ray Fluorescence) sample location
- Lead reading exceeding 600 mg/kg
- Hauling route

A4
1:10,000

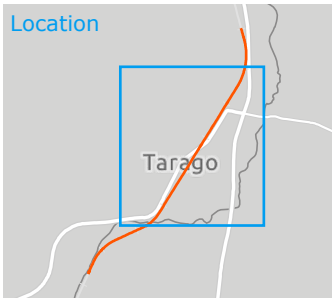
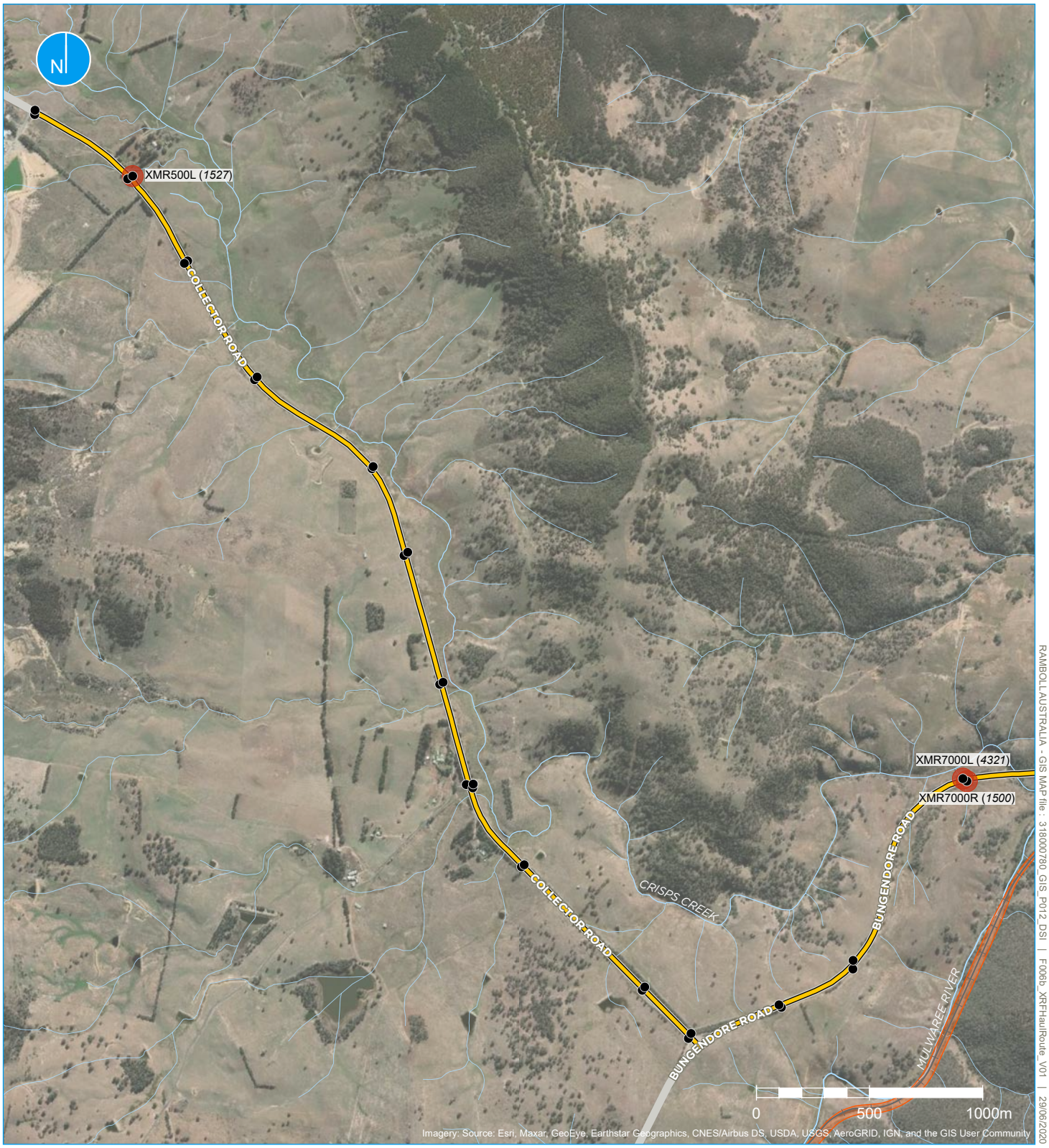


Figure 6a | Public road reserve XRF sampling locations - Tarago Town



RAMBOLL AUSTRALIA - GIS MAP file : 318000780_GIS_P012_DSI | F006b_XRFHaulRoute_V01 | 29/06/2020

Legend

- Rail corridor
- XRF (X-Ray Fluorescence) sample location
- Lead reading exceeding 1500 mg/kg
- Hauling route

A4
1:24,000

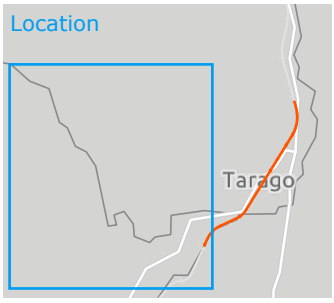
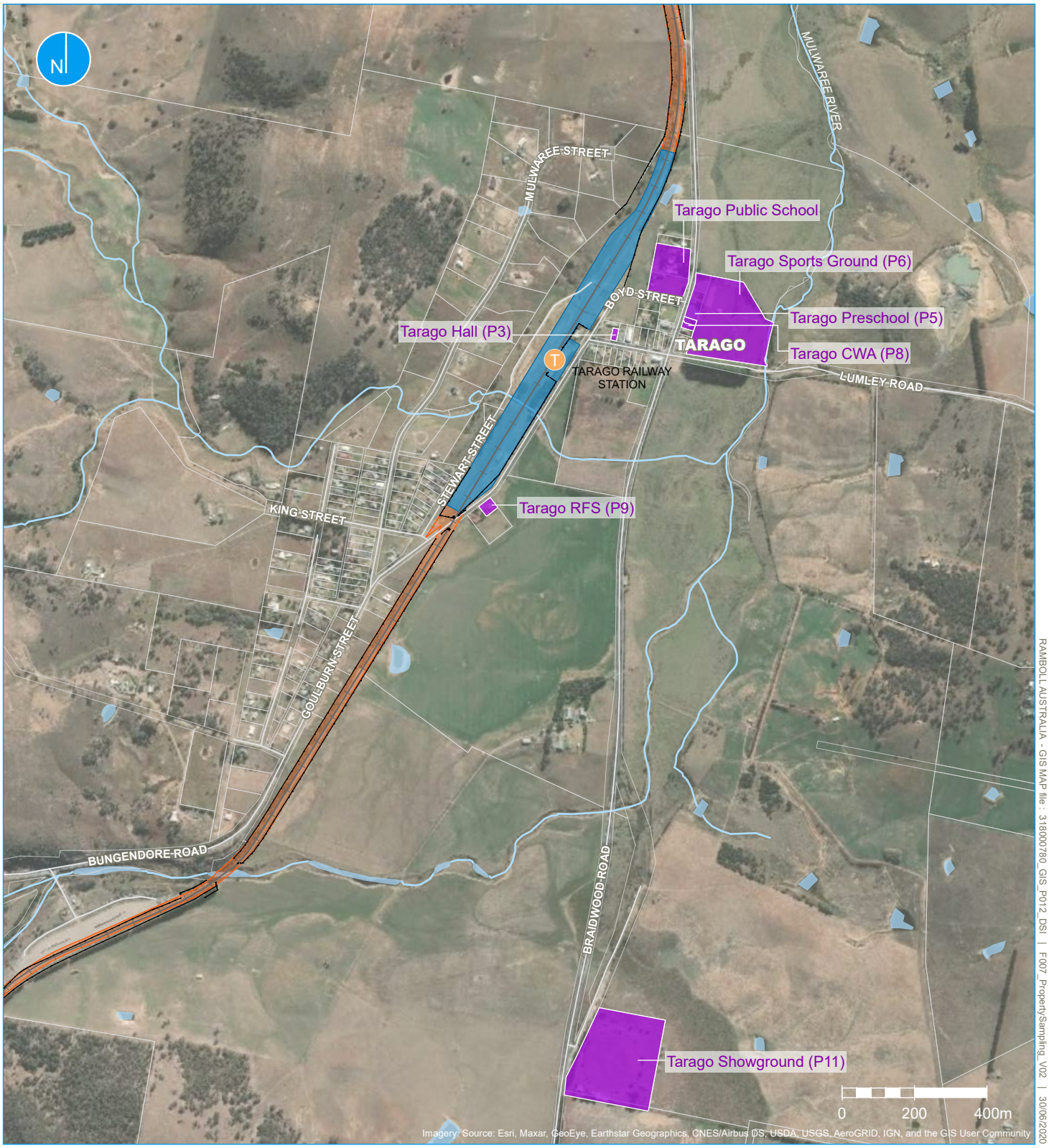


Figure 6b | Public road reserve XRF sampling locations - Haul Route



RAMBOLL AUSTRALIA - GIS MAP file : 318000780_GIS_P012_DSI | F007_PropertySampling_V02 | 30/06/2020

Legend

- Site boundary
- Rail corridor
- Rail corridor fence
- Property sampled (public)

A4
1:15,000

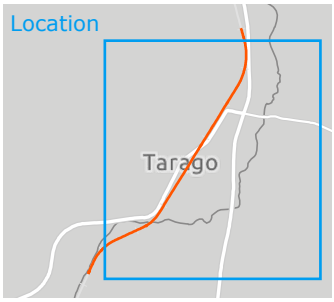
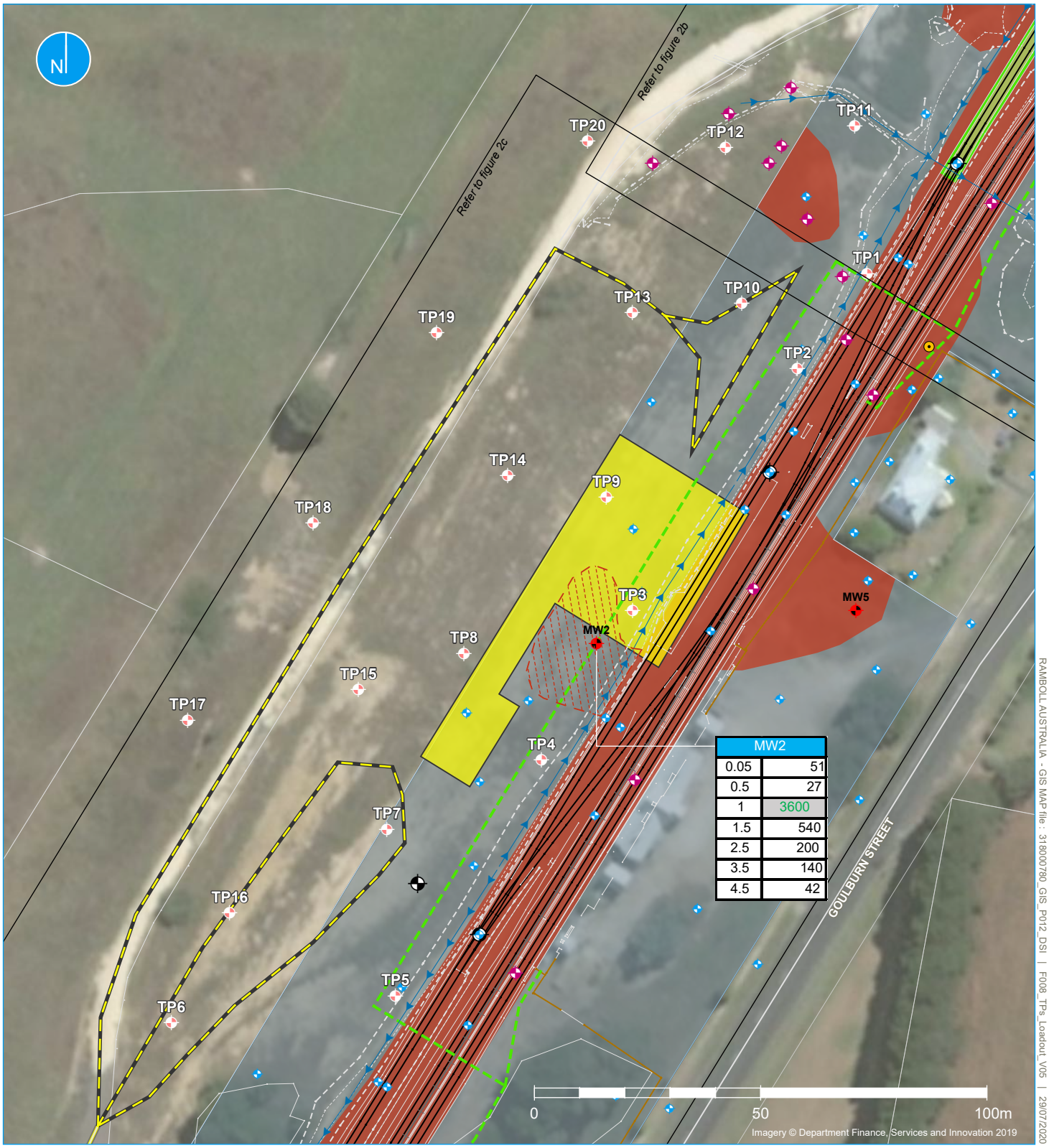


Figure 7 | Discrete public properties sample locations



RAMBOLL AUSTRALIA - GIS MAP file : 318000780_GIS_P012_DSI | F008_TPs_Loadout_V05 | 29/07/2020

A4
1:1,200

Legend

- Test pit (loadout complex)
- Former loadout complex building footprint
- Former loadout road (approximate)
- Haul route
- Site boundary
- Surface water flow (indicative)
- Signal trench (approximate)
- Rail corridor fence
- Area of excavation during loop extension (no further excavation proposed)
- Lead impacted area
- Indicative lead impacted area
- Groundwater monitoring location
- X-Ray fluorescence sampling (Ramboll 2019, 2020)
- Shallow soil (Ramboll 2019)
- Test pit (Ramboll 2019)
- Hand auger

Figure 8 | Loadout complex sampling locations

Appendix D Consultant's Summary Tables

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Loop Lead Management
23-07-20

Table H1:
Summary of EIL Inputs

		SS94	SS95	SS101	SS112	D03_230919	Average
	Units						
Cation exchange capacity	cmol/kg	15	15	10	15	9	12.8
pH (calcium chloride method)	pH Units	5.9	5.4	5.2	4.7	4.9	5.22
Organic carbon content	%	2.2	2.5	0.8	1.3	2.1	1.78
Iron content (aqua regia method)	%	1.1	0.76	0.88	1.4	1.1	1.048
% clay	%	13	13	8.5	18	7.5	12
Measured background concentration							
Copper	mg/kg	-	-	6.9	-	-	-
Nickel	mg/kg	-	-	2.5	-	-	-
Chromium	mg/kg	-	-	7.2	-	-	-
Zinc	mg/kg	-	-	31	-	-	-

Underlined values were reported <LOR and have been halved to allow for comparison of data.

SS101 selected for background due to low concentrations.

Table H2:
Commercial/Industrial Soil Sampling Results (Lead)

	NEPM 2013 HIL D Commercial / Industrial	NEPM 2013 ESLCommercial / Industrial [B]	NEPM 2013 Management Limits Commercial/ Industrial [C]	CRC CARE 2011 Direct Contact[D] HSL D	CRC CARE 2011 Direct Contact[D]HSL for Intrusive Maintenance Workers	CRC CARE 2011 Vapour Intrusion HSL for Intrusive Maintenance Workers Sand 0-<2m[A]	NEPC EIL Commercial / Industrial (site specific)	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
								ALS Sample number:		S19-JI39840	S19-JI39841	S19-JI39842	S19-JI39843	S19-JI39844	S19-JI39845	S19-JI39846	S19-JI39847	S19-JI39848	S19-JI39849	S19-JI39850	S19-JI39851	S19-Se36992	S19-Se36993	S19-Se36994	S19-Se36995
								Sample date:		26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	22-09-19	22-09-19	22-09-19	22-09-19
								Sample ID:		TP4 0.1-0.3	TP5 0.1-0.45	TP6 0.1-0.4	TP7 0.1-0.4	TP8 0.1-0.3	TP9 0.1-0.3	TP10 0.2	TP11 0.1	TP12 0.1	TP13 0.1	TP14 0.1	TP16 0.1	SS52	SS53	SS54	SS55
								Project Name:		Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop Lead Management	Tarago Loop Lead Management	Tarago Loop Lead Management	Tarago Loop Lead Management
								Sampling Method:		Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit				
								Sample Description																	
Analyte grouping/Analyte								**Units**	**LOR**																
EA055: Moisture Content																									
Moisture Content (dried @ 103°C)								%	--	3	3.7	2.4	< 1	1.1	21	9.1	10	9.4	11	2.3	7.3	8	2.5	14	17
EA200: AS 4964 - 2004 Identification of Asbestos in Soils																									
Asbestos Detected								g/kg	0.1	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Asbestos Type								--	--	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sample weight (dry)								g	0.1	594	540	65	247	430	259	59	53	68	51	66	751	853	1120	937	574
Description								--	--	Brown fine-grained soil and rocks	Brown fine-grained soil and rocks	Brown fine-grained soil and rocks	Brown fine-grained soil and rocks	Brown fine-grained soil and rocks	Brown fine-grained soil and rocks	Brown fine-grained soil and rocks	Brown fine-grained soil and rocks	Brown fine-grained soil and rocks	Brown fine-grained soil and rocks	Brown fine-grained soil and rocks	Brown fine-grained soil and rocks	Brown coarse-grained soil and rocks	Brown coarse-grained soil, rocks and bitumous material	Brown coarse-grained soil, rocks and bitumous material	Brown coarse-grained soil, rcoks and organic debris
EG005T: Total Metals by ICP-AES																									
Arsenic	3000						160	mg/kg	2	47	13	11	5.8	23	8.6	6.1	6.6	1	9.6	1	2.1	25	150	19	32
Cadmium	900							mg/kg	0.4	3.3	1.1	1	0.7	1.6	1	0.2	0.2	0.2	2.1	0.2	0.2	5.6	8.1	0.2	12
Chromium	3600						710	mg/kg	5	25	7.4	7.6	2.5	11	6.8	2.5	29	2.5	8.7	2.5	2.5	12	15	9	13
Copper	240000						160	mg/kg	5	990	180	190	62	190	91	2.5	9.9	2.5	21	2.5	2.5	220	660	95	320
Lead	2200[E]						1800	mg/kg	5	38,000	3,100	6,000	3,300	2800	730	18	43	11	39	6.4	10	540	3100	370	1800
Nickel	6000						340	mg/kg	5	8.8	2.5	2.5	2.5	5.7	2.5	2.5	5.9	2.5	2.5	2.5	2.5	2.5	11	2.5	6.6
Zinc	400000						370	mg/kg	5	940	320	350	130	320	200	17	81	15	300	14	12	770	1300	47	1500
EG035T: Total Recoverable Mercury by FIMS																									
Mercury	730							mg/kg	0.1	0.4	0.1	0.05	0.05	0.05	0.05	0.05	0.05	0.3	0.05	0.05	0.05	0.05	0.6	0.05	0.2
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons																									
Naphthalene				11000	29000	NL	370	mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Acenaphthylene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Acenaphthene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Fluorene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Phenanthrene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Anthracene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Fluoranthene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.6
Pyrene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.7	0.5	0.25	0.5
Benz(a)anthracene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.7	0.6	0.25	0.6
Chrysene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Benzo(b+j)fluoranthene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Benzo(k)fluoranthene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Benzo(a)pyrene		172						mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.7	0.6	0.25	0.6
Indeno(1.2.3.cd)pyrene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.6	0.25	0.25	0.6
Dibenz(a.h)anthracene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Benzo(g.h.i)perylene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.6	0.25	0.25	0.5
Sum of polycyclic aromatic hydrocarbons	4000							mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	3.3	1.7	0.25	3.4
Benzo(a)pyrene TEQ (zero)								mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.8	0.7	0.25	0.7
Benzo(a)pyrene TEQ (half LOR)								mg/kg	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	1.1	1	0.6	1
Benzo(a)pyrene TEQ (LOR)	40							mg/kg	0.5	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.4	1.3	1.2	1.3
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions																									
C6 - C10 Fraction			700	26000	82000	NL		mg/kg	20	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
C6 - C10 Fraction minus BTEX (F1)		215						mg/kg	20	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
>C10 - C16 Fraction			1000	20000	62000	NL		mg/kg	50	25	25	25	92	25	25	25	25	25	25	25	25	25	25	25	25
>C16 - C34 Fraction (F3)		1700	3500	27000	85000			mg/kg	100	50	140	50	220	50	50	50	50	50	50	150	50	130	300	50	220
>C34 - C40 Fraction (F4)		3300	10000	38000	120000			mg/kg	100	50	50	50	120	50	50	50	50	50	50	50	50	50	130	50	50
>C10 - C40 Fraction (sum)								mg/kg	100	50	140	50	432	50	50	50	50	50	50	150	50	130	430	50	220
>C10 - C16 Fraction minus Naphthalene (F2)		170						mg/kg	50	25	25	25	92	25	25	25	25	25	25	25	25	25	25	25	25
EP080: BTEXN																									
Benzene		75		430	1100	77		mg/kg	0.1	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Toluene		135		99000	120000	NL		mg/kg	0.1	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Ethylbenzene		165		27000	85000	NL		mg/kg	0.1	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
meta- & para-Xylene								mg/kg	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
ortho-Xylene								mg/kg	0.1	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Total Xylenes		95		81000	130000	NL		mg/kg	0.3	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Naphthalene				11000	29000	NL	370	mg/kg	1	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25

Blank Cell indicates no criterion available

LOR = Limit of Reporting

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

CRC Care Technical Report no.10, *Health Screening Levels for petroleum hydrocarbons in soil and groundwater* September 2011

[A] For soil texture classification undertaken in accord with AS 1726, the classifications of sand, silt and clay may be applied as coarse, fine with liquid limit <50% and fine with liquid limit>50% respectively, as the underlying properties to develop the HSLs may reasonably be selected to be similar. Where there is uncertainty, either a conservative approach may be adopted or laboratory analysis should be carried out. Generally SAND has been adopted in these scenarios.

[B] The most conservative ESL guideline value has been adopted for all analytes

[C] Management limits are applied after consideration of relevant ESLs and HSLs. Separate management limits for BTEX and naphthalene are not available hence these should not be subtracted from the relevant fractions to obtain F1 and F2.

[D] Direct Contact are applied to surface soils or soils that could result in immediate contact.

[E] Human Health Guideline for Lead adopted from the Human Health Risk Assessment (Ramboll 2019d)

NL = Non Limiting. No HSL is presented for these chemicals as a soil vapour source concentration for a petroleum mixture could not exceed a level that would result in the maximum allowable vapour risk for the given scenario.

Health Investigation Levels for chromium based on chromium (VI)

Chromium (III) EIL, based on a low clay content (% clay) of 1%

Nickel EIL, based on CEC of 5cmol/kg

Copper EIL, based on CEC of 5cmol/kg

Zinc EIL, based on slightly acidic soil pH of 4.0 and CEC of 5cmol/kg

To obtain F1 subtract the sum of BTEX concentrations from the C6-C10 fraction.

To obtain F2 subtract naphthalene from the >C10-C16 fraction.

Benzo(a)Pyrene ESL derived ecological guideline (95% confidence limits) based on CRC CARE Technical Report no. 39 Risk-based remediation and management guidance for benzo(a)pyrene developed using a species sensitivity distribution (SSD) for eco-toxicity data from five independent studies involving one soil bacteria, three soil invertebrate taxa and four plant taxa (13 endpoints) in preference to NEPM low reliability data.

Concentration in **red** font and grey box exceed the adopted HIL/HSL 'D' for Commercial/Industrial

Concentration in **orange** font and grey box exceed the adopted EIL/ESL 'D' for Commercial/Industrial use

Concentrations in box exceed the screening value >2.5 times

Where one or more guideline value is exceeded, the highest guideline exceeded will be highlighted

Underlined values were reported <LOR and have been halved to allow for comparison of data.

Table H2:
Commercial/Industrial Soil Sampling Results (Lead)

	NEPM 2013 HIL D Commercial / Industrial	NEPM 2013 ESLCommercial / Industrial [B]	NEPM 2013 Management Limits Commercial/ Industrial [C]	CRC CARE 2011 Direct Contact[D] HSL D	CRC CARE 2011 Direct Contact[D]HSL for Intrusive Maintenance Workers	CRC CARE 2011 Vapour Intrusion HSL for Intrusive Maintenance Workers Sand 0-<2m[A]	NEPC EIL Commercial / Industrial (site specific)	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
								ALS Sample number:		S19-Se37002	S19-Se37007	S19-Se37010	S19-Se37012	S19-Se37016	S19-Se37018	S19-Se37036	S19-Se37039	S19-Se37043	S19-Se37046	S19-Se37049	S19-Se37051	S19-Se37052	S19-Se37054
								Sample date:		22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19
								Sample ID:		SS58	SS63	SS66	SS68	SS72	SS74	SS92	SS95	SS99	SS102	SS105	SS107	SS108	SS110
								Project Name:		Tarago Loop Lead Management	Tarago Loop Lead Management	Tarago Loop Lead Management	Tarago Loop Lead Management	Tarago Loop Lead Management	Tarago Loop Lead Management	Tarago Loop Lead Management	Tarago Loop Lead Management	Tarago Loop Lead Management	Tarago Loop Lead Management	Tarago Loop Lead Management	Tarago Loop Lead Management	Tarago Loop Lead Management	Tarago Loop Lead Management
								Sampling Method:															
								Sample Description															
Analyte grouping/Analyte								**Units**	**LOR**														
EA055: Moisture Content																							
Moisture Content (dried @ 103°C)								%	--	7.1	9.4	15	12	6.7	11	8.7	14	11	3.5	13	24	9.4	11
EA200: AS 4964 - 2004 Identification of Asbestos in Soils																							
Asbestos Detected								g/kg	0.1	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Asbestos Type								--	--	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sample weight (dry)								g	0.1	735	652	690	701	892	742	776	649	823	1006	892	588	673	521
Description								--	--	Brown coarse-grained soil, rocks and organic debris	Brown coarse-grained soil, rocks and bitumous material	Brown coarse-grained soil, rocks and organic debris	Brown coarse-grained soil, rocks and plaster-like material	Brown coarse-grained soil, rocks and cement fragments	Brown coarse-grained soil and rocks	Brown coarse-grained soil and rocks	Brown coarse-grained soil and rocks	Brown coarse-grained soil and rocks	Brown coarse-grained soil and rocks	Brown coarse-grained soil and rocks	Brown coarse-grained soil and rocks	Brown coarse-grained soil and rocks	Brown coarse-grained soil and rocks
EG005T: Total Metals by ICP-AES																							
Arsenic	3000						160	mg/kg	2	3.7	5.4	20	12	15	15	2.9	2.4	3.1	6.2	65	11	4.9	13
Cadmium	900							mg/kg	0.4	0.8	1.6	14	7.4	2.3	6.6	0.8	0.7	0.2	0.2	4.3	3.2	0.9	0.2
Chromium	3600						710	mg/kg	5	7.2	2.5	57	8.2	22	14	8.6	8.3	7.3	9.3	27	13	11	36
Copper	240000						160	mg/kg	5	26	44	700	240	85	76	16	20	8.9	11	790	480	20	14
Lead	2200[E]						1800	mg/kg	5	66	75	1100	440	480	300	49	45	22	24	3900	530	52	30
Nickel	6000						340	mg/kg	5	2.5	2.5	17	5.4	5.3	8.9	8.4	2.5	2.5	2.5	9.2	6.4	2.5	5.9
Zinc	400000						370	mg/kg	5	210	180	1600	650	320	1300	130	120	38	42	780	350	170	27
EG035T: Total Recoverable Mercury by FIMS																							
Mercury	730							mg/kg	0.1	0.05	0.05	0.05	0.05	0.05	0.6	0.05	0.05	0.05	0.05	0.2	0.05	0.05	0.05
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons																							
Naphthalene				11000	29000	NL	370	mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Acenaphthylene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Acenaphthene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Fluorene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Phenanthrene								mg/kg	0.5	0.25	0.25	0.25	0.25	1.3	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Anthracene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Fluoranthene								mg/kg	0.5	0.25	0.25	0.25	0.25	1.2	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Pyrene								mg/kg	0.5	0.25	0.25	0.25	0.25	1	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Benz(a)anthracene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.7	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Chrysene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Benzo(b+j)fluoranthene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Benzo(k)fluoranthene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Benzo(a)pyrene		172						mg/kg	0.5	0.25	0.25	0.25	0.25	0.7	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Indeno(1.2.3.cd)pyrene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.6	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Dibenz(a.h)anthracene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Benzo(g.h.i)perylene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Sum of polycyclic aromatic hydrocarbons	4000							mg/kg	0.5	0.25	0.25	0.25	0.25	6	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Benzo(a)pyrene TEQ (zero)								mg/kg	0.5	0.25	0.25	0.25	0.25	0.8	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Benzo(a)pyrene TEQ (half LOR)								mg/kg	0.5	0.6	0.6	0.6	0.6	1.1	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (LOR)	40							mg/kg	0.5	1.2	1.2	1.2	1.2	1.4	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions																							
C6 - C10 Fraction			700	26000	82000	NL		mg/kg	20	10	10	10	10	10	10	10	10	10	10	10	10	10	10
C6 - C10 Fraction minus BTEX (F1)		215						mg/kg	20	10	10	10	10	10	10	10	10	10	10	10	10	10	10
>C10 - C16 Fraction			1000	20000	62000	NL		mg/kg	50	25	25	25	25	25	25	25	25	25	25	25	56	25	25
>C16 - C34 Fraction (F3)		1700	3500	27000	85000			mg/kg	100	150	130	160	140	140	250	50	50	50	50	50	310	50	50
>C34 - C40 Fraction (F4)		3300	10000	38000	120000			mg/kg	100	50	50	50	50	50	100	50	50	50	50	50	140	50	50
>C10 - C40 Fraction (sum)								mg/kg	100	150	130	160	140	140	350	50	50	50	50	50	506	50	50
>C10 - C16 Fraction minus Naphthalene (F2)		170						mg/kg	50	25	25	25	25	25	25	25	25	25	25	25	56	25	25
EP080: BTEXN																							
Benzene		75		430	1100	77		mg/kg	0.1	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Toluene		135		99000	120000	NL		mg/kg	0.1	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Ethylbenzene		165		27000	85000	NL		mg/kg	0.1	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
meta- & para-Xylene								mg/kg	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
ortho-Xylene								mg/kg	0.1	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Total Xylenes		95		81000	130000	NL		mg/kg	0.3	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Naphthalene				11000	29000	NL	370	mg/kg	1	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25

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CRC Care Technical Report no.10, *Health Screening Levels for petroleum hydrocarbons in soil and groundwater* September 2011

[A] For soil texture classification undertaken in accord with AS 1726, the classifications of sand, silt and clay may be applied as coarse, fine with liquid limit <50% and fine with liquid limit>50% respectively, as the underlying properties to develop the HSLs may reasonably be selected to be similar. Where there is uncertainty, either a conservative approach may be adopted or laboratory analysis should be carried out. Generally SAND has been adopted in these scenarios.

[B] The most conservative ESL guideline value has been adopted for all analytes

[C] Management limits are applied after consideration of relevant ESLs and HSLs. Separate management limits for BTEX and naphthalene are not available hence these should not be subtracted from the relevant fractions to obtain F1 and F2.

[D] Direct Contact are applied to surface soils or soils that could result in immediate contact.

[E] Human Health Guideline for Lead adopted from the Human Health Risk Assessment (Ramboll 2019d)

NL = Non Limiting. No HSL is presented for these chemicals as a soil vapour source concentration for a petroleum mixture could not exceed a level that would result in the maximum allowable vapour risk for the given scenario.

Health Investigation Levels for chromium based on chromium (VI)

Chromium (III) EIL, based on a low clay content (% clay) of 1%

Nickel EIL, based on CEC of 5cmol/kg

Copper EIL, based on CEC of 5cmol/kg

Zinc EIL, based on slightly acidic soil pH of 4.0 and CEC of 5cmol/kg

To obtain F1 subtract the sum of BTEX concentrations from the C6-C10 fraction.

To obtain F2 subtract naphthalene from the >C10-C16 fraction.

Benzo(a)Pyrene ESL derived ecological guideline (95% confidence limits) based on CRC CARE Technical Report no. 39 Risk-based remediation and management guidance for benzo(a)pyrene developed using a species sensitivity distribution (SSD) for eco-toxicity data from five independent studies involving one soil bacteria, three soil invertebrate taxa and four plant taxa (13 endpoints) in preference to NEPM low reliability data.

Concentration in **red** font and grey box exceed the adopted HIL/HSL 'D' for Commercial/Industrial

Concentration in **orange** font and grey box exceed the adopted EIL/ESL 'D' for Commercial/Industrial use

Concentrations in box exceed the screening value >2.5 times

Where one or more guideline value is exceeded, the highest guideline exceeded will be highlighted

Underlined values were reported <LOR and have been halved to allow for comparison of data.

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Loop Lead Management
23-07-20

Table H3:
Commercial/Industrial Soil Sampling Results

	HHRA (Ramboll 2019d)	NEPM 2013 EIL Commercial / Industrial	Sample Type:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
			Laboratory Sample numbe	S19-Jl39891	S19-Jl39892	S19-Jl39893	S19-Jl39894	S19-Jl39895	Report 677385	S19-Jl39896	S19-Jl39897	S19-Jl39898	Report 677385	S19-Jl39899	S19-Jl39900	Report 677385	S19-Jl39901
			Sample date:	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	16-09-19	26/07/19	26/07/19	26/07/19	16-09-19	26/07/19	26/07/19	16-09-19	26/07/19
			Sample ID:	TP1 0.1-0.5	TP1 0.5-0.6	TP2 0.1-0.4	TP2 0.4-0.5	TP2 0.5-0.7	TP3a 0-0.1	TP3 0.1-0.5	TP3 0.5-0.6	TP3 0.6-0.7	TP4a 0-0.1	TP4 0.1-0.3	TP4 0.3-0.4	TP5a 0-0.1	TP5 0.1-0.45
			Site:	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop
			Sampling Method:	Test pit	Test pit	Test pit	Test pit	Test pit	Test pit	Test pit	Test pit	Test pit	Test pit	Test pit	Test pit	Test pit	Test pit
Analyte grouping/Analyte			**Units**	**LOR**													
EG005T: Total Metals by ICP-AES																	
Lead	2,200	1,800	mg/kg	5	**4,400**	10	**3,500**	110	16	**18,500**	**29,000**	74	13	**184,000**	**38,000**	70	**29,000**	**3,100**

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

Concentration in **red** font and grey box exceed the adopted Human Health Guideline for Commercial/Industrial (Ramboll 2019d)

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Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Loop Lead Management
23-07-20

Table H3:
Commercial/Industrial Soil Sampling Results

	HHRA (Ramboll 2019d)	NEPM 2013 EIL Commercial / Industrial																
Sample Type:					Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Laboratory Sample numb					S19-JI39902	S19-JI39903	S19-JI39904	S19-JI39905	S19-JI39906	S19-JI39907	S19-JI39908	S19-JI39909	S19-JI39910	S19-JI39911	S19-JI39912	S19-JI39845	S19-JI39914	S19-JI39915
Sample date:					26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19
Sample ID:					TP5 0.45-0.55	TP5 0.6-0.7	TP6 0.1-0.4	TP6 0.4-0.5	TP6 0.5-0.7	TP7 0.1-0.4	TP7 0.4-0.5	TP7 0.5-0.7	TP8 0.1-0.3	TP8 0.3-0.5	TP8 0.5-0.8	TP9 0.1-0.3	TP9 0.3-0.5	TP9 0.5-0.7
Site:					Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop
Sampling Method:					Test pit	Test pit	Test pit	Test pit	Test pit	Test pit	Test pit	Test pit	Test pit	Test pit	Test pit	Test pit	Test pit	Test pit
Analyte grouping/Analyte			**Units**	**LOR**														
EG005T: Total Metals by ICP-AES																		
Lead	2,200	1,800	mg/kg	5	150	47	**6,000**	20	7	**3,300**	76	7	**2,800**	24	22	730	2.50	8

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Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Loop Lead Management
23-07-20

Table H3:
Commercial/Industrial Soil Sampling Results

	HHRA (Ramboll 2019d)	NEPM 2013 EIL Commercial / Industrial																
Sample Type:					Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Laboratory Sample numb					S19-JI39846	S19-JI39847	S19-JI39848	S19-JI39849	S19-JI39850	S19-JI39918	S19-JI39919	S19-JI39851	S19-JI39920	S19-JI39921	S19-JI39922	S19-JI39923	S19-JI39924	S19-JI39925
Sample date:					26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19
Sample ID:					TP10 0.2	TP11 0.1	TP12 0.1	TP13 0.1	TP14 0.1	TP15 0.1	TP15 0.8	TP16 0.1	SS1 0.0-0.1	SS2 0.0-0.1	SS3 0.0-0.1	SS4 0.0-0.1	SS5 0.0-0.1	SS6 0.0-0.1
Site:					Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop
Sampling Method:					Test pit	Test pit	Test pit	Test pit	Test pit	Test pit	Test pit	Test pit	Test pit	Test pit	Test pit	Test pit	Test pit	Test pit
Analyte grouping/Analyte			**Units**	**LOR**														
EG005T: Total Metals by ICP-AES																		
Lead	2,200	1,800	mg/kg	5	18	43	11	39	6.4	27	26	10	39	110	130	120	43	110

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Concentration in **red** font and grey box exceed the adopted Human Health Guideline for Commercial/Industrial (Ramboll 2019d)

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Job No: 318000780
Project Name: Tarago Loop Lead Management
23-07-20

Table H3:
Commercial/Industrial Soil Sampling Results

	HHRA (Ramboll 2019d)	NEPM 2013 EIL Commercial / Industrial																
Sample Type:					Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Laboratory Sample numb					S19-JI39926	S19-JI39927	S19-JI39928	S19-JI39929	S19-JI39930	Report 67385	S19-JI39932	S19-JI39933	S19-JI39934	S19-JI39935	S19-JI39997	S19-JI39998	S19-JI39999	Report 67385
Sample date:					26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19
Sample ID:					SS7 0.0-0.1	SS8 0.0-0.1	SS9 0.0-0.1	SS10 0.0-0.1	SS11 0.0-0.1	SS12 0.0-0.1	SS13 0.0-0.1	SS14 0.0-0.1	SS15 0.0-0.1	SS16 0.0-0.1	SS17_0.0-0.1	SS18_0.0-0.1	SS19_0.0-0.1	SS20_0.0-0.1
Site:					Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop
Sampling Method:					Test pit	Test pit	Test pit	Test pit	Test pit	Test pit	Test pit	Test pit	Test pit	Test pit	Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil
Analyte grouping/Analyte			**Units**	**LOR**														
EG005T: Total Metals by ICP-AES																		
Lead	2,200	1,800	mg/kg	5	**4,100**	340	140	780	**2,200**	**48,000**	**2,600**	31	350	**15,000**	25	34	**26,000**	**41,000**

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Concentration in **red** font and grey box exceed the adopted Human Health Guideline for Commercial/Industrial (Ramboll 2019d)

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Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Loop Lead Management
23-07-20

Table H3:
Commercial/Industrial Soil Sampling Results

	HHRA (Ramboll 2019d)	NEPM 2013 EIL Commercial / Industrial																
Sample Type:					Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Laboratory Sample numb					S19-Jl40001	S19-Jl40002	S19-Au17274	S19-Au17275	S19-Au17276	S19-Au17277	S19-Au17278	S19-Au17279	Report 67385	S19-Au17281	S19-Au39076	S19-Au39077	S19-Au39078	S19-Au39079
Sample date:					26/07/19	26/07/19	12-08-19	12-08-19	12-08-19	12-08-19	12-08-19	12-08-19	12-08-19	12-08-19	27-08-19	27-08-19	27-08-19	27-08-19
Sample ID:					SS21	SS22	SS23	SS24	SS25	SS26	SS27	SS28	SS29	SS30	SS31	SS32	SS33	SS34
Site:					Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop
Sampling Method:					Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil
Analyte grouping/Analyte			**Units**	**LOR**														
EG005T: Total Metals by ICP-AES																		
Lead	2,200	1,800	mg/kg	5	610	540	350	**3,000**	**11,000**	33	**6,700**	**15000***	**7,500**	570*	710	**2800***	800	850

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Project Name: Tarago Loop Lead Management
23-07-20

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	HHRA (Ramboll 2019d)	NEPM 2013 EIL Commercial / Industrial																
Sample Type:					Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Laboratory Sample numb					S19-Au39080	S19-Au39075	S19-Au39082	S19-Au39083	S19-Au39084	S19-Au39085	S19-Au39086	S19-Au39087	S19-Au39088	S19-Au39089	S19-Au39090	S19-Au39091	S19-Au39092	S19-Au39093
Sample date:					27-08-19	27-08-19	27-08-19	27-08-19	27-08-19	27-08-19	27-08-19	27-08-19	27-08-19	27-08-19	27-08-19	27-08-19	27-08-19	27-08-19
Sample ID:					SS35	SS36	SS37	SS38	SS39	SS40	SS41	SS42	SS43	SS44	SS45	SS46	SS47	SS48
Site:					Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop
Sampling Method:					Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil
Analyte grouping/Analyte			**Units**	**LOR**														
EG005T: Total Metals by ICP-AES																		
Lead	2,200	1,800	mg/kg	5	900	2,100	1,600	9,900	2,900	2,600	11,000	240	31,000	140	4,000	210	3,900	1,800

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23-07-20

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Commercial/Industrial Soil Sampling Results

	HHRA (Ramboll 2019d)	NEPM 2013 EIL Commercial / Industrial																
			Sample Type:		**Soil**	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**
			Laboratory Sample numb		S19-Au39094	S19-Au39095	S19-Au39096	S19-Se36992	S19-Se36993	S19-Se36994	S19-Se36995	S19-Se36998	S19-Se37001	S19-Se37002	S19-Se37003	S19-Se37004	S19-Se37005	S19-Se37006
			Sample date:		27-08-19	27-08-19	27-08-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19
			Sample ID:		SS49	SS50	SS51	SS52	SS53	SS54	SS55	SS56_0.1g	SS57_0.1g	SS58	SS59	SS60	SS61	SS62
			Site:		Tarago Loop	Tarago Loop	Tarago Loop	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor
			Sampling Method:		Shallow Soil	Shallow Soil	Shallow Soil	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete
Analyte grouping/Analyte			**Units**	**LOR**														
EG005T: Total Metals by ICP-AES																		
Lead	2,200	1,800	mg/kg	5	1,400	1,400	190	540	**3,100**	370	**1,800**	**40,000**	**83,000**	66	130	19	**5,000**	330

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Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Loop Lead Management
23-07-20

Table H3:
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	HHRA (Ramboll 2019d)	NEPM 2013 EIL Commercial / Industrial																
Sample Type:					Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Laboratory Sample numb					S19-Se37007	S19-Se37008	S19-Se37009	S19-Se37010	S19-Se37011	S19-Se37012	S19-Se37013	S19-Se37014	S19-Se37015	S19-Se37016	S19-Se37017	S19-Se37018	S19-Se37019	S19-Se37020
Sample date:					22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19
Sample ID:					SS63	SS64	SS65	SS66	SS67	SS68	SS69	SS70	SS71	SS72	SS73	SS74	SS75	SS76
Site:					Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor
Sampling Method:					Discrete	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete
Analyte grouping/Analyte			**Units**	**LOR**														
EG005T: Total Metals by ICP-AES																		
Lead	2,200	1,800	mg/kg	5	75	300	400	1,100	210	440	580	150	1,200	480	460	300	1,600	1,000

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Commercial/Industrial Soil Sampling Results

	HHRA (Ramboll 2019d)	NEPM 2013 EIL Commercial / Industrial																
Sample Type:					Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Laboratory Sample numb					S19-Se37021	S19-Se37022	S19-Se37023	S19-Se37024	S19-Se37025	S19-Se37026	S19-Se37027	S19-Se37028	S19-Se37029	S19-Se37030	S19-Se37031	S19-Se37032	S19-Se37033	S19-Se37034
Sample date:					22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19
Sample ID:					SS77	SS78	SS79	SS80	SS81	SS82	SS83	SS84	SS85	SS86	SS87	SS88	SS89	SS90
Site:					Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor
Sampling Method:					Discrete	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete
Analyte grouping/Analyte			**Units**	**LOR**														
EG005T: Total Metals by ICP-AES																		
Lead	2,200	1,800	mg/kg	5	500	530	98	200	120	230	530	460	330	28	32	660	200	28

Blank Cell indicates no criterion available

LOR = Limit of Reporting

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

Concentration in **red** font and grey box exceed the adopted Human Health Guideline for Commercial/Industrial (Ramboll 2019d)

Concentration in **orange** font and grey box exceed the adopted EIL 'D' for Commercial/Industrial

Concentrations in box exceed the screening value >2.5 times

Where one or more guideline value is exceeded, the highest guideline exceeded will be highlighted

* indicates higher duplicate value adopted

Underlined values were reported <LOR and have been halved to allow for comparison of data.

Concentrations at TP3a, TP4a, TP5a, SS12, SS20 and SS29 are reported based on 250um fractions separated and analysed to inform bio-accessibility analyses completed as part of HHRA (Ramboll 2019c)

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Loop Lead Management
23-07-20

Table H3:
Commercial/Industrial Soil Sampling Results

	HHRA (Ramboll 2019d)	NEPM 2013 EIL Commercial / Industrial																
Sample Type:					Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Laboratory Sample numb					S19-Se37035	S19-Se37036	S19-Se37037	S19-Se37038	S19-Se37039	S19-Se37040	S19-Se37041	S19-Se37042	S19-Se37043	S19-Se37044	S19-Se37045	S19-Se37046	S19-Se37047	S19-Se37048
Sample date:					22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19
Sample ID:					SS91	SS92	SS93	SS94	SS95	SS96	SS97	SS98	SS99	SS100	SS101	SS102	SS103	SS104
Site:					Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor
Sampling Method:					Discrete	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete
Analyte grouping/Analyte			**Units**	**LOR**														
EG005T: Total Metals by ICP-AES																		
Lead	2,200	1,800	mg/kg	5	110	49	32	100	45	79	35	38	22	870	17	24	35	620

Blank Cell indicates no criterion available

LOR = Limit of Reporting

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

Concentration in **red** font and grey box exceed the adopted Human Health Guideline for Commercial/Industrial (Ramboll 2019d)

Concentration in **orange** font and grey box exceed the adopted EIL 'D' for Commercial/Industrial

Concentrations in box exceed the screening value >2.5 times

Where one or more guideline value is exceeded, the highest guideline exceeded will be highlighted

* indicates higher duplicate value adopted

Underlined values were reported <LOR and have been halved to allow for comparison of data.

Concentrations at TP3a, TP4a, TP5a, SS12, SS20 and SS29 are reported based on 250um fractions separated and analysed to inform bio-accessibility analyses completed as part of HHRA (Ramboll 2019c)

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Loop Lead Management
23-07-20

Table H3:
Commercial/Industrial Soil Sampling Results

	HHRA (Ramboll 2019d)	NEPM 2013 EIL Commercial / Industrial										
Sample Type:					**Soil**	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**
Laboratory Sample numb					S19-Se37049	S19-Se37050	S19-Se37051	S19-Se37052	S19-Se37053	S19-Se37054	S19-Se37145	S19-Se37146
Sample date:					22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19
Sample ID:					SS105	SS106	SS107	SS108	SS109	SS110	SS111	SS112
Site:					Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor
Sampling Method:					Discrete	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete
Analyte grouping/Analyte			**Units**	**LOR**								
EG005T: Total Metals by ICP-AES												
Lead	2,200	1,800	mg/kg	5	**3,900**	1,400	530	52	76	30	38	27

Blank Cell indicates no criterion available

LOR = Limit of Reporting

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

Concentration in **red** font and grey box exceed the adopted Human Health Guideline for Commercial/Industrial (Ramboll 2019d)

Concentration in **orange** font and grey box exceed the adopted EIL 'D' for Commercial/Industrial

Concentrations in box exceed the screening value >2.5 times

Where one or more guideline value is exceeded, the highest guideline exceeded will be highlighted

* indicates higher duplicate value adopted

Underlined values were reported <LOR and have been halved to allow for comparison of data.

Concentrations at TP3a, TP4a, TP5a, SS12, SS20 and SS29 are reported based on 250um fractions separated and analysed to inform bio-accessibility analyses completed as part of HHRA (Ramboll 2019c)

Table H4: Rail Sleepers

	NEPM 2013 HIL D Commercial / Industrial	Sample Type:	Primary	Primary	Primary	Primary	Duplicate
		Sample number:	S20-Ma28575	S20-Ma28576	S20-Ma28577	S20-Ma28578	S20-Ma28579
		Sample date:	18-Mar-20	18-Mar-20	18-Mar-20	18-Mar-20	18-Mar-20
		Sample ID:	SLE01	SLE02	SLE03	SLE04	D01_180320
		Project Name:	John Holland	John Holland	John Holland	John Holland	John Holland
		Compound:					
		Site:	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop
		Sampling Method:	NA	NA	NA	NA	NA
		Sample Description	Woodchips	Woodchips	Woodchips	Woodchips	Woodchips

Analyte grouping/Analyte		Units	LOR					
Total Metals								
Arsenic	**3000**	mg/kg	5	< 2	6.9	6.5	< 2	4.6
Cadmium	**900**	mg/kg	1	15	11	7.6	11	11
Chromium (VI)	**3600**	mg/kg	2	< 5	11	14	< 5	< 5
Copper	**240000**	mg/kg	5	140	430	1700	230	590
Lead	**2200[e]**	mg/kg	5	240	1300	1300	560	**2700**
Mercury	**6000**	mg/kg	0.1	< 0.1	< 0.1	0.2	< 0.1	< 0.1
Nickel	**400000**	mg/kg	2	< 5	11	11	5.7	< 5
Zinc		mg/kg	5	2800	1200	1300	1100	1300
Organophosphorus Pesticides (OP)								
Azinphos-methyl		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Bolstar		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chlorfenvinphos		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chlorpyrifos	**2000**	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chlorpyrifos-methyl		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Coumaphos		mg/kg	< 2	< 2	< 2	< 2	< 2	< 2
Demeton-O		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Demeton-S		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Diazinon		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dichlorvos		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dimethoate		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Disulfoton		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
EPN		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Ethion		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Ethoprop		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Ethyl parathion		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Fenitrothion		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Fensulfothion		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Fenthion		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Malathion		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Merphos		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Methyl parathion		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Mevinphos		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Monocrotophos		mg/kg	< 2	< 2	< 2	< 2	< 2	< 2
Naled		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Omethoate		mg/kg	< 2	< 2	< 2	< 2	< 2	< 2
Phorate		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Pirimiphos-methyl		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Pyrazophos		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Ronnel		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Terbufos		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Tetrachlorvinphos		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Tokuthion		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Trichloronate		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Polynuclear Aromatic Hydrocarbons								
Acenaphthene		mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene		mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene		mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene		mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene		mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (lower bound) *	**40**	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *		mg/kg	< 0.6	0.6	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *		mg/kg	< 0.7	1.2	1.2	1.2	1.2	1.2
Benzo(b&j)fluoranthene		mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene		mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene		mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene		mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene		mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene		mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene		mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene		mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene		mg/kg	< 0.6	1.7	1.1	0.5	< 0.5	< 0.5
Phenanthrene		mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene		mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Total PAH*	**4000**	mg/kg	< 0.6	1.7	1.1	0.5	< 0.5	< 0.5
TRH - 1999 NEPM Fractions (after silica gel clean-up)								
TRH C10-C14 (after silica gel clean-up)		mg/kg	< 100	< 100	< 100	< 100	220	< 100
TRH C10-C36 (Total) (after silica gel clean-up)	**10000**	mg/kg	< 250	1200	< 250	750	< 250	2110
TRH C15-C28 (after silica gel clean-up)		mg/kg	< 250	300	< 250	320	< 250	510
TRH C29-C36 (after silica gel clean-up)		mg/kg	< 250	900	< 250	430	< 250	1600
Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
TRH >C10-C16 (after silica gel clean-up)		mg/kg	< 250	< 250	< 250	< 250	< 250	< 250
TRH >C16-C34 (after silica gel clean-up)		mg/kg	< 500	1100	< 500	650	< 500	1700
TRH >C34-C40 (after silica gel clean-up)		mg/kg	< 500	< 500	< 500	< 500	< 500	840

Blank Cell indicates no criterion available

LOR = Limit of Reporting

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

CRC Care Technical Report no.10, *Health Screening Levels for petroleum hydrocarbons in soil and groundwater* September 2011

[e] Human Health Guideline for Lead adopted from the Human Health Risk Assessment (Ramboll 2019d)

Health Investigation Levels for chromium based on chromium (VI)

Chromium (III) EIL, based on a low clay content (% clay) of 1%

Table H5: Lead Leachate

	Sample Type:		Leachate	Leachate	Leachate	Leachate	Leachate	Leachate
	Sample number:		S19-JI50740	S19-JI50741	S19-JI50742	S19-JI50743	S19-JI50744	S19-JI50745
	Sample date:		26-Jul-19	26-Jul-19	26-Jul-19	26-Jul-19	26-Jul-19	26-Jul-19
	Sample ID:		TP1 0.1-0.5	TP5 0.1-0.45	TP7 0.1-0.4	TP3 0.1-0.5	SS20 0-0.1	TP4 0.1-0.3
	Project Name:		John Holland	John Holland	John Holland	John Holland	John Holland	John Holland
	Compound:							
	Site:		US Leachate	US Leachate	US Leachate	AUS Leachate - Reagent Water	AUS Leachate - Reagent Water	AUS Leachate - Reagent Water
	Sampling Method:		NA	NA	NA	NA	NA	NA
	Sample Description		Leachate	Leachate	Leachate	Leachate	Leachate	Leachate
Analyte grouping/Analyte	**Units**	**LOR**						
Metals TCLP								
Arsenic	mg/L	0.1	--	--	--	--	--	--
Cadmium	mg/L	0.05	--	--	--	--	--	--
Chromium (VI)	mg/L	0.1	--	--	--	--	--	--
Copper	mg/L	0.1	--	--	--	--	--	--
Lead	mg/L	0.1	4.3	32	8.2	1.1	0.03	<0.01
Nickel	mg/L	0.1	--	--	--	--	--	--
Zinc	mg/L	0.1	--	--	--	--	--	--
Mercury	mg/L	0.001	--	--	--	--	--	--

Blank Cell indicates no criterion available
LOR = Limit of Reporting
PFOS/PFOA values adopted from Addendum to the Waste Classification Guidelines (2014) – Part 1: classifying waste, October 2016 (NSW EPA). Noting these values have been based on the enHealth TDI values
Blank cell indicates no screening criterion available
For Limit of Reporting (LOR) refer to laboratory certificates of analysis
--- Indicates sample not analysed
Concentrations below the LOR noted as <value

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Loop Lead Management
23-07-20

Table H6:
Offsite Soil Sampling Results

	NEPM 2013 HIL C Open Space	**Sample Type:**		**Soil**	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**
		Laboratory Sample numbe		S19-De30540	S19-De30541	S19-De30542	S19-De30543	S19-De30544	S19-De30545	S19-De30546	S19-De30547	S19-De30548	S19-De30549	S19-De30560	S19-De30561	S19-De30562	S19-De30563	S19-De30564	S19-De30565
		Sample date:		19-12-19	19-12-19	19-12-19	19-12-19	19-12-19	19-12-19	19-12-19	19-12-19	19-12-19	19-12-19	19-12-19	19-12-19	19-12-19	19-12-19	19-12-19	19-12-19
		Sample ID:		SS116	SS117	SS118	SS119	SS120	SS121	SS122	SS123	SS124	SS125	SS136	SS137	SS138	SS139	SS140	SS141
		Site:		Goulburn St	Goulburn St	Goulburn St	Goulburn St	Goulburn St	Goulburn St	Goulburn St	Goulburn St	Goulburn St	Goulburn St	Station Masters Cottage	Station Masters Cottage	Station Masters Cottage	Station Masters Cottage	Station Masters Cottage	Station Masters Cottage
		Sampling Method:		Discrete	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete
Analyte grouping/Analyte		**Units**	**LOR**																
EG005T: Total Metals by ICP-AES																			
Lead	600	mg/kg	5	250	250	**880**	110	86	140	260	480	70	520	**1,200**	**1,100**	210	**800**	**660**	**390**

Blank Cell indicates no criterion available

LOR = Limit of Reporting

National Environment Protection Council (2013) National Environmental Protection (Assessment of Site Contamination) Amendment Measure 2013 (No.

Concentration in **red** font and grey box exceed the adopted assessment criteria

* indicates higher duplicate value adopted

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Loop Lead Management
23-07-20

Table H6:
Offsite Soil Sampling Results

	NEPM 2013 HIL C Open Space	**Sample Type:**		**Soil**	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**
		Laboratory Sample numbe		S19-De30550	S19-De30551	S19-De30552	S19-De30553	S19-De30554	S19-De30555	S19-De30556	S19-De30557	S19-De30558	S19-De30559
		Sample date:		19-12-19	19-12-19	19-12-19	19-12-19	19-12-19	19-12-19	19-12-19	19-12-19	19-12-19	19-12-19
		Sample ID:		SS126	SS127	SS128	SS129	SS130	SS131	SS132	SS133	SS134	SS135
		Site:		Tarago Public School	Tarago Public School	Tarago Public School	Tarago Public School	Tarago Public School	Tarago Public School	Tarago Public School	Tarago Public School	Tarago Public School	Tarago Public School
		Sampling Method:		Discrete	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete
Analyte grouping/Analyte		**Units**	**LOR**										
EG005T: Total Metals by ICP-AES													
Lead	600	mg/kg	5	110	89	39	61	190	240	17	46	42	59

Blank Cell indicates no criterion available

LOR = Limit of Reporting

National Environment Protection Council (2013) National Environmental Protection (Assessment of Site Contamination) Amendment Measure 2013 (No.

Concentration in **red** font and grey box exceed the adopted assessment criteria

* indicates higher duplicate value adopted

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Loop Lead Management
23-07-20

Table H6:
Offsite Soil Sampling Results

	NEPM 2013 HIL C Open Space		**Sample Type:**
			Laboratory Sample numbe
			Sample date:
			Sample ID:
			Site:
			Sampling Method:
Analyte grouping/Analyte		**Units**	**LOR**
EG005T: Total Metals by ICP-AES			
Lead	600	mg/kg	5

Blank Cell indicates no criterion available

LOR = Limit of Reporting

National Environment Protection Council (2013) National Environmental Protection (Assessment of Site Contamination) Amendment Measure 2013 (No.

Concentration in **red** font and grey box exceed the adopted assessment criteria

* indicates higher duplicate value adopted

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Loop Lead Management
23-07-20

Table H7:
Offsite Paint Results

		Sample Type:			Paint	Paint	Paint	Paint	Paint	Paint	Paint
		Laboratory Sample number:			S19-De30587	S19-De30588	S19-De30589	S19-De30590	S19-De30591	S19-De30592	S19-De30593
		Sample date:			19-12-19	19-12-19	19-12-19	19-12-19	19-12-19	19-12-19	19-12-19
		Sample ID:			PAINT1	PAINT2	PAINT3	PAINT4	PAINT5	PAINT6	PAINT7
		Site:			Tarago P.S.	Tarago P.S.	Tarago P.S.	Tarago P.S.	Tarago P.S.	Station Masters Cottage	Station Masters Cottage
		Sampling Method:			Grab Sample	Grab Sample	Grab Sample	Grab Sample	Grab Sample	Grab Sample	Grab Sample
Analyte grouping/Analyt		**Units**	**LOR**								
Extractable metals in paint by ICP-AES											
Lead		%	0.01		0.09	0.25	1.8	0.29	0.03	0.07	16

Table H7:
Offsite Paint Results

		Sample Type:		**Paint**
		Laboratory Sample number:		S19-De30594
		Sample date:		19-12-19
		Sample ID:		PAINT8
		Site:		Station Masters Cottage
		Sampling Method:		Grab Sample

Analyte grouping/Analyt	**Units**	**LOR**		
Extractable metals in paint by ICP-AES				
Lead	%	0.01		15

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Loop Lead Management
23-07-20

Table H8:
Offsite Dust Swab Sampling Results

	NSW EPA (2003)	US EPA (2020)		Sample Type:		SWAB	SWAB	SWAB	SWAB	SWAB	SWAB	SWAB
				Laboratory Sample number:		S19-De30581	S19-De30582	S19-De30583	S19-De30584	S19-De30585	S19-De30586	S19-De30566
				Sample date:		19-12-19	19-12-19	19-12-19	19-12-19	19-12-19	19-12-19	19-12-19
				Sample ID:		SWAB16	SWAB17	SWAB18	SWAB19	SWAB20	SWAB21	SWAB1
				Site:		Station Masters Cottage Exterior	Station Masters Cottage Exterior	Station Masters Cottage Exterior	Station Masters Cottage Interior	Station Masters Cottage Interior	Station Masters Cottage Interior	Tarago Station
				Sampling Method:		Grid Swab	Grid Swab	Grid Swab	Grid Swab	Grid Swab	Grid Swab	Grid Swab
Analyte grouping/Analyte				**Units**	**LOR**							
External Dust												
E022.5 -: Acid Extractable metals in paint by ICP-AES												
Total Lead	--	--		µg	1	1200	410	900	--	--	--	52
Surface Area	--	--		m²	--	0.06	0.09	0.09	--	--	--	0.0675
Lead	4,300			µg/m²	--	**20000**	**4556**	**10000**	--	--	--	770
Internal Dust												
in paint by ICP-AES												
Total Lead	--	--		µg	1	--	--	--	750	1600	47	--
Surface Area	--	--		m²	--	--	--	--	0.09	0.09	0.08	--
Lead	NA	1,076		µg/m²	--	--	--	--	**8333**	**17778**	**588**	--

Blank Cell indicates no criterion available

LOR = Limit of Reporting

Concentration in **red** font and grey box exceed the adopted criteria

Concentrations in box exceed the screening value >2.5 times

NSW EPA (2003) Managing Lead Contamination in Home Maintenance, Renovation and Demolition Practices. A Guide for Councils. NSW Environment Protection Authority.

US EPA (2020) Protect your family from lead in your home

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Loop Lead Management
23-07-20

Table H8:
Offsite Dust Swab Sampling Results

	NSW EPA (2003)	US EPA (2020)												
				Sample Type:			**SWAB**	**SWAB**	**SWAB**	**SWAB**	**SWAB**	**SWAB**	**SWAB**	**SWAB**
				Laboratory Sample number:			S19-De30567	S19-De30568	S19-De30569	S19-De30570	S19-De30571	S19-De30572	S19-De30573	S19-De30574
				Sample date:			19-12-19	19-12-19	19-12-19	19-12-19	19-12-19	19-12-19	19-12-19	19-12-19
				Sample ID:			SWAB2	SWAB3	SWAB4	SWAB5	SWAB6	SWAB7	SWAB8	SWAB9
				Site:			Tarago Station	Tarago Station	Tarago Station	Tarago Station	Tarago P.S. Exterior	Tarago P.S. Exterior	Tarago P.S. Exterior	Tarago P.S. Exterior
				Sampling Method:			Grid Swab	Grid Swab	Grid Swab	Grid Swab	Grid Swab	Grid Swab	Grid Swab	Grid Swab
Analyte grouping/Analyte				**Units**	**LOR**									
External Dust														
E022.5 -: Acid Extractable metals in paint by ICP-AES														
Total Lead	--	--		µg	1		25	150	230	150	13	24	110	29
Surface Area	--	--		m²	--		0.09	0.09	0.08	0.08	0.08	0.09	0.05	0.09
Lead	4,300			µg/m²	--		278	1667	2875	1875	163	267	2200	322
Internal Dust														
in paint by ICP-AES														
Total Lead	--	--		µg	1		--	--	--	--	--	--	--	--
Surface Area	--	--		m²	--		--	--	--	--	--	--	--	--
Lead	NA	1,076		µg/m²	--		--	--	--	--	--	--	--	--

Blank Cell indicates no criterion available

LOR = Limit of Reporting

Concentration in **red** font and grey box exceed the adopted criteria

Concentrations in box exceed the screening value >2.5 times

NSW EPA (2003) Managing Lead Contamination in Home Maintenance, Renovation and Demolition Practices. A Guide for Councils. NSW Environment Protection Authority.

US EPA (2020) Protect your family from lead in your home

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Loop Lead Management
23-07-20

Table H8:
Offsite Dust Swab Sampling Results

	NSW EPA (2003)	US EPA (2020)		Sample Type:		SWAB	SWAB	SWAB	SWAB	SWAB	SWAB
				Laboratory Sample number:		S19-De30575	S19-De30576	S19-De30577	S19-De30578	S19-De30579	S19-De30580
				Sample date:		19-12-19	19-12-19	19-12-19	19-12-19	19-12-19	19-12-19
				Sample ID:		SWAB10	SWAB11	SWAB12	SWAB13	SWAB14	SWAB15
				Site:		Tarago P.S. Exterior	Tarago P.S. Interior	Tarago P.S. Interior	Tarago P.S. Interior	Tarago P.S. Interior	Tarago P.S. Interior
				Sampling Method:		Grid Swab	Grid Swab	Grid Swab	Grid Swab	Grid Swab	Grid Swab
Analyte grouping/Analyte				**Units**	**LOR**						
External Dust											
E022.5 -: Acid Extractable metals in paint by ICP-AES											
Total Lead	--	--		µg	1	70	--	--	--	--	--
Surface Area	--	--		m²	--	0.08	--	--	--	--	--
Lead	4,300			µg/m²	--	875	--	--	--	--	--
Internal Dust											
in paint by ICP-AES											
Total Lead	--	--		µg	1	--	4	4	3	3	1
Surface Area	--	--		m²	--	--	0.09	0.075	0.09	0.09	0.09
Lead	NA	1,076		µg/m²	--	--	44	49	37	31	12

Blank Cell indicates no criterion available

LOR = Limit of Reporting

Concentration in **red** font and grey box exceed the adopted criteria

Concentrations in box exceed the screening value >2.5 times

NSW EPA (2003) Managing Lead Contamination in Home Maintenance, Renovation and Demolition Practices. A Guide for Councils. NSW Environment Protection Authority.

US EPA (2020) Protect your family from lead in your home

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Rail Corridor and Tarago Area DSI
23-07-20

Table 1:
Tarago Area DSI - Discrete Properties Soil Results

RAMBOLL

	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space	NEPM 2013 EIL Residential / public Open Space	NSW EPA - Use and Disposal of Biosolids	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
					Site:		P01	P01	P01	P01	P01	P01	P01	P01	P01	P01	P01	P01
					Lab Sample number:		M20-Ap03657	M20-Ap03658	M20-Ap03659	M20-Ap03660	M20-Ap03661	M20-Ap03662	M20-Ap03663	M20-Ap03664	M20-Ap03665	M20-Ap03666	M20-Ap03667	M20-Ap03668
					Sample date:		19-03-20	19-03-20	19-03-20	19-03-20	19-03-20	19-03-20	19-03-20	19-03-20	19-03-20	19-03-20	19-03-20	19-03-20
					Sample ID:		P1BH1_0.05	P1BH1_0.2	P1BH1_0.5	P1BH2_0.05	P1BH2_0.2	P1BH2_0.5	P1BH3_0.05	P1BH3_0.2	P1BH3_0.5	P1BH4_0.05	P1BH4_0.2	P1BH4_0.5
					Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
					Sampling Method:		Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger
Analyte grouping/Analyte					**Units**	**LOR**												
LTM-GEN-7080 Moisture																		
Moisture Content (dried @ 103°C)					%	--	7.7	9.5	14	9.2	8.9	9.9	20	18	17	23	13	11
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS																		
Aluminium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	100	300	100	20	mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Barium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	60	90			mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	20	90		3	mg/kg	0.4	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	100	300	430	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	100	300			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Copper	6000	17000	110	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Iron					mg/kg	20	--	--	--	--	--	--	--	--	--	--	--	--
Lead	300	600	1100	150	mg/kg	5	44	54	47	330	240	40	160	46	30	110	85	93
Manganese	3800	19000			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	40	80		1	mg/kg	0.1	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	400	1200	200	60	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	7400	30000	250	200	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--

National Environment Protection Council (2013) National Environmental Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1) (NEPM).
^ For soil texture classification undertaken in accord with AS 1726, the classifications of sand, silt and clay may be applied as coarse, fine with liquid limit <50% and fine with liquid limit>50% respectively, as the underlying properties to develop the HSLs may reasonably be selected to be similar. Where there is uncertainty, either a conservative approach may be adopted or laboratory analysis should be carried out. Generally SAND has been adopted in these scenarios.
Health Investigation Levels for chromium based on chromium (VI)

Chromium (III) EIL, based on a low clay content (% clay) of 12%

Nickel EIL, based on CEC of 12.8cmol/kg

Copper EIL, based on CEC of 12cmol/kg, pH of 5.22, organic carbon content of 1.78%

Zinc EIL, based on CEC of 12cmol/kg and pH of 5.22

Concentration in **red** font and grey box exceed the adopted HIL/HSL 'A' for Low Density Residential
Concentration in **orange** font and grey box exceed the adopted HIL/HSL 'C' for Open Space and Recreational Land Use (applicable for P2, P3, P6, P8, P9 and P11)
Concentration in **green** font and grey box exceed the adopted EIL/ESL 'C' for Residential and Open Space and Recreational Land Use

Concentration in **Blue** font and grey box exceed the adopted Environmental Guidelines: Use and Disposal of Biosolid Products (NSW EPA 2000) (P29 only).

Concentrations in box exceed the screening value >2.5 times

Where one or more guideline value is exceeded, the highest guideline exceeded will be highlighted

Client: John Holland Rail
Job No: 318000780
Project Name: Targo Rail Corridor and Targo Area DSI
23-07-20

Table 1:
Tarago Area DSI - Discrete Properties Soil Results

	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space	NEPM 2013 EIL Residential / public Open Space	NSW EPA - Use and Disposal of Biosolids	Sample Type:		Soil	Soil
					Site:		P01	P01
					Lab Sample number:		M20-Ap03669	M20-Ap03670
					Sample date:		19-03-20	19-03-20
					Sample ID:		P1BH5_0.05	P1BH5_0.2
					Project Name:		Community DSI	Community DSI
					Sampling Method:		Hand Auger	Hand Auger
Analyte grouping/Analyte					**Units**	**LOR**		
LTM-GEN-7080 Moisture								
Moisture Content (dried @ 103°C)					%	--	14	14
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS								
Aluminium					mg/kg	10	--	--
Arsenic	100	300	100	20	mg/kg	2	--	--
Barium					mg/kg	10	--	--
Beryllium	60	90			mg/kg	2	--	--
Cadmium	20	90		3	mg/kg	0.4	--	--
Chromium	100	300	430	100	mg/kg	5	--	--
Cobalt	100	300			mg/kg	5	--	--
Copper	6000	17000	110	100	mg/kg	5	--	--
Iron					mg/kg	20	--	--
Lead	300	600	1100	150	mg/kg	5	45	41
Manganese	3800	19000			mg/kg	5	--	--
Mercury	40	80		1	mg/kg	0.1	--	--
Nickel	400	1200	200	60	mg/kg	5	--	--
Zinc	7400	30000	250	200	mg/kg	5	--	--

National Environment Protection Council (2013) National Environmental Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1)
^ For soil texture classification undertaken in accord with AS 1726, the classifications of sand, silt and clay may be applied as coarse, fine with liquid limit <50% and fine with liquid limit>50% respectively, as the underlying properties to develop the HSLs may reasonably be selected to be similar. Where there is uncertainty, either a conservative approach may be adopted or laboratory analysis should be carried out. Generally SAND has been adopted in these scenarios.
Health Investigation Levels for chromium based on chromium (VI)

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Copper EIL, based on CEC of 12cmol/kg, pH of 5.22, organic carbon content of 1.78%

Zinc EIL, based on CEC of 12cmol/kg and pH of 5.22

Concentration in **red** font and grey box exceed the adopted HIL/HSL 'A' for Low Density Residential
Concentration in **orange** font and grey box exceed the adopted HIL/HSL 'C' for Open Space and Recreational Land Use (applicable for P2, P3, P6, P8, P9 and P11)
Concentration in **green** font and grey box exceed the adopted EIL/ESL 'C' for Residential and Open Space and Recreational Land Use

Concentration in **Blue** font and grey box exceed the adopted Environmental Guidelines: Use and Disposal of Biosolid Products (NSW EPA 2000) (P29 only).

Concentrations in box exceed the screening value >2.5 times

Where one or more guideline value is exceeded, the highest guideline exceeded will be highlighted

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Rail Corridor and Tarago Area DSI
23-07-20

Table 1:
Tarago Area DSI - Discrete Properties Soil Results

	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space	NEPM 2013 EIL Residential / public Open Space	NSW EPA - Use and Disposal of Biosolids	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
					Site:		P01	P02	P02	P02	P02	P02	P02	P02	P02	P02	P02	P02
					Lab Sample number:		M20-Ap03671	M20-Ma43651	M20-Ma43652	M20-Ma43653	M20-Ma43654	M20-Ma43655	M20-Ma43656	M20-Ma43657	M20-Ma43658	M20-Ma43659	M20-Ma43660	M20-Ma43661
					Sample date:		19-03-20	24-03-20	24-03-20	24-03-20	24-03-20	24-03-20	24-03-20	24-03-20	24-03-20	24-03-20	24-03-20	24-03-20
					Sample ID:		P1BH5_0.5	P2_HA01_0.05	P2_HA01_0.2	P2_HA01_0.4	P2_HA02_0.0-0.05	P2_HA02_0.2	P2_HA02_0.4	P2_HA03_0.0-0.05	P2_HA03_0.2	P2_HA04_0.0-0.05	P2_HA04_0.2	P2_HA04_0.5
					Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
					Sampling Method:		Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger
Analyte grouping/Analyte					**Units**	**LOR**												
LTM-GEN-7080 Moisture																		
Moisture Content (dried @ 103°C)					%	--	9.4	1.1	3.7	5.6	1.3	8.4	7.8	1.1	4.3	2.4	14	12
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS																		
Aluminium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	100	300	100	20	mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Barium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	60	90			mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	20	90		3	mg/kg	0.4	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	100	300	430	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	100	300			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Copper	6000	17000	110	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Iron					mg/kg	20	--	--	--	--	--	--	--	--	--	--	--	--
Lead	300	600	1100	150	mg/kg	5	26	28	94	12	46	150	33	25	220	140	470	100
Manganese	3800	19000			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	40	80		1	mg/kg	0.1	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	400	1200	200	60	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	7400	30000	250	200	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--

National Environment Protection Council (2013) National Environmental Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1)
^ For soil texture classification undertaken in accord with AS 1726, the classifications of sand, silt and clay may be applied as coarse, fine with liquid limit <50% and fine with liquid limit>50% respectively, as the underlying properties to develop the HSLs may reasonably be selected to be similar. Where there is uncertainty, either a conservative approach may be adopted or laboratory analysis should be carried out. Generally SAND has been adopted in these scenarios.
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Zinc EIL, based on CEC of 12cmol/kg and pH of 5.22

Concentration in **red** font and grey box exceed the adopted HIL/HSL 'A' for Low Density Residential
Concentration in **orange** font and grey box exceed the adopted HIL/HSL 'C' for Open Space and Recreational Land Use (applicable for P2, P3, P6, P8, P9 and P11)
Concentration in **green** font and grey box exceed the adopted EIL/ESL 'C' for Residential and Open Space and Recreational Land Use

Concentration in **Blue** font and grey box exceed the adopted Environmental Guidelines: Use and Disposal of Biosolid Products (NSW EPA 2000) (P29 only).

Concentrations in box exceed the screening value >2.5 times

Where one or more guideline value is exceeded, the highest guideline exceeded will be highlighted

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Rail Corridor and Tarago Area DSI
23-07-20

Table 1:
Tarago Area DSI - Discrete Properties Soil Results

RAMBOLL

	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space	NEPM 2013 EIL Residential / public Open Space	NSW EPA - Use and Disposal of Biosolids	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
					Site:		P02	P02	P02	P02	P02	P02	P02	P02	P02	P02	P02	P02
					Lab Sample number:		M20-Ma43706	M20-Ma43662	M20-Ma43663	M20-Ma43664	M20-Ma43665	M20-Ma43666	M20-Ma43667	M20-Ma43668	M20-Ma43669	M20-Ma43670	M20-Ma43671	M20-Ma43672
					Sample date:		24-03-20	24-03-20	24-03-20	24-03-20	24-03-20	24-03-20	24-03-20	24-03-20	24-03-20	24-03-20	24-03-20	24-03-20
					Sample ID:		P2_HA05_0.0-0.5	P2_HA05_0.4	P2_HA05_0.7	P2_HA06_0.05	P2_HA06_0.2	P2_HA06_0.4	P2_HA07_0.0-0.05	P2_HA07_0.2	P2_HA07_0.4	P2_HA08_0.05	P2_HA08_0.2	P2_HA08_0.4
					Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
					Sampling Method:		Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger
Analyte grouping/Analyte					**Units**	**LOR**												
LTM-GEN-7080 Moisture																		
Moisture Content (dried @ 103°C)					%	--	2.4	15	17	12	8.1	9.9	19	16	16	18	14	18
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS																		
Aluminium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	100	300	100	20	mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Barium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	60	90			mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	20	90		3	mg/kg	0.4	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	100	300	430	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	100	300			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Copper	6000	17000	110	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Iron					mg/kg	20	--	--	--	--	--	--	--	--	--	--	--	--
Lead	300	600	1100	150	mg/kg	5	32	140	46	**1500**	440	63	150	61	26	100	74	23
Manganese	3800	19000			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	40	80		1	mg/kg	0.1	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	400	1200	200	60	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	7400	30000	250	200	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--

National Environment Protection Council (2013) National Environmental Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1)
^ For soil texture classification undertaken in accord with AS 1726, the classifications of sand, silt and clay may be applied as coarse, fine with liquid limit <50% and fine with liquid limit>50% respectively, as the underlying properties to develop the HSLs may reasonably be selected to be similar. Where there is uncertainty, either a conservative approach may be adopted or laboratory analysis should be carried out. Generally SAND has been adopted in these scenarios.
Health Investigation Levels for chromium based on chromium (VI)

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Copper EIL, based on CEC of 12cmol/kg, pH of 5.22, organic carbon content of 1.78%

Zinc EIL, based on CEC of 12cmol/kg and pH of 5.22

Concentration in **red** font and grey box exceed the adopted HIL/HSL 'A' for Low Density Residential
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Concentration in **Blue** font and grey box exceed the adopted Environmental Guidelines: Use and Disposal of Biosolid Products (NSW EPA 2000) (P29 only).

Concentrations in box exceed the screening value >2.5 times

Where one or more guideline value is exceeded, the highest guideline exceeded will be highlighted

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Rail Corridor and Tarago Area DSI
23-07-20

Table 1:
Tarago Area DSI - Discrete Properties Soil Results

RAMBOLL

	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space	NEPM 2013 EIL Residential / public Open Space	NSW EPA - Use and Disposal of Biosolids	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
					Site:		P02	P02	P02	P02	P02	P02	P02	P02	P02	P03	P03	P03
					Lab Sample number:		M20-Ma43673	M20-Ma43674	M20-Ma43675	M20-Ma43678	M20-Ma43676	M20-Ma43677	M20-Ma43679	M20-Ma43680	M20-Ma43681	M20-Ma43602	M20-Ma43604	M20-Ma43603
					Sample date:		24-03-20	24-03-20	24-03-20	24-03-20	24-03-20	24-03-20	24-03-20	24-03-20	24-03-20	24-03-20	24-03-20	24-03-20
					Sample ID:		P2_HA09_0.0-0.05	P2_HA09_0.2	P2_HA09_0.4	P2_HA10_0.0-0.05	P2_HA10_0.2	P2_HA10_0.4	P2_HA11_0.05	P2_HA11_0.2	P2_HA11_0.4	P3_HA01_0.05	P3_HA01_0.2	P3_HA01_0.4
					Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
					Sampling Method:		Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger
Analyte grouping/Analyte					**Units**	**LOR**												
LTM-GEN-7080 Moisture																		
Moisture Content (dried @ 103°C)					%	--	16	16	18	16	15	17	16	16	17	11	9.8	10
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS																		
Aluminium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	100	300	100	20	mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Barium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	60	90			mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	20	90		3	mg/kg	0.4	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	100	300	430	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	100	300			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Copper	6000	17000	110	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Iron					mg/kg	20	--	--	--	--	--	--	--	--	--	--	--	--
Lead	300	600	1100	150	mg/kg	5	99	74	26	84	58	30	89	76	28	120	97	110
Manganese	3800	19000			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	40	80		1	mg/kg	0.1	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	400	1200	200	60	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	7400	30000	250	200	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--

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Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Rail Corridor and Tarago Area DSI
23-07-20

Table 1:
Tarago Area DSI - Discrete Properties Soil Results

	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space	NEPM 2013 EIL Residential / public Open Space	NSW EPA - Use and Disposal of Biosolids	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
					Site:		P03	P03	P03	P03	P03	P03	P04	P04	P04	P04	P04	P04
					Lab Sample number:		M20-Ma43605	M20-Ma43606	M20-Ma43607	M20-Ma43608	M20-Ma43609	M20-Ma43610	M20-Ma43685	M20-Ma43686	M20-Ma43687	M20-Ma43688	M20-Ma43689	M20-Ma43690
					Sample date:		24-03-20	24-03-20	24-03-20	24-03-20	24-03-20	24-03-20	24-03-20	24-03-20	24-03-20	24-03-20	24-03-20	24-03-20
					Sample ID:		P3_HA02_0.15	P3_HA02_0.4	P3_HA02_0-0.05	P3_HA03_0.15	P3_HA03_0.3	P3_HA03_0-0.05	P4_HA01_0-0.05	P4_HA01_0-0.2	P4_HA01_0-0.4	P4_HA02_0-0.05	P4_HA02_0-0.2	P4_HA02_0-0.35
					Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
					Sampling Method:		Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger
Analyte grouping/Analyte					**Units**	**LOR**												
LTM-GEN-7080 Moisture																		
Moisture Content (dried @ 103°C)					%	--	14	14	3.7	9.3	12	6.5	11	9.9	8.7	13	11	9.1
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS																		
Aluminium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	100	300	100	20	mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Barium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	60	90			mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	20	90		3	mg/kg	0.4	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	100	300	430	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	100	300			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Copper	6000	17000	110	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Iron					mg/kg	20	--	--	--	--	--	--	--	--	--	--	--	--
Lead	300	600	1100	150	mg/kg	5	400	320	100	420	240	320	32	13	< 5	29	17	5.8
Manganese	3800	19000			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	40	80		1	mg/kg	0.1	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	400	1200	200	60	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	7400	30000	250	200	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--

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Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Rail Corridor and Tarago Area DSI
23-07-20

Table 1:
Tarago Area DSI - Discrete Properties Soil Results

	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space	NEPM 2013 EIL Residential / public Open Space	NSW EPA - Use and Disposal of Biosolids	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
					Site:		P04	P04	P04	P04	P04	P04	P04	P04	P04	P04	P04	P04
					Lab Sample number:		M20-Ma43691	M20-Ma43692	M20-Ma43693	M20-Ma43694	M20-Ma43695	M20-Ma43696	M20-Ma43697	M20-Ma43698	S20-My01439	S20-My01440	S20-My01311	S20-My01312
					Sample date:		24-03-20	24-03-20	24-03-20	24-03-20	24-03-20	24-03-20	24-03-20	24-03-20	29-04-20	29-04-20	29-04-20	29-04-20
					Sample ID:		P4_HA03_0-0.05	P4_HA03_0-0.3	P4_HA04_0-0.05	P4_HA04_0-0.2	P4_HA04_0-0.4	P4_HA05_0-0.05	P4_HA05_0-0.2	P4_HA05_0-0.4	P4_HA06_0-0.05	P4_HA07_0-0.05	P4_HA08_0.0-0.05	P4_HA09_0.0-0.05
					Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
					Sampling Method:		Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger
Analyte grouping/Analyte					**Units**	**LOR**												
LTM-GEN-7080 Moisture																		
Moisture Content (dried @ 103°C)					%	--	10	11	15	9.7	9.6	18	12	9.3	20	14	20	25
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS																		
Aluminium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	100	300	100	20	mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Barium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	60	90			mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	20	90		3	mg/kg	0.4	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	100	300	430	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	100	300			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Copper	6000	17000	110	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Iron					mg/kg	20	--	--	--	--	--	--	--	--	--	--	--	--
Lead	300	600	1100	150	mg/kg	5	540	5.8	19	7.9	5.4	23	13	5.2	37	19	24	20
Manganese	3800	19000			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	40	80		1	mg/kg	0.1	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	400	1200	200	60	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	7400	30000	250	200	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--

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Table 1:
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	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space	NEPM 2013 EIL Residential / public Open Space	NSW EPA - Use and Disposal of Biosolids	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
					Site:		P04	P04	P04	P04	P04	P04	P05	P05	P05	P05	P05	P05
					Lab Sample number:		S20-My01313	S20-My01314	S20-My01315	S20-My01316	S20-My01317	S20-My01318	M20-Ma43791	M20-Ma43789	M20-Ma43790	M20-Ma43793	M20-Ma43792	M20-Ma43794
					Sample date:		29-04-20	29-04-20	29-04-20	29-04-20	29-04-20	29-04-20	24-03-20	24-03-20	24-03-20	24-03-20	24-03-20	24-03-20
					Sample ID:		P4_HA10_0.0-0.05	P4_HA11_0.0-0.05	P4_HA12_0.0-0.05	P4_HA13_0.0-0.05	P4_HA14_0.0-0.05	P4_HA15_0.0-0.05	P5_HA01_0.0-0.05	P5_HA01_0.2	P5_HA01_0.3	P5_HA02_0.0-0.05	P5_HA02_0.3	P5_SANDPIT
					Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
					Sampling Method:		Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger
Analyte grouping/Analyte					**Units**	**LOR**												
LTM-GEN-7080 Moisture																		
Moisture Content (dried @ 103°C)					%	--	20	7.4	17	4.6	18	13	8.5	13	13	12	11	< 1
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS																		
Aluminium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	100	300	100	20	mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Barium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	60	90			mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	20	90		3	mg/kg	0.4	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	100	300	430	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	100	300			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Copper	6000	17000	110	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Iron					mg/kg	20	--	--	--	--	--	--	--	--	--	--	--	--
Lead	300	600	1100	150	mg/kg	5	22	23	19	25	20	21	38	42	26	67	33	< 5
Manganese	3800	19000			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	40	80		1	mg/kg	0.1	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	400	1200	200	60	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	7400	30000	250	200	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--

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23-07-20

Table 1:
Tarago Area DSI - Discrete Properties Soil Results

	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space	NEPM 2013 EIL Residential / public Open Space	NSW EPA - Use and Disposal of Biosolids	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
					Site:		P06	P06	P06	P06	P06	P06	P06	P06	P06	P06	P06	P06
					Lab Sample number:		M20-Ma43797	M20-Ma43798	M20-Ma43796	M20-Ma43800	M20-Ma43801	M20-Ma43799	M20-Ma43802	M20-Ma43803	M20-Ma43804	M20-Jn34829	M20-Ma43805	M20-Ma43806
					Sample date:		25-03-20	25-03-20	25-03-20	25-03-20	25-03-20	25-03-20	25-03-20	25-03-20	25-03-20	25-03-20	25-03-20	25-03-20
					Sample ID:		P6_HA1_0.2	P6_HA1_0.3	P6_HA1_0-0.05	P6_HA2_0.2	P6_HA2_0.3	P6_HA2_0-0.05	P6_HA3_0.0	P6_HA3_0.2	P6_HA4_0.0	P6_HA4_0.0	P6_HA4_0.2	P6_HA4_0.3
					Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
					Sampling Method:		Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger
Analyte grouping/Analyte					**Units**	**LOR**												
LTM-GEN-7080 Moisture																		
Moisture Content (dried @ 103°C)					%	--	8.7	13	6.4	15	12	19	1.8	11	11		12	15
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS																		
Aluminium					mg/kg	10	--	--	--	--	--	--	--	--	--	9900	--	--
Arsenic	100	300	100	20	mg/kg	2	--	--	--	--	--	--	--	--	--	4.8	--	--
Barium					mg/kg	10	--	--	--	--	--	--	--	--	--	140	--	--
Beryllium	60	90			mg/kg	2	--	--	--	--	--	--	--	--	--	< 2	--	--
Cadmium	20	90		3	mg/kg	0.4	--	--	--	--	--	--	--	--	--	0.8	--	--
Chromium	100	300	430	100	mg/kg	5	--	--	--	--	--	--	--	--	--	13	--	--
Cobalt	100	300			mg/kg	5	--	--	--	--	--	--	--	--	--	< 5	--	--
Copper	6000	17000	110	100	mg/kg	5	--	--	--	--	--	--	--	--	--	43	--	--
Iron					mg/kg	20	--	--	--	--	--	--	--	--	--	12000	--	--
Lead	300	600	1100	150	mg/kg	5	56	58	29	37	24	28	6	33	95	110	58	53
Manganese	3800	19000			mg/kg	5	--	--	--	--	--	--	--	--	--	320	--	--
Mercury	40	80		1	mg/kg	0.1	--	--	--	--	--	--	--	--	--	< 0.1	--	--
Nickel	400	1200	200	60	mg/kg	5	--	--	--	--	--	--	--	--	--	5.7	--	--
Zinc	7400	30000	250	200	mg/kg	5	--	--	--	--	--	--	--	--	--	160	--	--

National Environment Protection Council (2013) National Environmental Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1)
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Concentrations in box exceed the screening value >2.5 times

Where one or more guideline value is exceeded, the highest guideline exceeded will be highlighted

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Rail Corridor and Tarago Area DSI
23-07-20

Table 1:
Tarago Area DSI - Discrete Properties Soil Results

RAMBOLL

	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space	NEPM 2013 EIL Residential / public Open Space	NSW EPA - Use and Disposal of Biosolids	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
					Site:		P06	P06	P06	P06	P06	P06	P07	P07	P07	P07	P07	P07
					Lab Sample number:		M20-Ma43807	M20-Jn34830	M20-Ma43808	M20-Ma43809	M20-Ma43810	M20-Ma43811	S20-Ma44416	S20-Ma44417	S20-Ma44418	S20-Ma44419	S20-Ma44420	S20-Ma44421
					Sample date:		25-03-20	25-03-20	25-03-20	25-03-20	25-03-20	25-03-20	25-03-20	25-03-20	25-03-20	25-03-20	25-03-20	25-03-20
					Sample ID:		P6_HA5_0.0	P6_HA5_0.0	P6_HA5_0.15	P6_HA6_0.0	P6_HA6_0.2	P6_HA6_0.3	P7_HA01_0.0-0.05	P7_HA01_0.2	P7_HA02_0.0-0.05	P7_HA02_0.25	P7_HA03_0.0-0.05	P7_HA03_0.3
					Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
					Sampling Method:		Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger
Analyte grouping/Analyte					**Units**	**LOR**												
LTM-GEN-7080 Moisture																		
Moisture Content (dried @ 103°C)					%	--	10		16	17	12	18	17	6.1	8.8	9.8	7.5	19
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS																		
Aluminium					mg/kg	10	--	13000	--	--	--	--	--	--	--	--	--	--
Arsenic	100	300	100	20	mg/kg	2	--	18	--	--	--	--	--	--	--	--	--	--
Barium					mg/kg	10	--	140	--	--	--	--	--	--	--	--	--	--
Beryllium	60	90			mg/kg	2	--	< 2	--	--	--	--	--	--	--	--	--	--
Cadmium	20	90		3	mg/kg	0.4	--	8.1	--	--	--	--	--	--	--	--	--	--
Chromium	100	300	430	100	mg/kg	5	--	21	--	--	--	--	--	--	--	--	--	--
Cobalt	100	300			mg/kg	5	--	7.3	--	--	--	--	--	--	--	--	--	--
Copper	6000	17000	110	100	mg/kg	5	--	**610**	--	--	--	--	--	--	--	--	--	--
Iron					mg/kg	20	--	23000	--	--	--	--	--	--	--	--	--	--
Lead	300	600	1100	150	mg/kg	5	430	430	160	30	25	15	17	16	23	20	19	11
Manganese	3800	19000			mg/kg	5	--	260	--	--	--	--	--	--	--	--	--	--
Mercury	40	80		1	mg/kg	0.1	--	< 0.1	--	--	--	--	--	--	--	--	--	--
Nickel	400	1200	200	60	mg/kg	5	--	15	--	--	--	--	--	--	--	--	--	--
Zinc	7400	30000	250	200	mg/kg	5	--	**790**	--	--	--	--	--	--	--	--	--	--

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Client: John Holland Rail
Job No: 318000780
Project Name: Targo Rail Corridor and Targo Area DSI
23-07-20

Table 1:
Tarago Area DSI - Discrete Properties Soil Results

	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space	NEPM 2013 EIL Residential / public Open Space	NSW EPA - Use and Disposal of Biosolids	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
					Site:		P07	P07	P07	P07	P08	P08	P08	P08	P09	P09	P09	P09
					Lab Sample number:		S20-Ma44422	S20-Ma44423	S20-Ma44424	S20-Ma44425	M20-Ap22762	M20-Ap22763	M20-Ap22764	M20-Ap22765	S20-Ma44379	S20-Ma44380	S20-Ma44381	S20-Ma44382
					Sample date:		25-03-20	25-03-20	25-03-20	25-03-20	25-03-20	25-03-20	25-03-20	25-03-20	25-03-20	25-03-20	25-03-20	25-03-20
					Sample ID:		P7_HA04_0.0-0.05	P7_HA04_0.25	P7_HA05_0.0-0.05	P7_HA05_0.25	P8_HA3_0.0	P8_HA3_0.3	P8_HA4_0.0	P8_HA4_0.3	P9_HA01_0.0-0.05	P9_HA01_0.2	P9_HA02_0.0	P9_HA03_0.0
					Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
					Sampling Method:		Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger
Analyte grouping/Analyte					**Units**	**LOR**												
LTM-GEN-7080 Moisture																		
Moisture Content (dried @ 103°C)					%	--	11	14	9.5	9.7	20	14	7.9	8	< 1	4.3	3	4.2
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS																		
Aluminium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	100	300	100	20	mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Barium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	60	90			mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	20	90		3	mg/kg	0.4	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	100	300	430	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	100	300			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Copper	6000	17000	110	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Iron					mg/kg	20	--	--	--	--	--	--	--	--	--	--	--	--
Lead	300	600	1100	150	mg/kg	5	16	8.6	11	14	130	30	93	18	33	32	10	32
Manganese	3800	19000			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	40	80		1	mg/kg	0.1	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	400	1200	200	60	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	7400	30000	250	200	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--

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Project Name: Targo Rail Corridor and Targo Area DSI
23-07-20

Table 1:
Tarago Area DSI - Discrete Properties Soil Results

RAMBOLL

	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space	NEPM 2013 EIL Residential / public Open Space	NSW EPA - Use and Disposal of Biosolids	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
					Site:		P09	P09	P09	P09	P09	P09	P10	P10	P10	P10	P10	P10
					Lab Sample number:		S20-Ma44383	S20-Ma44384	S20-Ma44385	S20-Ma44386	S20-Ma44392	S20-Ma44393	S20-Ma44403	S20-Ma44404	S20-Ma44405	S20-Ma44407	S20-Ap16787	S20-Ma44408
					Sample date:		25-03-20	25-03-20	25-03-20	25-03-20	25-03-20	25-03-20	25-03-20	25-03-20	25-03-20	25-03-20	25-03-20	25-03-20
					Sample ID:		P9_HA03_0.3	P9_HA04_0.0	P9_HA05_0.0	P9_HA05_0.3	P9_HA2_0.2	P9_HA4_0.3	P10_HA01_0.0-0.05	P10_HA01_0.2	P10_HA01_0.4	P10_HA02_0.3	P10_HA02_0-0.2	P10_HA03_0.0-0.05
					Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
					Sampling Method:		Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger
Analyte grouping/Analyte					**Units**	**LOR**												
LTM-GEN-7080 Moisture																		
Moisture Content (dried @ 103°C)					%	--	8.8	8.7	9.3	11	8.7	11	17	12	12	11	11	13
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS																		
Aluminium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	100	300	100	20	mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Barium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	60	90			mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	20	90		3	mg/kg	0.4	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	100	300	430	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	100	300			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Copper	6000	17000	110	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Iron					mg/kg	20	--	--	--	--	--	--	--	--	--	--	--	--
Lead	300	600	1100	150	mg/kg	5	14	34	46	45	17	39	62	54	17	34	39	25
Manganese	3800	19000			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	40	80		1	mg/kg	0.1	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	400	1200	200	60	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	7400	30000	250	200	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--

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Project Name: Tarago Rail Corridor and Tarago Area DSI
23-07-20

Table 1:
Tarago Area DSI - Discrete Properties Soil Results

RAMBOLL

	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space	NEPM 2013 EIL Residential / public Open Space	NSW EPA - Use and Disposal of Biosolids	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
					Site:		P10	P10	P10	P10	P10	P11	P11	P11	P11	P11	P11	P11
					Lab Sample number:		S20-Ma44409	S20-Ma44410	S20-Ma44411	S20-Ma44412	S20-Ma44413	S20-Ma43998	S20-Ma43999	S20-Ma44000	S20-Ma44001	S20-Ma44002	S20-Ma44003	S20-Ma44004
					Sample date:		25-03-20	25-03-20	25-03-20	25-03-20	25-03-20	26-03-20	26-03-20	26-03-20	26-03-20	26-03-20	26-03-20	26-03-20
					Sample ID:		P10_HA03_0.3	P10_HA04_0.0-0.05	P10_HA04_0.3	P10_HA05_0.0-0.05	P10_HA05_0.2	P11_HA01_0.0-0.05	P11_HA01_0.2	P11_HA02_0.0-0.05	P11_HA02_0.2	P11_HA02_0.3	P11_HA03_0.0-0.05	P11_HA03_0.2
					Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
					Sampling Method:		Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger
Analyte grouping/Analyte					**Units**	**LOR**												
LTM-GEN-7080 Moisture																		
Moisture Content (dried @ 103°C)					%	--	11	11	12	8.6	7.3	2.6	7.6	6.9	5.1	5.9	1.5	4.6
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS																		
Aluminium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	100	300	100	20	mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Barium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	60	90			mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	20	90		3	mg/kg	0.4	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	100	300	430	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	100	300			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Copper	6000	17000	110	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Iron					mg/kg	20	--	--	--	--	--	--	--	--	--	--	--	--
Lead	300	600	1100	150	mg/kg	5	7.3	87	17	130	58	6	12	12	< 5	< 5	8.2	< 5
Manganese	3800	19000			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	40	80		1	mg/kg	0.1	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	400	1200	200	60	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
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23-07-20

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	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space	NEPM 2013 EIL Residential / public Open Space	NSW EPA - Use and Disposal of Biosolids	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
					Site:		P11	P11	P11	P11	P11	P12	P12	P12	P12	P12	P12	P12
					Lab Sample number:		S20-Ma44005	S20-Ma44006	S20-Ma44007	S20-Ma44008	S20-Ma44009	S20-Ma44145	S20-Ma44146	S20-Ma44147	S20-Ma44148	S20-Ma44149	S20-Ma44150	S20-Ma44153
					Sample date:		26-03-20	26-03-20	26-03-20	26-03-20	26-03-20	26-03-20	26-03-20	26-03-20	26-03-20	26-03-20	26-03-20	26-03-20
					Sample ID:		P11_HA04_0.0-0.05	P11_HA04_0.2	P11_HA04_0.3	P11_HA05_0.0-0.05	P11_HA05_0.2	P12_HA01_0.0	P12_HA01_0.2	P12_HA01_0.3	P12_HA02_0.0_0.05	P12_HA02_0.2	P12_HA03_0.0_0.05	P12_HA03_0.2
					Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
					Sampling Method:		Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger
Analyte grouping/Analyte					**Units**	**LOR**												
LTM-GEN-7080 Moisture																		
Moisture Content (dried @ 103°C)					%	--	12	9.4	9.1	8.2	6.1	9	9.6	9.3	11	13	13	12
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS																		
Aluminium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	100	300	100	20	mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Barium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	60	90			mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	20	90		3	mg/kg	0.4	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	100	300	430	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	100	300			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Copper	6000	17000	110	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Iron					mg/kg	20	--	--	--	--	--	--	--	--	--	--	--	--
Lead	300	600	1100	150	mg/kg	5	12	8.2	7.3	11	7.1	130	20	9.3	85	110	260	200
Manganese	3800	19000			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	40	80		1	mg/kg	0.1	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	400	1200	200	60	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	7400	30000	250	200	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--

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Concentration in **red** font and grey box exceed the adopted HIL/HSL 'A' for Low Density Residential
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Concentrations in box exceed the screening value >2.5 times

Where one or more guideline value is exceeded, the highest guideline exceeded will be highlighted

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Rail Corridor and Tarago Area DSI
23-07-20

Table 1:
Tarago Area DSI - Discrete Properties Soil Results

RAMBOLL

	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space	NEPM 2013 EIL Residential / public Open Space	NSW EPA - Use and Disposal of Biosolids	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
					Site:		P12	P12	P12	P12	P14	P14	P14	P14	P14	P14	P14	P14
					Lab Sample number:		S20-Ma44154	S20-Ma44155	S20-Ma44156	S20-Ma44157	S20-Ma44055	S20-Ma44045	S20-Ma44046	S20-Ma44047	S20-Ma44048	S20-Ma44049	S20-Ma44050	S20-Ma44051
					Sample date:		26-03-20	26-03-20	26-03-20	26-03-20	26-03-20	26-03-20	26-03-20	26-03-20	26-03-20	26-03-20	26-03-20	26-03-20
					Sample ID:		P12_HA04_0.0	P12_HA04_0.3	P12_HA05_0.0	P12_HA05_0.2	P13_HA05_0.3	P14_HA01_0.0_0.05	P14_HA01_0.2	P14_HA02_0.0_0.05	P14_HA02_0.3	P14_HA03_0.0-0.05	P14_HA03_0.25	P14_HA04_0.0-0.05
					Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
					Sampling Method:		Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger
Analyte grouping/Analyte					**Units**	**LOR**												
LTM-GEN-7080 Moisture																		
Moisture Content (dried @ 103°C)					%	--	11	9.9	14	5.4	14	7.5	8.4	16	14	30	13	14
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS																		
Aluminium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	100	300	100	20	mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Barium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	60	90			mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	20	90		3	mg/kg	0.4	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	100	300	430	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	100	300			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Copper	6000	17000	110	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Iron					mg/kg	20	--	--	--	--	--	--	--	--	--	--	--	--
Lead	300	600	1100	150	mg/kg	5	170	25	190	45	13	9.7	14	10	11	17	11	19
Manganese	3800	19000			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	40	80		1	mg/kg	0.1	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	400	1200	200	60	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	7400	30000	250	200	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--

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Client: John Holland Rail
Job No: 318000780
Project Name: Targo Rail Corridor and Targo Area DSI
23-07-20

Table 1:
Tarago Area DSI - Discrete Properties Soil Results

RAMBOLL

	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space	NEPM 2013 EIL Residential / public Open Space	NSW EPA - Use and Disposal of Biosolids	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
					Site:		P14	P14	P14	P15	P15	P15	P15	P15	P15	P15	P15	P15
					Lab Sample number:		S20-Ma44052	S20-Ma44053	S20-Ma44054	S20-Ap02850	S20-Ap02851	S20-Ap02852	S20-Ap02853	S20-Ap02854	S20-Ap02855	S20-Ap02856	S20-Ap02857	S20-Ap02858
					Sample date:		26-03-20	26-03-20	26-03-20	30-03-20	30-03-20	30-03-20	30-03-20	30-03-20	30-03-20	30-03-20	30-03-20	30-03-20
					Sample ID:		P14_HA04_0.3	P14_HA05_0.0-0.05	P14_HA05_0.2	P15_HA01_0.0-0.05	P15_HA01_0.2	P15_HA02_0.0	P15_HA02_0.2	P15_HA03_0.0-0.05	P15_HA03_0.2	P15_HA04_0.0	P15_HA04_0.2	P15_HA05_0.0
					Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
					Sampling Method:		Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger
Analyte grouping/Analyte					**Units**	**LOR**												
LTM-GEN-7080 Moisture																		
Moisture Content (dried @ 103°C)					%	--	9	25	15	6.7	7.7	8.8	8.9	7.1	8.2	14	8.8	14
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS																		
Aluminium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	100	300	100	20	mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Barium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	60	90			mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	20	90		3	mg/kg	0.4	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	100	300	430	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	100	300			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Copper	6000	17000	110	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Iron					mg/kg	20	--	--	--	--	--	--	--	--	--	--	--	--
Lead	300	600	1100	150	mg/kg	5	11	19	13	22	19	24	21	15	9.9	27	38	20
Manganese	3800	19000			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	40	80		1	mg/kg	0.1	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	400	1200	200	60	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	7400	30000	250	200	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--

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Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Rail Corridor and Tarago Area DSI
23-07-20

Table 1:
Tarago Area DSI - Discrete Properties Soil Results

	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space	NEPM 2013 EIL Residential / public Open Space	NSW EPA - Use and Disposal of Biosolids	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
					Site:		P15	P16	P16	P16	P16	P16	P16	P16	P16	P16	P16	P17
					Lab Sample number:		S20-Ap02859	S20-Ap02873	S20-Ap02874	S20-Ap02875	S20-Ap02876	S20-Ap02877	S20-Ap02878	S20-Ap02879	S20-Ap02880	S20-Ap02881	S20-Ap02882	S20-Ap02883
					Sample date:		30-03-20	30-03-20	30-03-20	30-03-20	30-03-20	30-03-20	30-03-20	30-03-20	30-03-20	30-03-20	30-03-20	30-03-20
					Sample ID:		P15_HA05_0.2	P16_HA01_0.0	P16_HA01_0.2	P16_HA02_0.0	P16_HA02_0.2	P16_HA03_0.0-0.05	P16_HA03_0.2	P16_HA04_0.0	P16_HA04_0.2	P16_HA05_0.0	P16_HA05_0.2	P17_HA01_0.0-0.05
					Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
					Sampling Method:		Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger
Analyte grouping/Analyte					**Units**	**LOR**												
LTM-GEN-7080 Moisture																		
Moisture Content (dried @ 103°C)					%	--	11	14	13	9.5	10	13	9.6	11	6.5	14	4.6	13
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS																		
Aluminium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	100	300	100	20	mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Barium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	60	90			mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	20	90		3	mg/kg	0.4	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	100	300	430	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	100	300			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Copper	6000	17000	110	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Iron					mg/kg	20	--	--	--	--	--	--	--	--	--	--	--	--
Lead	300	600	1100	150	mg/kg	5	14	14	13	13	13	12	14	11	11	11	12	16
Manganese	3800	19000			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	40	80		1	mg/kg	0.1	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	400	1200	200	60	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	7400	30000	250	200	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--

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23-07-20

Table 1:
Tarago Area DSI - Discrete Properties Soil Results

RAMBOLL

	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space	NEPM 2013 EIL Residential / public Open Space	NSW EPA - Use and Disposal of Biosolids	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
					Site:		P17	P17	P17	P17	P17	P17	P17	P17	P17	P18	P18	P18
					Lab Sample number:		S20-Ap02884	S20-Ap02885	S20-Ap02886	S20-Ap02887	S20-Ap02888	S20-Ap02889	S20-Ap02890	S20-Ap02891	S20-Ap02892	S20-Ap02937	S20-Ap02938	S20-Ap02939
					Sample date:		30-03-20	30-03-20	30-03-20	30-03-20	30-03-20	30-03-20	30-03-20	30-03-20	30-03-20	31-03-20	31-03-20	31-03-20
					Sample ID:		P17_HA01_0.2	P17_HA02_0.0	P17_HA02_0.2	P17_HA03_0.0-0.05	P17_HA03_0.2	P17_HA04_0.0	P17_HA04_0.2	P17_HA05_0.0	P17_HA05_0.2	P18_HA01_0.0	P18_HA01_0.2	P18_HA02_0.0
					Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
					Sampling Method:		Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger
Analyte grouping/Analyte					**Units**	**LOR**												
LTM-GEN-7080 Moisture																		
Moisture Content (dried @ 103°C)					%	--	9.1	13	11	11	12	10	12	14	11	18	12	19
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS																		
Aluminium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	100	300	100	20	mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Barium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	60	90			mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	20	90		3	mg/kg	0.4	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	100	300	430	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	100	300			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Copper	6000	17000	110	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Iron					mg/kg	20	--	--	--	--	--	--	--	--	--	--	--	--
Lead	300	600	1100	150	mg/kg	5	19	150	15	25	28	9.8	16	97	14	28	26	71
Manganese	3800	19000			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	40	80		1	mg/kg	0.1	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	400	1200	200	60	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	7400	30000	250	200	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--

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Concentration in **Blue** font and grey box exceed the adopted Environmental Guidelines: Use and Disposal of Biosolid Products (NSW EPA 2000) (P29 only).

Concentrations in box exceed the screening value >2.5 times

Where one or more guideline value is exceeded, the highest guideline exceeded will be highlighted

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Rail Corridor and Tarago Area DSI
23-07-20

Table 1:
Tarago Area DSI - Discrete Properties Soil Results

RAMBOLL

	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space	NEPM 2013 EIL Residential / public Open Space	NSW EPA - Use and Disposal of Biosolids	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
					Site:		P18	P18	P18	P18	P18	P18	P18	P19	P19	P19	P19	P19
					Lab Sample number:		S20-Ap02940	S20-Ap02941	S20-Ap02942	S20-Ap02943	S20-Ap02944	S20-Ap02945	S20-Ap02946	S20-Ap02971	S20-Ap02972	S20-Ap02973	S20-Ap02974	S20-Ap02975
					Sample date:		31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20
					Sample ID:		P18_HA02_0.2	P18_HA03_0.0	P18_HA03_0.2	P18_HA04_0.0	P18_HA04_0.2	P18_HA05_0.0	P18_HA05_0.2	P19_HA01_0.0	P19_HA01_0.2	P19_HA02_0.0	P19_HA02_0.2	P19_HA03_0.0
					Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
					Sampling Method:		Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger
Analyte grouping/Analyte					**Units**	**LOR**												
LTM-GEN-7080 Moisture																		
Moisture Content (dried @ 103°C)					%	--	21	14	9.8	2.7	15	20	14	9.4	15	14	11	16
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS																		
Aluminium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	100	300	100	20	mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Barium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	60	90			mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	20	90		3	mg/kg	0.4	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	100	300	430	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	100	300			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Copper	6000	17000	110	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Iron					mg/kg	20	--	--	--	--	--	--	--	--	--	--	--	--
Lead	300	600	1100	150	mg/kg	5	73	60	48	15	86	160	20	14	10	13	5.7	10
Manganese	3800	19000			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	40	80		1	mg/kg	0.1	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	400	1200	200	60	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	7400	30000	250	200	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--

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Client: John Holland Rail
Job No: 318000780
Project Name: Targo Rail Corridor and Targo Area DSI
23-07-20

Table 1:
Tarago Area DSI - Discrete Properties Soil Results

RAMBOLL

	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space	NEPM 2013 EIL Residential / public Open Space	NSW EPA - Use and Disposal of Biosolids	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
					Site:		P19	P19	P19	P19	P19	P20	P20	P20	P20	P20	P20	P20
					Lab Sample number:		S20-Ap02976	S20-Ap02977	S20-Ap02978	S20-Ap02979	S20-Ap02980	S20-Ap02990	S20-Ap02991	S20-Ap02992	S20-Ap02993	S20-Ap02994	S20-Ap02995	S20-Ap02996
					Sample date:		31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	30-03-20	30-03-20	30-03-20	30-03-20	30-03-20	30-03-20	30-03-20
					Sample ID:		P19_HA03_0.2	P19_HA04_0.0	P19_HA04_0.2	P19_HA05_0.0	P19_HA05_0.2	P20_HA01_0.0	P20_HA01_0.2	P20_HA02_0.0	P20_HA02_0.2	P20_HA03_0.0-0.05	P20_HA03_0.2	P20_HA04_0.0
					Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
					Sampling Method:		Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger
Analyte grouping/Analyte					**Units**	**LOR**												
LTM-GEN-7080 Moisture																		
Moisture Content (dried @ 103°C)					%	--	12	5	4.5	13	7.8	6.4	7.6	5.8	7.9	7.9	8.8	11
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS																		
Aluminium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	100	300	100	20	mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Barium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	60	90			mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	20	90		3	mg/kg	0.4	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	100	300	430	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	100	300			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Copper	6000	17000	110	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Iron					mg/kg	20	--	--	--	--	--	--	--	--	--	--	--	--
Lead	300	600	1100	150	mg/kg	5	8.1	9.6	5.7	21	6.9	24	33	8.9	7.8	11	5.7	10
Manganese	3800	19000			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	40	80		1	mg/kg	0.1	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	400	1200	200	60	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	7400	30000	250	200	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--

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Client: John Holland Rail
Job No: 318000780
Project Name: Targo Rail Corridor and Targo Area DSI
23-07-20

Table 1:
Tarago Area DSI - Discrete Properties Soil Results

RAMBOLL

	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space	NEPM 2013 EIL Residential / public Open Space	NSW EPA - Use and Disposal of Biosolids	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
					Site:		P20	P20	P20	P21	P21	P21	P21	P21	P21	P21	P21	P21
					Lab Sample number:		S20-Ap02997	S20-Ap02998	S20-Ap02999	S20-Ap03003	S20-Ap03004	S20-Ap03005	S20-Ap03006	S20-Ap03007	S20-Ap03008	S20-Ap03009	S20-Ap03010	S20-Ap03011
					Sample date:		30-03-20	30-03-20	30-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20
					Sample ID:		P20_HA04_0.2	P20_HA05_0.0	P20_HA05_0.2	P21_HA01_0.0	P21_HA01_0.2	P21_HA02_0.0	P21_HA02_0.2	P21_HA03_0.0	P21_HA04_0.0	P21_HA04_0.2	P21_HA05_0.0	P21_HA05_0.2
					Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
					Sampling Method:		Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger
Analyte grouping/Analyte					**Units**	**LOR**												
LTM-GEN-7080 Moisture																		
Moisture Content (dried @ 103°C)					%	--	11	4.9	9.7	8.8	9.3	8.9	8.4	8.2	8.8	10	4.8	4.1
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS																		
Aluminium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	100	300	100	20	mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Barium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	60	90			mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	20	90		3	mg/kg	0.4	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	100	300	430	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	100	300			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Copper	6000	17000	110	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Iron					mg/kg	20	--	--	--	--	--	--	--	--	--	--	--	--
Lead	300	600	1100	150	mg/kg	5	14	11	10	24	25	16	11	18	33	38	14	12
Manganese	3800	19000			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	40	80		1	mg/kg	0.1	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	400	1200	200	60	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	7400	30000	250	200	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--

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23-07-20

Table 1:
Tarago Area DSI - Discrete Properties Soil Results

RAMBOLL

	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space	NEPM 2013 EIL Residential / public Open Space	NSW EPA - Use and Disposal of Biosolids	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
					Site:		P22	P22	P22	P22	P22	P22	P22	P22	P22	P23	P23	P23
					Lab Sample number:		S20-Ap03057	S20-Ap03058	S20-Ap03059	S20-Ap03060	S20-Ap03061	S20-Ap03062	S20-Ap03063	S20-Ap03064	S20-Ap03083	S20-Ap03088	S20-Ap03089	S20-Ap03090
					Sample date:		31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20
					Sample ID:		P22_HA01_0.0	P22_HA02_0.0	P22_HA02_0.2	P22_HA03_0.0	P22_HA03_0.2	P22_HA04_0.0	P22_HA04_0.2	P22_HA05_0.0	P22_HA05_0.2	P23_HA01_0.0	P23_HA01_0.2	P23_HA02_0.0
					Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
					Sampling Method:		Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger
Analyte grouping/Analyte					**Units**	**LOR**												
LTM-GEN-7080 Moisture																		
Moisture Content (dried @ 103°C)					%	--	4.8	4.2	7.2	6.5	6.4	5.9	3.9	9	5.8	13	10	12
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS																		
Aluminium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	100	300	100	20	mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Barium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	60	90			mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	20	90		3	mg/kg	0.4	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	100	300	430	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	100	300			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Copper	6000	17000	110	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Iron					mg/kg	20	--	--	--	--	--	--	--	--	--	--	--	--
Lead	300	600	1100	150	mg/kg	5	13	12	8.9	18	11	< 5	< 5	22	9.2	74	29	62
Manganese	3800	19000			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	40	80		1	mg/kg	0.1	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	400	1200	200	60	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	7400	30000	250	200	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--

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23-07-20

Table 1:
Tarago Area DSI - Discrete Properties Soil Results

	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space	NEPM 2013 EIL Residential / public Open Space	NSW EPA - Use and Disposal of Biosolids	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
					Site:		P23	P23	P23	P23	P23	P23	P23	P24	P24	P24	P24	P24
					Lab Sample number:		S20-Ap03091	S20-Ap03092	S20-Ap03093	S20-Ap03094	S20-Ap03095	S20-Ap03096	S20-Ap03097	P24_HA01_0.0	P24_HA01_0.2	P24_HA02_0.0	P24_HA02_0.2	P24_HA03_0.0
					Sample date:		31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	01-04-20	01-04-20	01-04-20	01-04-20	01-04-20
					Sample ID:		P23_HA02_0.2	P23_HA03_0.0	P23_HA03_0.2	P23_HA04_0.0	P23_HA04_0.2	P23_HA05_0.0	P23_HA05_0.2	S20-Ap09824	S20-Ap09825	S20-Ap09826	S20-Ap09827	S20-Ap09828
					Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
					Sampling Method:		Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger
Analyte grouping/Analyte					**Units**	**LOR**												
LTM-GEN-7080 Moisture																		
Moisture Content (dried @ 103°C)					%	--	8.6	11	7.8	11	7.2	21	13	11	9.8	9	9	10
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS																		
Aluminium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	100	300	100	20	mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Barium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	60	90			mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	20	90		3	mg/kg	0.4	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	100	300	430	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	100	300			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Copper	6000	17000	110	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Iron					mg/kg	20	--	--	--	--	--	--	--	--	--	--	--	--
Lead	300	600	1100	150	mg/kg	5	35	60	39	31	17	49	50	37	24	22	18	21
Manganese	3800	19000			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	40	80		1	mg/kg	0.1	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	400	1200	200	60	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	7400	30000	250	200	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--

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Concentration in **red** font and grey box exceed the adopted HIL/HSL 'A' for Low Density Residential
Concentration in **orange** font and grey box exceed the adopted HIL/HSL 'C' for Open Space and Recreational Land Use (applicable for P2, P3, P6, P8, P9 and P11)
Concentration in **green** font and grey box exceed the adopted EIL/ESL 'C' for Residential and Open Space and Recreational Land Use

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Concentrations in box exceed the screening value >2.5 times

Where one or more guideline value is exceeded, the highest guideline exceeded will be highlighted

Client: John Holland Rail
Job No: 318000780
Project Name: Targo Rail Corridor and Targo Area DSI
23-07-20

Table 1:
Tarago Area DSI - Discrete Properties Soil Results

RAMBOLL

	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space	NEPM 2013 EIL Residential / public Open Space	NSW EPA - Use and Disposal of Biosolids	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
					Site:		P24	P24	P24	P24	P24	P25	P25	P25	P25	P25	P25	P25
					Lab Sample number:		P24_HA03_0.2	P24_HA04_0.0	P24_HA04_0.2	P24_HA05_0.0	P24_HA05_0.2	S20-Ap09754	S20-Ap09755	S20-Ap09756	S20-Ap09757	S20-Ap09758	S20-Ap09759	S20-Ap09760
					Sample date:		01-04-20	01-04-20	01-04-20	01-04-20	01-04-20	01-04-20	01-04-20	01-04-20	01-04-20	01-04-20	01-04-20	01-04-20
					Sample ID:		S20-Ap09829	S20-Ap09830	S20-Ap09831	S20-Ap09832	S20-Ap09833	P25_HA01_0.0	P25_HA01_0.2	P25_HA02_0.0	P25_HA02_0.2	P25_HA03_0.0	P25_HA03_0.2	P25_HA04_0.0
					Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
					Sampling Method:		Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger
Analyte grouping/Analyte					**Units**	**LOR**												
LTM-GEN-7080 Moisture																		
Moisture Content (dried @ 103°C)					%	--	10	3.4	4.7	6.4	9	9.8	7.7	2.9	4.2	9.7	5.3	21
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS																		
Aluminium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	100	300	100	20	mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Barium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	60	90			mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	20	90		3	mg/kg	0.4	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	100	300	430	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	100	300			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Copper	6000	17000	110	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Iron					mg/kg	20	--	--	--	--	--	--	--	--	--	--	--	--
Lead	300	600	1100	150	mg/kg	5	19	29	31	27	50	25	22	20	13	23	16	40
Manganese	3800	19000			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	40	80		1	mg/kg	0.1	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	400	1200	200	60	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	7400	30000	250	200	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--

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Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Rail Corridor and Tarago Area DSI
23-07-20

Table 1:
Tarago Area DSI - Discrete Properties Soil Results

RAMBOLL

	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space	NEPM 2013 EIL Residential / public Open Space	NSW EPA - Use and Disposal of Biosolids	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
					Site:		P25	P25	P25	P26	P26	P26	P26	P26	P26	P26	P26	P26
					Lab Sample number:		S20-Ap09761	S20-Ap09762	S20-Ap09763	S20-Ap09870	S20-Ap09871	S20-Ap09872	S20-Ap09873	S20-Ap09874	S20-Ap09875	S20-Ap09876	S20-Ap09877	S20-Ap09878
					Sample date:		01-04-20	01-04-20	01-04-20	01-04-20	01-04-20	01-04-20	01-04-20	01-04-20	01-04-20	01-04-20	01-04-20	01-04-20
					Sample ID:		P25_HA04_0.2	P25_HA05_0.0	P25_HA05_0.2	P26_HA01_0.0	P26_HA01_0.2	P26_HA02_0.0	P26_HA02_0.2	P26_HA03_0.0	P26_HA03_0.2	P26_HA04_0.0	P26_HA04_0.2	P26_HA05_0.0
					Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
					Sampling Method:		Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger
Analyte grouping/Analyte					**Units**	**LOR**												
LTM-GEN-7080 Moisture																		
Moisture Content (dried @ 103°C)					%	--	13	9.7	7.5	11	12	10	12	18	14	12	10	13
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS																		
Aluminium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	100	300	100	20	mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Barium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	60	90			mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	20	90		3	mg/kg	0.4	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	100	300	430	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	100	300			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Copper	6000	17000	110	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Iron					mg/kg	20	--	--	--	--	--	--	--	--	--	--	--	--
Lead	300	600	1100	150	mg/kg	5	65	18	13	20	23	32	35	30	33	27	17	57
Manganese	3800	19000			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	40	80		1	mg/kg	0.1	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	400	1200	200	60	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	7400	30000	250	200	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--

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Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Rail Corridor and Tarago Area DSI
23-07-20

Table 1:
Tarago Area DSI - Discrete Properties Soil Results

	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space	NEPM 2013 EIL Residential / public Open Space	NSW EPA - Use and Disposal of Biosolids	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
					Site:		P26	P26	P27	P27	P27	P27	P27	P27	P27	P27	P27	P28
					Lab Sample number:		S20-Ap09879	S20-Ap09881	S20-Ap09724	S20-Ap09725	S20-Ap09726	S20-Ap09727	S20-Ap09728	S20-Ap09729	S20-Ap09730	S20-Ap09731	S20-Ap09732	S20-Ap09683
					Sample date:		01-04-20	01-04-20	01-04-20	01-04-20	01-04-20	01-04-20	01-04-20	01-04-20	01-04-20	01-04-20	01-04-20	01-04-20
					Sample ID:		P26_HA05_0.2	P26_TWS1	P27_HA01_0.0	P27_HA02_0.0	P27_HA02_0.2	P27_HA03_0.0	P27_HA03_0.2	P27_HA04_0.0	P27_HA04_0.2	P27_HA05_0.0	P27_HA05_0.2	P28_HA01_0.0
					Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
					Sampling Method:		Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger
Analyte grouping/Analyte					**Units**	**LOR**												
LTM-GEN-7080 Moisture																		
Moisture Content (dried @ 103°C)					%	--	8		6.2	9.3	11	16	12	7.4	5.5	11	8	24
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS																		
Aluminium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	100	300	100	20	mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Barium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	60	90			mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	20	90		3	mg/kg	0.4	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	100	300	430	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	100	300			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Copper	6000	17000	110	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Iron					mg/kg	20	--	--	--	--	--	--	--	--	--	--	--	--
Lead	300	600	1100	150	mg/kg	5	21		16	25	23	35	20	32	20	43	25	27
Manganese	3800	19000			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	40	80		1	mg/kg	0.1	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	400	1200	200	60	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	7400	30000	250	200	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--

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23-07-20

Table 1:
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	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space	NEPM 2013 EIL Residential / public Open Space	NSW EPA - Use and Disposal of Biosolids	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
					Site:		P28	P28	P28	P28	P28	P28	P28	P29	P29	P29	P29	P29
					Lab Sample number:		S20-Ap09684	S20-Ap09685	S20-Ap09686	S20-Ap09687	S20-Ap09688	S20-Ap09689	S20-Ap09690	S20-Ap09564	S20-Jn26502	S20-Ap09565	S20-Jn26503	S20-Ap09566
					Sample date:		01-04-20	01-04-20	01-04-20	01-04-20	01-04-20	01-04-20	01-04-20	02-04-20	02-04-20	02-04-20	02-04-20	02-04-20
					Sample ID:		P28_HA01_0.2	P28_HA02_0.0	P28_HA02_0.2	P28_HA03_0.0	P28_HA04_0.0	P28_HA05_0.0	P28_HA05_0.2	P29_HA01_0.0	P29_HA01_0.0	P29_HA01_0.2	P29_HA01_0.2	P29_HA02_0.0
					Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
					Sampling Method:		Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger
Analyte grouping/Analyte					**Units**	**LOR**												
LTM-GEN-7080 Moisture																		
Moisture Content (dried @ 103°C)					%	--	16	7.9	14	13	14	12	15		23		11	
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS																		
Aluminium					mg/kg	10	--	--	--	--	--	--	--	--	2500		1900	--
Arsenic	100	300	100	20	mg/kg	2	--	--	--	--	--	--	--	--	3	--	2.4	--
Barium					mg/kg	10	--	--	--	--	--	--	--	--	42	--	27	--
Beryllium	60	90			mg/kg	2	--	--	--	--	--	--	--	--	< 2	--	< 2	--
Cadmium	20	90		3	mg/kg	0.4	--	--	--	--	--	--	--	--	< 0.4	--	< 0.4	--
Chromium	100	300	430	100	mg/kg	5	--	--	--	--	--	--	--	--	9.2	--	8.5	--
Cobalt	100	300			mg/kg	5	--	--	--	--	--	--	--	--	< 5	--	< 5	--
Copper	6000	17000	110	100	mg/kg	5	--	--	--	--	--	--	--	--	11	--	< 5	--
Iron					mg/kg	20	--	--	--	--	--	--	--	--	5400	--	4600	--
Lead	300	600	1100	150	mg/kg	5	50	13	26	19	20	16	28	21	30	12	13	130
Manganese	3800	19000			mg/kg	5	--	--	--	--	--	--	--	--	200	--	69	--
Mercury	40	80		1	mg/kg	0.1	--	--	--	--	--	--	--	--	< 0.1	--	< 0.1	--
Nickel	400	1200	200	60	mg/kg	5	--	--	--	--	--	--	--	--	< 5	--	< 5	--
Zinc	7400	30000	250	200	mg/kg	5	--	--	--	--	--	--	--	--	130	--	19	--

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	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space	NEPM 2013 EIL Residential / public Open Space	NSW EPA - Use and Disposal of Biosolids	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
					Site:		P29	P29	P29	P29	P29	P29	P29	P29	P29	P29	P29	P29
					Lab Sample number:		S20-Jn26504	S20-Ap09567	S20-Jn26505	S20-Ap09568	S20-Jn26506	S20-Ap09569	S20-Jn26507	S20-Ap09570	S20-Jn26508	S20-Ap09571	S20-Jn26509	S20-Ap09572
					Sample date:		02-04-20	02-04-20	02-04-20	02-04-20	02-04-20	02-04-20	02-04-20	02-04-20	02-04-20	02-04-20	02-04-20	02-04-20
					Sample ID:		P29_HA02_0.0	P29_HA02_0.2	P29_HA02_0.2	P29_HA03_0.0	P29_HA03_0.0	P29_HA03_0.2	P29_HA03_0.2	P29_HA04_0.0	P29_HA04_0.0	P29_HA05_0.0	P29_HA05_0.0	P29_HA05_0.2
					Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
					Sampling Method:		Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger
Analyte grouping/Analyte					**Units**	**LOR**												
LTM-GEN-7080 Moisture																		
Moisture Content (dried @ 103°C)					%	--	18		16		11		10		12		19	
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS																		
Aluminium					mg/kg	10	4400	--	4300		6700	--	7800	--	3400	--	3200	--
Arsenic	100	300	100	20	mg/kg	2	4.2	--	3.5	--	8	--	6.7	--	3.5	--	5.4	--
Barium					mg/kg	10	120	--	140	--	72	--	73	--	61	--	74	--
Beryllium	60	90			mg/kg	2	< 2	--	< 2	--	< 2	--	< 2	--	< 2	--	< 2	--
Cadmium	20	90		3	mg/kg	0.4	0.8	--	< 0.4	--	1.2	--	0.4	--	0.4	--	0.9	--
Chromium	100	300	430	100	mg/kg	5	9.8	--	11	--	11	--	13	--	8.8	--	11	--
Cobalt	100	300			mg/kg	5	< 5	--	< 5	--	< 5	--	< 5	--	< 5	--	< 5	--
Copper	6000	17000	110	100	mg/kg	5	37	--	16	--	42	--	18	--	19	--	44	--
Iron					mg/kg	20	6700	--	8000	--	7900	--	9600	--	5100	--	7000	--
Lead	300	600	1100	150	mg/kg	5	110	47	52	100	100	33	43	47	52	160	160	71
Manganese	3800	19000			mg/kg	5	400	--	280	--	110	--	100	--	210	--	240	--
Mercury	40	80		1	mg/kg	0.1	< 0.1	--	< 0.1	--	< 0.1	--	< 0.1	--	< 0.1	--	< 0.1	--
Nickel	400	1200	200	60	mg/kg	5	< 5	--	< 5	--	< 5	--	< 5	--	< 5	--	< 5	--
Zinc	7400	30000	250	200	mg/kg	5	190	--	120	--	220	--	130	--	80	--	210	--

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Concentrations in box exceed the screening value >2.5 times

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Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Rail Corridor and Tarago Area DSI
23-07-20

Table 1:
Tarago Area DSI - Discrete Properties Soil Results

RAMBOLL

	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space	NEPM 2013 EIL Residential / public Open Space	NSW EPA - Use and Disposal of Biosolids	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
					Site:		P29	P29	P29	P29	P29	P29	P29	P30	P30	P30	P30	P30
					Lab Sample number:		S20-Jn26510	S20-Ap09573	S20-Jn26511	S20-Ap09574	S20-Jn26512	S20-Ap09575	S20-Jn26513	S20-Ap09555	S20-Ap09556	S20-Ap09557	S20-Ap09558	S20-Ap09559
					Sample date:		02-04-20	02-04-20	02-04-20	02-04-20	02-04-20	02-04-20	02-04-20	02-04-20	02-04-20	02-04-20	02-04-20	02-04-20
					Sample ID:		P29_HA05_0.2	P29_SURFACE1	P29_SURFACE1	P29_SURFACE2	P29_SURFACE2	P29_SURFACE3	P29_SURFACE3	P30_HA01_0.0	P30_HA01_0.2	P30_HA02_0.0	P30_HA03_0.0	P30_HA03_0.2
					Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
					Sampling Method:		Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger
Analyte grouping/Analyte					**Units**	**LOR**												
LTM-GEN-7080 Moisture																		
Moisture Content (dried @ 103°C)					%	--	9.5		23		25		30	26	8.8	20	35	17
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS																		
Aluminium					mg/kg	10	3500	--	6800	--	7500	--	8100	--	--	--	--	--
Arsenic	100	300	100	20	mg/kg	2	4.2	--	4.6	--	7.7	--	14	--	--	--	--	--
Barium					mg/kg	10	50	--	72	--	61	--	75	--	--	--	--	--
Beryllium	60	90			mg/kg	2	< 2	--	< 2	--	< 2	--	< 2	--	--	--	--	--
Cadmium	20	90		3	mg/kg	0.4	0.6	--	3	--	4.3	--	9.1	--	--	--	--	--
Chromium	100	300	430	100	mg/kg	5	10	--	11	--	13	--	13	--	--	--	--	--
Cobalt	100	300			mg/kg	5	< 5	--	< 5	--	< 5	--	6.9	--	--	--	--	--
Copper	6000	17000	110	100	mg/kg	5	21	--	81	--	94	--	**740**	--	--	--	--	--
Iron					mg/kg	20	9400	--	7900	--	12000	--	9200	--	--	--	--	--
Lead	300	600	1100	150	mg/kg	5	59	190	91	220	110	400	570	12	7.3	23	28	16
Manganese	3800	19000			mg/kg	5	180	--	72	--	140	--	340	--	--	--	--	--
Mercury	40	80		1	mg/kg	0.1	< 0.1	--	< 0.1	--	< 0.1	--	< 0.1	--	--	--	--	--
Nickel	400	1200	200	60	mg/kg	5	< 5	--	< 5	--	5	--	8.2	--	--	--	--	--
Zinc	7400	30000	250	200	mg/kg	5	140	--	350	--	**650**	--	**1100**	--	--	--	--	--

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Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Rail Corridor and Tarago Area DSI
23-07-20

Table 1:
Tarago Area DSI - Discrete Properties Soil Results

	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space	NEPM 2013 EIL Residential / public Open Space	NSW EPA - Use and Disposal of Biosolids	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
					Site:		P30	P30	P30	P30	P31	P31	P31	P31	P31	P31	P31	P31
					Lab Sample number:		S20-Ap09560	S20-Ap09561	S20-Ap09562	S20-Ap09563	S20-Ap09838	S20-Ap09839	S20-Ap09840	S20-Ap09841	S20-Ap09842	S20-Ap09843	S20-Ap09844	S20-Ap09845
					Sample date:		02-04-20	02-04-20	02-04-20	02-04-20	02-04-20	02-04-20	02-04-20	02-04-20	02-04-20	02-04-20	02-04-20	02-04-20
					Sample ID:		P30_HA04_0.0	P30_HA04_0.2	P30_HA05_0.0	P30_HA05_0.2	P31_HA01_0.0	P31_HA01_0.2	P31_HA02_0.0	P31_HA02_0.2	P31_HA03_0.0	P31_HA03_0.2	P31_HA04_0.0	P31_HA04_0.2
					Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
					Sampling Method:		Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger
Analyte grouping/Analyte					**Units**	**LOR**												
LTM-GEN-7080 Moisture																		
Moisture Content (dried @ 103°C)					%	--	37	10	20	13	21	10	21	11	25	6.2	26	17
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS																		
Aluminium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	100	300	100	20	mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Barium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	60	90			mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	20	90		3	mg/kg	0.4	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	100	300	430	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	100	300			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Copper	6000	17000	110	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Iron					mg/kg	20	--	--	--	--	--	--	--	--	--	--	--	--
Lead	300	600	1100	150	mg/kg	5	20	12	9.3	7.2	30	33	50	17	26	27	35	19
Manganese	3800	19000			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	40	80		1	mg/kg	0.1	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	400	1200	200	60	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	7400	30000	250	200	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--

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23-07-20

Table 1:
Tarago Area DSI - Discrete Properties Soil Results

	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space	NEPM 2013 EIL Residential / public Open Space	NSW EPA - Use and Disposal of Biosolids	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
					Site:		P31	P31	P32	P32	P32	P32	P32	P32	P32	P32	P32	P32
					Lab Sample number:		S20-Ap09846	S20-Ap09847	S20-Ap09647	S20-Ap09647	S20-Ap09648	S20-Ap09648	S20-Ap09649	S20-Ap09649	S20-Ap09650	S20-Ap09650	S20-Ap09651	S20-Ap09651
					Sample date:		02-04-20	02-04-20	02-04-20	02-05-20	02-04-20	02-05-20	02-04-20	02-05-20	02-04-20	02-05-20	02-04-20	02-05-20
					Sample ID:		P31_HA05_0.0	P31_HA05_0.2	P32_HA01_0.0	P32_HA01_0.0	P32_HA01_0.2	P32_HA01_0.2	P32_HA02_0.0	P32_HA02_0.0	P32_HA02_0.2	P32_HA02_0.2	P32_HA03_0.0	P32_HA03_0.0
					Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
					Sampling Method:		Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger
Analyte grouping/Analyte					**Units**	**LOR**												
LTM-GEN-7080 Moisture																		
Moisture Content (dried @ 103°C)					%	--	44	20	9.2	9.2	6.9	6.9	49	49	15	15	25	25
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS																		
Aluminium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	100	300	100	20	mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Barium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	60	90			mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	20	90		3	mg/kg	0.4	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	100	300	430	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	100	300			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Copper	6000	17000	110	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Iron					mg/kg	20	--	--	--	--	--	--	--	--	--	--	--	--
Lead	300	600	1100	150	mg/kg	5	23	37	42	42	13	13	69	69	53	53	99	99
Manganese	3800	19000			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	40	80		1	mg/kg	0.1	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	400	1200	200	60	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	7400	30000	250	200	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--

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RAMBOLL

	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space	NEPM 2013 EIL Residential / public Open Space	NSW EPA - Use and Disposal of Biosolids	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
					Site:		P32	P32	P32	P32	P32	P32	P32	P32	P32	P32	P33	P33
					Lab Sample number:		S20-Ap09652	S20-Ap09652	S20-Ap09653	S20-Ap09653	S20-Ap09654	S20-Ap09654	S20-Ap09655	S20-Ap09655	S20-Ap09656	S20-Ap09656	S20-My00633	S20-My00634
					Sample date:		02-04-20	02-05-20	02-04-20	02-05-20	02-04-20	02-05-20	02-04-20	02-05-20	02-04-20	02-05-20	24-04-20	24-04-20
					Sample ID:		P32_HA03_0.2	P32_HA03_0.2	P32_HA04_0.0	P32_HA04_0.0	P32_HA04_0.2	P32_HA04_0.2	P32_HA05_0.0	P32_HA05_0.0	P32_HA05_0.2	P32_HA05_0.2	P33_HA01_0.0	P33_HA01_0.2
					Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
					Sampling Method:		Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger
Analyte grouping/Analyte					**Units**	**LOR**												
LTM-GEN-7080 Moisture																		
Moisture Content (dried @ 103°C)					%	--	12	12	22	22	15	15	20	20	3.4	3.4	9.8	9.4
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS																		
Aluminium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	100	300	100	20	mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Barium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	60	90			mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	20	90		3	mg/kg	0.4	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	100	300	430	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	100	300			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Copper	6000	17000	110	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Iron					mg/kg	20	--	--	--	--	--	--	--	--	--	--	--	--
Lead	300	600	1100	150	mg/kg	5	70	70	72	72	36	36	98	98	25	25	12	14
Manganese	3800	19000			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	40	80		1	mg/kg	0.1	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	400	1200	200	60	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	7400	30000	250	200	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--

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Zinc EIL, based on CEC of 12cmol/kg and pH of 5.22

Concentration in **red** font and grey box exceed the adopted HIL/HSL 'A' for Low Density Residential
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Concentration in **Blue** font and grey box exceed the adopted Environmental Guidelines: Use and Disposal of Biosolid Products (NSW EPA 2000) (P29 only).

Concentrations in box exceed the screening value >2.5 times

Where one or more guideline value is exceeded, the highest guideline exceeded will be highlighted

Client: John Holland Rail
Job No: 318000780
Project Name: Targo Rail Corridor and Targo Area DSI
23-07-20

Table 1:
Tarago Area DSI - Discrete Properties Soil Results

	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space	NEPM 2013 EIL Residential / public Open Space	NSW EPA - Use and Disposal of Biosolids	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
					Site:		P33	P33	P33	P33	P33	P33	P33	P33	P34	P34	P34	P34
					Lab Sample number:		S20-My00635	S20-My00636	S20-My00637	S20-My00638	S20-My00639	S20-My00640	S20-My00641	S20-My00642	S20-My01480	S20-My01479	S20-My01482	S20-My01481
					Sample date:		24-04-20	24-04-20	24-04-20	24-04-20	24-04-20	24-04-20	24-04-20	24-04-20	28-04-20	28-04-20	28-04-20	28-04-20
					Sample ID:		P33_HA02_0.0	P33_HA02_0.2	P33_HA03_0.0	P33_HA03_0.2	P33_HA04_0.0	P33_HA04_0.2	P33_HA05_0.0	P33_HA05_0.2	P34_HA01_0.2	P34_HA01_0-0.05	P34_HA02_0.2	P34_HA02_0-0.05
					Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
					Sampling Method:		Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger
Analyte grouping/Analyte					**Units**	**LOR**												
LTM-GEN-7080 Moisture																		
Moisture Content (dried @ 103°C)					%	--	5	4.7	3.6	3.6	5.3	3	5.8	5.2	11	8.9	8.2	12
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS																		
Aluminium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	100	300	100	20	mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Barium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	60	90			mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	20	90		3	mg/kg	0.4	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	100	300	430	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	100	300			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Copper	6000	17000	110	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Iron					mg/kg	20	--	--	--	--	--	--	--	--	--	--	--	--
Lead	300	600	1100	150	mg/kg	5	9.8	5.4	21	19	42	24	13	9.5	90	93	8.3	120
Manganese	3800	19000			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	40	80		1	mg/kg	0.1	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	400	1200	200	60	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	7400	30000	250	200	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--

National Environment Protection Council (2013) National Environmental Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1)
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Concentrations in box exceed the screening value >2.5 times

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Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Rail Corridor and Tarago Area DSI
23-07-20

Table 1:
Tarago Area DSI - Discrete Properties Soil Results

RAMBOLL

	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space	NEPM 2013 EIL Residential / public Open Space	NSW EPA - Use and Disposal of Biosolids	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
					Site:		P34	P34	P34	P34	P34	P34	P35	P35	P35	P35	P35	P35
					Lab Sample number:		S20-My01484	S20-My01483	S20-My01486	S20-My01485	S20-My01494	S20-My01487	S20-My01761	S20-My01760	S20-My01763	S20-My01762	S20-My01745	S20-My01744
					Sample date:		28-04-20	28-04-20	28-04-20	28-04-20	28-04-20	28-04-20	28-04-20	28-04-20	28-04-20	28-04-20	28-04-20	28-04-20
					Sample ID:		P34_HA03_0.2	P34_HA03_0-0.05	P34_HA04_0.2	P34_HA04_0-0.05	P34_HA05_0.2	P34_HA05_0-0.05	P35_HA01_0.2	P35_HA01_0_0.05	P35_HA02_0.2	P35_HA02_0_0.05	P35_HA03_0.2	P35_HA03_0_0.05
					Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
					Sampling Method:		Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger
Analyte grouping/Analyte					**Units**	**LOR**												
LTM-GEN-7080 Moisture																		
Moisture Content (dried @ 103°C)					%	--	13	15	16	5.4		5.6	6.1	21	15	16	10	6.4
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS																		
Aluminium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	100	300	100	20	mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Barium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	60	90			mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	20	90		3	mg/kg	0.4	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	100	300	430	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	100	300			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Copper	6000	17000	110	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Iron					mg/kg	20	--	--	--	--	--	--	--	--	--	--	--	--
Lead	300	600	1100	150	mg/kg	5	18	270	55	**800**	16	420	37	24	25	34	7.7	22
Manganese	3800	19000			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	40	80		1	mg/kg	0.1	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	400	1200	200	60	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	7400	30000	250	200	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--

National Environment Protection Council (2013) National Environmental Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1)
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Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Rail Corridor and Tarago Area DSI
23-07-20

Table 1:
Tarago Area DSI - Discrete Properties Soil Results

RAMBOLL

	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space	NEPM 2013 EIL Residential / public Open Space	NSW EPA - Use and Disposal of Biosolids	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
					Site:		P35	P35	P35	P35	P36	P36	P36	P36	P36	P36	P36	P36
					Lab Sample number:		S20-My01747	S20-My01746	S20-My01749	S20-My01748	S20-My00604	S20-My00605	S20-My00606	S20-My00607	S20-My00608	S20-My00609	S20-My00610	S20-My00611
					Sample date:		28-04-20	28-04-20	28-04-20	28-04-20	28-04-20	28-04-20	28-04-20	28-04-20	28-04-20	28-04-20	28-04-20	28-04-20
					Sample ID:		P35_HA04_0.2	P35_HA04_0_0.05	P35_HA05_0.2	P35_HA05_0_0.05	P36_HA01_0.0-0.05	P36_HA01_0.2	P36_HA02_0.0-0.05	P36_HA02_0.2	P36_HA03_0.0-0.05	P36_HA03_0.2	P36_HA04_0.0-0.05	P36_HA04_0.2
					Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
					Sampling Method:		Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger
Analyte grouping/Analyte					**Units**	**LOR**												
LTM-GEN-7080 Moisture																		
Moisture Content (dried @ 103°C)					%	--	9.3	11	9.9	6.4	11	8.9	10	9.9	9.7	8.8	18	16
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS																		
Aluminium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	100	300	100	20	mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Barium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	60	90			mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	20	90		3	mg/kg	0.4	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	100	300	430	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	100	300			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Copper	6000	17000	110	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Iron					mg/kg	20	--	--	--	--	--	--	--	--	--	--	--	--
Lead	300	600	1100	150	mg/kg	5	15	25	12	37	160	20	180	22	45	12	44	14
Manganese	3800	19000			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	40	80		1	mg/kg	0.1	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	400	1200	200	60	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	7400	30000	250	200	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--

National Environment Protection Council (2013) National Environmental Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1)
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Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Rail Corridor and Tarago Area DSI
23-07-20

Table 1:
Tarago Area DSI - Discrete Properties Soil Results

RAMBOLL

	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space	NEPM 2013 EIL Residential / public Open Space	NSW EPA - Use and Disposal of Biosolids	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
					Site:		P36	P36	P37	P37	P37	P37	P37	P37	P37	P37	P37	P37
					Lab Sample number:		S20-My00612	S20-My00613	S20-My01795	S20-My01794	S20-My01797	S20-My01796	S20-My01799	S20-My01798	S20-My01801	S20-My01800	S20-My01817	S20-My01802
					Sample date:		28-04-20	28-04-20	29-04-20	29-04-20	29-04-20	29-04-20	29-04-20	29-04-20	29-04-20	29-04-20	29-04-20	29-04-20
					Sample ID:		P36_HA05_0.0-0.05	P36_HA05_0.2	P37_HA01_0.2	P37_HA01_0-0.05	P37_HA02_0.2	P37_HA02_0-0.05	P37_HA03_0.2	P37_HA03_0-0.05	P37_HA04_0.2	P37_HA04_0-0.05	P37_HA05_0.2	P37_HA05_0-0.05
					Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
					Sampling Method:		Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger
Analyte grouping/Analyte					**Units**	**LOR**												
LTM-GEN-7080 Moisture																		
Moisture Content (dried @ 103°C)					%	--	12	12	4.5	7.8	6.6	5.7	8.6	9.8	5.8	5.3	8.9	8.3
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS																		
Aluminium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	100	300	100	20	mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Barium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	60	90			mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	20	90		3	mg/kg	0.4	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	100	300	430	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	100	300			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Copper	6000	17000	110	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Iron					mg/kg	20	--	--	--	--	--	--	--	--	--	--	--	--
Lead	300	600	1100	150	mg/kg	5	58	30	44	92	54	52	21	41	11	76	27	70
Manganese	3800	19000			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	40	80		1	mg/kg	0.1	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	400	1200	200	60	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	7400	30000	250	200	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--

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Concentrations in box exceed the screening value >2.5 times

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Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Rail Corridor and Tarago Area DSI
23-07-20

Table 1:
Tarago Area DSI - Discrete Properties Soil Results

	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space	NEPM 2013 EIL Residential / public Open Space	NSW EPA - Use and Disposal of Biosolids	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
					Site:		P38	P38	P38	P38	P38	P38	P38	P38	P38	P38	P39	P39
					Lab Sample number:		S20-My01776	S20-My01775	S20-My01778	S20-My01777	S20-My01780	S20-My01779	S20-My01782	S20-My01781	S20-My01784	S20-My01783	S20-My00960	S20-Jn26499
					Sample date:		29-04-20	29-04-20	29-04-20	29-04-20	29-04-20	29-04-20	29-04-20	29-04-20	29-04-20	29-04-20		30-04-20
					Sample ID:		P38_HA01_0.2	P38_HA01_0-0.05	P38_HA02_0.2	P38_HA02_0-0.05	P38_HA03_0.2	P38_HA03_0-0.05	P38_HA04_0.2	P38_HA04_0-0.05	P38_HA05_0.2	P38_HA05_0-0.05	P39_HA01_0.0-0.05	P39_HA01_0.0-0.05
					Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
					Sampling Method:		Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger
Analyte grouping/Analyte					**Units**	**LOR**												
LTM-GEN-7080 Moisture																		
Moisture Content (dried @ 103°C)					%	--	6.1	11	5.4	7.6	6.5	8	3.3	7.7	4.9	7.6	32	
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS																		
Aluminium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	3200
Arsenic	100	300	100	20	mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	3.3
Barium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	54
Beryllium	60	90			mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	< 2
Cadmium	20	90		3	mg/kg	0.4	--	--	--	--	--	--	--	--	--	--	--	3.2
Chromium	100	300	430	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	< 5
Cobalt	100	300			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	< 5
Copper	6000	17000	110	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	83
Iron					mg/kg	20	--	--	--	--	--	--	--	--	--	--	--	4700
Lead	300	600	1100	150	mg/kg	5	14	21	9.8	15	13	16	7	16	17	38	310	220
Manganese	3800	19000			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	290
Mercury	40	80		1	mg/kg	0.1	--	--	--	--	--	--	--	--	--	--	--	< 0.1
Nickel	400	1200	200	60	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	< 5
Zinc	7400	30000	250	200	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	360

National Environment Protection Council (2013) National Environmental Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1)
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Concentrations in box exceed the screening value >2.5 times

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Client: John Holland Rail
Job No: 318000780
Project Name: Targo Rail Corridor and Targo Area DSI
23-07-20

Table 1:
Tarago Area DSI - Discrete Properties Soil Results

RAMBOLL

	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space	NEPM 2013 EIL Residential / public Open Space	NSW EPA - Use and Disposal of Biosolids	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
					Site:		P39	P39	P39	P39	P39	P39	P39	P39	P39	P39	P39	P39
					Lab Sample number:		S20-My00961	S20-My00962	S20-Jn26500	S20-My00963	S20-My00964	S20-My00965	S20-My00966	S20-My00967	S20-My00968	S20-My00969	S20-My00970	S20-My00971
					Sample date:				30-04-20									
					Sample ID:		P39_HA01_0.2	P39_HA02_0.0-0.05	P39_HA02_0.0-0.05	P39_HA03_0.0-0.05	P39_HA03_0.2	P39_HA04_0.0-0.05	P39_HA05_0.0-0.05	P39_HA05_0.2	P39_HA06_0.0-0.05	P39_HA07_0.0-0.05	P39_HA07_0.2	P39_HA08_0.0-0.05
					Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
					Sampling Method:		Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger
Analyte grouping/Analyte					**Units**	**LOR**												
LTM-GEN-7080 Moisture																		
Moisture Content (dried @ 103°C)					%	--	14	32		30	13	25	27	12	32	17	9.1	29
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS																		
Aluminium					mg/kg	10	--	--	5200	--	--	--	--	--	--	--	--	--
Arsenic	100	300	100	20	mg/kg	2	--	--	5.1	--	--	--	--	--	--	--	--	--
Barium					mg/kg	10	--	--	56	--	--	--	--	--	--	--	--	--
Beryllium	60	90			mg/kg	2	--	--	< 2	--	--	--	--	--	--	--	--	--
Cadmium	20	90		3	mg/kg	0.4	--	--	2.1	--	--	--	--	--	--	--	--	--
Chromium	100	300	430	100	mg/kg	5	--	--	7.7	--	--	--	--	--	--	--	--	--
Cobalt	100	300			mg/kg	5	--	--	< 5	--	--	--	--	--	--	--	--	--
Copper	6000	17000	110	100	mg/kg	5	--	--	95	--	--	--	--	--	--	--	--	--
Iron					mg/kg	20	--	--	6600	--	--	--	--	--	--	--	--	--
Lead	300	600	1100	150	mg/kg	5	36	390	250	130	53	50	93	39	28	78	26	120
Manganese	3800	19000			mg/kg	5	--	--	90	--	--	--	--	--	--	--	--	--
Mercury	40	80		1	mg/kg	0.1	--	--	0.2	--	--	--	--	--	--	--	--	--
Nickel	400	1200	200	60	mg/kg	5	--	--	< 5	--	--	--	--	--	--	--	--	--
Zinc	7400	30000	250	200	mg/kg	5	--	--	340	--	--	--	--	--	--	--	--	--

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Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Rail Corridor and Tarago Area DSI
23-07-20

Table 1:
Tarago Area DSI - Discrete Properties Soil Results

	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space	NEPM 2013 EIL Residential / public Open Space	NSW EPA - Use and Disposal of Biosolids	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
					Site:		P39	P39	P39	P40	P40	P40	P40	P40	P40	P40	P40	P40
					Lab Sample number:		S20-My00972	S20-My00973	S20-My00974	S20-My00560	S20-My00561	S20-My00562	S20-My00563	S20-My00564	S20-My00565	S20-My00566	S20-My00567	S20-My00568
					Sample date:					30-04-20	30-04-20	30-04-20	30-04-20	30-04-20	30-04-20	30-04-20	30-04-20	30-04-20
					Sample ID:		P39_HA09_0.0-0.05	P39_HA09_0.2	P39_HA10_0.0-0.05	P40_HA01_0.0-0.05	P40_HA01_0.2	P40_HA02_0.0-0.05	P40_HA03_0.0-0.05	P40_HA03_0.2	P40_HA04_0.0-0.05	P40_HA05_0.0-0.05	P40_HA05_0.2	P40_HA06_0.0-0.05
					Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
					Sampling Method:		Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger
Analyte grouping/Analyte					**Units**	**LOR**												
LTM-GEN-7080 Moisture																		
Moisture Content (dried @ 103°C)					%	--	17	5.6	26	16	13	20	24	9.9	19	30	14	7.9
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS																		
Aluminium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	100	300	100	20	mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Barium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	60	90			mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	20	90		3	mg/kg	0.4	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	100	300	430	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	100	300			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Copper	6000	17000	110	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Iron					mg/kg	20	--	--	--	--	--	--	--	--	--	--	--	--
Lead	300	600	1100	150	mg/kg	5	79	46	110	260	28	67	220	200	83	**650**	66	190
Manganese	3800	19000			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	40	80		1	mg/kg	0.1	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	400	1200	200	60	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	7400	30000	250	200	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--

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Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Rail Corridor and Tarago Area DSI
23-07-20

Table 1:
Tarago Area DSI - Discrete Properties Soil Results

	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space	NEPM 2013 EIL Residential / public Open Space	NSW EPA - Use and Disposal of Biosolids	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
					Site:		P40	P40	P40	P40	P40	P40	P41	P41	P41	P41	P41	P41
					Lab Sample number:		S20-My00569	S20-My00570	S20-My00571	S20-My00572	S20-My00573	S20-My00574	S20-My28582	S20-My28584	S20-My28583	S20-My28586	S20-My28585	S20-My28588
					Sample date:		30-04-20	30-04-20	30-04-20	30-04-20	30-04-20	30-04-20						
					Sample ID:		P40_HA07_0.0-0.05	P40_HA07_0.2	P40_HA08_0.0-0.05	P40_HA09_0.0-0.05	P40_HA09_0.2	P40_HA10_0.0-0.05	P41_HA01_0-0.05	P41_HA02_0.2-0.3	P41_HA02_0-0.05	P41_HA03_0.15-0.2	P41_HA03_0-0.05	P41_HA04_0.2-0.3
					Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
					Sampling Method:		Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger
Analyte grouping/Analyte					**Units**	**LOR**												
LTM-GEN-7080 Moisture																		
Moisture Content (dried @ 103°C)					%	--	30	10	22	26	19	32	7.3	12	10	3.9	5.3	11
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS																		
Aluminium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	100	300	100	20	mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Barium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	60	90			mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	20	90		3	mg/kg	0.4	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	100	300	430	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	100	300			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Copper	6000	17000	110	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Iron					mg/kg	20	--	--	--	--	--	--	--	--	--	--	--	--
Lead	300	600	1100	150	mg/kg	5	270	31	91	**540**	68	**450**	24	15	47	15	18	13
Manganese	3800	19000			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	40	80		1	mg/kg	0.1	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	400	1200	200	60	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	7400	30000	250	200	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--

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23-07-20

Table 1:
Tarago Area DSI - Discrete Properties Soil Results

	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space	NEPM 2013 EIL Residential / public Open Space	NSW EPA - Use and Disposal of Biosolids	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
					Site:		P41	P41	P41	SMC	SMC	SMC	SMC	SMC	SMC	SMC	SMC	SMC
					Lab Sample number:		S20-My28587	S20-My28590	S20-My28589	M20-Ma44100	M20-Ma44101	M20-Ma44102	M20-Ma44103	M20-Ma44104	M20-Ma44105	M20-Ma44106	M20-Ma44107	M20-Ma44108
					Sample date:					23-03-20	23-03-20	23-03-20	23-03-20	23-03-20	23-03-20	23-03-20	23-03-20	23-03-20
					Sample ID:		P41_HA04_0-0.05	P41_HA05_0.2-0.3	P41_HA05_0-0.05	SMC_HA01_0.0	SMC_HA01_0.2	SMC_HA01_0.5	SMC_HA02_0.0-0.05	SMC_HA02_0.2	SMC_HA02_0.4	SMC_HA03_0.0-0.05	SMC_HA03_0.2	SMC_HA03_0.4
					Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
					Sampling Method:		Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger
Analyte grouping/Analyte					**Units**	**LOR**												
LTM-GEN-7080 Moisture																		
Moisture Content (dried @ 103°C)					%	--	9.2	9.6	12	9.1	11	10	17	13	9.8	19	11	11
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS																		
Aluminium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	100	300	100	20	mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Barium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	60	90			mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	20	90		3	mg/kg	0.4	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	100	300	430	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	100	300			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Copper	6000	17000	110	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Iron					mg/kg	20	--	--	--	--	--	--	--	--	--	--	--	--
Lead	300	600	1100	150	mg/kg	5	19	16	17	**1100**	19	12	**610**	**440**	34	**1200**	49	110
Manganese	3800	19000			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	40	80		1	mg/kg	0.1	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	400	1200	200	60	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	7400	30000	250	200	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--

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23-07-20

Table 1:
Tarago Area DSI - Discrete Properties Soil Results

RAMBOLL

	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space	NEPM 2013 EIL Residential / public Open Space	NSW EPA - Use and Disposal of Biosolids	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
					Site:		SMC	SMC	SMC	SMC	SMC	SMC	SMC	SMC	SMC	SMC	SMC	SMC
					Lab Sample number:		M20-Ma44109	M20-Ma44110	M20-Ma44111	M20-Ma44112	M20-Ma44113	M20-Ma44114	M20-Ma44115	M20-Ma44116	M20-Ma44117	M20-Ma44118	M20-Ma44119	M20-Ma44120
					Sample date:		23-03-20	23-03-20	23-03-20	23-03-20	23-03-20	23-03-20	23-03-20	23-03-20	23-03-20	23-03-20	23-03-20	23-03-20
					Sample ID:		SMC_HA04_0.0	SMC_HA04_0.2	SMC_HA04_0.4	SMC_HA05_0.0-0.05	SMC_HA05_0.25	SMC_HA05_0.4	SMC_HA06_0.0	SMC_HA06_0.2	SMC_HA06_0.4	SMC_HA07_0.0	SMC_HA07_0.2	SMC_HA07_0.4
					Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
					Sampling Method:		Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger	Hand Auger
Analyte grouping/Analyte					**Units**	**LOR**												
LTM-GEN-7080 Moisture																		
Moisture Content (dried @ 103°C)					%	--	10	10	9.6	13	12	11	15	13	10	19	13	12
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS																		
Aluminium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	100	300	100	20	mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Barium					mg/kg	10	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	60	90			mg/kg	2	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	20	90		3	mg/kg	0.4	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	100	300	430	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	100	300			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Copper	6000	17000	110	100	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Iron					mg/kg	20	--	--	--	--	--	--	--	--	--	--	--	--
Lead	300	600	1100	150	mg/kg	5	240	34	19	**490**	**1100**	240	**760**	**520**	20	**3800**	93	14
Manganese	3800	19000			mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	40	80		1	mg/kg	0.1	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	400	1200	200	60	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	7400	30000	250	200	mg/kg	5	--	--	--	--	--	--	--	--	--	--	--	--

National Environment Protection Council (2013) National Environmental Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1)
^ For soil texture classification undertaken in accord with AS 1726, the classifications of sand, silt and clay may be applied as coarse, fine with liquid limit <50% and fine with liquid limit>50% respectively, as the underlying properties to develop the HSLs may reasonably be selected to be similar. Where there is uncertainty, either a conservative approach may be adopted or laboratory analysis should be carried out. Generally SAND has been adopted in these scenarios.
Health Investigation Levels for chromium based on chromium (VI)

Chromium (III) EIL, based on a low clay content (% clay) of 12%

Nickel EIL, based on CEC of 12.8cmol/kg

Copper EIL, based on CEC of 12cmol/kg, pH of 5.22, organic carbon content of 1.78%

Zinc EIL, based on CEC of 12cmol/kg and pH of 5.22

Concentration in **red** font and grey box exceed the adopted HIL/HSL 'A' for Low Density Residential
Concentration in **orange** font and grey box exceed the adopted HIL/HSL 'C' for Open Space and Recreational Land Use (applicable for P2, P3, P6, P8, P9 and P11)
Concentration in **green** font and grey box exceed the adopted EIL/ESL 'C' for Residential and Open Space and Recreational Land Use

Concentration in **Blue** font and grey box exceed the adopted Environmental Guidelines: Use and Disposal of Biosolid Products (NSW EPA 2000) (P29 only).

Concentrations in box exceed the screening value >2.5 times

Where one or more guideline value is exceeded, the highest guideline exceeded will be highlighted

Client: John Holland Rail
Job No: 318000780
Project Name: Targo Rail Corridor and Targo Area DSI
23-07-20

Table 1:
Tarago Area DSI - Discrete Properties Soil Results

	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space	NEPM 2013 EIL Residential / public Open Space	NSW EPA - Use and Disposal of Biosolids	Sample Type:		Soil	Soil	Soil
					Site:		SMC	SMC	SMC
					Lab Sample number:		S20-Ma43347	S20-Ma43348	S20-Ma43349
					Sample date:		23-03-20	23-03-20	23-03-20
					Sample ID:		SMC_HA08_0.0-0.05	SMC_HA08_0.2	SMC_HA08_0.45
					Project Name:		Community DSI	Community DSI	Community DSI
					Sampling Method:		Hand Auger	Hand Auger	Hand Auger
Analyte grouping/Analyte					**Units**	**LOR**			
LTM-GEN-7080 Moisture									
Moisture Content (dried @ 103°C)					%	--	4.1	4.8	5.1
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS									
Aluminium					mg/kg	10	--	--	--
Arsenic	100	300	100	20	mg/kg	2	--	--	--
Barium					mg/kg	10	--	--	--
Beryllium	60	90			mg/kg	2	--	--	--
Cadmium	20	90		3	mg/kg	0.4	--	--	--
Chromium	100	300	430	100	mg/kg	5	--	--	--
Cobalt	100	300			mg/kg	5	--	--	--
Copper	6000	17000	110	100	mg/kg	5	--	--	--
Iron					mg/kg	20	--	--	--
Lead	300	600	1100	150	mg/kg	5	**840**	260	280
Manganese	3800	19000			mg/kg	5	--	--	--
Mercury	40	80		1	mg/kg	0.1	--	--	--
Nickel	400	1200	200	60	mg/kg	5	--	--	--
Zinc	7400	30000	250	200	mg/kg	5	--	--	--

National Environment Protection Council (2013) National Environmental Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1)
^ For soil texture classification undertaken in accord with AS 1726, the classifications of sand, silt and clay may be applied as coarse, fine with liquid limit <50% and fine with liquid limit>50% respectively, as the underlying properties to develop the HSLs may reasonably be selected to be similar. Where there is uncertainty, either a conservative approach may be adopted or laboratory analysis should be carried out. Generally SAND has been adopted in these scenarios.
Health Investigation Levels for chromium based on chromium (VI)

Chromium (III) EIL, based on a low clay content (% clay) of 12%

Nickel EIL, based on CEC of 12.8cmol/kg

Copper EIL, based on CEC of 12cmol/kg, pH of 5.22, organic carbon content of 1.78%

Zinc EIL, based on CEC of 12cmol/kg and pH of 5.22

Concentration in **red** font and grey box exceed the adopted HIL/HSL 'A' for Low Density Residential
Concentration in **orange** font and grey box exceed the adopted HIL/HSL 'C' for Open Space and Recreational Land Use (applicable for P2, P3, P6, P8, P9 and P11)
Concentration in **green** font and grey box exceed the adopted EIL/ESL 'C' for Residential and Open Space and Recreational Land Use

Concentration in **Blue** font and grey box exceed the adopted Environmental Guidelines: Use and Disposal of Biosolid Products (NSW EPA 2000) (P29 only).

Concentrations in box exceed the screening value >2.5 times

Where one or more guideline value is exceeded, the highest guideline exceeded will be highlighted

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Rail Corridor and Tarago Area DSI
23-07-20

Table 2:
Tarago Area DSI - Discrete Properties Gorundwater Bore Results

	NHMRC Australian Drinking Water Guidelines[A]	ANZECC Fresh Water Guidelines - Irrigation[B]	ANZECC Fresh Water Guidelines - Stock Water[B]											
Sample Type:						GroundWater	Groundwater	GroundWater	GroundWater	GroundWater	GroundWater	GroundWater	Groundwater	GroundWater	GroundWater
Site:						**P1**	**P2**	**P10**	**P12**	**P14**	**P23**	**P32**	**P39**	**SMC**	**SCHOOL BORE**
Lab Sample number:						M20-Ap03656	S20-My00680	S20-Ma44400	S20-Ma44158	S20-Ma44056	S20-Ap03099	S20-Ap09659	S20-My00979	M20-Ma44097	M20-Ma42252
Sample date:						24-03-20	30-04-20	25-03-20	26-03-20	26-03-20	31-03-20	02-04-20		24-03-20	24-03-20
Sample ID:						P1-GW1	P2_GWBORE	P10_BORE	P12_BORE	P14_BORE	P23_BORE	P32_BORE	P39_GWBORE	SMC_GW	SMC_GW
Project Name:						Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
Sampling Method:						Tap	Tap	Tap	Tap	Tap	Peristaltic/syphon	Tap	Tap	Peristaltic/syphon	Tap
Analyte grouping/Analyte				**Units**	**LOR**										
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS															
Aluminium	--			mg/L		--	< 0.05	--	--	--	0.34	< 0.05	< 0.05	--	< 0.05
Aluminium (filtered)		20	5	mg/L		--	< 0.05	--	--	--	< 0.05	< 0.05	--	--	< 0.05
Arsenic (filtered)	2	2	0.5	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.005	< 0.001	--	< 0.001	< 0.001
Barium (filtered)		--	--	mg/L		--	0.12	--	--	--	0.08	0.07	--	--	0.09
Beryllium (filtered)	4	0.5	--	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	--	< 0.001	< 0.001
Boron (filtered)			--	mg/L	0.05	< 0.05	--	< 0.05	< 0.05	< 0.05	--	--	--	< 0.05	--
Cadmium (filtered)	0.05	0.002	0.01	mg/L	0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	--	< 0.0002	< 0.0002
Chromium (filtered)		0.05	1	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	--	< 0.001	< 0.001
Cobalt (filtered)	2	0.1	1	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.001	< 0.001	--	< 0.001	< 0.001
Copper (filtered)		5	0.4	mg/L	0.001	0.02	< 0.001	< 0.001	0.001	< 0.001	0.003	< 0.001	--	< 0.001	< 0.001
Iron (filtered)		10	--	mg/L		--	< 0.05	--	--	--	< 0.05	**13**	--	--	3.5
Lead (filtered)	0.5	5	0.1	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	--	< 0.001	< 0.001
Manganese (filtered)	0.5	10	--	mg/L	0.005	< 0.005	0.007	0.19	0.063	0.13	0.14	0.16	--	< 0.005	0.35
Mercury (filtered)	0.02	0.002	0.002	mg/L	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	--	< 0.0001	< 0.0001
Nickel (filtered)	0.01	2	1	mg/L	0.001	< 0.001	< 0.001	< 0.001	0.004	< 0.001	0.001	< 0.001	--	< 0.001	< 0.001
Selenium (filtered)		--	--	mg/L	0.001	< 0.001	--	< 0.001	< 0.001	< 0.001	--	--	--	< 0.001	--
Zinc (filtered)		5	20	mg/L	0.005	0.015	< 0.005	< 0.005	0.009	< 0.005	0.034	< 0.005	--	0.009	< 0.005

LOR = Limit of Reporting

Concentration in **purple** font and grey box exceed the ANZECC Fresh Water Guidelines - Stock Water

Concentration in **green** font and grey box exceed the ANZECC Fresh Water Guidelines - Irrigation

Concentration in **blue** font and grey box exceed the NHMRC Australian Drinking Water Guideline

Concentrations in box exceed the screening value >2.5 times

Where one or more guideline value is exceeded, the highest guideline exceeded will be highlighted

[A]NRMMC (2011 updated 2018) Australian Drinking Water Guidelines (ADWG) Paper 6 National Water Quality Management Strategy. National Health and Medical Research Council.

[B]Australia and New Zealand Environment and Conservation Council (2000) Australian and New Zealand Guidelines for Fresh and Marine Water Quality.

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Rail Corridor and Tarago Area DSI
23-07-20

Table 3:
Tarago Area DSI - Discrete Properties Rainwater Tank Water Results

	NHMRC Australian Drinking Water Guidelines[A]	Sample Type:	Tank Water	Tank Water	Tank Water	Tank Water	Tank Water	Tank Water	Tank Water	Tank Water	Tank Water
		Site:	P1	P1	P3	P4	P4	P5	P6	P7	P7
		Lab Sample number:	M20-Ap03653	M20-Ap03654	S20-Ap02121	M20-Ma43682	M20-Ma43683	M20-Ma43795	S20-Ap02122	S20-Ma44414	S20-Ma44415
		Sample date:	24-03-20	24-03-20	26-03-20	24-03-20	24-03-20	24-03-20	25-03-20	25-03-20	25-03-20
		Sample ID:	P1-TW1	P1-TW2	P3_TW2	P2*_TW1	P2*_TW2	P5_TW1	P6_TW1	P7_TW1	P7_TW2
		Project Name:	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
		Sampling Method:	Micropurge/ Syphon	Micropurge/ Syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon
Analyte grouping/Analyte		**Units**	**LOR**								
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS											
Aluminium		mg/L		--	--	< 0.05				0.08		
Arsenic	0.01	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Barium	2	mg/L		--	--	< 0.02			< 0.001	< 0.02	< 0.001	< 0.001
Beryllium	0.06	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.05	< 0.001	< 0.05	< 0.05
Boron		mg/L	0.05	< 0.05	< 0.05		< 0.05	< 0.05				
Cadmium	0.002	mg/L	0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	0.0003	< 0.0002	< 0.0002
Chromium	0.05	mg/L	0.001	< 0.001	< 0.001	0.002	0.001	< 0.001	0.002	< 0.001	< 0.001	0.009
Cobalt		mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Copper	2	mg/L	0.001	0.003	0.011	0.002	< 0.001	< 0.001	< 0.001	0.027	0.023	< 0.001
Iron		mg/L		--	--	< 0.05				< 0.05		
Lead	0.01	mg/L	0.001	< 0.001	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.002	< 0.001
Manganese	0.5	mg/L	0.005	0.006	0.033	< 0.005	< 0.005	< 0.005	0.25	0.024	0.026	< 0.005
Mercury	0.001	mg/L	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel	0.02	mg/L	0.001	< 0.001	0.002	< 0.001	< 0.001	< 0.001	0.002	< 0.001	< 0.001	< 0.001
Selenium	0.01	mg/L	0.001	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001		< 0.001	< 0.001
Zinc		mg/L	0.005	0.12	0.45	0.42	< 0.005	< 0.005	0.088	0.071	0.31	0.082

Concentration in **blue** font and grey box exceed the NHMRC Australian Drinking Water Guideline

[A]NRMMC (2011 updated 2018) Australian Drinking Water Guidelines (ADWG) Paper 6 National Water Quality Management Strategy. National Health and Medical Research Council.

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Rail Corridor and Tarago Area DSI
23-07-20

Table 3:
Tarago Area DSI - Discrete Properties Rainwater Tank Water Results

	NHMRC Australian Drinking Water Guidelines[A]	Sample Type:	Tank Water	Tank Water	Tank Water	Tank Water	Tank Water	Tank Water	Tank Water	Tank Water	Tank Water
		Site:	P9	P9	P10	P10	P10	P11	P11	P12	P12
		Lab Sample number:	S20-Ma44377	S20-Ma44378	S20-My01303	S20-Ma44401	S20-Ma44402	S20-Ma43996	S20-Ma43997	S20-Ma44141	S20-Ma44142
		Sample date:	25-03-20	25-03-20	25-03-20	25-03-20	25-03-20	26-03-20	26-03-20	26-03-20	26-03-20
		Sample ID:	RFS_TW1	RFS_TW2	P10_BORETANK	P10_TW1	P10_TW2	P11_TW1	P11_TW2	P12_TW1	P12_TW2
		Project Name:	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
		Sampling Method:	Micropurge/syphon	Micropurge/syphon	Micropurge/ Syphon	Micropurge/ Syphon	Micropurge/ Syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon
Analyte grouping/Analyte		**Units**	**LOR**								
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS											
Aluminium		mg/L		--	--	< 0.05	--	--	--	--	--	--
Arsenic	0.01	mg/L	0.001	< 0.001	< 0.001	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Barium	2	mg/L		--	--	0.05	--	--	--	--	--	--
Beryllium	0.06	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Boron		mg/L	0.05	< 0.05	< 0.05		0.06	0.59	< 0.05	< 0.05	< 0.05	< 0.05
Cadmium	0.002	mg/L	0.0002	< 0.0002	0.0015	< 0.0002	< 0.0002	< 0.0002	0.0003	< 0.0002	< 0.0002	0.0005
Chromium	0.05	mg/L	0.001	0.003	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.002
Cobalt		mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Copper	2	mg/L	0.001	0.008	0.005	< 0.001	< 0.001	0.002	< 0.001	0.002	0.004	0.001
Iron		mg/L		--	--	< 0.05	--	--	--	--	--	--
Lead	0.01	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.002	< 0.001
Manganese	0.5	mg/L	0.005	0.029	< 0.005	0.032	0.006	< 0.005	0.013	0.021	< 0.005	< 0.005
Mercury	0.001	mg/L	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel	0.02	mg/L	0.001	< 0.001	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Selenium	0.01	mg/L	0.001	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Zinc		mg/L	0.005	0.24	0.15	0.007	0.028	0.047	2	0.63	0.007	1.6

Concentration in **blue** font and grey box exceed the NHMRC Australian Drinking Water Guideline

[A]NRMMC (2011 updated 2018) Australian Drinking Water Guidelines (ADWG) Paper 6 National Water Quality Management Strategy. National Health and Medical Research Council.

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Rail Corridor and Tarago Area DSI
23-07-20

Table 3:
Tarago Area DSI - Discrete Properties Rainwater Tank Water Results

	NHMRC Australian Drinking Water Guidelines[A]	Sample Type:	Tank Water	Tank Water	Tank Water	Tank Water	Tank Water	Tank Water	Tank Water	Tank Water	Tank Water
		Site:	P14	P14	P14	P15	P15	P17	P17	P18	P18
		Lab Sample number:	S20-Ma44057	S20-Ma44058	S20-Ma44059	S20-Ap02860	S20-Ap02861	S20-Ap02893	S20-Ap02894	S20-Ap02947	S20-Ap02948
		Sample date:	26-03-20	26-03-20	26-03-20	30-03-20	30-03-20	30-03-20	30-03-20	31-03-20	31-03-20
		Sample ID:	P14_TW1	P14_TW2	P14_TW3	P15_TW1	P15_TW2	P17_TW1	P17_TW2	P18_TW1	P18_TW2
		Project Name:	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
		Sampling Method:	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon
						28	29				
Analyte grouping/Analyte		**Units**	**LOR**								
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS											
Aluminium		mg/L		--	--	--	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Arsenic	0.01	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Barium	2	mg/L		--	--	--	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Beryllium	0.06	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Boron		mg/L	0.05	< 0.05	< 0.05	< 0.05	--	--	--	--		
Cadmium	0.002	mg/L	0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	0.0003	< 0.0002
Chromium	0.05	mg/L	0.001	0.005	0.004	< 0.001	< 0.001	< 0.001	0.001	< 0.001	0.002	0.002
Cobalt		mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Copper	2	mg/L	0.001	< 0.001	< 0.001	0.004	< 0.001	0.002	0.029	0.004	0.001	0.003
Iron		mg/L		--	--	--	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Lead	0.01	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Manganese	0.5	mg/L	0.005	0.006	< 0.005	< 0.005	< 0.005	< 0.005	0.036	0.016	< 0.005	< 0.005
Mercury	0.001	mg/L	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel	0.02	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Selenium	0.01	mg/L	0.001	< 0.001	< 0.001	< 0.001	--	--	--	--		
Zinc		mg/L	0.005	0.091	0.05	0.12	0.046	0.039	0.099	0.045	0.28	0.37

Concentration in **blue** font and grey box exceed the NHMRC Australian Drinking Water Guideline

[A]NRMMC (2011 updated 2018) Australian Drinking Water Guidelines (ADWG) Paper 6 National Water Quality Management Strategy. National Health and Medical Research Council.

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Rail Corridor and Tarago Area DSI
23-07-20

Table 3:
Tarago Area DSI - Discrete Properties Rainwater Tank Water Results

	NHMRC Australian Drinking Water Guidelines[A]			Sample Type:	Tank Water	Tank Water	Tank Water	Tank Water	Tank Water	Tank Water	Tank Water	Tank Water	Tank Water
				Site:	P18	P18	P19	P21	P21	P23	P24	P24	P25
				Lab Sample number:	S20-Ap02949	S20-Ap02950	S20-Ap02981	S20-Ap03012	S20-Ap03013	S20-Ap03098	P24_TW1	P24_TW2	S20-Ap09764
				Sample date:	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	01-04-20	01-04-20	01-04-20
				Sample ID:	P18_TW3	P18_TW4	P19_TW1	P21_TW1	P21_TW2	P23_TW1	S20-Ap09834	S20-Ap09835	P25_TW1
				Project Name:	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
				Sampling Method:	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon
Analyte grouping/Analyte		**Units**	**LOR**										
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS													
Aluminium		mg/L		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.06	< 0.05	< 0.05
Arsenic	0.01	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Barium	2	mg/L		< 0.02	< 0.02	0.06	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Beryllium	0.06	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Boron		mg/L	0.05				--	--				
Cadmium	0.002	mg/L	0.0002	0.0006	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chromium	0.05	mg/L	0.001	< 0.001	0.001	< 0.001	< 0.001	< 0.001	0.001	0.001	0.001	0.001
Cobalt		mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Copper	2	mg/L	0.001	0.002	< 0.001	< 0.001	0.003	< 0.001	0.001	< 0.001	< 0.001	< 0.001
Iron		mg/L		< 0.05	< 0.05	< 0.05	< 0.05	0.05	< 0.05	0.1	< 0.05	< 0.05
Lead	0.01	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Manganese	0.5	mg/L	0.005	0.005	0.008	< 0.005	0.02	0.006	0.009	0.007	0.014	< 0.005
Mercury	0.001	mg/L	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel	0.02	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.001	< 0.001
Selenium	0.01	mg/L	0.001				--	--				
Zinc		mg/L	0.005	0.61	0.42	0.021	0.046	0.017	1.9	0.064	0.044	0.051

Concentration in **blue** font and grey box exceed the NHMRC Australian Drinking Water Guideline

[A]NRMMC (2011 updated 2018) Australian Drinking Water Guidelines (ADWG) Paper 6 National Water Quality Management Strategy. National Health and Medical Research Council.

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Rail Corridor and Tarago Area DSI
23-07-20

Table 3:
Tarago Area DSI - Discrete Properties Rainwater Tank Water Results

	NHMRC Australian Drinking Water Guidelines[A]			Sample Type:	Tank Water	Tank Water	Tank Water	Tank Water	Tank Water	Tank Water	Tank Water	Tank Water
				Site:	P25	P26	P26	P27	P28	P28	P28	P31
				Lab Sample number:	S20-Ap09765	S20-Ap09880	S20-Jn09814	S20-Ap09733	S20-Ap09691	S20-Ap09692	S20-Ap09693	S20-Ap09848
				Sample date:	01-04-20	01-04-20	05-06-20	01-04-20	01-04-20	01-04-20	01-04-20	02-04-20
				Sample ID:	P25_TW2	P26_TW1	P26_TW1A	P27_TW1	P28_TW1	P28_TW2	P28_TW3	P31_TW1
				Project Name:	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
				Sampling Method:	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon
Analyte grouping/Analyte		**Units**	**LOR**									
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS												
Aluminium		mg/L		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.12	< 0.05	< 0.05
Arsenic	0.01	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Barium	2	mg/L		< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Beryllium	0.06	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Boron		mg/L	0.05								
Cadmium	0.002	mg/L	0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chromium	0.05	mg/L	0.001	0.001	0.001	< 0.001	0.002	0.002	0.002	< 0.001	0.001
Cobalt		mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Copper	2	mg/L	0.001	0.002	< 0.001	< 0.001	< 0.001	0.002	0.004	0.002	0.002
Iron		mg/L		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Lead	0.01	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Manganese	0.5	mg/L	0.005	0.017	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.008	< 0.005
Mercury	0.001	mg/L	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel	0.02	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Selenium	0.01	mg/L	0.001								
Zinc		mg/L	0.005	0.044	0.063	0.078	0.057	0.13	0.061	0.22	0.037

Concentration in **blue** font and grey box exceed the NHMRC Australian Drinking Water Guideline

[A]NRMMC (2011 updated 2018) Australian Drinking Water Guidelines (ADWG) Paper 6 National Water Quality Management Strategy. National Health and Medical Research Council.

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Rail Corridor and Tarago Area DSI
23-07-20

Table 3:
Tarago Area DSI - Discrete Properties Rainwater Tank Water Results

	NHMRC Australian Drinking Water Guidelines[A]	Sample Type:	Tank Water	Tank Water	Tank Water	Tank Water	Tank Water	Tank Water
		Site:	**P31**	**P31**	**P32**	**P32**	**P32**	**P32**
		Lab Sample number:	S20-Ap09849	S20-Ap09850	S20-Ap09659	S20-Ap09657	S20-Ap09658	S20-Ap09657
		Sample date:	02-04-20	02-04-20	02-05-20	02-05-20	02-05-20	02-04-20
		Sample ID:	P31_TW2	P31_TW3	P32_BORE	P32_TW1	P32_TW2	P32_TW1
		Project Name:	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
		Sampling Method:	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon
Analyte grouping/Analyte		**Units**	**LOR**					
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS								
Aluminium		mg/L		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Arsenic	0.01	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Barium	2	mg/L		< 0.02	< 0.02	0.06	< 0.02	< 0.02	< 0.02
Beryllium	0.06	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Boron		mg/L	0.05						
Cadmium	0.002	mg/L	0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chromium	0.05	mg/L	0.001	0.003	0.001	0.002	< 0.001	0.001	< 0.001
Cobalt		mg/L	0.001	0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Copper	2	mg/L	0.001	0.005	0.006	< 0.001	0.002	< 0.001	0.002
Iron		mg/L		< 0.05	< 0.05	11	< 0.05	< 0.05	< 0.05
Lead	0.01	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Manganese	0.5	mg/L	0.005	0.009	0.021	0.13	< 0.005	< 0.005	< 0.005
Mercury	0.001	mg/L	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel	0.02	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Selenium	0.01	mg/L	0.001						
Zinc		mg/L	0.005	0.066	0.51	0.006	0.015	0.019	0.015

Concentration in **blue** font and grey box exceed the NHMRC Australian Drinking Water Guideline

[A]NRMMC (2011 updated 2018) Australian Drinking Water Guidelines (ADWG) Paper 6 National Water Quality Management Strategy. National Health and Medical Research Council.

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Rail Corridor and Tarago Area DSI
23-07-20

Table 3:
Tarago Area DSI - Discrete Properties Rainwater Tank Water Results

	NHMRC Australian Drinking Water Guidelines[A]			Sample Type:	Tank Water	Tank water	Tank water	Tank Water	Tank Water	Tank Water	Tank Water	Tank Water	Tank Water
				Site:	P32	P33	P33	P34	P35	P35	P36	P36	P37
				Lab Sample number:	S20-Ap09658	S20-My00643	S20-My00644	S20-My01488	S20-My01750	S20-My01751	S20-My00614	S20-My00615	S20-My01791
				Sample date:	02-04-20	24-04-20	24-04-20	28-04-20	28-04-20	28-04-20	28-04-20	28-04-20	29-04-20
				Sample ID:	P32_TW2	P33_TW1	P33_TW2	P34_TW1	P35_TW1	P35_TW2	P36_TW1	P36_TW2	P37_TW1
				Project Name:	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
				Sampling Method:	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon
Analyte grouping/Analyte		**Units**	**LOR**										
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS													
Aluminium		mg/L		< 0.05	< 0.05	0.13	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Arsenic	0.01	mg/L	0.001	< 0.001	< 0.001	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Barium	2	mg/L		< 0.02	< 0.02	< 0.02	0.03	0.02	< 0.02	0.04	0.03	< 0.02
Beryllium	0.06	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Boron		mg/L	0.05							< 0.0002	< 0.0002	
Cadmium	0.002	mg/L	0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002			< 0.0002
Chromium	0.05	mg/L	0.001	0.001	0.001	0.005	0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Cobalt		mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Copper	2	mg/L	0.001	< 0.001	< 0.001	0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.004	0.002
Iron		mg/L		< 0.05	< 0.05	0.07	0.14	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Lead	0.01	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Manganese	0.5	mg/L	0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Mercury	0.001	mg/L	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel	0.02	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Selenium	0.01	mg/L	0.001									
Zinc		mg/L	0.005	0.019	0.035	< 0.005	0.031	0.016	0.014	< 0.005	0.008	0.039

Concentration in **blue** font and grey box exceed the NHMRC Australian Drinking Water Guideline

[A]NRMMC (2011 updated 2018) Australian Drinking Water Guidelines (ADWG) Paper 6 National Water Quality Management Strategy. National Health and Medical Research Council.

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Rail Corridor and Tarago Area DSI
23-07-20

Table 3:
Tarago Area DSI - Discrete Properties Rainwater Tank Water Results

	NHMRC Australian Drinking Water Guidelines[A]			Sample Type:	Tank Water	Tank Water	Tank Water	Tank Water	Tank Water	Tank Water	Tank Water	Tank Water	Tank Water
				Site:	P37	P38	P38	P39	P39	SMC	Tarago P.S.	Tarago P.S.	Tarago P.S.
				Lab Sample number:	S20-My01792	S20-My01771	S20-My01772	S20-My00975	S20-My00977	M20-Ma44098	S20-My00663	S20-My00664	S20-My00665
				Sample date:	29-04-20	29-04-20	29-04-20			24-03-20	30-04-20	30-04-20	30-04-20
				Sample ID:	P37_TW2	P38_TW1	P38_TW2	P39_TW1	P39_TW2	SMC_TW1	SCHOOL_TW1	SCHOOL_TW2	SCHOOL_TW3
				Project Name:	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
				Sampling Method:	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon
Analyte grouping/Analyte		**Units**	**LOR**										
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS													
Aluminium		mg/L		< 0.05	< 0.05	< 0.05	0.05	< 0.05	--	< 0.05	< 0.05	< 0.05
Arsenic	0.01	mg/L	0.001	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Barium	2	mg/L		< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	--	< 0.02	< 0.02	< 0.02
Beryllium	0.06	mg/L	0.001	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Boron		mg/L	0.05						< 0.05			
Cadmium	0.002	mg/L	0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chromium	0.05	mg/L	0.001	0.001	0.003	0.002	0.001	0.001	0.002	< 0.001	< 0.001	< 0.001
Cobalt		mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Copper	2	mg/L	0.001	0.003	< 0.001	< 0.001	0.008	< 0.001	0.001	< 0.001	< 0.001	< 0.001
Iron		mg/L		< 0.05	< 0.05	< 0.05	< 0.05	0.05	--	< 0.05	< 0.05	< 0.05
Lead	0.01	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.007	0.004	< 0.001	< 0.001	< 0.001
Manganese	0.5	mg/L	0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.029	0.028	0.023
Mercury	0.001	mg/L	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel	0.02	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.002	< 0.001	< 0.001	< 0.001
Selenium	0.01	mg/L	0.001						< 0.001			
Zinc		mg/L	0.005	0.046	0.14	0.17	0.14	0.064	0.069	0.056	0.053	0.088

Concentration in **blue** font and grey box exceed the NHMRC Australian Drinking Water Guideline

[A]NRMMC (2011 updated 2018) Australian Drinking Water Guidelines (ADWG) Paper 6 National Water Quality Management Strategy. National Health and Medical Research Council.

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Rail Corridor and Tarago Area DSI
23-07-20

Table 4:
Tarago Area DSI - Discrete Properties Rainwater Tank Sediment Results

	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space										
Sample Type:					**Sediment**	**Sediment**	**Sediment**	**Sediment**	**Sediment**	**Sediment**	**Sediment**	**Sediment**
Site:					**P1**	**P3**	**P4**	**P6**	**P7**	**P10**	**P10**	**P10**
Lab Sample number:					S20-Jn00670	S20-Ap02118	M20-Ma43684	S20-Ap02120	S20-Ma44426	S20-My01304	S20-Jn00675	S20-Jn00676
Sample date:					31-05-20	26-03-20	24-03-20	25-03-20	25-03-20	25-03-20	31-05-20	31-05-20
Sample ID:					P1_T1SED	P3_TWS2	P2*_TWS1	P6_TWS1	P7_TWS2	P10_BORETANKSED	P10_T1SED	P10_T2SED
Project Name:					Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
Sampling Method:					Micropurge/Syphon	Micropurge/Syphon	Micropurge/Syphon	Micropurge/Syphon	Micropurge/Syphon	Micropurge/Syphon	Micropurge/Syphon	Micropurge/Syphon
Analyte grouping/Analyte			**Units**	**LOR**								
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS												
Aluminium			mg/kg	10	--	--	--	--	--	--	--	--
Arsenic	100	300	mg/kg	2	**410**	--	--	--	--	--	4	3
Barium			mg/kg	10	--	--	--	--	--	--	--	--
Beryllium	70	90	mg/kg	2	17	--	--	--	--	--	< 2	< 2
Boron	5000		mg/kg	5	460	--	--	--	--	--	12	34
Cadmium	20	90	mg/kg	0.4	31	--	--	--	--	--	< 0.4	< 0.4
Chromium		300	mg/kg	5	--	--	--	--	--	--	--	--
Cobalt	100	300	mg/kg	5	170	--	--	--	--	--	< 5	< 5
Copper	7000	17000	mg/kg	5	4,900	--	--	--	--	--	8	30
Iron			mg/kg	20	--	--	--	--	--	--	--	--
Lead	300	600	mg/kg	5	**8,700**	--	--	96	100	47	11	64
Manganese	3000	19000	mg/kg	5	6,100	--	--	--	--	--	180	70
Mercury	200	80	mg/kg	0.1	6	--	--	--	--	--	< 0.1	< 0.1
Nickel	400	1200	mg/kg	5	500	--	--	--	--	--	< 5	< 5
Selenium	200		mg/kg	2	45	--	--	--	--	--	< 2	< 2
Zinc	8000	30000	mg/kg	10	16,000	--	--	--	--	--	62	220
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS												
Lead			mg/L	0.001	--	0.9	3.3	1	--	--	--	--

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Concentrations in box exceed the screening value >2.5 times

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Rail Corridor and Tarago Area DSI
23-07-20

Table 4:
Tarago Area DSI - Discrete Properties Rainwater Tank Sediment Results

	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space										
Sample Type:					Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
Site:					P11	P11	P12	P12	P14	P17	P18	P18
Lab Sample number:					S20-Ma44010	S20-Ma44011	S20-Ma44143	S20-Ma44144	S20-Ma44060	S20-Ap02895	S20-Ap02951	S20-Ap02952
Sample date:					26-03-20	26-03-20	26-03-20	26-03-20	26-03-20	30-03-20	31-03-20	31-03-20
Sample ID:					P11_TWS1	P11_TWS2	P12_TWS1	P12_TWS2	P14_TWS3	P17_TWS2	P18_TWS1	P18_TWS2
Project Name:					Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
Sampling Method:					Micropurge/Syphon	Micropurge/Syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon
Analyte grouping/Analyte			**Units**	**LOR**								
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS												
Aluminium			mg/kg	10	--	--	--	--	--	--	--	--
Arsenic	100	300	mg/kg	2	--	--	--	--	--	--	--	--
Barium			mg/kg	10	--	--	--	--	--	--	--	--
Beryllium	70	90	mg/kg	2	--	--	--	--	--	--	--	--
Boron	5000		mg/kg	5	--	--	--	--	--	--	--	--
Cadmium	20	90	mg/kg	0.4	--	--	--	--	--	--	--	--
Chromium		300	mg/kg	5	--	--	--	--	--	--	--	--
Cobalt	100	300	mg/kg	5	--	--	--	--	--	--	--	--
Copper	7000	17000	mg/kg	5	--	--	--	--	--	--	--	--
Iron			mg/kg	20	--	--	--	--	--	--	--	--
Lead	300	600	mg/kg	5	590	47	--	--	--	87	280	110
Manganese	3000	19000	mg/kg	5	--	--	--	--	--	--	--	--
Mercury	200	80	mg/kg	0.1	--	--	--	--	--	--	--	--
Nickel	400	1200	mg/kg	5	--	--	--	--	--	--	--	--
Selenium	200		mg/kg	2	--	--	--	--	--	--	--	--
Zinc	8000	30000	mg/kg	10	--	--	--	--	--	--	--	--
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS												
Lead			mg/L	0.001	4.8	0.6	0.18	2.8	0.13	--	7.6	0.44

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23-07-20

Table 4:
Tarago Area DSI - Discrete Properties Rainwater Tank Sediment Results

	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space			Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
Site:					**P19**	**P21**	**P21**	**P23**	**P24**	**P24**	**P25**	**P25**
Lab Sample number:					S20-Ap13757	S20-Ap03014	S20-Ap03015	S20-Ap03100	P24_TWS1	P24_TWS2	S20-Ap09766	S20-Ap09767
Sample date:					31-03-20	31-03-20	31-03-20	31-03-20	01-04-20	01-04-20	01-04-20	01-04-20
Sample ID:					P19_TWS1	P21_TWS1	P21_TWS2	P23_TWS1	S20-Ap09836	S20-Ap09837	P25_TWS1	P25_TWS2
Project Name:					Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
Sampling Method:					Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon
Analyte grouping/Analyte			**Units**	**LOR**								
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS												
Aluminium			mg/kg	10	--	--	--	--	--	--	--	--
Arsenic	100	300	mg/kg	2	--	--	--	--	--	--	--	--
Barium			mg/kg	10	--	--	--	--	--	--	--	--
Beryllium	70	90	mg/kg	2	--	--	--	--	--	--	--	--
Boron	5000		mg/kg	5	--	--	--	--	--	--	--	--
Cadmium	20	90	mg/kg	0.4	--	--	--	--	--	--	--	--
Chromium		300	mg/kg	5	--	--	--	--	--	--	--	--
Cobalt	100	300	mg/kg	5	--	--	--	--	--	--	--	--
Copper	7000	17000	mg/kg	5	--	--	--	--	--	--	--	--
Iron			mg/kg	20	--	--	--	--	--	--	--	--
Lead	300	600	mg/kg	5	--	--	--	--	40	**8100**	**4300**	71
Manganese	3000	19000	mg/kg	5	--	--	--	--	--	--	--	--
Mercury	200	80	mg/kg	0.1	--	--	--	--	--	--	--	--
Nickel	400	1200	mg/kg	5	--	--	--	--	--	--	--	--
Selenium	200		mg/kg	2	--	--	--	--	--	--	--	--
Zinc	8000	30000	mg/kg	10	--	--	--	--	--	--	--	--
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS												
Lead			mg/L	0.001	0.15	2.1	0.76	1.4	0.069	0.16	0.16	0.24

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Project Name: Tarago Rail Corridor and Tarago Area DSI
23-07-20

Table 4:
Tarago Area DSI - Discrete Properties Rainwater Tank Sediment Results

	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space			Sample Type:	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
					Site:	P26	P27	P28	P28	P28	P31	P31	P31
					Lab Sample number:	S20-Jn09815	S20-Ap09734	S20-Ap09694	S20-Ap09695	S20-Ap09696	S20-Ap09851	S20-Ap09852	S20-Ap09853
					Sample date:	05-06-20	01-04-20	01-04-20	01-04-20	01-04-20	02-04-20	02-04-20	02-04-20
					Sample ID:	P26_TWS1A	P27_TWS1	P28_TWS1	P28_TWS2	P28_TWS3	P31_TWS1	P31_TWS2	P31_TWS3
					Project Name:	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
					Sampling Method:	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon
Analyte grouping/Analyte				**Units**	**LOR**								
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS													
Aluminium				mg/kg	10	--	--	--	--	--	--	--	--
Arsenic	100	300		mg/kg	2	--	--	--	--	--	--	--	--
Barium				mg/kg	10	--	--	--	--	--	--	--	--
Beryllium	70	90		mg/kg	2	--	--	--	--	--	--	--	--
Boron	5000			mg/kg	5	--	--	--	--	--	--	--	--
Cadmium	20	90		mg/kg	0.4	--	--	--	--	--	--	--	--
Chromium		300		mg/kg	5	--	--	--	--	--	--	--	--
Cobalt	100	300		mg/kg	5	--	--	--	--	--	--	--	--
Copper	7000	17000		mg/kg	5	--	--	--	--	--	--	--	--
Iron				mg/kg	20	--	--	--	--	--	--	--	--
Lead	300	600		mg/kg	5	69	**1000**	72	110	33	97	120	110
Manganese	3000	19000		mg/kg	5	--	--	--	--	--	--	--	--
Mercury	200	80		mg/kg	0.1	--	--	--	--	--	--	--	--
Nickel	400	1200		mg/kg	5	--	--	--	--	--	--	--	--
Selenium	200			mg/kg	2	--	--	--	--	--	--	--	--
Zinc	8000	30000		mg/kg	10	--	--	--	--	--	--	--	--
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS													
Lead				mg/L	0.001	--	0.21	36	1.1	0.19	4.3	18	7

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Project Name: Tarago Rail Corridor and Tarago Area DSI
23-07-20

Table 4:
Tarago Area DSI - Discrete Properties Rainwater Tank Sediment Results

	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space			Sample Type:	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
					Site:	P32	P32	P33	P33	P35	P35	P37	P38
					Lab Sample number:	S20-Ap09662	S20-Ap09662	S20-My00645	S20-My00646	S20-My01752	S20-My01753	S20-My01793	S20-My01773
					Sample date:	02-04-20	02-05-20	24-04-20	24-04-20	28-04-20	28-04-20	29-04-20	29-04-20
					Sample ID:	P32_TWS2	P32_TWS2	P33_TWS1	P33_TWS2	P35_TWS1	P35_TWS2	P37_TWS2	P38_TWS1
					Project Name:	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
					Sampling Method:	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon
Analyte grouping/Analyte				**Units**	**LOR**								
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS													
Aluminium				mg/kg	10	--	--	--	--	--	--	--	--
Arsenic	100	300		mg/kg	2	--	--	--	--	--	--	--	--
Barium				mg/kg	10	--	--	--	--	--	--	--	--
Beryllium	70	90		mg/kg	2	--	--	--	--	--	--	--	--
Boron	5000			mg/kg	5	--	--	--	--	--	--	--	--
Cadmium	20	90		mg/kg	0.4	--	--	--	--	--	--	--	--
Chromium		300		mg/kg	5	--	--	--	--	--	--	--	--
Cobalt	100	300		mg/kg	5	--	--	--	--	--	--	--	--
Copper	7000	17000		mg/kg	5	--	--	--	--	--	--	--	--
Iron				mg/kg	20	--	--	--	--	--	--	--	--
Lead	300	600		mg/kg	5	120	--	94	37	260	210	76	120
Manganese	3000	19000		mg/kg	5	--	--	--	--	--	--	--	--
Mercury	200	80		mg/kg	0.1	--	--	--	--	--	--	--	--
Nickel	400	1200		mg/kg	5	--	--	--	--	--	--	--	--
Selenium	200			mg/kg	2	--	--	--	--	--	--	--	--
Zinc	8000	30000		mg/kg	10	--	--	--	--	--	--	--	--
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS													
Lead				mg/L	0.001	0.21	0.21	--	--	--	--	--	--

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23-07-20

Table 4:
Tarago Area DSI - Discrete Properties Rainwater Tank Sediment Results

	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space			Sample Type:	Sediment	Sediment	Sediment	Sediment	Sediment
					Site:	P38	P39	P39	SMC	Tarago P.S.
					Lab Sample number:	S20-My01774	S20-My00976	S20-My00978	M20-Ma44121	S20-My00666
					Sample date:	29-04-20			23-03-20	30-04-20
					Sample ID:	P38_TWS2	P39_TWS1	P39_TWS2	SMCTW2	SCHOOL_TWS3
					Project Name:	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
					Sampling Method:	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon	Micropurge/syphon
Analyte grouping/Analyte				**Units**	**LOR**					
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS										
Aluminium				mg/kg	10	--	15,000	9,600	--	--
Arsenic	100	300		mg/kg	2	--	5	4	--	--
Barium				mg/kg	10	--	43	37	--	--
Beryllium	70	90		mg/kg	2	--	1	1	--	--
Boron	5000			mg/kg	5	--	--	--	--	--
Cadmium	20	90		mg/kg	0.4	--	0	2	--	--
Chromium		300		mg/kg	5	--	35	60	--	--
Cobalt	100	300		mg/kg	5	--	3	4	--	--
Copper	7000	17000		mg/kg	5	--	180	56	--	--
Iron				mg/kg	20	--	16,000	18,000	--	--
Lead	300	600		mg/kg	5	92	160	**1,100**	**9100**	120
Manganese	3000	19000		mg/kg	5	--	130	250	--	--
Mercury	200	80		mg/kg	0.1	--	0	0	--	--
Nickel	400	1200		mg/kg	5	--	9	15	--	--
Selenium	200			mg/kg	2	--	--	--	--	--
Zinc	8000	30000		mg/kg	10	--	410	1,800	--	--
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS										
Lead				mg/L	0.001	--			--	

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Project Name: Tarago Rail Corridor and Tarago Area DSI
23-07-20

Table 5:
Tarago Area DSI - Discrete Properties Dust Results

	Dust Interior – Floors (Residential)[A]	Dust Interior – Window Sills and Shelves (Residential)[A]	Dust Interior – Floors (commercial)[B]	Dust Interior – Window Sills and Shelves (Commercial)[B]	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space	Sample Type:		Dust	Dust	Dust	Dust	Dust	Dust
							Site:		P1	P1	P1	P1	P1	P1
							Lab Sample number:		M20-Ap03788	M20-Ap03789	M20-Ap03790	M20-Ap03791	M20-Ap03792	M20-Ap03793
							Sample date:		24-03-20	24-03-20	24-03-20	24-03-20	24-03-20	24-03-20
							Sample ID:		DGrab-MH(17W)	DGrab-MH2(17W)	DSwab-BE(17W)	DSwab-DA(17W)	DSwab-FW(17W)	DSwab-TV(17W)
							Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
							Sampling Method:		Vacuum	Vacuum	Swab	Swab	Swab	Swab
Analyte grouping/Analyte							**Units**	**LOR**						
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS														
Lead					300	600	mg/kg	5	230	240	--	--	--	--
Total Lead							Total µg	1	--	--	4.6	2.3	520	2.2
Lead Loading														
Sample Area							m²	NA	--	--	0.09	0.09	0.1855	0.09
Sample Mass							g		--	--	--	--	--	--
Lead Loading	108	1076	1000	5000			µg/m²	NA	--	--	51.11111111	25.55555556	2803.234501	24.44444444

LOR = Limit of Reporting

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

Concentration in **red** font and grey box exceed the adopted residential dust criteria

Concentration in **orange** font and grey box exceed the adopted commercial dust criteria (Applicable for P2, P6, P9, P11 & Tarago Staion only)

Concentrations in box exceed the screening value >2.5 times

Where one or more guideline value is exceeded, the highest guideline exceeded will be highlighted

[A]USEPA (2020) Protect your family from lead in your home. US Environmental Protection Agency – January 2020.

[B]AS 4361.2-1998 Guide to lead paint management - Residential and commercial buildings.

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	Dust Interior – Floors (Residential)[A]	Dust Interior – Window Sills and Shelves (Residential)[A]	Dust Interior – Floors (commercial)[B]	Dust Interior – Window Sills and Shelves (Commercial)[B]	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space	Dust	Dust	Dust	Dust	Dust	Dust	Dust	Dust
							P1	P1	P3	P3	P3	P3	P3	P3
							M20-Ap03794	M20-Ap03795	S20-Ap02130	S20-My01256	S20-My01260	S20-My01257	S20-My01261	S20-Ap02127
							24-03-20	24-03-20	25-03-20	27-04-20	27-04-20	27-04-20	27-04-20	25-03-20
							DVAC-BR1(17W)	DVAC-LR(17W)	DSWAB_FE (P3)	DSWAB_FE(P3)	DSWAB_FE(P3)	DSWAB_KE(P3)	DSWAB_KE(P3)	DSWAB_RE (P3)
							Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
							Vacuum	Vacuum	SWAB	SWAB	SWAB	SWAB	SWAB	SWAB
Analyte grouping/Analyte														
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS														
Lead					300	600	89	24						
Total Lead							--	--	28	18	13	9.2	5.8	9.2
Lead Loading														
Sample Area							2	--	0.09	0.09	0.09	0.09	0.09	0.09
Sample Mass							8.675	--						
Lead Loading	108	1076	1000	5000			386.0375	--	311.1111111	200	144.4444444	102.2222222	64.44444444	102.2222222

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	Dust Interior – Floors (Residential)[A]	Dust Interior – Window Sills and Shelves (Residential)[A]	Dust Interior – Floors (commercial)[B]	Dust Interior – Window Sills and Shelves (Commercial)[B]	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space	Dust	Dust	Dust	Dust	Dust	Dust	Dust	Dust
							P3	P3	P3	P3	P3	P3	P3	P4
							S20-Ap02128	S20-My01258	S20-My01262	S20-Ap02129	S20-My01259	S20-My01263	S20-Ap02148	S20-My01435
							25-03-20	27-04-20	27-04-20	25-03-20	27-04-20	27-04-20	25-03-20	29-04-20
							DSWAB_SE (P3)	DSWAB_SE(P3)	DSWAB_SE(P3)	DSWAB_WIN (P3)	DSWAB_WIN(P3)	DSWAB_WIN(P3)	DVAC_MH(P3)	DSWAB_BE(P4)
							Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
							SWAB	SWAB	SWAB	SWAB	SWAB	SWAB	Vacuum	SWAB
Analyte grouping/Analyte														
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS														
Lead					300	600							450	
Total Lead							110	79	12	31	10	2.4		4.8
Lead Loading														
Sample Area							0.09	0.09	0.09	0.09	0.09	0.09	4	0.09
Sample Mass													1.742	
Lead Loading	108	1076	1000	5000			1222.222222	877.7777778	133.3333333	344.4444444	111.1111111	26.66666667	195.975	53.33333333

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Project Name: Tarago Rail Corridor and Tarago Area DSI
23-07-20

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							P4	P4	P4	P4	P4	P5	P5	P5
							S20-My01436	S20-My01437	S20-My01438	S20-My01434	S20-My01433	M20-Ap02131	M20-Ap02133	S20-Ap02152
							29-04-20	29-04-20	29-04-20	29-04-20	29-04-20			
							DSWAB_FE(P4)	DSWAB_MH(P4)	DSWAB_WIN(P4)	DVAC_KB(P4)	DVAC_LR(P4)	DSWAB_BC (PS)	DSWAB_KA (PS)	DVAC-BE(PS)
							Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
							SWAB	SWAB	SWAB	Vacuum	Vacuum	SWAB	SWAB	Vacuum
												shelf	Hard floor	Carpet floor
Analyte grouping/Analyte														
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS														
Lead					300	600				53	11			52
Total Lead							3.2	120	60			13	1.7	
Lead Loading														
Sample Area							0.09	0.286	0.06	2	2	0.09	0.09	2
Sample Mass										1.042	4.101			9.922
Lead Loading	108	1076	1000	5000			35.55555556	419.5804196	1000	27.613	22.5555	144.4444444	18.88888889	257.972

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							P5	P5	P5	P5	P5	P5	P5	P5
							M20-Ap02149	M20-Ap02150	M20-Ap02151	S20-My27000	S20-My27001	S20-My27002	S20-My27003	S20-My27004
							DVAC-FE(PS)	DVAC-LA(PS)	DVAC-WPS(PS)	DSWAB_1 (PS)	DSWAB_2 (PS)	DSWAB_3 (PS)	DSWAB_4 (PS)	DSWAB_5 (PS)
							Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
							Vacuum	Vacuum	Vacuum	SWAB	SWAB	SWAB	SWAB	SWAB
							Carpet floor	Carpet floor	whole area					
Analyte grouping/Analyte														
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS														
Lead					300	600	78	74	17	-	-	-	-	-
Total Lead										2.1	1.2	1.4	1.3	2.1
Lead Loading														
Sample Area							0.975	1	1	0.09	0.09	0.09	0.09	0.09
Sample Mass							9.34	7.614	3.604	-	-	-	-	-
Lead Loading	108	1076	1000	5000			747.2	563.436	61.268	23.33333333	13.33333333	15.55555556	14.44444444	23.33333333

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							P5	P5	P5	P5	P5	P5	P5	P5
							S20-My27005	S20-My27006	S20-My27007	S20-My27000	S20-My27001	S20-My27002	S20-My27003	S20-My27004
										18-05-20	18-05-20	18-05-20	18-05-20	18-05-20
							DSWAB_6 (PS)	DSWAB_7 (PS)	DSWAB_8 (PS)	DSWAB_1 (PS)	DSWAB_2 (PS)	DSWAB_3 (PS)	DSWAB_4 (PS)	DSWAB_5 (PS)
							Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
							SWAB	SWAB	SWAB	SWAB	SWAB	SWAB	SWAB	SWAB
Analyte grouping/Analyte														
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS														
Lead					300	600	-	-	-					
Total Lead							5.4	1.1	1.6	2.1	1.2	1.4	1.3	2.1
Lead Loading														
Sample Area							0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Sample Mass							-	-	-	-	-	-	-	-
Lead Loading	108	1076	1000	5000			60	12.22222222	17.77777778	23.33333333	13.33333333	15.55555556	14.44444444	23.33333333

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							P5	P5	P5	P7	P7	P7	P7	P7
							S20-My27005	S20-My27006	S20-My27007	S20-My01121	S20-My01119	S20-My01120	S20-My01118	S20-My01117
							18-05-20	18-05-20	18-05-20	29-04-20	29-04-20	29-04-20	29-04-20	29-04-20
							DSWAB_6 (PS)	DSWAB_7 (PS)	DSWAB_8 (PS)	DGRAB_MH(P7)	DSWAB_BE(P7)	DSWAB_FE(P7)	DVAC_KB(P7)	DVAC_LR(P7)
							Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
							SWAB	SWAB	SWAB	SWAB	SWAB	SWAB	Vacuum	Vacuum
Analyte grouping/Analyte														
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS														
Lead					300	600				61			25	41
Total Lead							5.4	1.1	1.6		2.6	1.2		
Lead Loading														
Sample Area							0.09	0.09	0.09		0.09	0.09	2	2
Sample Mass							-	-	-	1.523			1.403	0.57
Lead Loading	108	1076	1000	5000			60	12.22222222	17.77777778		28.88888889	13.33333333	17.5375	11.685

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							P9	P9	P9	P9	P9	P10	P10	P10
							S20-Ma44388	S20-Ma44391	S20-Ma44387	S20-Ma44389	S20-Ma44390	S20-My01299	S20-My01300	S20-My01297
							25-03-20	25-03-20	25-03-20	25-03-20	25-03-20	28-04-20	28-04-20	28-04-20
							DSWAB_BE(F9)	DSWAB_BS(P9)	DSWAB_FE(F9)	DSWAB_KF(F9)	DVAC_MA(P9)	DSWAB_BE(P10)	DSWAB_FE(P10)	DSWAB_MH(P10)
							Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
							Swab	Swab	Swab	Swab	Vacuum Dust	Swab	Swab	Swab
Analyte grouping/Analyte														
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS														
Lead					300	600	--	--	--	--	38			
Total Lead							11	210	9.4	8.4	--	2.1	1.9	11
Lead Loading														
Sample Area							0.09	0.09	0.09	0.09	2	0.09	0.09	0.33
Sample Mass							--	--	--	--	28.492			
Lead Loading	108	1076	1000	5000			122.2222222	2333.333333	104.4444444	93.33333333	541.348	23.33333333	21.11111111	33.33333333

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							P10	P10	P11	P11	P11	P11	P11	P14
							S20-My01301	S20-My01298	S20-Ma44013	S20-Ma44015	S20-Ma44016	S20-Ma44014	S20-Ma44012	S20-My00997
							28-04-20	28-04-20	26-03-20	26-03-20	26-03-20	26-03-20	26-03-20	29-04-20
							DVAC_KB(P10)	DVAC_LR(P10)	DSWAB_FE(P11)	DSWAB_KC(P11)	DSWAB_OD(P11)	DSWAB_TC(P11)	DVAC_MA(P11)	DSWAB_BE(P14)
							Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
							Vacuum	Vacuum	Swab	Swab	Swab	Swab	Vacuum	SWAB
Analyte grouping/Analyte														
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS														
Lead					300	600	21	46	--	--	--	--	180	
Total Lead									20	17	24	76	--	< 1
Lead Loading														
Sample Area							9.18	2	0.09	0.09	0.09	0.09	2	0.09
Sample Mass							1.043	1.274	--	--	--	--	12	
Lead Loading	108	1076	1000	5000			2.385947712	29.302	222.2222222	188.8888889	266.6666667	844.4444444	1080	< 11.11

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							P14	P14	P14	P14	P14	P17	P17	P17
							S20-My00998	S20-My00999	S20-My01000	S20-My00995	S20-My00996	S20-My00956	S20-My00955	S20-My00958
							29-04-20	29-04-20	29-04-20	29-04-20	29-04-20	30-04-20	30-04-20	30-04-20
							DSWAB_FE(P14)	DSWAB_MH(P14)	DSWAB_SE(P14)	DVAC_LR(P14)	DVAC_MB(P14)	DSWAB_AC(P17)	DSWAB_BE(P17)	DSWAB_FE(P17)
							Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
							SWAB	SWAB	SWAB	Vacuum	Vacuum	SWAB	SWAB	SWAB
Analyte grouping/Analyte														
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS														
Lead					300	600				19	28			
Total Lead							1.1	9.9	1.9			39	1.6	1
Lead Loading														
Sample Area							0.09	0.09	0.09	2	2	0.09	0.09	0.09
Sample Mass										1.066	1.353			
Lead Loading	108	1076	1000	5000			12.22222222	110	21.11111111	10.127	18.942	433.3333333	17.77777778	11.11111111

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							P17	P17	P17	P17	P18	P18	P18	P18
							S20-My00959	S20-My00957	S20-My00954	S20-My00953	S20-My01071	S20-My01068	S20-My01069	S20-My01070
							30-04-20	30-04-20	30-04-20	30-04-20	30-04-20	30-04-20	30-04-20	30-04-20
							DSWAB_MH(P17)	DSWAB_WIN(P17)	DVAC_LR(P17)	DVAC_MBR(P17)	DSWAB_AC(P18)	DSWAB_BE(P18)	DSWAB_FE(P18)	DSWAB_MH(P18)
							Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
							SWAB	SWAB	Vacuum	Vacuum	SWAB	SWAB	SWAB	SWAB
Analyte grouping/Analyte														
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS														
Lead					300	600			77	66				
Total Lead							12	6			72	20	13	54
Lead Loading														
Sample Area							0.09	0.05	2	2	0.06	0.09	0.09	0.09
Sample Mass									1.043	3.362				
Lead Loading	108	1076	1000	5000			133.3333333	120	40.1555	110.946	1200	222.2222222	144.4444444	600

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							P18	P18	P26	P26	P26	P26	P26	P26
							S20-My01067	S20-My01066	S20-My01831	S20-My01832	S20-My01833	S20-My01834	S20-My01835	S20-My01836
							30-04-20	30-04-20	30-04-20	30-04-20	30-04-20	30-04-20	30-04-20	30-04-20
							DVAC_KB(P18)	DVAC_LR(P18)	DVAC_MBR(P26)	DVAC_LR(P26)	DSWAB_LE(P26)	DSWAB_WIN(P26)	DSWAB_FE(P26)	DSWAB_MH(P26)
							Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
							Vacuum	Vacuum	Vacuum	Vacuum	SWAB	SWAB	SWAB	SWAB
Analyte grouping/Analyte														
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS														
Lead					300	600	83	48	11	20				
Total Lead											< 1	7.5	1	1.3
Lead Loading														
Sample Area							2	2	2	1.5	0.09	0.12	0.09	0.06
Sample Mass							13.297	34.488	0.553	1.788				
Lead Loading	108	1076	1000	5000			551.8255	827.712	3.0415	23.84	<11.11	62.5	11.11111111	21.66666667

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							P26	P27	P27	P27	P27	P27	P27	P28
							S20-My01837	S20-My01273	S20-My01274	S20-My01272	S20-My01271	S20-My01275	S20-My01276	S20-My01110
							30-04-20	28-04-20	28-04-20	28-04-20	28-04-20	28-04-20	28-04-20	29-04-20
							DSWAB_BE(P26)	DSWAB_BE(P27)	DSWAB_FE(P27)	DSWAB_LE(P27)	DSWAB_MH(P27)	DVAC_KB(P27)	DVAC_RR(P27)	DSWAB_BE(P28)
							Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
							SWAB	SWAB	SWAB	SWAB	SWAB	Vacuum	Vacuum	SWAB
Analyte grouping/Analyte														
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS														
Lead					300	600						<5	42	
Total Lead							< 1	< 1	1.4	1.4	3.3			1.7
Lead Loading														
Sample Area							0.09	0.09	0.09	0.09	0.09	9	2	0.09
Sample Mass												1.258	0.89	
Lead Loading	108	1076	1000	5000			<11.11	<11.11	15.55555556	15.55555556	36.66666667	<0.7	18.69	18.88888889

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Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Rail Corridor and Tarago Area DSI
23-07-20

Table 5:
Tarago Area DSI - Discrete Properties Dust Results

	Dust Interior – Floors (Residential)[A]	Dust Interior – Window Sills and Shelves (Residential)[A]	Dust Interior – Floors (commercial)[B]	Dust Interior – Window Sills and Shelves (Commercial)[B]	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space	Dust	Dust	Dust	Dust	Dust	Dust	Dust
							P28	P28	P28	P28	P32	P32	P32
							S20-My01111	S20-My01112	S20-My01108	S20-My01109	S20-My01147	S20-My01145	S20-My01143
							29-04-20	29-04-20	29-04-20	29-04-20	30-04-20	30-04-20	30-04-20
							DSWAB_FE(P28)	DSWAB_MH(P28)	DVAC_LR(P28)	DVAC_MB(P28)	DGRAB_MH(P32)	DSWAB_AC(P32)	DSWAB_BE(P32)
							Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
							SWAB	SWAB	Vacuum	Vacuum	Direct	SWAB	SWAB
Analyte grouping/Analyte													
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS													
Lead					300	600			23	18	300		
Total Lead							5.7	4				17	4.5
Lead Loading													
Sample Area							0.09	0.3	2	2.25		0.09	0.09
Sample Mass									9.691	7.714	4.622		
Lead Loading	108	1076	1000	5000			63.33333333	13.33333333	111.4465	61.712		188.8888889	50

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							P32	**P32**	**P32**	**P32**	**P32**	**P32**	**P32**	**P32**
							S20-My01150	S20-My01149	S20-My01153	S20-My01144	S20-My01154	S20-My01152	S20-My01148	S20-My01141
							30-04-20	30-04-20	30-04-20	30-04-20	30-04-20	30-04-20	30-04-20	30-04-20
							DSWAB_BE(P32_T1)	DSWAB_BS(P32_T1)	DSWAB_BS(P32_T2	DSWAB_FE(P32)	DSWAB_ME(P32_T2	SWAB_WIN(P32_T2	SWAB_WS(P32_T1	DVAC_KB(P32)
							Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
							SWAB	SWAB	SWAB	SWAB	SWAB	SWAB	SWAB	Vacuum
Analyte grouping/Analyte														
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS														
Lead					300	600								140
Total Lead							23	7	15	3.8	26	33	17	
Lead Loading														
Sample Area							0.09	0.09	0.09	0.09	0.09	0.049	0.0603	9.62
Sample Mass														3.549
Lead Loading	108	1076	1000	5000			255.5555556	77.77777778	166.6666667	42.22222222	288.8888889	673.4693878	281.9237148	51.64864865

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							P32	P32	P33	P33	P33	P33	P33	P33
							S20-My01142	S20-My01151	S20-My00632	S20-My00630	S20-My00631	S20-My00629	S20-My00628	S20-My00627
							30-04-20	30-04-20	24-04-20	24-04-20	24-04-20	24-04-20	24-04-20	24-04-20
							DVAC_LR(P32)	DVAC_LR(P32_T1)	DGRAB_MH(P33)	DSWAB_BE(P33)	DSWAB_FE(P33)	DSWAB_LE(P33)	DVAC_KB(P33)	DVAC_LR(P33)
							Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
							Vacuum	Vacuum	Vacuum	SWAB	SWAB	SWAB	Vacuum	Vacuum
Analyte grouping/Analyte														
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS														
Lead					300	600	53	49					12	29
Total Lead									1	1	1.3	3.9		
Lead Loading														
Sample Area							2	2	0.3025	0.09	0.09	0.09	2	2
Sample Mass							9.286	0.39					1.76	5.596
Lead Loading	108	1076	1000	5000			246.079	9.555	3.305785124	11.11111111	14.44444444	43.33333333	10.56	81.142

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	Dust Interior – Floors (Residential)[A]	Dust Interior – Window Sills and Shelves (Residential)[A]	Dust Interior – Floors (commercial)[B]	Dust Interior – Window Sills and Shelves (Commercial)[B]	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space	Dust	Dust	Dust	Dust	Dust	Dust	Dust	Dust
							P34	P34	P34	P34	P35	P35	P35	P35
							S20-My01490	S20-My01489	S20-My01491	S20-My01492	S20-My01757	S20-My01756	S20-My01758	S20-My01759
							28-04-20	28-04-20	28-04-20	28-04-20	28-04-20	28-04-20	28-04-20	28-04-20
							DSWAB_BE(P34)	DSWAB_FE(P34)	DSWAB_MH(P34)	DVAC_BR(P34)	DSWAB_BE(P35)	DSWAB_FE(P35)	DSWAB_KC(P35)	DSWAB_MH(P35)
							Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
							SWAB	SWAB	SWAB	Vacuum	SWAB	SWAB	SWAB	SWAB
Analyte grouping/Analyte														
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS														
Lead					300	600				49				
Total Lead							15	9.7	3.1		< 1	1.5	2.9	38
Lead Loading														
Sample Area							0.09	0.09	0.0275	2	0.09	0.09	0.09	0.34
Sample Mass										0.56				
Lead Loading	108	1076	1000	5000			166.6666667	107.7777778	112.7272727	13.72	< 11.11	16.66666667	32.22222222	111.7647059

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							P35	P35	P37	P37	P37	P37	P37	P37
							S20-My01755	S20-My01754	S20-My01788	S20-My01789	S20-My01790	S20-My01787	S20-My01786	S20-My01785
							28-04-20	28-04-20	29-04-20	29-04-20	29-04-20	29-04-20	29-04-20	29-04-20
							DVAC_KB(P35)	DVAC_LR(P35)	DSWAB_BE(P37)	DSWAB_FE(P37)	DSWAB_MH(P37)	DSWAB_SE(P37)	DVAC_MBR(P37)	DVAC_LR(P37)
							Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
							Vacuum	Vacuum	SWAB	SWAB	SWAB	SWAB	Vacuum	Vacuum
Analyte grouping/Analyte														
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS														
Lead					300	600	31	35					37	35
Total Lead									3.4	26	13	3.7		
Lead Loading														
Sample Area							8.31	2	0.09	0.09	--	0.09	2	2
Sample Mass							0.554	1.216					2.586	4.981
Lead Loading	108	1076	1000	5000			2.066666667	21.28	37.77777778	288.8888889		41.11111111	47.841	87.1675

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							P38	P38	P38	P38	P38	P41	P41	P41
							S20-My01770	S20-My01768	S20-My01769	S20-My01767	S20-My01766	S20-My28577	S20-My28578	S20-My28579
							29-04-20	29-04-20	29-04-20	29-04-20	29-04-20			
							DGRAB_MH(P38)	DSWAB_BE(P38)	DSWAB_FE(P38)	DVAC_KB(P38)	DVAC_LR(P38)	P41_DSWAB_FE	P41_DSWAB_MBR	P41_DSWAB_KIT
							Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
							Vacuum	SWAB	SWAB	Vacuum	Vacuum	SWAB	SWAB	SWAB
Analyte grouping/Analyte														
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS														
Lead					300	600	< 5			13	20			
Total Lead								2.9	2.6			< 1	< 1	< 1
Lead Loading														
Sample Area							--	0.09	0.09	2.34	6.44	--	--	--
Sample Mass							2.491			0.413	0.33	--	--	--
Lead Loading	108	1076	1000	5000				32.22222222	28.88888889	2.294444444	1.02484472	--	--	--

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							P41	**P41**	**SMC**	**SMC**	**SMC**	**SMC**	**SMC**	**SMC**
							S20-My28580	S20-My28581	S20-Ma43350	S20-Ma43351	S20-Ma43352	S20-Ap02153	S20-Ma43353	S20-Ma43354
									23-03-20	23-03-20	23-03-20	23-03-20	23-03-20	23-03-20
							P41_DSWAB_SILL	P41_DSWAB_BE	DGRAB-MH(SMC)	DSWAB-BE(SMC)	DSWAB-FE(SMC)	DVAC-LR(SMC)	DVAC-WH(SMC)	DVAL-CP(SMC)
							Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
							SWAB	SWAB	Vacuum	Swab	Swab	Vacuum	Vacuum	Vacuum
Analyte grouping/Analyte														
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS														
Lead					300	600			**5100**	--	--	**540**	**11000**	**1100**
Total Lead							< 1	1	--	190	200	--	--	--
Lead Loading														
Sample Area							--	--	--	0.09	0.09	2	--	--
Sample Mass							--	--	--	--	--	6.57	--	--
Lead Loading	108	1076	1000	5000			--	--	--	**2111.111111**	**2222.222222**	**1773.9**	--	--

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	Dust Interior – Floors (Residential)[A]	Dust Interior – Window Sills and Shelves (Residential)[A]	Dust Interior – Floors (commercial)[B]	Dust Interior – Window Sills and Shelves (Commercial)[B]	NEPM 2013 HIL A Residential	NEPM 2013 HIL C Open Space	Dust	Dust	Dust	Dust	Dust	Dust	Dust	Dust
							SMC	SMC	SMC	SMC	SMC	SMC	SMC	SMC
							S20-Ma43355	S20-Jn00683	S20-Jn00684	S20-Jn00685	S20-Jn00686	S20-Jn00687	S20-Jn00688	S20-Jn00689
							24-03-20	31-05-20	31-05-20	31-05-20	31-05-20	31-05-20	31-05-20	31-05-20
							DVAL-KYAK(SMC)	SMC_SWAB_CDS	SMC_SWAB_COT	SMC_SWAB_PRINTE	SMC_SWAB_LOUNGE	SMC_SWAB_MAG	SMC_SWAB_LOUNGE	SMC_SWAB_BOOKS
							Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
							Vacuum	Swab	Swab	Swab	Swab	Swab	Swab	Swab
Analyte grouping/Analyte														
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS														
Lead					300	600	**1000**							
Total Lead							--	1	18	2	20	2	9	3
Lead Loading														
Sample Area							--	0.09	0.09	0.03	0.09	0.061275	0.09	0.09
Sample Mass							--							
Lead Loading	108	1076	1000	5000			--	6	200	60	222	36	97	37

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Analyte grouping/Analyte						
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS						
Lead					300	600
Total Lead						
Lead Loading						
Sample Area						
Sample Mass						
Lead Loading	108	1076	1000	5000		

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23-07-20

Table 6:
Tarago Area DSI - Discrete Properties Paint Results

	NSW EPA Lead in Paint guideline[A]	Sample Type:	Paint	Paint	Paint	Paint	Paint	Paint	Paint	Paint	Paint
		Site:	P12	P14	P18	P3	P32	P32	P32	P5	SMC
		Lab Sample number:	S20-Ma44159	S20-Ma44061	S20-Ap13759	S20-Ap02142	S20-My01146	S20-My01155	S20-My01156	S20-My27008	S20-Ap02141
		Sample date:	26-03-20	26-03-20	31-03-20	23-03-20	30-04-20	30-04-20	30-04-20	18-05-20	26-03-20
		Sample ID:	P12_PAINT1	P14_PAINT1	P18_PAINT	P3_PAINT 1	P32_HOUSEPAINT	P32_TRAINPAINT	P32_TRAINPAINT2	PAINT 1 (PS)	SMC_PAINT 1
		Project Name:	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
		Sampling Method:	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct
Analyte grouping/Analyte		**Units**	**LOR**								
E022.5 - ACID EXTRACTABLE METALS IN PAINT by ICP-MS											
Lead	0.1	%	0.01	**0.44**	< 0.01	**2.8**	< 0.01	**0.24**	**0.29**	**3.1**	**0.02**	**0.51**

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[A]NSW EPA Managing Lead Contamination in Home Maintenance, Renovation and Demolition Practices. A Guide for Councils 2003.

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23-07-20

Table 7:
Tarago Area DSI - Load-Out Comples Soil Results

	NEPM 2013 HIL D Commercial / Industrial	NEPM EIL Commercial / Industrial (site specific)	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
			Site:		Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor
			Lab Sample number:		S20-Ap02695	S20-Ap02696	S20-Ap02697	S20-Ap02698	S20-Ap02699	S20-Ap02700	S20-Ap02701	S20-Ap02702	S20-Ap02703
			Sample date:		31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20
			Sample ID:		TP1_0.0-0.1	TP1_0.2-0.3	TP1_1.0-1.1	TP1_1.8-1.9	TP2_0.0-0.1	TP2_0.5-0.6	TP2_1.0-1.1	TP3_0.0-0.1	TP3_0.5-0.6
			Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
			Sampling Method:		Excavator	Excavator	Excavator	Excavator	Excavator	Excavator	Excavator	Excavator	Excavator
Analyte grouping/Analyte			**Units**	**LOR**									
LTM-GEN-7080 Moisture													
Moisture Content (dried @ 103°C)			%	--	12	8.1	10	12	8.3	5.9	5.9	7.6	4.2
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS													
Lead	2200[a]	1800	mg/kg	5	290	490	42	28	140	38	16	29	1100

LOR = Limit of Reporting

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

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Job No: 318000780
Project Name: Tarago Rail Corridor and Tarago Area DSI
23-07-20

Table 7:
Tarago Area DSI - Load-Out Comples Soil Results

	NEPM 2013 HIL D Commercial / Industrial	NEPM EIL Commercial / Industrial (site specific)	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
			Site:		Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor
			Lab Sample number:		S20-Ap02704	S20-Ap02705	S20-Ap02706	S20-Ap02707	S20-Ap02708	S20-Ap02709	S20-Ap02710	S20-Ap02711	S20-Ap02712
			Sample date:		31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20
			Sample ID:		TP3_0.6-0.7	TP5_0.0-0.1	TP5_0.6-0.7	TP5_1.0-1.1	TP5_1.9-2.0	TP6_0.0-0.1	TP6_0.5-0.6	TP6_1.9-2.0	TP7_0.0-0.1
			Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
			Sampling Method:		Excavator	Excavator	Excavator	Excavator	Excavator	Excavator	Excavator	Excavator	Excavator
Analyte grouping/Analyte			**Units**	**LOR**									
LTM-GEN-7080 Moisture													
Moisture Content (dried @ 103°C)			%	--	9.5	6.5	11	10	14	4.2	17	13	6.4
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS													
Lead	2200[a]	1800	mg/kg	5	< 5	51	160	28	18	33	16	15	13

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			Site:		Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor
			Lab Sample number:		S20-Ap02713	S20-Ap02714	S20-Ap02715	S20-Ap02716	S20-Ap02717	S20-Ap02718	S20-Ap02719	S20-Ap02720	S20-Ap02721
			Sample date:		31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20
			Sample ID:		TP7_0.5-0.6	TP7_1.9-2.0	TP8_0.0-0.1	TP8_0.5-0.6	TP8_1.1-1.2	TP8_1.9-2.0	TP9_0.0-0.1	TP9_0.5-0.6	TP9_1.2-1.3
			Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
			Sampling Method:		Excavator	Excavator	Excavator	Excavator	Excavator	Excavator	Excavator	Excavator	Excavator
Analyte grouping/Analyte			**Units**	**LOR**									
LTM-GEN-7080 Moisture													
Moisture Content (dried @ 103°C)			%	--	19	13	6.9	7.7	7.4	6.6	8.8	7.6	7.3
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS													
Lead	2200[a]	1800	mg/kg	5	22	16	37	83	210	220	40	140	1200

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			Site:		Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor
			Lab Sample number:		S20-Ap02722	S20-Ap02723	S20-Ap02724	S20-Ap02725	S20-Ap02726	S20-Ap02727	S20-Ap02728	S20-Ap02729	S20-Ap02730
			Sample date:		31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20
			Sample ID:		TP10_0.05-0.15	TP10_0.5-0.6	TP10_1.5-1.6	TP11_0.0-0.1	TP11_0.5-0.6	TP12_0.0-0.1	TP12_0.5-0.6	TP13_0.0-0.1	TP13_0.5-0.6
			Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
			Sampling Method:		Excavator	Excavator	Excavator	Excavator	Excavator	Excavator	Excavator	Excavator	Excavator
Analyte grouping/Analyte			**Units**	**LOR**									
LTM-GEN-7080 Moisture													
Moisture Content (dried @ 103°C)			%	--	8.8	12	9.3	9.8	19	15	18	6.7	7.1
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS													
Lead	2200[a]	1800	mg/kg	5	25	140	17	550	23	810	130	17	18

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Table 7:
Tarago Area DSI - Load-Out Comples Soil Results

	NEPM 2013 HIL D Commercial / Industrial	NEPM EIL Commercial / Industrial (site specific)	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
			Site:		Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor
			Lab Sample number:		S20-Ap02731	S20-Ap02732	S20-Ap02733	S20-Ap02734	S20-Ap02735	S20-Ap02736	S20-Ap06337	S20-Ap06338	S20-Ap06339
			Sample date:		31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	01-04-20	01-04-20	01-04-20
			Sample ID:		TP13_1.2-1.3	TP13_1.9-2.0	TP14_0.0-0.1	TP14_0.5-0.6	TP14_0.8-0.9	TP14_1.9-2.0	TP15_0.0-0.1	TP15_0.5-0.6	TP15_1.9-2.0
			Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
			Sampling Method:		Excavator	Excavator	Excavator	Excavator	Excavator	Excavator	Excavator	Excavator	Excavator
Analyte grouping/Analyte			**Units**	**LOR**									
LTM-GEN-7080 Moisture													
Moisture Content (dried @ 103°C)			%	--	7.4	11	7	8.1	5.9	8.1	7.1	8.4	5.6
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS													
Lead	2200[a]	1800	mg/kg	5	7.9	18	23	29	72	52	49	17	21

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23-07-20

Table 7:
Tarago Area DSI - Load-Out Comples Soil Results

	NEPM 2013 HIL D Commercial / Industrial	NEPM EIL Commercial / Industrial (site specific)	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
			Site:		Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor
			Lab Sample number:		S20-Ap06340	S20-Ap06341	S20-Ap06342	S20-Ap06343	S20-Ap06344	S20-Ap06345	S20-Ap06346	S20-Ap06347	S20-Ap06348
			Sample date:		01-04-20	01-04-20	01-04-20	01-04-20	01-04-20	01-04-20	01-04-20	01-04-20	01-04-20
			Sample ID:		TP16_0.0-0.1	TP16_0.5-0.6	TP16_1.5-1.6	TP17_0.0-0.1	TP17_0.5-0.6	TP18_0.0-0.1	TP18_0.5-0.6	TP18_1.0-1.1	TP19_0.0-0.1
			Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
			Sampling Method:		Excavator	Excavator	Excavator	Excavator	Excavator	Excavator	Excavator	Excavator	Excavator
Analyte grouping/Analyte			**Units**	**LOR**									
LTM-GEN-7080 Moisture													
Moisture Content (dried @ 103°C)			%	--	13	8.6	19	9.5	5.1	18	15	12	17
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS													
Lead	2200[a]	1800	mg/kg	5	31	31	24	49	18	210	23	46	180

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23-07-20

Table 7:
Tarago Area DSI - Load-Out Comples Soil Results

	NEPM 2013 HIL D Commercial / Industrial	NEPM EIL Commercial / Industrial (site specific)	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
			Site:		Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor
			Lab Sample number:		S20-Ap06349	S20-Ap06350	S20-Ap06351	S20-Ap06352	S20-Ap06353	S20-Ap44309	S20-Ap44310	S20-Ap44311	S20-Ap44312
			Sample date:		01-04-20	01-04-20	01-04-20	01-04-20	01-04-20	31-05-20	31-05-20	31-05-20	31-05-20
			Sample ID:		TP19_0.3-0.4	TP19_1.0-1.1	TP20_0.0-0.1	TP20_0.5-0.6	TP20_1.2-1.3	TP3_1.5-1.6	TP4_0.0-0.1	TP4_0.5-0.6	TP4_1.0-1.1
			Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
			Sampling Method:		Excavator	Excavator	Excavator	Excavator	Excavator	Excavator	Excavator	Excavator	Excavator
Analyte grouping/Analyte			**Units**	**LOR**									
LTM-GEN-7080 Moisture													
Moisture Content (dried @ 103°C)			%	--	11	12	7.6	15	13	10	9.7	8.8	7.3
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS													
Lead	2200[a]	1800	mg/kg	5	25	33	62	95	28	44	380	170	90

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Job No: 318000780
Project Name: Tarago Rail Corridor and Tarago Area DSI
23-07-20

Table 7:
Tarago Area DSI - Load-Out Comples Soil Results

	NEPM 2013 HIL D Commercial / Industrial	NEPM EIL Commercial / Industrial (site specific)	Sample Type:		Soil
			Site:		Rail Corridor
			Lab Sample number:		S20-Ap44313
			Sample date:		31-05-20
			Sample ID:		TP4_1.9-2.0
			Project Name:		Community DSI
			Sampling Method:		Excavator
Analyte grouping/Analyte			**Units**	**LOR**	
LTM-GEN-7080 Moisture					
Moisture Content (dried @ 103°C)			%	--	8
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS					
Lead	2200[a]	1800	mg/kg	5	29

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Table 8:
Tarago Area DSI - Surface Water Results

	Health-based Screening Criteria (Recreational Waters)	ANZECC Fresh Water Guidelines - Irrigation[B]	ANZECC Fresh Water Guidelines - Stock Water[B]	Ecological Sceening Criteria (ANZG 95% Protection) Fresh Water	Sample Type:		Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
					Lab ID		-		S20-Ap12287	S20-Ap12286		S20-Ap12288	S20-My01341		S20-Ap12289	-
					Sample date:		12-08-2019	1-09-2020	01-04-20	01-04-20	1-09-2020	01-04-20	30/4/20	1-09-2020	01-04-20	6-08-2019
					Sample ID:		SW1-UP	SW1-UP	SW1-UP	SW1	SW2	SW2	SW2	SW3	SW3	SW4
					Project Name:		Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring
					Project No:		318000780	318000780	318000782	318000781	318000780	318000783	318000789	318000780	318000784	318000780
					Sample Location		Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop
					Sampling Method:		Grab Sample	Grab Sample	Grab Sample	Grab Sample	Grab Sample	Grab Sample	Grab Sample	Grab Sample	Grab Sample	Grab Sample
Guidelines					Sample Description:		-									-
Analyte grouping/Analyte					**Units**	**LOR**										
Inorganics																
Ammonia (as N)	500	-	-	900	µg/L	10	10	<10	-	-	150	-	-	10	-	<10
Conductivity (at 25@°C)	-	-	-	-	µS/cm	100	820	730	-	-	520	-	-	170	-	170
Nitrate & Nitrite (as N)	-	-	-	-	µg/L	10	< 10	<50	-	-	220	-	-	3800	-	<50
Nitrate (as N)	50000	400000	-	3500	µg/L	10	< 20	-	-	-	-	-	-	-	-	< 20
Nitrite (as N)	30000	30000	-	-	µg/L	10	< 20	-	-	-	-	-	-	-	-	< 20
pH (at 25@°C)	-	-	-	-	pH units	0.1	7.9	7.6	-	-	8	-	-	6	-	6.9
Phosphate total (as P)	-	-	800-1200	-	µg/L	10	< 50	<50	-	-	<50	-	-	0.06	-	30
Total Dissolved Solids Dried at 180°C ± 2°C	-	-	-	-	mg/L	5	420	370	-	-	290	-	-	130	-	< 10
Total Kjeldahl Nitrogen (as N)	800	-	-	-	µg/L	5	<20	<20	-	-	<20	-	-	0.6	-	10
Total Nitrogen (as N)	-	-	25000-125000	-	µg/L	5	<20	<20	-	-	0.22	-	-	4.4	-	10
Total Suspended Solids Dried at 105°C	-	-	-	700	mg/L	5	< 5	5.6	-	-	< 5	-	-	7.2	-	7
Turbidity	-	-	-	-	NTU	1	1	1.3	-	-	3	-	-	37	-	6
Dissolved and Total Metals																
Aluminium	2				mg/L	0.05	-	-	< 0.05	0.13	-	0.08	0.06	-	0.92	-
Aluminium (filtered)		5	20	0.055	mg/L	0.05	0.05	0.05	-	-	0.05	-	-	**0.3**	-	**0.17**
Arsenic	0.1				mg/L	0.001	-	-	< 0.001	0.004	-	0.002	< 0.001	-	0.004	-
Arsenic (filtered)		0.5	2	0.024	mg/L	0.001	0.001	<0.001	-	-	<0.001	-	-	<0.001	-	0.001
Barium	2				mg/L	0.001	-	-	0.1	0.15	-	0.1	0.08	-	0.1	-
Barium (filtered)					mg/L	0.001	0.1	0.1	-	-	0.07	-	-	0.08	-	0.04
Beryllium	0.6				mg/L	0.001	-	-	< 0.001	< 0.001	-	< 0.001	< 0.001	-	< 0.001	-
Beryllium (filtered)			0.5	0.00013	mg/L	0.001	<0.001	<0.001	-	-	<0.001	-	-	<0.001	-	<0.001
Cadmium	0.002				mg/L	0.0002	-	-	< 0.0002	0.0013	-	0.0019	0.0004	-	**0.021**	-
Cadmium (filtered)		0.01	0.05	0.0002	mg/L	0.0002	<0.0002	<0.0002	-	-	**0.0014**	-	-	**0.0053**	-	**0.0055**
Chromium	0.5				mg/L	0.001	-	-	< 0.001	< 0.001		0.001	< 0.001	-	0.002	-
Chromium (filtered)		1	1	0.001	mg/L	0.001	0.001	<0.001	-	-	<0.001	-	-	<0.001	-	<0.001
Cobalt	-				mg/L	0.001	-	-	< 0.001	0.014	-	0.004	0.002	-	0.006	-
Cobalt (filtered)		1	0.1	0.09	mg/L	0.001	<1	<0.001	-	-	<0.001	-	-	0.005	-	<0.001
Copper	20				mg/L	0.001	-	-	< 0.001	0.019	-	0.023	0.006	-	0.18	-
Copper (filtered)		0.5	0.1	0.0014	mg/L	0.001	0.001	<0.001	-	-	**0.015**	-	-	**0.027**	-	**0.14**
Iron	3				mg/L	0.05	-	-	0.26	4.5	-	0.94	0.75	-	1.8	-
Iron (filtered)			10	0.3	mg/L	0.05	<0.05	-	-	-	-	-	-	-	-	-
Lead	0.1				mg/L	0.001	-	-	< 0.001	0.056	-	0.02	0.006	-	0.17	-
Lead (filtered)		0.1	5	0.0034	mg/L	0.001	<0.001	<0.001	-	-	0.003	-	-	**0.011**	-	**0.008**
Manganese	5				mg/L	0.005	-	-	0.044	0.76	-	0.41	0.26	-	0.52	-
Manganese (filtered)		10	2.5	1.9	mg/L	0.005	<0.005	<0.005	-	-	0.014	-	-	0.015	-	0.015
Mercury	0.01				mg/L	0.0001	-	-	< 0.0001	< 0.0001		< 0.0001	< 0.0001	-	< 0.0001	-
Mercury (filtered)		0.002	0.002	0.00006	mg/L	0.0001	**0.0001**	<0.0001	-	-	<0.0001	-	-	<0.0001	-	<0.0001
Nickel	0.2				mg/L	0.001	-	-	< 0.001	0.003		0.002	< 0.001	-	0.036	-
Nickel (filtered)		1	2	0.011	mg/L	0.001	0.001	<0.001	-	-	<0.001	-	-	0.002	-	**0.014**
Zinc	30				mg/L	0.005	-	-	0.011	0.2		0.35	0.16	-	4	-
Zinc (filtered)		20	5	0.008	mg/L	0.005	0.005	<0.005	-	-	**0.2**	-	-	**0.95**	-	**1.2**
Total Recoverable Hydrocarbons - 1999 NEPM Fractions																
TRH C10-C14	-	-	-	-	µg/L	50	<50	<50	-	-	<50	-	-	<50	-	<50
TRH C10-C36 (Total)	-	-	-	-	µg/L	100	<100	<100	-	-	<100	-	-	<100	-	<100
TRH C15-C28	-	-	-	-	µg/L	100	<100	<100	-	-	<100	-	-	<100	-	<100
TRH C29-C36	-	-	-	-	µg/L	100	<100	<100	-	-	<100	-	-	<100	-	<100
TRH C6-C9	-	-	-	-	µg/L	20	<20	<20	-	-	<20	-	-	<20	-	<20
Total Recoverable Hydrocarbons - 2013 NEPM Fractions																
Naphthalene	17	-	-	16	µg/L	10	<10	<10	-	-	<10	-	-	<10	-	<10
TRH >C10-C16	-	-	-	-	µg/L	50	<50	<50	-	-	<50	-	-	<50	-	<50
TRH >C10-C16 less Naphthalene (F2)	-	-	-	-	µg/L	50	<50	<50	-	-	<50	-	-	<50	-	<50
TRH >C10-C40 (total)*	-	-	-	-	µg/L	100	<100	<100	-	-	<100	-	-	<100	-	<100
TRH >C16-C34	-	-	-	-	µg/L	100	<100	<100	-	-	<100	-	-	<100	-	<100
TRH >C34-C40	-	-	-		µg/L	100	<100	<100	-	-	<100	-	-	<100	-	<100
TRH C6-C10	-	-	-		µg/L	20	<20	<20	-	-	<20	-	-	<20	-	<20
TRH C6-C10 less BTEX (F1)	-	-	-	-	µg/L	20	<20	<20	-	-	<20	-	-	<20	-	<20
BTEX																
Benzene	10	-	-	950	µg/L	1	<1	<1	-	-	<1	-	-	<1	-	<1
Ethylbenzene	3000	-	-	80	µg/L	1	<2	<2	-	-	<2	-	-	<2	-	<2
m&p-Xylenes	-	-	-	-	µg/L	2	<2	<2	-	-	<2	-	-	<2	-	<2
o-Xylene	-	-	-	-	µg/L	1	<2	<2	-	-	<2	-	-	<2	-	<2
Toluene	8000	-	-	180	µg/L	1	<2	<2	-	-	<2	-	-	<2	-	<2
Xylenes - Total	6000	-	-	200	µg/L	3	<3	<3	-	-	<3	-	-	<3	-	<3

- indicates no criterion available
All results are in µg/L
LOR = Limit of Reporting
Concentrations below the LOR noted as <value
NOC = No observed contamination
Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG 2018)
Australia and New Zealand Environment and Conservation Council (2000) Australian and New Zealand Guidelines for Fresh and Marine Water Quality.
[A]NRMMC (2011 updated 2018) Australian Drinking Water Guidelines (ADWG) Paper 6 National Water Quality Management Strategy. National Health and Medical Research Council.
ANZECC, NEPM and NHMRC guidelines for mercury are based on total mercury.
Concentration in **red bold** font exceed the Health-based Recreational Use Criteria
Concentration in grey box exceed the Ecological Criteria
Concentration in **blue bold** font exceed the Irrigation short term value Criteria
Concentration in **green bold** font exceed the Stock watering Criteria
(1) Generally 95% protective level for fresh water ecosystems.
Details of Guideline values are presented in **Section 10** of report (**Table 10-2**)

Table 9:
Tarago Area DSI - Sediment Results

	Sediment DGV[A]	Sediment GV-High[A]	Sample Type:		Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Surface Water	Surface Water
			Site:		Tarago	Tarago	Tarago	Tarago	Tarago	Tarago	Tarago	Tarago	Tarago	Tarago	Tarago	Tarago
			Lab Sample number:		S20-Ap12274	S20-Ap12275	S20-Ap12276	S20-Ap12277	S20-Ap12278	S20-Ap12279	S20-Ap12280	S20-Ap12281	S20-Ap12282	S20-Ap12283	S20-My01339	S20-My01340
			Sample date:		01-04-20	01-04-20	01-04-20	01-04-20	01-04-20	01-04-20	01-04-20	02-04-20	02-04-20	02-04-20	30-04-20	30-04-20
			Sample ID:		SED1	SED1_UP	SED2	SED3	SED4	SED5	SED6	SED7	SED8	SED9	BR_SED1	BR_SED2
			Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
			Sampling Method:		Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct
Analyte grouping/Analyte			**Units**	**LOR**												
LTM-GEN-7080 Moisture																
Moisture Content (dried @ 103°C)			%	--											5.9	51
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS																
Aluminium	--	--	mg/kg	10	9200	12000	8300	13000	9200	4400	6500	5200	8500	12000	7000	10000
Arsenic	20	70	mg/kg	2	19	8.6	18	5.1	**37**	2.9	10	6.4	4.8	3.6	8.4	9
Barium	--	--	mg/kg	10	120	65	85	200	150	64	63	60	93	96	64	100
Beryllium	--	--	mg/kg	2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Boron	--	--	mg/kg	0.4	2.6	< 0.4	7.2	3	5	0.6	3.3	4.6	0.4	0.5	--	--
Cadmium	1.5	10	mg/kg	0.4	**16**	**20**	**14**	**16**	**17**	**8.3**	**9.6**	**8.1**	**12**	**17**	0.5	1.1
Chromium	80	370	mg/kg	5	9.5	5.5	6.1	< 5	< 5	< 5	< 5	< 5	6.3	5.5	18	16
Cobalt	--	--	mg/kg	5	9.5	5.5	6.1	< 5	< 5	< 5	< 5	< 5	6.3	5.5	5.9	6.3
Copper	65	270	mg/kg	5	**200**	10	**490**	58	**600**	14	59	**190**	12	13	49	**84**
Iron	--	--	mg/kg	20	17000	23000	16000	15000	17000	6600	9200	7600	10000	14000	14000	15000
Lead	50	220	mg/kg	5	**4700**	18	**1600**	**130**	**2600**	39	**88**	**210**	20	19	**78**	**120**
Manganese	--	--	mg/kg	5	290	56	280	120	140	280	91	140	76	400	230	360
Mercury	0.15	1	mg/kg	0.1	< 0.1	< 0.1	0.1	< 0.1	**0.3**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nickel	21	52	mg/kg	5	9.8	8.6	8.7	7.6	9.8	< 5	6.9	< 5	6.6	8.4	16	11
Zinc	200	410	mg/kg	5	**610**	20	**2400**	**320**	**750**	100	**470**	**580**	94	140	**210**	**490**

LOR = Limit of Reporting

Concentration in **red** font and grey box exceed the adopted Sediment DGV

Concentration in **orange** font and grey box exceed the Sediment GV-High

[A]ANZG (2018)˙ Toxicant default guideline values for sediment quality

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Rail Corridor and Tarago Area DSI
23-07-20

Table 10:
Tarago Area DSI - Groundwater Monitoring Well Soil Results

	NEPM 2013 HIL D Commercial / Industrial	NEPM EIL Commercial / Industrial (site specific)	NEPM 2013 HIL C Open Space	NEPM 2013 EIL Residential / public Open Space	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil
					Site:		Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor
					Lab Sample number:		M20-Ma43430	M20-Ma43431	M20-Ma43432	M20-Ma43433	M20-Ma43434	M20-Ma43435	M20-Ma43436
					Sample date:		18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20
					Sample ID:		MW01_0.5	MW01_1.5	MW01_2.5	MW01_3.5	MW01_4.5	MW2_0-0.05	MW2_1.0
					Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
					Sampling Method:		Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig
Analyte grouping/Analyte					**Units**	**LOR**							
LTM-GEN-7080 Moisture													
Moisture Content (dried @ 103°C)					%	--	14	12	8.7	7.8	14	< 1	5.5
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS													
Lead	2200[e]	1800	600	1100	mg/kg	5	13	16	15	26	24	51	**3600**

LOR = Limit of Reporting

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

Concentration in **red** font and grey box exceed the adopted HIL/HSL 'D' for Commercial/Industrial use (Applicable for MW01, MW02, MW03 and MW04)

Concentration in **orange** font and grey box exceed the adopted EIL/ESL 'D' for Commercial/Industrial use (Applicable for MW01, MW02, MW03 and MW04)

Concentration in **blue** font and grey box exceed the adopted HIL/HSL 'C' for Open Space and Recreational Land Use (Applicable for MW5, MW6 and MW7)

Concentration in **green** font and grey box exceed the adopted EIL/ESL 'C' for Residential and Open Space and Recreational Land Use (Applicable for MW5, MW6 and MW7)

Concentrations in box exceed the screening value >2.5 times

Where one or more guideline value is exceeded, the highest guideline exceeded will be highlighted

Underlined values were reported <LOR and have been halved to allow for comparison of data.

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Rail Corridor and Tarago Area DSI
23-07-20

Table 10:
Tarago Area DSI - Groundwater Monitoring Well Soil Results

Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Rail Corridor	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**
M20-Ma43437	M20-Ma43438	M20-Ma43439	M20-Ma43440	M20-Ma43441	M20-Ma43442	M20-Ma43443	M20-Ma43444	M20-Ma43445	M20-Ma43583	M20-Ma43584	M20-Ma43446	M20-Ma43447	M20-Ma43448
18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	19-03-20	19-03-20	19-03-20
MW2_1.5	MW2_2.5	MW2_3.5	MW2_4.5	MW3_0.5	MW3_1.0	MW3_1.5	MW3_2.5	MW3_3.5	MW3_4.5	MW2_0.5	MW4_0-0.05	MW4_0.5	MW4_1.0
Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig
4.9	4.4	7	7.9	9.3	8.4	10	9.1	12	15	5.5	3.1	6.5	3.6
540	200	140	42	25	18	16	15	15	22	27	1200	390	31

Client: John Holland Rail
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Table 10:
Tarago Area DSI - Groundwater Monitoring Well Soil Results

Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Rail Corridor	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**
M20-Ma43449	M20-Ma43450	M20-Ma43451	M20-Ma43452	M20-Ma43453	M20-Ma43454	M20-Ma43455	M20-Ma43456	M20-Ma43457	M20-Ma43458	M20-Ma43459	M20-Ma43460	M20-Ma43461	M20-Ma43462
19-03-20	19-03-20	19-03-20	19-03-20	19-03-20	19-03-20	19-03-20	19-03-20	19-03-20	19-03-20	19-03-20	19-03-20	19-03-20	19-03-20
MW4_1.5	MW4_2.5	MW4_3.5	MW4_4.5	MW5_0.05	MW5_0.5	MW5_1.0	MW5_1.5	MW5_3.5	MW5_4.5	MW6_0.05	MW6_0.5	MW6_1.0	MW6_1.5
Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig
8.3	14	6.6	12	5.1	8.1	3.2	4.4	6.2	5.3	14	9	2.9	6.6
19	21	30	27	120	190	13	20	22	28	57	25	21	18

Client: John Holland Rail
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Table 10:
Tarago Area DSI - Groundwater Monitoring Well Soil Results

Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Rail Corridor	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**
M20-Ma43463	M20-Ma43464	M20-Ma43465	M20-Ma43585	M20-Ma43466	M20-Ma43467	M20-Ma43468	M20-Ma43469	M20-Ma43470	M20-Ma43471	M20-Ma43472
19-03-20	19-03-20	19-03-20	19-03-20	20-03-20	20-03-20	20-03-20	20-03-20	20-03-20	20-03-20	20-03-20
MW6_2.5	MW6_3.5	MW6_4.5	MW5_2.5	MW7_0.05	MW7_0.5	MW7_1.0	MW7_1.5	MW7_2.5	MW7_3.5	MW7_4.5
Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig
4.1	7.5	5.8	5.5	7.6	8.9	7.2	9.9	17	13	< 1
14	19	28	21	210	43	52	18	43	44	20

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Rail Corridor and Tarago Area DSI
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Table 11:
Tarago Area DSI - Groundwater Monitorign Well Results

	NHMRC Australian Drinking Water Guidelines[A]	ANZECC Fresh Water Guidelines - 95% Species Protection[B]	ANZECC Fresh Water Guidelines - Irrigation[B]	ANZECC Fresh Water Guidelines - Stock Water[B]	Sample Type:		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
					Site:		Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Goulburn Street	Wallace Street	Wallace Street
					Lab Sample number:		S20-Ap16796	S20-Ap16797	S20-Ap16798	S20-Ap16799	S20-Ap16800	S20-Ma43288	S20-Ma43289	S20-Ma43290
					Sample date:		02-04-20	02-04-20	02-04-20	02-04-20	02-04-20	27-03-20	27-03-20	27-03-20
					Sample ID:		MW1	MW2	MW3	MW4	GW053976	MW05	MW06	MW07
					Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
					Sampling Method:		Peristaltic	Peristaltic	Peristaltic	Peristaltic	Peristaltic	Peristaltic	Peristaltic	Peristaltic
Analyte grouping/Analyte					**Units**	**LOR**								
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS														
Aluminium (filtered)	0.01	0.055	20	5	mg/L	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	--	--	--
Arsenic (filtered)	0.01	0.024	2	0.5	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.005	< 0.001	< 0.001	0.003
Barium (filtered)	2				mg/L	0.02	0.14	0.16	0.08	0.11	0.05	--	--	--
Beryllium (filtered)	0.06		0.5		mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Boron (filtered)	4				mg/L	0.05	--	--	--	--	--	< 0.05	< 0.05	< 0.05
Cadmium (filtered)	0.002	0.0002	0.002	0.01	mg/L	0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	0.0002	**0.0003**	< 0.0002	< 0.0002
Chromium (filtered)	0.05	0.001	0.05	1	mg/L	0.001	< 0.001	< 0.001	< 0.001	**0.002**	< 0.001	< 0.001	< 0.001	< 0.001
Cobalt (filtered)		0.0014	0.1	1	mg/L	0.001	**0.004**	**0.006**	**0.029**	**0.006**	< 0.001	0.001	< 0.001	**0.006**
Copper (filtered)	2	0.0014	5	0.4	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	**0.003**	0.001	< 0.001	< 0.001
Lead (filtered)	0.01	0.0034	5	0.1	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	**0.005**	0.002	< 0.001	< 0.001
Manganese (filtered)	0.5	1.9	10		mg/L	0.005	0.77	0.6	**2**	0.71	0.02	0.085	0.026	1.4
Mercury (filtered)	0.001	0.00006	0.002	0.002	mg/L	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel (filtered)	0.02	0.011	2	1	mg/L	0.001	0.003	0.003	0.003	0.004	< 0.001	0.001	< 0.001	0.002
Selenium (filtered)	0.01				mg/L	0.001	--	--	--	--	--	< 0.001	< 0.001	< 0.001
Zinc (filtered)		0.008	5	20	mg/L	0.005	**0.01**	**0.011**	**0.022**	**0.011**	**0.27**	**0.044**	0.007	< 0.005

LOR = Limit of Reporting

Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG 2018)

Australia and New Zealand Environment and Conservation Council (2000) Australian and New Zealand Guidelines for Fresh and Marine Water Quality.

[A]NRMMC (2011 updated 2018) Australian Drinking Water Guidelines (ADWG) Paper 6 National Water Quality Management Strategy.
National Health and Medical Research Council.

Concentration in **red bold** font exceed the Health-based drinking water criteria
Concentration in **blue bold** font exceed the Irrigation short term value Criteria
Concentration in **purple bold** font exceed the Stock watering Criteria
Concentration in **green bold** font exceed the ANZG 2018 95% Species Protection

Where one or more guideline value is exceeded, the highest guideline exceeded will be highlighted
Details of Guideline values are presented in **Section 10** of report (**Table 10-2**)

Table 12:
Tarago Area DSI - Tarago Town XRF Results

	NEPM 2013 HIL C Open Space	NEPM EIL Commercial / Industrial (site specific)	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
			Easting		741874	741863	741893	741895	741924	741915	741958	741955	742012	742008	742058	742060	742109	742106	742039
			Northing		6116040	6116041	6116087	6116088	6116131	6116132	6116158	6116169	6116158	6116158	6116140	6116147	6116130	6116142	6116142
			Sample date:		18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20
			Sample ID:		XBOYD1E	XBOYD1W	XBOYD2E	XBOYD2W	XBOYD4E	XBOYD4W	XBOYD5E	XBOYD5W	XBOYD6E	XBOYD6W	XBOYD7E	XBOYD7W	XBOYD8E	XBOYD8WD	XBOYDR02
			Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
			Sampling Method:		XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF
Analyte grouping/Analyte			**Units**	**LOD**															
Field Portable XRF																			
Arsenic	300	160	mg/kg		20.94	24.73	15.88	16.62	14.21	67.15	8.61	<LOD	15.84	18.38	19.81	10.7	11.86	6.29	25.68
Barium			mg/kg		<LOD	<LOD	464.42	<LOD	<LOD	236.89	140.95	<LOD	<LOD	<LOD	<LOD	<LOD	183.95		<LOD
Cadmium	90		mg/kg		<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD		<LOD
Chromium	300	710	mg/kg		<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
Cobalt	300		mg/kg		<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
Copper	17000	160	mg/kg		58.24	73.21	57.96	95.96	94.35	**497.29**	56.65	34.66	66.06	101.46	117.32	94.66	50.34	<LOD	148.12
Iron			mg/kg		8418.78	8845.53	7680.24	6293.52	8987.34	14321.38	7954.57	6523.13	5787.58	7264.59	7140.61	5617.23	6180.88	7940.99	10717.13
Lead	600	1800	mg/kg		162.1	167.62	60.98	195	213.22	**779.14**	100.49	113.46	135.18	233.06	138.88	169.87	79.68	10.23	265.35
Manganese	19000		mg/kg		119.33	135.06	137.36	164.53	277.78	111.77	271.78	134.39	141.04	143.89	350.34	92.47	203.18	<LOD	341.2
Mercury	80		mg/kg		<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
Nickel	1200	340	mg/kg		<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
Zinc	30000	370	mg/kg		**512.36**	**1052.16**	205.43	**557.11**	**454.05**	**582.72**	**463.97**	334.32	**525.34**	**563.03**	**858.72**	**485.63**	**491.01**	59.15	**681.18**

LOD = Limit of Detection

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

Concentration in **orange** font and grey box exceed the adopted HIL for Open Space land use

Concentration in **green** font and grey box exceed the adopted EIL for Commercial/Industrial use

Concentrations in box exceed the screening value >2.

Where one or more guideline value is exceeded, the highest guideline exceeded will be highlighted

[a] Human Health Guideline for Lead adopted from the Human Health Risk Assessment (Ramboll 2019d)

Table 12:
Tarago Area DSI - Tarago Town XRF Results

	NEPM 2013 HIL C Open Space	NEPM EIL Commercial / Industrial (site specific)	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
			Easting		742037	741910	741905	741900	741889	742142	742145	742094	742148	742113	742133	742122	742142	742153	742161
			Northing		6116155	6116100	6116103	6116102	6116094	6116269	6116282	6116003	6116308	6116060	6116107	6116084	6116243	6116189	6116150
			Sample date:		18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20
			Sample ID:		XBOYDRPS	XBOYDSTE1	XBOYDSTW1	XBOYDSTW2	XBOYDSTW3	XBRAIDR10	XBRAIDR12	XBRAIDR1-4	XBRAIDR2135	XBRAIDRCH	XBRAIDRMPC	XBRAIDRPRE	XBRAIDRPS	XBRAIDSRA1	XBRAIDSRA2
			Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
			Sampling Method:		XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF
Analyte grouping/Analyte			**Units**	**LOD**															
Field Portable XRF																			
Arsenic	300	160	mg/kg		<LOD	<LOD	32.27	45.6	57.14	<LOD	8.88	<LOD	6.92	8.13	<LOD	7.68	<LOD	15.72	<LOD
Barium			mg/kg		<LOD	665.38	752.22	924.35	<LOD	71.4	370.53	155.79	304.27	496.06	67.63	<LOD	150.4	232.33	161.88
Cadmium	90		mg/kg		<LOD	<LOD	21.67	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
Chromium	300	710	mg/kg		<LOD	<LOD	33.29	16.84	<LOD	<LOD	<LOD	<LOD	<LOD	37.19	<LOD	<LOD	<LOD	<LOD	<LOD
Cobalt	300		mg/kg		<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
Copper	17000	160	mg/kg		63.87	**195.21**	**281.69**	**272.2**	**336.6**	15.34	28.81	36.08	28.83	34.27	<LOD	14.43	14.9	51.13	<LOD
Iron			mg/kg		4165.9	11842.94	14450.2	17106.94	11380.42	7495.27	7035.5	11493.85	7559.12	22529.87	10147.92	7456.94	8851.25	10673.53	8349.91
Lead	600	1800	mg/kg		129.99	459.09	412.32	363.84	**750.91**	15.67	66.77	66.45	32.61	46.58	14.64	18.12	13.41	69.56	29.35
Manganese	19000		mg/kg		129.82	402.67	514.21	296.78	95.84	568.93	313.8	292.37	299.57	402.8	229.02	82.87	294.21	254.42	190.53
Mercury	80		mg/kg		<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
Nickel	1200	340	mg/kg		<LOD	<LOD	34.92	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	46.48	<LOD	<LOD	<LOD	<LOD	<LOD
Zinc	30000	370	mg/kg		**472.91**	368.63	**1017.64**	**604.04**	**688.35**	90.33	96.23	221.85	243.46	133.37	85.96	**525.38**	202.73	231.06	70.47

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Concentration in **orange** font and grey box exceed the adopted HIL for Open Space land use

Concentration in **green** font and grey box exceed the adopted EIL for Commercial/Industrial use

Concentrations in box exceed the screening value >2.

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[a] Human Health Guideline for Lead adopted from the Human Health Risk Assessment (Ramboll 2019d)

Table 12:
Tarago Area DSI - Tarago Town XRF Results

	NEPM 2013 HIL C Open Space	NEPM EIL Commercial / Industrial (site specific)	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
			Easting		741636	741645	741093	741127	741113	741144	741158	741203	741245	741259	741065	741079	741544	741281	741830
			Northing		6115687	6115684	6115040	6115102	6115079	6115136	6115168	6115249	6115331	6115325	6114986	6115004	6115568	6115382	6116008
			Sample date:		24-03-20	24-03-20	23-03-20	23-03-20	23-03-20	23-03-20	23-03-20	23-03-20	23-03-20	23-03-20	23-03-20	23-03-20	24-03-20	23-03-20	24-03-20
			Sample ID:		XGOULGSL	XGOULGSR	XGOULR10	XGOULR12	XGOULR12-3	XGOULR14	XGOULR16	XGOULR22	XGOULR26	XGOULR41-43	XGOULR6	XGOULR8	XGOULRPS	XGOULRSED	XGOULTSL
			Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
			Sampling Method:		XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF
Analyte grouping/Analyte			**Units**	**LOD**															
Field Portable XRF																			
Arsenic	300	160	mg/kg		47.36	35.01	50.84	<LOD	<LOD	18.27	<LOD	<LOD	<LOD	22.74	20.98	11.85	<LOD	<LOD	11.89
Barium			mg/kg		432.77	548.4	<LOD	171.77	<LOD	478.3	585.27	202.25	<LOD	409.15	<LOD	<LOD	<LOD	399.83	290.96
Cadmium	90		mg/kg		<LOD	<LOD	<LOD	<LOD	<LOD	19.36	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
Chromium	300	710	mg/kg		52.81	65.62	<LOD	<LOD	<LOD	39.45	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	42.62	<LOD
Cobalt	300		mg/kg		<LOD	<LOD	93.23	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
Copper	17000	160	mg/kg		57.96	121.26	**195.12**	**180.16**	**386.06**	<LOD	74.56	25.09	82.34	17.86	83.05	64.35	24.06	**788.2**	50.94
Iron			mg/kg		14125.21	17134.8	9606.71	11862.31	10239.82	39845.07	16905.73	5181.07	7874.5	14303.43	7507.19	12555.79	6756.99	14975.85	10485.41
Lead	600	1800	mg/kg		371	304.15	284.63	**628.74**	**1107.23**	16.03	220.55	43.05	297.05	55.02	233.81	166.1	211.36	**1667.25**	196.38
Manganese	19000		mg/kg		488.28	176.5	419.5	292.61	434.49	165.16	205.23	97.56	174.75	156.09	134.61	238.21	268.55	143.66	219.86
Mercury	80		mg/kg		<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
Nickel	1200	340	mg/kg		<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
Zinc	30000	370	mg/kg		**468.67**	**740.43**	**1227.25**	**1880.91**	**2752.84**	91.8	273.58	206.34	**1214.06**	86.7	**695.33**	**896.93**	337.95	**1090.05**	**399.09**

LOD = Limit of Detection

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Concentration in **orange** font and grey box exceed the adopted HIL for Open Space land use

Concentration in **green** font and grey box exceed the adopted EIL for Commercial/Industrial use

Concentrations in box exceed the screening value >2.

Where one or more guideline value is exceeded, the highest guideline exceeded will be highlighted

[a] Human Health Guideline for Lead adopted from the Human Health Risk Assessment (Ramboll 2019d)

Table 12:
Tarago Area DSI - Tarago Town XRF Results

	NEPM 2013 HIL C Open Space	NEPM EIL Commercial / Industrial (site specific)	Sample Type:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
			Easting	741845	741190	741065	741349	741319	740985	741009	740975	740976	741166	740915	740766	740849	740863	742134
			Northing	6115997	6115517	6115558	6115502	6115507	6115541	6115580	6115560	6115586	6115535	6114909	6114964	6114790	6114923	6115989
			Sample date:	24-03-20	23-03-20	19-03-20	19-03-20	19-03-20	19-03-20	19-03-20	19-03-20	19-03-20	19-03-20	23-03-20	23-03-20	23-03-20	23-03-20	18-03-20
			Sample ID:	XGOULTSR	XKINGCH	XKINGR13	XKINGR2	XKINGR2	XKINGR41	XKINGR42	XKINGR43	XKINGR44	XKINGR7	XLIMER11	XLIMER16	XLIMER19	XLIMER21	XLUMRCC
			Project Name:	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
			Sampling Method:	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF
Analyte grouping/Analyte			**Units**	**LOD**														
Field Portable XRF																		
Arsenic	300	160	mg/kg		24.72	8.5	10.77	<LOD	<LOD	<LOD	<LOD	5.69	9.39	9.01	<LOD	6.25	5.9	<LOD	<LOD
Barium			mg/kg		111.96	125.44	192.34	512.1	282.84	201.8	256.93	<LOD	523.23	614.72	176.36	333.43	105.64	<LOD	390.12
Cadmium	90		mg/kg		<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
Chromium	300	710	mg/kg		<LOD	<LOD	24.78	<LOD	33.68	<LOD	<LOD	36.08	38.42	45.6	<LOD	<LOD	<LOD	<LOD	18.48
Cobalt	300		mg/kg		<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
Copper	17000	160	mg/kg		81.04	20.76	<LOD	17.62	19.78	<LOD	15.79	18.87	18.69	29.48	17.24	15.19	19.92	16.77	32.86
Iron			mg/kg		12435.07	6711.99	5775.35	6481.5	6014.83	4208.7	6419.19	17271.94	24702.47	17742.36	6798.31	10910.57	4061.05	5449.43	13891.34
Lead	600	1800	mg/kg		256.7	75.95	<LOD	15.45	12.38	<LOD	6.49	8.43	10	33.36	53.26	<LOD	<LOD	13.83	41.35
Manganese	19000		mg/kg		262.29	185.21	110.27	287.65	280.27	372.82	146.63	110.29	129.98	261.54	182.2	110.3	177.38	133.32	367.2
Mercury	80		mg/kg		<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
Nickel	1200	340	mg/kg		<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	34.03	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
Zinc	30000	370	mg/kg		702.62	112.71	63.49	51.93	48.8	41.03	88.71	55.87	111.54	137.17	177.94	39.52	34.73	82.03	85.52

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Concentration in orange font and grey box exceed the adopted HIL for Open Space land use

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Concentrations in box exceed the screening value >2.

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Table 12:
Tarago Area DSI - Tarago Town XRF Results

	NEPM 2013 HIL C Open Space	NEPM EIL Commercial / Industrial (site specific)	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
			Easting		740522	740549	741024	741036	741117	741135	741193	741199	741357	741369	741456	741514	741518	741511	741514
			Northing		6114601	6114587	6114896	6114888	6115084	6115081	6115234	6115208	6115439	6115429	6115571	6115656	6115679	6115682	6115681
			Sample date:		24-03-20	24-03-20	24-03-20	24-03-20	24-03-20	24-03-20	24-03-20	24-03-20	24-03-20	24-03-20	24-03-20	24-03-20	24-03-20	24-03-20	24-03-20
			Sample ID:		XMR7600L	XMR7600R	XMR8200L	XMR8200R	XMR8500L	XMR8500R	XMR8600L	XMR8600R	XMR9000L	XMR9000R	XMR9100R	XMR9200R	XMR9220C	XMR9220L	XMR9220LD
			Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
			Sampling Method:		XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF
Analyte grouping/Analyte			**Units**	**LOD**															
Field Portable XRF																			
Arsenic	300	160	mg/kg		12.98	137.05	50.07	389.39	57.6	100.96	43.91	119.72	<LOD	<LOD	29.21	71.58	<LOD	388.05	491.11
Barium			mg/kg		640.76	69.64	<LOD	<LOD	<LOD	668.46	<LOD	<LOD	321.42	201.1	<LOD	<LOD	803.94	577.8	719.43
Cadmium	90		mg/kg		<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	42.94	<LOD	<LOD
Chromium	300	710	mg/kg		39.65	99.74	30.86	<LOD	<LOD	29.2	<LOD	27.88	<LOD	<LOD	<LOD	<LOD	28.85	<LOD	<LOD
Cobalt	300		mg/kg		<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
Copper	17000	160	mg/kg		70.2	437.52	349.09	1064.28	308.06	792.3	153.88	379.68	62.83	143.99	114.93	396.69	598.76	2736.94	1167.05
Iron			mg/kg		14677.7	13130.33	12296.1	23425.76	12524.78	25706.48	10993.27	12393.45	9386.12	8111.11	6979.12	10498.68	15838.04	30484.98	53784.95
Lead	600	1800	mg/kg		57.24	1736.62	1060.39	5145.91	848.48	5606.03	570.33	1177.73	221.84	496.96	394.74	1227.99	1049.98	5993.39	3441.45
Manganese	19000		mg/kg		313.59	301.4	56.22	214.21	247.93	<LOD	111.32	111.18	97.01	164.59	272.41	227.18	261.17	172.98	269.23
Mercury	80		mg/kg		<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
Nickel	1200	340	mg/kg		60.81	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	40.54	<LOD	47.72
Zinc	30000	370	mg/kg		237.86	2454.56	3018.88	4395.83	2110.58	239.81	1984.27	5240.12	280.53	1029.63	1295.68	1547.49	1438.17	5450.25	621.48

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	NEPM 2013 HIL C Open Space	NEPM EIL Commercial / Industrial (site specific)	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
			Easting		741521	741268	741631	741652	741272	741268	741268	741281	741665	741374	741704	741684	741738	741694	741721
			Northing		6115679	6115465	6116271	6116273	6115481	6115467	6115454	6115460	6116349	6115593	6116382	6116461	6116451	6116480	6116530
			Sample date:		24-03-20	23-03-20	19-03-20	19-03-20	23-03-20	23-03-20	23-03-20	23-03-20	19-03-20	23-03-20	19-03-20	19-03-20	19-03-20	19-03-20	19-03-20
			Sample ID:		XMR9220R	XMULWR10	XMULWR101	XMULWR102	XMULWR10-2	XMULWR10-3	XMULWR10-4	XMULWR10-5	XMULWR109	XMULWR11	XMULWR116-114	XMULWR121	XMULWR122	XMULWR123	XMULWR129
			Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
			Sampling Method:		XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF
Analyte grouping/Analyte			**Units**	**LOD**															
Field Portable XRF																			
Arsenic	300	160	mg/kg		102.69	46.18	<LOD	<LOD	12.94	14.96	62.43	15.62	<LOD	10.01	<LOD	6.95	<LOD	<LOD	6.95
Barium			mg/kg		<LOD	<LOD	<LOD	275.95	<LOD	<LOD	<LOD	154.78	367.68	<LOD	358.17	424.62	273.26	302.29	415.47
Cadmium	90		mg/kg		<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
Chromium	300	710	mg/kg		<LOD	29.31	<LOD	<LOD	<LOD	<LOD	43.5	34	<LOD	<LOD	29.78	<LOD	<LOD	<LOD	<LOD
Cobalt	300		mg/kg		<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	59.07	<LOD	106.91	<LOD	**359.16**	<LOD	<LOD
Copper	17000	160	mg/kg		**671.96**	**278.73**	<LOD	<LOD	108.61	118.79	**469.08**	143.61	<LOD	15.55	<LOD	<LOD	19.92	21.29	<LOD
Iron			mg/kg		15293.54	10816.84	3879.6	6398.13	5769.17	11200.7	12003	10455.26	6090.25	11104	10590.12	10618.45	17052.16	9442.22	11138.6
Lead	600	1800	mg/kg		**1551.24**	516.79	<LOD	6.1	184.56	328.74	**1190.96**	218.99	6.84	42.04	<LOD	7.9	24.88	12.77	9.21
Manganese	19000		mg/kg		334.84	344.58	90.84	105.28	57.12	211.96	619.73	164.77	66.87	290.54	174.41	168.94	429.12	154.12	115.06
Mercury	80		mg/kg		<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
Nickel	1200	340	mg/kg		<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	30.45	<LOD
Zinc	30000	370	mg/kg		**4330.75**	**2606.76**	27.36	29.19	**3470.43**	**885.6**	**2396.76**	**1097.93**	21.8	237.1	36.74	22.89	49.28	24.87	24.85

LOD = Limit of Detection

LOR = Limit of Reporting

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

Concentration in **orange** font and grey box exceed the adopted HIL for Open Space land use

Concentration in **green** font and grey box exceed the adopted EIL for Commercial/Industrial use

Concentrations in box exceed the screening value >2.

Where one or more guideline value is exceeded, the highest guideline exceeded will be highlighted

[a] Human Health Guideline for Lead adopted from the Human Health Risk Assessment (Ramboll 2019d)

Table 12:
Tarago Area DSI - Tarago Town XRF Results

	NEPM 2013 HIL C Open Space	NEPM EIL Commercial / Industrial (site specific)	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
			Easting		741737	741826	741827	741866	741293	741254	741295	741300	741308	741329	741309	741357	741415	741499	741537
			Northing		6116547	6116566	6116543	6116540	6115578	6115388	6115598	6115623	6115659	6115710	6115683	6115776	6115858	6116006	6116105
			Sample date:		19-03-20	19-03-20	19-03-20	19-03-20	23-03-20	23-03-20	23-03-20	23-03-20	23-03-20	23-03-20	23-03-20	23-03-20	23-03-20	23-03-20	19-03-20
			Sample ID:		XMULWR131	XMULWR141	XMULWR142	XMULWR144	XMULWR18	XMULWR2	XMULWR22-20	XMULWR24	XMULWR28-26	XMULWR36	XMULWR41	XMULWR44	XMULWR54	XMULWR72-70	XMULWR83-79
			Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
			Sampling Method:		XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF
Analyte grouping/Analyte			**Units**	**LOD**															
Field Portable XRF																			
Arsenic	300	160	mg/kg		6.84	17.5	4.92	<LOD	<LOD	14.91	6.13	<LOD	10.21	17.03	<LOD	<LOD	9.54	<LOD	<LOD
Barium			mg/kg		486.97	418.3	121.06	205.59	<LOD	<LOD	<LOD	126.62	232.14	669.56	339.71	107.74	424.33	303.79	213.26
Cadmium	90		mg/kg		<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
Chromium	300	710	mg/kg		34.67	76.98	<LOD	<LOD	30.07	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	25.67	32.13	27.82	<LOD
Cobalt	300		mg/kg		<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	49.42	<LOD	<LOD	<LOD	<LOD
Copper	17000	160	mg/kg		<LOD	19.07	16.72	23.84	29.14	153.96	<LOD	24.7	25.84	32.02	<LOD	<LOD	24.05	21.02	26.65
Iron			mg/kg		11709.37	30145.75	12907.11	7165.08	6741.08	8509.09	9263.39	7038.46	9327.01	9779.12	4731.88	8265.75	9932.57	6417.06	8896.3
Lead	600	1800	mg/kg		12.92	9.98	<LOD	<LOD	<LOD	171.61	13.07	11.03	10.49	7.3	<LOD	5.77	<LOD	8.09	17.65
Manganese	19000		mg/kg		156.89	94.46	68.32	136.33	280.17	408.79	517.77	477.37	434.87	243.06	218.65	275.12	251.52	330.31	325.2
Mercury	80		mg/kg		<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
Nickel	1200	340	mg/kg		<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	33.7	<LOD
Zinc	30000	370	mg/kg		33.66	35.29	16.16	27.08	73.34	**929.36**	96.11	69.08	87.4	180.96	18.8	86.47	31.23	36.35	42.55

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Concentration in **orange** font and grey box exceed the adopted HIL for Open Space land use

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Concentrations in box exceed the screening value >2.

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Table 12:
Tarago Area DSI - Tarago Town XRF Results

	NEPM 2013 HIL C Open Space	NEPM EIL Commercial / Industrial (site specific)	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
			Easting		741564	741360	741605	741626	741813	742155	742138	742133	741092	741098	741105	741034	741015	741026	741079
			Northing		6116114	6115565	6116226	6116215	6116016	6116073	6116083	6116093	6115345	6115379	6115408	6115147	6115110	6115169	6115287
			Sample date:		19-03-20	23-03-20	19-03-20	19-03-20	19-03-20	24-03-20	24-03-20	24-03-20	23-03-20	23-03-20	23-03-20	23-03-20	23-03-20	23-03-20	23-03-20
			Sample ID:		XMULWR84-82	XMULWR9	XMULWR95	XMULWR96	XMW4_0-0.005	XPSR	XPSR	XPSSP	XROSE21-23	XROSE25	XROSE27-29	XROSER11	XROSER12-10	XROSER14	XROSER17
			Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
			Sampling Method:		XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF
Analyte grouping/Analyte			**Units**	**LOD**															
Field Portable XRF																			
Arsenic	300	160	mg/kg		6.16	17.31	6.56	<LOD	**204.84**	<LOD	<LOD	<LOD	8.81	<LOD	<LOD	13.83	<LOD	<LOD	<LOD
Barium			mg/kg		200.62	<LOD	303.52	366.58	316.71	<LOD	<LOD	342.49	90.22	<LOD	253.08	312.85	863.96	270.12	<LOD
Cadmium	90		mg/kg		<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
Chromium	300	710	mg/kg		<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	88.83	<LOD	<LOD	25.74
Cobalt	300		mg/kg		<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	**464.12**	<LOD	<LOD	<LOD
Copper	17000	160	mg/kg		15.19	37.19	17.39	21.65	**466.53**	51.4	<LOD	<LOD	<LOD	26.22	25.34	<LOD	17.84	14.79	26.9
Iron			mg/kg		8046.65	9015.72	7020.99	13580.76	20609.84	5719.68	2131.51	1903.78	14391.66	9304.09	13180.12	72358.66	14113.56	9294.64	6353.51
Lead	600	1800	mg/kg		10.6	56.69	7.07	7.02	**2097.97**	21.09	<LOD	<LOD	7.99	39.45	132.75	21.35	<LOD	<LOD	14.65
Manganese	19000		mg/kg		398.52	370.83	392.26	360.07	422.59	466.5	97.46	80.03	362.33	608.47	371.65	175.83	162.46	214.48	314.54
Mercury	80		mg/kg		<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
Nickel	1200	340	mg/kg		<LOD	<LOD	<LOD	34.66	42.57	<LOD	<LOD	53.56	<LOD	<LOD	<LOD	<LOD	61.51	<LOD	<LOD
Zinc	30000	370	mg/kg		36.32	355.43	46.67	85.97	**579.74**	**1595.08**	26.14	16.71	91.34	195.47	168.02	57.88	44.36	39.04	135.92

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Table 12:
Tarago Area DSI - Tarago Town XRF Results

	NEPM 2013 HIL C Open Space	NEPM EIL Commercial / Industrial (site specific)	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
			Easting		741136	741070	741092	740984	741101	740967	741142	741145	741150	741150	741153	741156	741161	741164	740986
			Northing		6115302	6115313	6115420	6114983	6115484	6114968	6115593	6115614	6115638	6115660	6115673	6115696	6115720	6115734	6115047
			Sample date:		23-03-20	23-03-20	23-03-20	23-03-20	23-03-20	23-03-20	23-03-20	23-03-20	23-03-20	23-03-20	23-03-20	23-03-20	23-03-20	23-03-20	23-03-20
			Sample ID:		XROSER19	XROSER20	XROSER26	XROSER3-1	XROSER34	XROSER4-2	XROSER45	XROSER47	XROSER49	XROSER51	XROSER53	XROSER55	XROSER57	XROSER59	XROSER6
			Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
			Sampling Method:		XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF
Analyte grouping/Analyte			**Units**	**LOD**															
Field Portable XRF																			
Arsenic	300	160	mg/kg		<LOD	<LOD	<LOD	<LOD	<LOD	4.75	11.57	8.66	18.08	7.66	<LOD	10.04	15.1	8.54	<LOD
Barium			mg/kg		198.94	278.03	160.9	714.13	<LOD	91.55	378.43	<LOD	458.57	228.21	411.12	138.1	376.78	293.71	315.34
Cadmium	90		mg/kg		<LOD	16.37	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
Chromium	300	710	mg/kg		22.7	28.69	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
Cobalt	300		mg/kg		<LOD	<LOD	437.04	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	131.5	<LOD
Copper	17000	160	mg/kg		19.19	<LOD	20.28	20.48	<LOD	<LOD	34.44	17.39	32.39	<LOD	<LOD	16.62	37.74	30.94	<LOD
Iron			mg/kg		6631.09	17919.29	26978.2	15990.79	4127.69	4231.55	13931.09	7947.66	18843.9	8744.53	6078.16	9396.94	14981.66	12124.38	7301.06
Lead	600	1800	mg/kg		8.46	<LOD	253.84	33.06	<LOD	<LOD	16.06	24.66	147.9	20.97	10.89	17.88	38.39	27.81	<LOD
Manganese	19000		mg/kg		274.88	99.6	315.65	257.61	252.62	125.18	297.19	209.17	590.85	340.14	254.36	266	278.31	521.98	106.29
Mercury	80		mg/kg		<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
Nickel	1200	340	mg/kg		<LOD	<LOD	<LOD	45.66	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
Zinc	30000	370	mg/kg		65.58	46.95	152.51	158.7	63.49	16.64	153.86	298.33	227.2	81.12	52.11	70.57	95.96	110.48	27.73

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Table 12:
Tarago Area DSI - Tarago Town XRF Results

	NEPM 2013 HIL C Open Space	NEPM EIL Commercial / Industrial (site specific)	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
			Easting		741163	741030	742264	742230	742181	742168	741807	741810	741817	741436	741445	741460	741468	741484	741393
			Northing		6115751	6115132	6116059	6116123	6115985	6116115	6116026	6116025	6116019	6115570	6115580	6115605	6115616	6115639	6115501
			Sample date:		23-03-20	23-03-20	24-03-20	24-03-20	24-03-20	24-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20
			Sample ID:		XROSER61	XROSER9	XSG1	XSG2	XSG3	XSGTC-1	XSMC1	XSMC2	XSMC3	XSTEWR10	XSTEWR12	XSTEWR14	XSTEWR16	XSTEWR18	XSTEWR2
			Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
			Sampling Method:		XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF
Analyte grouping/Analyte			**Units**	**LOD**															
Field Portable XRF																			
Arsenic	300	160	mg/kg		7.09	11.72	6.76	<LOD	10.76	7.49	10.69	41.57	140.84	16.08	9.48	<LOD	<LOD	16.97	<LOD
Barium			mg/kg		431.84	251.58	<LOD	165.3	113.15	129.77	393.15	<LOD	<LOD	<LOD	377.3	223.12	433.02	<LOD	<LOD
Cadmium	90		mg/kg		<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
Chromium	300	710	mg/kg		31.55	50.4	38.82	<LOD	<LOD	<LOD	28.62	<LOD	53.53	59.01	28.89	<LOD	<LOD	<LOD	<LOD
Cobalt	300		mg/kg		78.4	186.43	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	59.78	<LOD	<LOD
Copper	17000	160	mg/kg		20.03	22.07	35.05	23.69	38.66	27.17	87.27	**317.68**	**421.15**	78.24	49.43	69.32	32.1	66.34	13.49
Iron			mg/kg		14076.2	39447.87	14976.71	14969.08	12588.24	10108.22	10358.12	10566.54	24154.72	9690.31	10057.12	10831.61	8602.95	10680.23	5280.17
Lead	600	1800	mg/kg		9.45	13.21	38.83	56.85	51.98	24.1	332.05	**1052.25**	**1298.2**	23.74	72.72	111.63	37.09	238.32	51.5
Manganese	19000		mg/kg		242.83	225.52	298.71	277.47	188.93	251.73	223.54	179.97	481.43	576.13	135.82	273.35	284.99	446.18	251.75
Mercury	80		mg/kg		<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
Nickel	1200	340	mg/kg		<LOD	51.44	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
Zinc	30000	370	mg/kg		47.91	62.55	131.18	143.01	253.86	363.7	**622.1**	**1866.57**	**2479.04**	345.41	181.16	260.22	284.21	**1114.68**	**435.88**

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	NEPM 2013 HIL C Open Space	NEPM EIL Commercial / Industrial (site specific)	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
			Easting		741496	741416	741431	741991	741971	741946	741868	741909	742047	741991	741976	742019	741954	742056	741918
			Northing		6115650	6115537	6115560	6116010	6116019	6116025	6116027	6116015	6116001	6115998	6115999	6116009	6116006	6115988	6116030
			Sample date:		18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20
			Sample ID:		XSTEWR20	XSTEWR6	XSTEWR8	XWALLR10-12	XWALLR14	XWALLR16	XWALLR17	XWALLR17B	XWALLR4-6	XWALLR5	XWALLR7	XWALLR8	XWALLR9	XWALLRLD	XWALLRTH1
			Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
			Sampling Method:		XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF
Analyte grouping/Analyte			**Units**	**LOD**															
Field Portable XRF																			
Arsenic	300	160	mg/kg		<LOD	<LOD	<LOD	16.86	12.33	10.62	19.55	<LOD	<LOD	<LOD	<LOD	<LOD	9.85	<LOD	12.56
Barium			mg/kg		282	205.09	<LOD	138.35	45.77	<LOD	<LOD	513.3	354.94	424.19	142.73	<LOD	113.48	536.29	471.4
Cadmium	90		mg/kg		<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	11.01	<LOD	<LOD	<LOD	<LOD	10.93	<LOD
Chromium	300	710	mg/kg		<LOD	<LOD	<LOD	<LOD	22.92	<LOD	<LOD	<LOD	<LOD	28.46	<LOD	28.44	<LOD	24.51	<LOD
Cobalt	300		mg/kg		<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	116.12	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
Copper	17000	160	mg/kg		24.02	36.43	13.46	71.7	72.39	68.98	57.83	73.39	45.39	77.88	25.29	75.33	65.44	78.97	32.73
Iron			mg/kg		12293.38	10463.39	6479.15	11760.83	13763.41	15616.68	8419.86	18116.61	11392.98	11943.13	8889.32	12602.05	14734.1	13582.33	8848.4
Lead	600	1800	mg/kg		44.95	70.01	47.99	217.17	115.57	115.42	174.46	109.75	80.78	191.19	327.32	109.86	131.82	112.49	88.77
Manganese	19000		mg/kg		429.61	346.2	279.45	223.21	235.01	197.09	377.72	370.03	235.13	229.72	297.04	357.5	388.44	259.45	212.88
Mercury	80		mg/kg		<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
Nickel	1200	340	mg/kg		<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	40.26	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
Zinc	30000	370	mg/kg		115.32	165.7	**381.74**	**576.54**	**504.19**	**634.35**	**1089.46**	331.29	285.86	364.07	288.75	**950.96**	**529.84**	**411.16**	313.36

LOD = Limit of Detection

LOR = Limit of Reporting

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

Concentration in **orange** font and grey box exceed the adopted HIL for Open Space land use

Concentration in **green** font and grey box exceed the adopted EIL for Commercial/Industrial use

Concentrations in box exceed the screening value >2.

Where one or more guideline value is exceeded, the highest guideline exceeded will be highlighted

[a] Human Health Guideline for Lead adopted from the Human Health Risk Assessment (Ramboll 2019d)

Table 12:
Tarago Area DSI - Tarago Town XRF Results

	NEPM 2013 HIL C Open Space	NEPM EIL Commercial / Industrial (site specific)				Soil	Soil
			Sample Type:			**Soil**	**Soil**
			Easting			741921	741898
			Northing			6116047	6116032
			Sample date:			18-03-20	18-03-20
			Sample ID:			XWALLRTH2	XWALLRTH3
			Project Name:			Community DSI	Community DSI
			Sampling Method:			XRF	XRF
Analyte grouping/Analyte			**Units**	**LOD**			
Field Portable XRF							
Arsenic	300	160	mg/kg			<LOD	17.22
Barium			mg/kg			256.73	380.66
Cadmium	90		mg/kg			<LOD	<LOD
Chromium	300	710	mg/kg			<LOD	<LOD
Cobalt	300		mg/kg			<LOD	<LOD
Copper	17000	160	mg/kg			55.11	115.04
Iron			mg/kg			8748.64	14716.37
Lead	600	1800	mg/kg			177.74	280.67
Manganese	19000		mg/kg			223.04	346.33
Mercury	80		mg/kg			<LOD	<LOD
Nickel	1200	340	mg/kg			<LOD	<LOD
Zinc	30000	370	mg/kg			**572.34**	**894.61**

LOD = Limit of Detection

LOR = Limit of Reporting

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

Concentration in **orange** font and grey box exceed the adopted HIL for Open Space land use

Concentration in **green** font and grey box exceed the adopted EIL for Commercial/Industrial use

Concentrations in box exceed the screening value >2.

Where one or more guideline value is exceeded, the highest guideline exceeded will be highlighted

[a] Human Health Guideline for Lead adopted from the Human Health Risk Assessment (Ramboll 2019d)

Table 13:
Tarago Area DSI - Haul Route XRF Results

	NEPM 2013 HIL D Commercial / Industrial	NEPM EIL Commercial / Industrial (site specific)	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
			Easting		741874	735784	735783	736459	736444	736766	736754	737278	737273	737431	737415	737588	737573
			Northing		6116040	6117481	6117462	6116815	6116804	6116302	6116290	6115906	6115896	6115527	6115513	6114952	6114943
			Sample date:		18-03-20	23-03-20	23-03-20	23-03-20	23-03-20	23-03-20	23-03-20	23-03-20	23-03-20	23-03-20	23-03-20	23-03-20	23-03-20
			Sample ID:		XBOYD1E	XMR0L	XMR0R	XMR1000L	XMR1000R	XMR1500L	XMR1500R	XMR2200L	XMR2200R	XMR2600L	XMR2600R	XMR3200L	XMR3200R
			Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
			Sampling Method:		XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF
Analyte grouping/Analyte			**Units**	**LOD**													
Field Portable XRF																	
Arsenic	300	160	mg/kg		20.94	22.8	78.25	81.27	23.59	33.15	<LOD	24.43	10.88	<LOD	<LOD	21.9	30.29
Barium			mg/kg		<LOD	721.85	596.43	187.05	<LOD	220.12	360.46	125.07	<LOD	685.83	341.04	<LOD	182.15
Cadmium	90		mg/kg		<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
Chromium	300	710	mg/kg		<LOD	74.09	84.53	<LOD	<LOD	<LOD	45.71	54.21	<LOD	<LOD	<LOD	<LOD	<LOD
Cobalt	300		mg/kg		<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
Copper	17000	160	mg/kg		58.24	**161.37**	**362.98**	**256.24**	**274.37**	108.66	91.56	**518.36**	56.23	114.57	24.26	102.89	**165.29**
Iron			mg/kg		8418.78	29192.75	26219.97	21112.43	10743.8	14098.66	13989.28	21684.43	11107.11	13996.68	7038.58	17821.49	7362.91
Lead	600	1800	mg/kg		162.1	298.71	541.15	**600.23**	447.27	411.71	162.91	365.23	145.58	335.06	70.77	196.39	416.37
Manganese	19000		mg/kg		119.33	598.98	479.41	353.49	141.74	171.29	350.74	1100.3	289.34	246.24	109.48	338.45	86.47
Mercury	80		mg/kg		<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
Nickel	1200	340	mg/kg		<LOD	71.91	66.36	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	43.2	<LOD	<LOD	33.68
Zinc	30000	370	mg/kg		**512.36**	**907.86**	**1829.7**	**1206.63**	**591.55**	**736.86**	**886.87**	**3872.08**	**752.86**	**504.14**	161.21	**776.19**	**509.72**

LOD = Limit of Detection

LOD = Limit of Detection

LOR = Limit of Reporting

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

Concentration in **orange** font and grey box exceed the adopted HIL for Commercial Industrial land use

Concentration in **green** font and grey box exceed the adopted EIL 'D' for Commercial/Industrial use

Concentrations in box exceed the screening value >2.5 t

Where one or more guideline value is exceeded, the highest guideline exceeded will be highlighted

[a] Human Health Guideline for Lead adopted from the Human Health Risk Assessment (Ramboll 2019d)

Table 13:
Tarago Area DSI - Haul Route XRF Results

	NEPM 2013 HIL D Commercial / Industrial	NEPM EIL Commercial / Industrial (site specific)	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
			Easting		737721	737719	737690	737946	737934	738479	738468	736216	736194	738684	738672	739072	739083
			Northing		6114502	6114486	6114500	6114145	6114136	6113605	6113591	6117190	6117178	6113400	6113378	6113526	6113515
			Sample date:		23-03-20	23-03-20	23-03-20	23-03-20	24-03-20	24-03-20	24-03-20	23-03-20	23-03-20	24-03-20	24-03-20	24-03-20	24-03-20
			Sample ID:		XMR3600L	XMR3600L2	XMR3600R	XMR4100L	XMR4100R	XMR5000L	XMR5000R	XMR500L	XMR500R	XMR5200L	XMR5200R	XMR5500L	XMR5500R
			Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
			Sampling Method:		XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF	XRF
Analyte grouping/Analyte			**Units**	**LOD**													
Field Portable XRF																	
Arsenic	300	160	mg/kg		29.17	92.79	17.57	1	1	43.85	74.72	53.78	26.6	25.05	13.04	21.24	14.59
Barium			mg/kg		<LOD		<LOD	<LOD	106.98	603.99	<LOD	<LOD	433.18	<LOD	<LOD	<LOD	383.37
Cadmium	90		mg/kg		<LOD		<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
Chromium	300	710	mg/kg		<LOD	<LOD	<LOD	<LOD	<LOD	46.14	<LOD	<LOD	125.08	<LOD	33.78	48.91	<LOD
Cobalt	300		mg/kg		<LOD	<LOD	120.19	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
Copper	17000	160	mg/kg		**193.89**	**553.64**	98.9	159.45	67.35	**476.79**	**379.21**	**501.54**	**178.94**	96.29	45.39	101.1	106.98
Iron			mg/kg		17087.65	12959.83	18216.39	12483.51	6489.92	19930.67	17668	19538.44	40800.99	13120.65	8552.05	19528.71	18356.4
Lead	600	1800	mg/kg		**1285.72**	**1064.81**	396.09	**756.95**	219.37	**640.13**	**1116.03**	**1527.26**	481.13	214.59	99.55	262.81	260.45
Manganese	19000		mg/kg		583.61	160.66	279.25	470.27	106.25	394.91	179.92	215.19	262.12	92.15	428.61	333.59	255.08
Mercury	80		mg/kg		<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
Nickel	1200	340	mg/kg		<LOD	<LOD	<LOD	<LOD	<LOD	36.65	<LOD	<LOD	35.15	<LOD	<LOD	<LOD	<LOD
Zinc	30000	370	mg/kg		**3353.21**	**2047.23**	**730.26**	**1349.8**	**587.41**	**687.18**	**1293.95**	**1556.17**	**454.57**	**945.95**	**1693.07**	**1247.04**	**506.69**

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

Concentration in **orange** font and grey box exceed the adopted HIL for Commercial Industrial land use

Concentration in **green** font and grey box exceed the adopted EIL 'D' for Commercial/Industrial use

Concentrations in box exceed the screening value >2.5 t

Where one or more guideline value is exceeded, the highest guideline exceeded will be highlighted

[a] Human Health Guideline for Lead adopted from the Human Health Risk Assessment (Ramboll 2019d)

Table 13:
Tarago Area DSI - Haul Route XRF Results

	NEPM 2013 HIL D Commercial / Industrial	NEPM EIL Commercial / Industrial (site specific)	Sample Type:		Soil	Soil	Soil	Soil
			Easting		739400	739399	739885	739903
			Northing		6113723	6113685	6114526	6114515
			Sample date:		24-03-20	24-03-20	24-03-20	24-03-20
			Sample ID:		XMR6000L	XMR6000R	XMR7000L	XMR7000R
			Project Name:		Community DSI	Community DSI	Community DSI	Community DSI
			Sampling Method:		XRF	XRF	XRF	XRF
Analyte grouping/Analyte			**Units**	**LOD**				
Field Portable XRF								
Arsenic	300	160	mg/kg		45.68	92.3	**373.89**	**208.01**
Barium			mg/kg		108.54	593.4	676.95	<LOD
Cadmium	90		mg/kg		<LOD	16.44	35.73	<LOD
Chromium	300	710	mg/kg		32.31	<LOD	63.79	48.55
Cobalt	300		mg/kg		<LOD	<LOD	<LOD	<LOD
Copper	17000	160	mg/kg		**189.34**	**338.64**	**1943.62**	**550.08**
Iron			mg/kg		17278.38	13235.01	25931.15	22612.94
Lead	600	1800	mg/kg		352.12	**1235.66**	**4320.82**	**1499.77**
Manganese	19000		mg/kg		416.06	342.54	326.78	209.22
Mercury	80		mg/kg		<LOD	<LOD	<LOD	<LOD
Nickel	1200	340	mg/kg		<LOD	<LOD	<LOD	<LOD
Zinc	30000	370	mg/kg		**1072.11**	**3147.89**	**7624.91**	**2673.44**

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Concentrations in box exceed the screening value >2.5 t

Where one or more guideline value is exceeded, the highest guideline exceeded will be highlighted

[a] Human Health Guideline for Lead adopted from the Human Health Risk Assessment (Ramboll 2019d)

Client: John Holland Rail
Job No: 318000780
Project Name: DSI Addendum

Table I: Field Physico-Chemical Parameters

Sample Location	Sample Date	Time	Sample Depth (mm below surface)	Temperature (°C)	Spec Conductivity (µScm-¹)	pH	Dissolved Oxygen (mg/L)	Redox (mV)	TDS (ppm)	Comments
SW1_UP										
SW1_UP	13-Aug-19	7:45	*Not recorded*	*Not recorded*	*Not recorded*	*Not recorded*	*Not recorded*	*Not recorded*	*Not recorded*	Not recorded
SW1_UP	24-Sep-19	*Not recorded*	100	*Not recorded*	*Not recorded*	*Not recorded*	*Not recorded*	*Not recorded*	*Not recorded*	Clear/slightly brown. Frogs audible.
SW1_UP	29-Jan-20	---	---	---	---	---	---	---	---	DRY
SW1_UP	1-Apr-20	13:25	200	19.94	584	7.05	4.72	154.0	374.0	Clear. No turbidity. No odour. No flow.
SW1_UP	11-Aug-20	*Not recorded*	100	8.0	205.6	7.43	10.55	170.7	133.3	Clear to slightly brown. Flowing.
SW1_UP	13-Oct-20	7:37	400	11.9	673	7.39	2.6	94.0	431.0	Water clear/brown, flowing.
SW1										
SW1	29-Jan-20	---	---	---	---	---	---	---	---	DRY
SW1	1-Apr-20	12:45	100	17.4	575	6.35	5.88	115.0	368.0	Clear to brown, low/no turbidity, minor suspended solids. No odour. No flow.
SW1	11-Aug-20	Not recorded	100	7.8	206.1	7.44	11.00	169.5	133.9	Brown, slightly turbid, continuous flow.
SW1	13-Oct-20	7:35	50	10.38	678	7.7	2.71	125.0	434.0	Water flowing, turbid, yellow/brown, water level shallow.
SW2										
SW2	24-Sep-19	*Not recorded*	Surface. Shallow water.	*Not recorded*	*Not recorded*	*Not recorded*	*Not recorded*	*Not recorded*	*Not recorded*	Clear.
SW2	29-Jan-20	---	---	---	---	---	---	---	---	DRY
SW2	1-Apr-20	13:50	100	17.5	358	7.25	3.84	163.0	233.0	Brown, low-medium turbidity, some suspended solids. No odour. No flow.
SW2	30-Apr-20	17:40	50	9.8	605	6.54	3.32	185.9	391.9	Collected at Goulburn Street footbridge. Clear, not flowing.
SW2	11-Aug-20	*Not recorded*	100	7.3	213.3	8.13	10.59	185.2	137.8	Clear to slightly turbid. Flowing.
SW2	13-Oct-20	8:15am	200	11.8	650	8.27	5.92	96.0	416.0	Water clear, flowing, water level low.
SW3										
SW3	24-Sep-19	*Not recorded*	50	*Not recorded*	*Not recorded*	*Not recorded*	*Not recorded*	*Not recorded*	*Not recorded*	Moderate turbidity. Frogs audible.
SW3	29-Jan-20	---	---	---	---	---	---	---	---	DRY
SW3	1-Apr-20	14:20	100	21.8	245	6.23	5.24	178.0	159.0	Brown to yellow, medium turbidity, some brown matter at surface.
SW3	11-Aug-20	*Not recorded*	100	8.9	142.5	7.43	9.43	174.7	92.3	Brown to clear.
SW3	13-Oct-20	8:36	100	11.63	229	7.96	4.84	137.0	149.0	Water clear/brown to slightly turbid, flowing.
SW4										
SW4	6-Aug-19	11:35	100	12.4	128.2	8.8	9.74	200.0	*Not recorded*	Stagnant pond, clear to slightly yellow.
SW4	24-Sep-19	*Not recorded*	100	*Not recorded*	*Not recorded*	*Not recorded*	*Not recorded*	*Not recorded*	*Not recorded*	Turbid. Frogs audible.
SW4	29-Jan-20	---	---	---	---	---	---	---	---	DRY
SW4	1-Apr-20	15:00	200	20.33	297	6.73	5.24	168.0	193.0	Light brown, low turbidity. No odour. No flow.
SW4	30-Apr-20	17:30	50	9	388.3	5.75	3.53	263.1	251.8	Collected at Boyd Street culvert. Flowing.
SW4	11-Aug-20	*Not recorded*	100	7.4	153.4	7.69	10.42	210.9	99.5	Brown, slightly turbid, full but flow not evident.
SW4	13-Oct-20	8:50	300	13.1	307	8.19	5.73	107.0	200.0	Water flowing, turbid, brown, no odour.
SW5										
SW5	29-Jan-20	---	---	---	---	---	---	---	---	DRY
SW5	1-Apr-20	---	---	---	---	---	---	---	---	DRY
SW5	11-Aug-20	*Not recorded*	100	11.2	117.9	7.33	7.94	163.2	76.7	Brown, turbid, flow at culvert evident beneath crushed rock.
SW5	13-Oct-20	9:06	50	11.95	187	8.35	4.06	-3.0	121.0	Water not flowing, very shallow, turbid, light brown, no odour.
SW6										
SW6	29-Jan-20	---	---	---	---	---	---	---	---	DRY
SW6	1-Apr-20	---	---	---	---	---	---	---	---	DRY
SW6	11-Aug-20	*Not recorded*	50	8.3	168.3	7.47	9.61	187.0	109.2	Brown, slightly turbid. Not flowing.
SW6	13-Oct-20	---	---	---	---	---	---	---	---	DRY
SW7										
SW7	29-Jan-20	10:00	50	23.1	609	8.92	8.46	83.0	396.6	Silty, from dam, low level water.
SW7	2-Apr-20	*Not recorded*	10	18.1	2342	7.23	4.45	114.2	152.1	Highly turbid.
SW7	11-Aug-20	*Not recorded*	100	12.5	94.7	7.26	7.80	109.8	61.8	Brown, turbid.
SW7	12-Oct-20	17:46	200	21.34	172	7.69	5.35	56.0	112.0	Water slightly turbid, brown, not flowing.
SW8										
SW8	29-Jan-20	11:01	100	23.6	1007	7.77	5.22	121.6	656.5	Upstream Lumley Road bridge. Clear, vegetation. Not flowing.
SW8	2-Apr-20	9:30am	10	18	425.7	7.23	4.39	124.0	276.9	Grease at surface, lots of algae growing on plants.
SW8	10-Aug-20	*Not recorded*	100	9.1	170.5	8.53	9.34	123.6	107.9	Water flowing, level high, turbid, sediment sample collected higher up embankment than previous round due to water level.
SW8	12-Oct-20	17:26	200	20.12	847	7.76	7.58	84.0	542.0	Water flowing, clear/brown.
SW9										
SW9	29-Jan-20	12:22	300	25.0	125.3	8.35	16.8	99.4	812.5	Stagnant pond. Algae and fish present. Slightly turbid.
SW9	02-Apr-20	*Not recorded*	10	18.2	381.7	7.62	6.29	124.5	247.7	Non-turbid, slightly brown, not flowing but full.
SW9	10-Aug-20	*Not recorded*	100	8.9	178.2	7.84	10.73	173.6	115.7	High level, brown, slightly turbid, bubbles at surface.
SW9	12-Oct-20	16:47	200	21.39	852	8.17	10.04	83.0	545.0	Water flowing, clear/brown, slightly turbid.
SW10										
SW10	13-Oct-20	12:26	400	16.02	881	7.19	3.58	79.0	564.0	Water flowing, clear/brown, slightly turbid, no odour.

Notes
ppm = parts per million
µScm-¹ = microSiemens per centimetre
mV = milli Volts
n/a = not applicable

Client: John Holland Rail
Job No: 318000780
Project Name: DSI Addendum

Table II: Surface Water Results

	95% Freshwater (ANZG 2018)	Hardness Correction Value Applied (ANZECC 2000)	Drinking Water (ADWG 2011)	Irrigation Short-term Trigger Value (ANZECC 2000)	Stock Water (ANZECC 2000)													
Sample Type:								Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
Lab ID								S19-Au17273	S19-Se37061	-	S20-Ap12287	S20-Au23116	S20-Oc25321	-	S20-Ap12286	S20-Au23115	S20-Oc25141	S19-Se37062	-
Sample date:								13-Aug-19	24-Sep-19	29-Jan-20	1-Apr-20	11-Aug-20	13-Oct-20	29-Jan-20	1-Apr-20	11-Aug-20	13-Oct-20	24-Sep-19	29-Jan-20
Sample ID:								SW1-UP	SW1-UP	SW1_UP	SW1-UP	SW1_UP	SW1_UP	SW1	SW1	SW1	SW1	SW2	SW2
Project Name:								Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring
Project No:								318000780	318000780	318000780	318000780	318000780	318000780	318000780	318000780	318000780	318000780	318000780	318000780
Sample Location								Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop
Sampling Method:								Grab Sample	Grab Sample	-	Grab Sample	Grab Sample	Grab Sample	-	Grab Sample	Grab Sample	Grab Sample	Grab Sample	-
Guidelines						**Sample Description:**		Not recorded.	Clear/slightly brown.	DRY	Clear. No turbidity. No odour.	Clear to slightly brown. Flowing.	Water clear/brown, flowing.	DRY	Clear to brown, low/no turbidity, minor suspendid solids. No odour.	Brown, slightly turbid, continuous flow.	Water flowing, turbid, yellow/borwn, water level shallow.	Clear.	DRY
Analyte grouping/Analyte						**Units**	**LOR**												
Dissolved and Total Metals																			
Aluminium	0.055[a]	-	**-**	20	5	mg/L	0.05	-	-	-	< 0.05	0.85	< 0.05	-	0.13	0.88	*0.61*	**-**	-
Dissolved Aluminium	0.055[a]	-	**-**	20	5	mg/L	0.05	< 0.05	< 0.05	-	-	0.45	< 0.05	-	-	*0.54*	< 0.05	< 0.05	-
Arsenic	0.024[b]	-	0.01	2	0.5-5	mg/L	0.001	-	-	-	< 0.001	< 0.001	< 0.001	-	0.004	< 0.001	0.004	**-**	-
Dissolved Arsenic	0.024[b]	-	0.01	2	0.5-5	mg/L	0.001	< 0.001	<0.001	-	-	< 0.001	< 0.001	-	-	< 0.001	< 0.001	< 0.001	-
Barium	-	-	2	-	-	mg/L	0.001	-	-	-	0.1	0.05	0.1	-	0.15	0.04	0.36	**-**	-
Dissolved Barium	-	-	2	-	-	mg/L	0.001	0.1	0.1	-	-	0.04	0.1	-	-	0.04	0.11	0.07	-
Beryllium	-	-	0.06	0.5	-	mg/L	0.001	-	-	-	< 0.001	< 0.001	< 0.001	-	< 0.001	< 0.001	< 0.001	**-**	-
Dissolved Beryllium	-	-	0.06	0.5	-	mg/L	0.001	< 0.001	<0.001	-	-	< 0.001	< 0.001	-	-	< 0.001	< 0.001	< 0.001	-
Boron	-	-	-	-	-	mg/L	0.05	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Boron	-	-	-	-	-	mg/L	0.05	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	0.0002	0.00054[g]	0.002	0.05	0.01	mg/L	0.0002	-	-	-	< 0.0002	< 0.0002	< 0.0002	-	0.0013	< 0.0002	*0.0021*	**-**	-
Dissolved Cadmium	0.0002	0.00054[g]	0.002	0.05	0.01	mg/L	0.0002	< 0.0002	<0.0002	-	-	< 0.0002	< 0.0002	-	-	*0.0003*	0.0005	0.0014	-
Chromium	0.001[c]	0.0025[g]	0.05[c]	1	1	mg/L	0.001	-	-	-	< 0.001	0.002	< 0.001	-	< 0.001	*0.002*	0.001	**-**	-
Dissolved Chromium	0.001[c]	0.0025[g]	0.05[c]	1	1	mg/L	0.001	< 0.001	<0.001	-	-	< 0.001	< 0.001	-	-	0.001	< 0.001	< 0.001	-
Cobalt	0.0014	-	-	0.1	1	mg/L	0.001	-	-	-	< 0.001	< 0.001	< 0.001	-	0.014	< 0.001	*0.007*	**-**	-
Dissolved Cobalt	0.0014	-	-	0.1	1	mg/L	0.001	< 0.001	<0.001	-	-	< 0.001	< 0.001	-	-	< 0.001	< 0.001	< 0.001	-
Copper	0.0014	0.0035[g]	2	5	0.4-5	mg/L	0.001	-	-	-	< 0.001	0.002	< 0.001	-	0.019	0.003	*0.014*	**-**	-
Dissolved Copper	0.0014	0.0035[g]	2	5	0.4-5	mg/L	0.001	< 0.001	<0.001	-	-	0.002	< 0.001	-	-	*0.003*	0.002	0.015	-
Iron	-	-	-	10	not sufficiently toxic	mg/L	0.05	-	-	-	0.26	0.93	0.12	-	4.5	0.91	*1.41*	**-**	-
Dissolved Iron	-	-	-	10	not sufficiently toxic	mg/L	0.05	< 0.05	< 0.05	-	-	0.3	< 0.05	-	-	0.34	< 0.05	< 0.05	-
Lead	0.0034	0.0136[g]	0.01	5	0.1	mg/L	0.001	-	< 0.001	-	< 0.001	< 0.001	0.001	-	0.056	0.001	*0.032*	0.003	-
Dissolved Lead	0.0034	0.0136[g]	0.01	5	0.1	mg/L	0.001	< 0.001	<0.001	-	-	< 0.001	< 0.001	-	-	*0.004*	< 0.001	0.014	-
Manganese	1.9	-	0.5	10	not sufficiently toxic	mg/L	0.005	-	-	-	0.044	0.026	0.022	-	0.76	0.024	*0.706*	**-**	-
Dissolved Manganese	1.9	-	0.5	10	not sufficiently toxic	mg/L	0.005	< 0.005	*0.005*	-	-	0.02	0.022	-	-	0.018	*0.044*	0.014	-
Mercury	0.00006[d,e]	-	0.001	0.002	0.002	mg/L	0.0001	-	-	-	< 0.0001	< 0.0001	< 0.0001	-	< 0.0001	< 0.0001	< 0.0001	**-**	-
Dissolved Mercury	0.00006[d,e]	-	0.001	0.002	0.002	mg/L	0.0001	< 0.0001	< 0.0001	-	-	<0.0001	< 0.0001	-	-	< 0.0001	< 0.0001	< 0.0001	-
Nickel	0.011	0.0275[g]	0.02	2	1	mg/L	0.001	-	-	-	< 0.001	0.002	< 0.001	-	0.003	0.002	*0.002*	**-**	-
Dissolved Nickel	0.011	0.0275[g]	0.02	2	1	mg/L	0.001	< 0.001	<0.001	-	-	0.002	< 0.001	-	-	0.002	< 0.001	< 0.001	-
Selenium	-	-	-	-	-	mg/L	0.001	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Selenium	-	-	-	-	-	mg/L	0.001	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	0.008	0.02[g]	-	5	20	mg/L	0.005	-	-	-	0.011	0.011	0.009	-	0.2	0.02	*0.32*	-	-
Dissolved Zinc	0.008	0.02[g]	-	5	20	mg/L	0.005	< 0.005	<0.005	-	-	0.008	< 0.005	-	-	*0.045*	0.073	0.2	-

- indicates no criterion available or not analysed
LOR = Limit of Reporting
Concentrations below the LOR noted as <value
The LOR for mercury exceeds the ecological criteria for 95% protection freshwater ecosystems however concentrations reported as <LOR are considered acceptable as mercury is not a contaminant of concern at the site.
Details of Guideline values are presented in **Section 6** of report (**Table 6-1**)
Concentrations *underlined and in italics* adopted the higher duplicate value
Concentration in a grey box exceed the ecological criteria of 95% protection freshwater ecosytems
Concentrations in a dark grey box exceed the criteria of 95% protection freshwater ecosystems and the hardness corrected value
Concentrations in a bold box exceed the human health guideline value for drinking water
Concentrations in blue font exceed the irrigation short term value
Concentrations in **bold font** exceed stock watering criteria
[a] Aluminium guidelines for pH > 6.5, based on the pH of groundwater measured at the site and surrounding area.
[b] Guideline value for arsenic (III).
[c] Guideline value for chromium (VI).
[d] Guideline value for inorganic mercury.
[e] 99% species protection level DGV has been adopted to account for the bioaccumulating nature of this contaminant.
[f] Hardness correction factor applied to the threshold value as detailed in Section 3.4.3 and Table 3.4.4 of ANZECC 2000. For calculations, water hardness was conservatively presumed moderately hard based on the Goulburn Mulwaree Regional State of the Environment Report 2004-2009.

Client: John Holland Rail
Job No: 318000780
Project Name: DSI Addendum

Table II: Surface Water Results

	95% Freshwater (ANZG 2018)	Hardness Correction Value Applied (ANZECC 2000)	Drinking Water (ADWG 2011)	Irrigation Short-term Trigger Value (ANZECC 2000)	Stock Water (ANZECC 2000)	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
						S20-Ap12288	S20-My01341	S20-Au23117	S20-Oc25143	S19-Se37063	-	S20-Ap12289	S20-Au23118	S20-Oc25145	S19-Au07234	S19-Se37064	-	S20-Ap12290
						1-Apr-20	30-Apr-20	11-Aug-20	13-Oct-20	24-Sep-19	29-Jan-20	1-Apr-20	11-Aug-20	13-Oct-20	06-Aug-19	24-Sep-19	29-Jan-20	1-Apr-20
						SW2	SW2	SW2	SW2	SW3	SW3	SW3	SW3	SW3	SW4	SW4	SW4	SW4
						Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring
						318000780	318000780	318000780	318000780	318000780	318000780	318000780	318000780	318000780	318000780	318000780	318000780	318000780
						Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop
						Grab Sample	Grab Sample	Grab Sample	Grab Sample	Grab Sample	-	Grab Sample	Grab Sample	Grab Sample	Grab Sample	Grab Sample	-	Grab Sample
Guidelines						Brown, low-medium turbidity, some suspended solids. No odour.	Collected at Goulburn Street footbridge. Not flowing.	Clear to slightly turbid. Flowing.	Water clear, flowing, water level low.	Moderate turbidity.	DRY	Brown to yellow, medium turbidity, some brown matter at surface.	Brown to clear.	Water clear/brown to slightly trubid, flowing.	Stagnant pond, clear to slightly yellow.	Turbid.	DRY	Light brown, low turbidity. No odour.
Analyte grouping/Analyte																		
Dissolved and Total Metals																		
Aluminium	0.055[a]	-	-	20	5	0.08	0.06	0.95	< 0.05	-	-	0.92	0.61	0.46	-	-	-	0.18
Dissolved Aluminium	0.055[a]	-	-	20	5	-	-	0.47	< 0.05	0.3	-	-	0.69	0.4	0.17	0.38	-	-
Arsenic	0.024[b]	-	0.01	2	0.5-5	0.002	< 0.001	< 0.001	< 0.001	-	-	0.004	< 0.001	0.003	-	-	-	0.002
Dissolved Arsenic	0.024[b]	-	0.01	2	0.5-5	-	-	< 0.001	< 0.001	<0.001	-	-	< 0.001	0.002	0.001	<0.001	-	-
Barium	-	-	2	-	-	0.1	0.08	0.05	0.11	-	-	0.1	0.05	0.07	-	-	-	0.07
Dissolved Barium	-	-	2	-	-	-	-	0.04	0.11	0.08	-	-	0.05	0.07	0.04	0.05	-	-
Beryllium	-	-	0.06	0.5	-	< 0.001	< 0.001	< 0.001	< 0.001	-	-	< 0.001	< 0.001	< 0.001	-	-	-	< 0.001
Dissolved Beryllium	-	-	0.06	0.5	-	-	-	< 0.001	< 0.001	<0.001	-	-	< 0.001	< 0.001	<0.001	<0.001	-	-
Boron	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Boron	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	0.0002	0.00054[g]	0.002	0.05	0.01	0.0019	0.0004	< 0.0002	0.0007	-	-	**0.021**	0.0011	0.0036	-	-	-	**0.019**
Dissolved Cadmium	0.0002	0.00054[g]	0.002	0.05	0.01	-	-	< 0.0002	0.0007	0.0053	-	-	0.001	0.0033	*0.0056*	**0.013**	-	-
Chromium	0.001[c]	0.0025[g]	0.05[c]	1	1	0.001	< 0.001	0.002	< 0.001	-	-	0.002	0.001	0.001	-	-	-	< 0.001
Dissolved Chromium	0.001[c]	0.0025[g]	0.05[c]	1	1	-	-	< 0.001	< 0.001	<0.001	-	-	0.001	0.001	<0.001	<0.001	-	-
Cobalt	0.0014	-	-	0.1	1	0.004	0.002	< 0.001	< 0.001	-	-	0.006	< 0.001	< 0.001	-	-	-	0.005
Dissolved Cobalt	0.0014	-	-	0.1	1	-	-	< 0.001	< 0.001	0.005	-	-	< 0.001	< 0.001	<0.001	0.003	-	-
Copper	0.0014	0.0035[g]	2	5	0.4-5	0.023	0.006	0.004	0.004	-	-	0.18	0.018	0.12	-	-	-	0.13
Dissolved Copper	0.0014	0.0035[g]	2	5	0.4-5	-	-	0.003	0.003	0.027	-	-	0.016	0.1	*0.15*	0.2	-	-
Iron	-	-	-	10	not sufficiently toxic	0.94	0.75	1	< 0.05	-	-	1.8	0.6	1.4	-	-	-	0.68
Dissolved Iron	-	-	-	10	not sufficiently toxic	-	-	0.31	< 0.05	0.33	-	-	0.46	1.1	0.22	0.37	-	-
Lead	0.0034	0.0136[g]	0.01	5	0.1	0.02	0.006	0.003	0.004	0.014	-	**0.17**	0.011	0.051	0.013	0.055	-	0.055
Dissolved Lead	0.0034	0.0136[g]	0.01	5	0.1	-	-	< 0.001	< 0.001	0.011	-	-	0.009	0.023	0.008	0.033	-	-
Manganese	1.9	-	0.5	10	not sufficiently toxic	0.41	0.26	0.043	0.017	-	-	0.52	0.017	0.042	-	-	-	0.42
Dissolved Manganese	1.9	-	0.5	10	not sufficiently toxic	-	-	0.015	0.017	0.015	-	-	0.014	0.029	0.015	0.2	-	-
Mercury	0.00006[d,e]	-	0.001	0.002	0.002	< 0.0001	< 0.0001	< 0.0001	< 0.0001	-	-	< 0.0001	< 0.0001	< 0.0001	-	-	-	< 0.0001
Dissolved Mercury	0.00006[d,e]	-	0.001	0.002	0.002	-	-	< 0.0001	< 0.0001	< 0.0001	-	-	< 0.0001	< 0.0001	< 0.0001	< 0.0001	-	-
Nickel	0.011	0.0275[g]	0.02	2	1	0.002	< 0.001	0.002	< 0.001	-	-	0.036	0.002	0.011	-	-	-	0.037
Dissolved Nickel	0.011	0.0275[g]	0.02	2	1	-	-	0.002	< 0.001	0.002	-	-	0.002	0.011	0.014	0.019	-	-
Selenium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Selenium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	0.008	0.02[g]	-	5	20	0.35	0.16	0.028	0.096	-	-	4	0.22	0.74	-	-	-	3.2
Dissolved Zinc	0.008	0.02[g]	-	5	20	-	-	0.02	0.13	0.95	-	-	0.2	0.7	1.2	2.6	-	-

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Concentrations *underlined and in italics* adopted the higher duplicate value
Concentration in a grey box exceed the ecological criteria of 95% protection freshwater ecosytems
Concentrations in a dark grey box exceed the criteria of 95% protection freshwater ecosystems and the hardness corrected value
Concentrations in a bold box exceed the human health guideline value for drinking water
Concentrations in blue font exceed the irrigation short term value
Concentrations in **bold font** exceed stock watering criteria
[a] Aluminium guidelines for pH > 6.5, based on the pH of groundwater measured at the site and surrounding area.
[b] Guideline value for arsenic (III).
[c] Guideline value for chromium (VI).
[d] Guideline value for inorganic mercury.
[e] 99% species protection level DGV has been adopted to account for the bioaccumulating nature of this contaminant.
[f] Hardness correction factor applied to the threshold value as detailed in Section 3.4.3 and Table 3.4.4 of ANZECC 2000. For calculations, water hardness was conservatively presumed moderately hard based on the Goulburn Mulwaree Regional State of the Environment Report 2004-2009.

Client: John Holland Rail
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Table II: Surface Water Results

	95% Freshwater (ANZG 2018)	Hardness Correction Value Applied (ANZECC 2000)	Drinking Water (ADWG 2011)	Irrigation Short-term Trigger Value (ANZECC 2000)	Stock Water (ANZECC 2000)	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
						S20-My01342	S20-Au23119	S20-Oc25147	-	-	S20-Au23120	S20-Oc25149	-	-	S20-Au23121	-	S20-Ja29060	S20-Ap12291
						30-Apr-20	11-Aug-20	13-Oct-20	29-Jan-20	1-Apr-20	11-Aug-20	13-Oct-20	29-Jan-20	1-Apr-20	11-Aug-20	13-Oct-20	29-Jan-20	2-Apr-20
						SW4	SW4	SW4	SW5	SW5	SW5	SW5	SW6	SW6	SW6	SW6	SW7	SW7
						Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring
						318000780	318000780	318000780	318000780	318000785	318000785	318000785	318000780	318000785	318000785	318000785	318000785	318000786
						Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop
						Grab Sample	Grab Sample	Grab Sample	-	-	Grab Sample	Grab Sample	-	-	Grab Sample	Grab Sample	Grab Sample	Grab Sample
Guidelines						Collected at Boyd Street culvert. Flowing.	Brown, slightly trubid, full but flow not evident.	Water flowing, turbid, brown, no odour.	DRY	DRY	Brown, turbid, flow at culvert evident beneath crushed rock.	Water not flowing, very shallow, turbid, light brown, no odour.	DRY	DRY	Brown, slightly turbid. Not flowing.	DRY	Silty, from dam, low level water.	Highly turbid.
Analyte grouping/Analyte																		
Dissolved and Total Metals																		
Aluminium	0.055[a]	-	-	20	5	0.49	0.59	0.36	-	-	1.8	**11**	-	-	1.8	-	-	*0.29*
Dissolved Aluminium	0.055[a]	-	-	20	5	-	0.63	0.28	-	-	3.2	0.28	-	-	2.4	-	-	-
Arsenic	0.024[b]	-	0.01	2	0.5-5	0.002	< 0.001	0.003	-	-	0.001	0.005	-	-	0.002	-	0.016	0.004
Dissolved Arsenic	0.024[b]	-	0.01	2	0.5-5	-	< 0.001	0.002	-	-	0.001	0.002	-	-	0.001	-	0.011	-
Barium	-	-	2	-	-	0.07	0.05	0.08	-	-	0.03	0.17	-	-	0.06	-	-	0.08
Dissolved Barium	-	-	2	-	-	-	0.04	0.08	-	-	0.03	0.08	-	-	0.05	-	-	-
Beryllium	-	-	0.06	0.5	-	< 0.001	< 0.001	< 0.001	-	-	< 0.001	< 0.001	-	-	< 0.001	-	< 0.001	< 0.001
Dissolved Beryllium	-	-	0.06	0.5	-	-	< 0.001	< 0.001	-	-	< 0.001	< 0.001	-	-	< 0.001	-	< 0.001	-
Boron	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.05	-
Dissolved Boron	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.05	-
Cadmium	0.0002	0.00054[g]	0.002	0.05	0.01	**0.04**	0.003	**0.019**	-	-	0.0009	0.0021	-	-	0.0072	-	0.0016	0.0009
Dissolved Cadmium	0.0002	0.00054[g]	0.002	0.05	0.01	-	0.0029	**0.018**	-	-	0.0009	0.001	-	-	0.0063	-	0.0005	-
Chromium	0.001[c]	0.0025[g]	0.05[c]	1	1	0.001	0.001	0.001	-	-	0.003	0.011	-	-	0.003	-	-	0.001
Dissolved Chromium	0.001[c]	0.0025[g]	0.05[c]	1	1	-	< 0.001	< 0.001	-	-	0.003	< 0.001	-	-	0.003	-	-	-
Cobalt	0.0014	-	-	0.1	1	0.009	0.001	0.004	-	-	< 0.001	0.003	-	-	< 0.001	-	0.002	0.002
Dissolved Cobalt	0.0014	-	-	0.1	1	-	< 0.001	0.004	-	-	< 0.001	0.001	-	-	< 0.001	-	0.002	-
Copper	0.0014	0.0035[g]	2	5	0.4-5	0.31	0.04	0.19	-	-	0.019	0.074	-	-	0.1	-	0.021	0.022
Dissolved Copper	0.0014	0.0035[g]	2	5	0.4-5	-	0.035	0.18	-	-	0.016	0.045	-	-	0.088	-	0.009	-
Iron	-	-	-	10	not sufficiently toxic	0.83	0.57	1.3	-	-	1.5	8.9	-	-	1.4	-	-	4.22
Dissolved Iron	-	-	-	10	not sufficiently toxic	-	0.47	0.89	-	-	1.4	0.54	-	-	1.1	-	-	-
Lead	0.0034	0.0136[g]	0.01	5	0.1	**0.13**	0.015	0.038	-	-	0.01	0.031	-	-	0.022	-	0.037	0.02
Dissolved Lead	0.0034	0.0136[g]	0.01	5	0.1	-	0.011	0.023	-	-	0.006	0.007	-	-	0.013	-	*0.017*	-
Manganese	1.9	-	0.5	10	not sufficiently toxic	0.63	0.045	0.37	-	-	0.012	0.15	-	-	0.018	-	1.1	0.41
Dissolved Manganese	1.9	-	0.5	10	not sufficiently toxic	-	0.041	0.38	-	-	0.008	0.09	-	-	0.013	-	0.68	-
Mercury	0.00006[d,e]	-	0.001	0.002	0.002	< 0.0001	< 0.0001	< 0.0001	-	-	< 0.0001	< 0.0001	-	-	< 0.0001	-	< 0.0001	< 0.0001
Dissolved Mercury	0.00006[d,e]	-	0.001	0.002	0.002	-	< 0.0001	< 0.0001	-	-	< 0.0001	< 0.0001	-	-	< 0.0001	-	< 0.0001	-
Nickel	0.011	0.0275[g]	0.02	2	1	0.12	0.006	0.038	-	-	0.002	0.007	-	-	0.029	-	0.012	0.006
Dissolved Nickel	0.011	0.0275[g]	0.02	2	1	-	0.006	0.038	-	-	0.002	0.003	-	-	0.026	-	0.009	-
Selenium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-
Dissolved Selenium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-
Zinc	0.008	0.02[g]	-	5	20	7	0.56	2.6	-	-	0.11	0.3	-	-	0.9	-	0.28	0.15
Dissolved Zinc	0.008	0.02[g]	-	5	20	-	0.5	2.5	-	-	0.094	0.14	-	-	0.79	-	0.087	-

- indicates no criterion available or not analysed
LOR = Limit of Reporting
Concentrations below the LOR noted as <value
The LOR for mercury exceeds the ecological criteria for 95% protection freshwater ecosystems however concentrations reported as <LOR are considered acceptable as mercury is not a contaminant of concern at the site.
Details of Guideline values are presented in **Section 6** of report (**Table 6-1**)
Concentrations *underlined and in italics* adopted the higher duplicate value
Concentration in a grey box exceed the ecological criteria of 95% protection freshwater ecosytems
Concentrations in a dark grey box exceed the criteria of 95% protection freshwater ecosystems and the hardness corrected value
Concentrations in a bold box exceed the human health guideline value for drinking water
Concentrations in blue font exceed the irrigation short term value
Concentrations in **bold font** exceed stock watering criteria
[a] Aluminium guidelines for pH > 6.5, based on the pH of groundwater measured at the site and surrounding area.
[b] Guideline value for arsenic (III).
[c] Guideline value for chromium (VI).
[d] Guideline value for inorganic mercury.
[e] 99% species protection level DGV has been adopted to account for the bioaccumulating nature of this contaminant.
[f] Hardness correction factor applied to the threshold value as detailed in Section 3.4.3 and Table 3.4.4 of ANZECC 2000. For calculations, water hardness was conservatively presumed moderately hard based on the Goulburn Mulwaree Regional State of the Environment Report 2004-2009.

Client: John Holland Rail
Job No: 318000780
Project Name: DSI Addendum

Table II: Surface Water Results

	95% Freshwater (ANZG 2018)	Hardness Correction Value Applied (ANZECC 2000)	Drinking Water (ADWG 2011)	Irrigation Short-term Trigger Value (ANZECC 2000)	Stock Water (ANZECC 2000)	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water	Surface Water
						S20-Au23122	S20-Oc25163	S20-Ja29061	S20-Ap12292	S20-Au23123	S20-Oc25165	S20-Ja29062	S20-Ap12293	S20-Au23124	S20-Oc25167	S20-Oc25153	S20-Oc25317	S20-Oc25319
						11-Aug-20	12-Oct-20	29-Jan-20	2-Apr-20	10-Aug-20	12-Oct-20	29-Jan-20	2-Apr-20	10-Aug-20	12-Oct-20	13-Oct-20	13-Oct-20	13-Oct-20
						SW7	SW7	SW8	SW8	SW8	SW8	SW9	SW9	SW9	SW9	SW10	SW_BR001	SW_BR002
						Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring	Tarago SW Monitoring
						318000785	318000785	318000780	318000780	318000780	318000780	318000780	318000780	318000780	318000780	318000780	318000780	318000780
						Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop
						Grab Sample	Grab Sample	Grab Sample	Grab Sample	Grab Sample	Grab Sample	Grab Sample	Grab Sample	Grab Sample	Grab Sample	Grab Sample	Grab Sample	Grab Sample
Guidelines						Brown, turbid.	Water slightly trubid, brown, not flowing.	Clear, vegetation. Not flowing.	Grease at surface, lots of algae growing on plants.	Water flowing, level high, turbid.	Water flowing, clear/brown.	Stagnant pond. Algae and fish present. Slightly turbid.	Non-turbid, slightly brown, not flowing but full.	High level, brown, slightly turbid, bubbles at surface.	Water flowing, clear/brown, slightly turbid.	Water flowing, clear/brown, slightly turbid, no odour.	Water slightly turbid, yellow/brown, no odour, not flowing.	Water flowing, turbid, brown, no odour.
Analyte grouping/Analyte																		
Dissolved and Total Metals																		
Aluminium	0.055[a]	-	-	20	5	*1.7*	*0.33*	-	< 0.05	0.72	< 0.05	-	0.05	0.53	< 0.05	< 0.05	0.48	0.38
Dissolved Aluminium	0.055[a]	-	-	20	5	0.95	0.18	-	-	0.41	< 0.05	-	-	0.35	< 0.05	< 0.05	0.17	0.16
Arsenic	0.024[b]	-	0.01	2	0.5-5	0.003	0.005	< 0.001	0.001	< 0.001	0.001	0.001	0.001	< 0.001	0.001	0.001	0.003	0.003
Dissolved Arsenic	0.024[b]	-	0.01	2	0.5-5	0.001	0.004	< 0.001	-	< 0.001	< 0.001	< 0.001	-	< 0.001	< 0.001	< 0.001	0.003	0.002
Barium	-	-	2	-	-	0.04	0.05	-	0.12	0.02	0.08	-	0.08	0.02	0.09	0.1	0.05	< 0.02
Dissolved Barium	-	-	2	-	-	0.03	0.05	-	-	0.02	0.09	-	-	0.02	0.09	0.11	0.05	< 0.02
Beryllium	-	-	0.06	0.5	-	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Dissolved Beryllium	-	-	0.06	0.5	-	< 0.001	< 0.001	< 0.001	-	< 0.001	< 0.001	< 0.001	-	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Boron	-	-	-	-	-	-	-	< 0.05	-	-	-	< 0.05	-	-	-	-	-	-
Dissolved Boron	-	-	-	-	-	-	-	< 0.05	-	-	-	< 0.05	-	-	-	-	-	-
Cadmium	0.0002	0.00054[g]	0.002	0.05	0.01	0.0014	0.0003	< 0.0002	< 0.0002	0.0003	< 0.0002	< 0.0002	< 0.0002	0.0004	< 0.0002	< 0.0002	0.0002	0.0005
Dissolved Cadmium	0.0002	0.00054[g]	0.002	0.05	0.01	0.001	< 0.0002	< 0.0002	-	0.0002	< 0.0002	< 0.0002	-	0.0004	< 0.0002	< 0.0002	< 0.0002	0.0003
Chromium	0.001[c]	0.0025[g]	0.05[c]	1	1	0.002	0.001	-	< 0.001	0.001	< 0.001	-	< 0.001	0.002	< 0.001	< 0.001	0.005	0.001
Dissolved Chromium	0.001[c]	0.0025[g]	0.05[c]	1	1	0.002	< 0.001	-	-	0.001	< 0.001	-	-	< 0.001	< 0.001	< 0.001	0.004	< 0.001
Cobalt	0.0014	-	-	0.1	1	< 0.001	< 0.001	< 0.001	0.003	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.002
Dissolved Cobalt	0.0014	-	-	0.1	1	< 0.001	< 0.001	< 0.001	-	< 0.001	< 0.001	< 0.001	-	< 0.001	< 0.001	< 0.001	< 0.001	0.002
Copper	0.0014	0.0035[g]	2	5	0.4-5	0.027	0.014	< 0.001	< 0.001	0.008	< 0.001	< 0.001	0.001	0.01	< 0.001	< 0.001	0.008	0.016
Dissolved Copper	0.0014	0.0035[g]	2	5	0.4-5	0.019	0.013	< 0.001	-	0.007	< 0.001	< 0.001	-	0.008	< 0.001	< 0.001	0.007	0.011
Iron	-	-	-	10	not sufficiently toxic	1.8	3	-	3.2	0.76	0.51	-	0.54	0.6	0.15	0.55	0.43	4
Dissolved Iron	-	-	-	10	not sufficiently toxic	0.57	2.4	-	-	0.31	0.15	-	-	0.29	< 0.05	0.11	0.16	2
Lead	0.0034	0.0136[g]	0.01	5	0.1	0.025	0.012	< 0.001	< 0.001	0.002	0.001	< 0.001	< 0.001	0.002	0.001	0.002	0.004	0.011
Dissolved Lead	0.0034	0.0136[g]	0.01	5	0.1	0.005	0.009	< 0.001	-	< 0.001	< 0.001	< 0.001	-	< 0.001	< 0.001	< 0.001	< 0.001	0.005
Manganese	1.9	-	0.5	10	not sufficiently toxic	0.032	0.063	0.37	1.9	0.035	0.066	0.19	0.33	0.041	0.03	0.089	0.086	0.2
Dissolved Manganese	1.9	-	0.5	10	not sufficiently toxic	0.028	0.056	0.33	-	0.028	0.064	0.012	-	0.036	0.023	0.089	0.027	0.19
Mercury	0.00006[d,e]	-	0.001	0.002	0.002	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Dissolved Mercury	0.00006[d,e]	-	0.001	0.002	0.002	< 0.0001	< 0.0001	< 0.0001	-	< 0.0001	< 0.0001	< 0.0001	-	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel	0.011	0.0275[g]	0.02	2	1	0.003	0.003	0.001	0.002	0.002	0.001	0.002	0.002	0.002	0.001	0.001	0.003	0.006
Dissolved Nickel	0.011	0.0275[g]	0.02	2	1	0.003	0.003	< 0.001	-	0.002	0.001	< 0.001	-	0.002	0.001	< 0.001	0.003	0.006
Selenium	-	-	-	-	-	-	-	< 0.001	-	-	-	< 0.001	-	-	-	-	-	-
Dissolved Selenium	-	-	-	-	-	-	-	< 0.001	-	-	-	< 0.001	-	-	-	-	-	-
Zinc	0.008	0.02[g]	-	5	20	0.36	0.065	< 0.005	0.022	0.12	0.009	0.009	0.015	0.16	0.008	0.013	0.034	0.051
Dissolved Zinc	0.008	0.02[g]	-	5	20	0.26	0.051	< 0.005	-	0.1	0.01	< 0.005	-	0.14	< 0.005	0.006	0.015	0.034

- indicates no criterion available or not analysed
LOR = Limit of Reporting
Concentrations below the LOR noted as <value
The LOR for mercury exceeds the ecological criteria for 95% protection freshwater ecosystems however concentrations reported as <LOR are considered acceptable as mercury is not a contaminant of concern at the site.
Details of Guideline values are presented in **Section 6** of report (**Table 6-1**)
Concentrations *underlined and in italics* adopted the higher duplicate value
Concentration in a grey box exceed the ecological criteria of 95% protection freshwater ecosytems
Concentrations in a dark grey box exceed the criteria of 95% protection freshwater ecosystems and the hardness corrected value
Concentrations in a bold box exceed the human health guideline value for drinking water
Concentrations in blue font exceed the irrigation short term value
Concentrations in **bold font** exceed stock watering criteria
[a] Aluminium guidelines for pH > 6.5, based on the pH of groundwater measured at the site and surrounding area.
[b] Guideline value for arsenic (III).
[c] Guideline value for chromium (VI).
[d] Guideline value for inorganic mercury.
[e] 99% species protection level DGV has been adopted to account for the bioaccumulating nature of this contaminant.
[f] Hardness correction factor applied to the threshold value as detailed in Section 3.4.3 and Table 3.4.4 of ANZECC 2000. For calculations, water hardness was conservatively presumed moderately hard based on the Goulburn Mulwaree Regional State of the Environment Report 2004-2009.

Client: John Holland Rail
Job No: 318000780
Project Name: DSI Addendum

Table III: Sediment Results

	Sediment DGV[A]	Sediment GV-High[A]	Sample Type:	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Sediment
			Site:	Ephemeral creek bed	Ephemeral creek bed	Ephemeral creek bed	Ephemeral creek bed	Ephemeral creek bed	Ephemeral creek bed	Ephemeral creek bed	Ephemeral creek bed	Ephemeral creek bed	Ephemeral creek bed	Ephemeral creek bed	Ephemeral creek bed	Ephemeral creek bed	Ephemeral creek bed	Ephemeral creek bed	Upgradient
			Lab Sample number:	---	---	---	---	---	---	---	S20-Oc25318	---	---	M20-Jn34830	M20-Ma43808	---	---	---	S20-Ap12275
			Sample date:	30-06-20	30-06-20	30-06-20	30-06-20	30-06-20	30-06-20	30-06-20	13-10-20	13-10-20	13-10-20	25-03-20	25-03-20	13-10-20	13-10-20	13-10-20	1-Apr-20
			Sample ID:	Creek 1	Creek 1a	Creek 2	Creek 3	Creek 4	Creek 5	Creek 6	SED_BR002	XP6O01	XP6O02	P6_HA5_0.0	P6_HA5_0.15	XP6O03	XP6O04	XP6O05	SED1_UP
			Project Name:	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum
			Sampling Method:	Field Portable XRF	Field Portable XRF	Field Portable XRF	Field Portable XRF	Field Portable XRF	Field Portable XRF	Field Portable XRF	Sediment Sampler	Field Portable XRF	Field Portable XRF	Hand Auger	Hand Auger	Field Portable XRF	Field Portable XRF	Field Portable XRF	Direct
											---	---	---	Duplicate analysis	---	Duplicated collected	---	---	
Analyte grouping/Analyte			**Units**	**LOR**															
Moisture																			
Moisture Content (dried @ 103°C)			%	--	--	--	--	--	--	--	--	64	---	---	*11*	16	---	---	---	-
Metals																			
Aluminium	--	--	mg/kg	10	--	--	--	--	--	--	--	20000	-	-	*13000*	---	*17000*	-	-	12000
Arsenic	20	70	mg/kg	2	<LOD	12	20	<LOD	12	<LOD	<LOD	34	-	-	*18*	---	*11*	-	-	8.6
Barium	--	--	mg/kg	10	132	<LOD	356	<LOD	<LOD	<LOD	<LOD	180	<LOD	<LOD	*140*	---	*200*	<LOD	<LOD	65
Beryllium	--	--	mg/kg	2	--	--	--	--	--	--	--	< 2	-	-	*< 2*	---	-	-	-	< 2
Cadmium	1.5	10	mg/kg	0.4	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	45	<LOD	<LOD	*8.1*	---	*11*	<LOD	<LOD	< 0.4
Chromium	80	370	mg/kg	5	<LOD	<LOD	24	<LOD	<LOD	<LOD	<LOD	21	-	-	*21*	---	*16*	-	-	20
Cobalt	--	--	mg/kg	5	<LOD	<LOD	<LOD	<LOD	130	<LOD	<LOD	13	<LOD	<LOD	*7.3*	---	*8.1*	<LOD	<LOD	5.5
Copper	65	270	mg/kg	5	76	63	71	54	42	34	31	1300	37	114	*610*	---	*397*	<LOD	31.45	10
Iron	--	--	mg/kg	20	10622	13219	18468	9981	18417	11702	10848	20000	3306	11576.16	*23000*	---	*23400*	10318	10643	23000
Lead	50	220	mg/kg	5	309	226	206	133	121	69	84	1900	58	171.92	*800*	160	*310*	22	30	18
Manganese	--	--	mg/kg	5	166	502	236	157	240	226	112	68	81	284.01	*260*	---	*160*	338	340	56
Mercury	0.15	1	mg/kg	0.1	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	0.2	<LOD	<LOD	*< 0.1*	---	<LOD	<LOD	<LOD	< 0.1
Nickel	21	52	mg/kg	5	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	54	<LOD	<LOD	*15*	---	*18*	<LOD	<LOD	8.6
Zinc	200	410	mg/kg	5	514	663	857	890	522	405	367	8600	220	761.98	*790*	---	*1100*	175	239	20

LOR = Limit of Reporting
LOD = Limit of Detection
Concentrations below the LOR / LOD noted as <value
Concentrations *underlined and in italics* adopted the higher duplicate value
Concnetrations in grey box exceed sediment DGV
Concentrations in orange box exceed sediment DGV-High

Client: John Holland Rail
Job No: 318000780
Project Name: DSI Addendum

Table III: Sediment Results

	Sediment DGV[A]	Sediment GV-High[A]	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
			Upgradient	Upgradient	Rail corridor	Rail corridor	Rail corridor	Rail corridor	Rail corridor	Rail corridor	Rail corridor	Rail corridor	Rail corridor	Tarago	Tarago	Tarago	Rail corridor	Rail corridor	Rail corridor
			S20-Au23105	S20-Oc25320	S20-Ap12274	S20-Au23104	S20-Oc25142	S20-Ap12276 / S20-Jn50647	S20-Au23106	S20-Oc25144	S20-Ap12277 / S20-Jn50648	S20-Au23107	S20-Oc25146	S20-Ap12278 / S20-Jn50649	S20-Au23108	S20-Oc25148	S20-Ap12279	S20-Au23109	S20-Oc25150
			11-Aug-20	13-Oct-20	1-Apr-20	11-Aug-20	13-Oct-20	1-Apr-20	11-Aug-20	13-Oct-20	1-Apr-20	11-Aug-20	13-Oct-20	1-Apr-20	11-Aug-20	13-Oct-20	1-Apr-20	11-Aug-20	13-Oct-20
			SED1-UP	SED1-UP	SED1	SED1	SED1	SED2	SED2	SED2	SED3	SED3	SED3	SED4	SED4	SED4	SED5	SED5	SED5
			DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum
			Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct
Analyte grouping/Analyte																			
Moisture																			
Moisture Content (dried @ 103°C)			-	18	-	-	44	-	-	-		-	-	-	-	27	-	-	21
Metals																			
Aluminium	--	--	-	12000	9200	-	*21000*	8300	-	14000	13000	-	10000	9200	-	28000	4400	-	7800
Arsenic	20	70	-	16	19	-	9.7	18	-	18	5.1	-	11	37	-	5.1	2.9	-	6.4
Barium	--	--	-	49	120	-	*170*	85	-	110	200	-	110	150	-	240	64	-	98
Beryllium	--	--	-	< 2	< 2	-	< 2	< 2	-	< 2	< 2	-	< 2	< 2	-	< 2	< 2	-	< 2
Cadmium	1.5	10	-	< 0.4	2.6	-	7.2	7.2	-	6.2	3	-	1.8	5	-	8.2	0.6	-	0.5
Chromium	80	370	-	29	16	-	*25*	14	-	22	16	-	16	17	-	23	8.3	-	14
Cobalt	--	--	-	6.3	9.5	-	*7.6*	6.1	-	11	< 5	-	< 5	< 5	-	5.4	< 5	-	< 5
Copper	65	270	-	12	200	-	*247*	490	-	320	58	-	140	600	-	160	14	-	13
Iron	--	--	-	37000	17000	-	*19000*	16000	-	24000	15000	-	19000	17000	-	18000	6600	-	18000
Lead	50	220	23	29	4700	1700	*740*	1600	340	1000	130	630	400	2600	1600	130	39	24	27
Manganese	--	--	-	70	290	-	120	280	-	640	120	-	97	140	-	220	280	-	200
Mercury	0.15	1	-	< 0.1	< 0.1	-	< 0.1	0.1	-	< 0.1	< 0.1	-	< 0.1	0.3	-	< 0.1	< 0.1	-	< 0.1
Nickel	21	52	-	8.8	9.8	-	*14*	8.7	-	14	7.6	-	8.7	9.8	-	17	< 5	-	< 5
Zinc	200	410	-	24	610	-	*1100*	2400	-	2400	320	-	290	750	-	840	100	-	81

LOR = Limit of Reporting
LOD = Limit of Detection
Concentrations below the LOR / LOD noted a
Concentrations *underlined and in italics* adop
Concnetrations in grey box exceed sediment
Concentrations in orange box exceed sedime

Client: John Holland Rail
Job No: 318000780
Project Name: DSI Addendum

Table III: Sediment Results

	Sediment DGV[A]	Sediment GV-High[A]	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
			Rail corridor	Rail corridor	Rail corridor	Adjacent rail corridor	Adjacent rail corridor	Adjacent rail corridor	Mulwaree River	Mulwaree River	Mulwaree River	Mulwaree River	Mulwaree River	Mulwaree River	Mulwaree River
			S20-Ap12280	S20-Au23110	-	S20-Ap12281	S20-Au23111	S20-Oc25164	S20-Ap12282	S20-Au23112	S20-Oc25166	S20-Ap12283	S20-Au23113	S20-Oc25168	S20-Oc25154
			1-Apr-20	11-Aug-20	13-Oct-20	2-Apr-20	11-Aug-20	12-Oct-20	2-Apr-20	10-Aug-20	12-Oct-20	2-Apr-20	20-Aug-20	12-Oct-20	13-Oct-20
			SED6	SED6	SED6	SED7	SED7	SED7	SED8	SED8	SED8	SED9	SED9	SED9	SED10
			DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum
			Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct	Direct
Analyte grouping/Analyte															
Moisture															
Moisture Content (dried @ 103°C)			-	-	-	-	-	32	-	-	26	-	-	17	32
Metals															
Aluminium	--	--	6500	-	*5100*	5200	-	8100	8500	-	16000	12000	-	3400	13000
Arsenic	20	70	10	-	*5.7*	6.4	-	6.3	4.8	-	7.8	3.6	-	16	4.3
Barium	--	--	63	-	*53*	60	-	78	93	-	130	96	-	58	110
Beryllium	--	--	< 2	-	*< 2*	< 2	-	< 2	< 2	-	< 2	< 2	-	< 2	< 2
Cadmium	1.5	10	3.3	-	*2.1*	4.6	-	3.3	0.4	-	< 0.4	0.5	-	< 0.4	0.6
Chromium	80	370	9.6	-	*11*	8.1	-	10	12	-	16	17	-	13	14
Cobalt	--	--	< 5	-	*2*	< 5	-	< 5	6.3	-	< 5	5.5	-	11	< 5
Copper	65	270	59	-	*40*	190	-	42	12	-	10	13	-	12	15
Iron	--	--	9200	-	*15000*	7600	-	8900	10000	-	14000	14000	-	28000	12000
Lead	50	220	88	290	*59*	210	56	180	20	15	23	19	24	23	26
Manganese	--	--	91	-	*136*	140	-	61	76	-	130	400	-	380	160
Mercury	0.15	1	< 0.1	-	<LOD	< 0.1	-	< 0.1	< 0.1	-	< 0.1	< 0.1	-	< 0.1	< 0.1
Nickel	21	52	6.9	-	*4*	< 5	-	< 5	6.6	-	7.3	8.4	-	8.9	7.1
Zinc	200	410	470	-	*850*	580	-	560	94	-	70	140	-	70	140

LOR = Limit of Reporting
LOD = Limit of Detection
Concentrations below the LOR / LOD noted a
Concentrations *underlined and in italics* ador
Concnetrations in grey box exceed sediment
Concentrations in orange box exceed sedime

Client: John Holland Rail
Job No: 318000780
Project Name: DSI Addendum

Table IV: Sediment Results (Drainage Lines)

	NEPM 2013 HIL C Open Space	NEPM 2013 EIL Residential / public Open Space	Sample Type:		Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
			Site:		Boyd Street	Boyd Street	Boyd Street	Boyd Street	Boyd Street	Boyd Street	Boyd Street	Boyd Street	Boyd Street	Boyd Street	Boyd Street	Braidwood Road	Braidwood Road	Braidwood Road
			Lab Sample number:		---	S20-Jn26497	---	---	---	---	---	---	---	---	---	---	---	---
			Sample date:		18-03-20	18-03-20	18-03-20	30-06-20	30-06-20	30-06-20	30-06-20	30-06-20	13-10-20	13-10-20	13-10-20	13-10-20	13-10-20	13-10-20
			Sample ID:		XBOYDSTW2	XBOYDSTW1	XBOYDSTE1	BOYD1	BOYD2	BOYD3	BOYD4	BOYD5	XBOYDO01	XBOYDO02	XBOYDO03	XBRO01	XBRO02	XBRO03
			Project Name:		DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
			Sampling Method:		Field Portable XRF	Sediment Sampler	Field Portable XRF	Field Portable XRF	Field Portable XRF	Field Portable XRF	Field Portable XRF	Field Portable XRF	Field Portable XRF	Field Portable XRF	Field Portable XRF	Field Portable XRF	Field Portable XRF	Field Portable XRF
			Comments:		---	Duplicate collected	---	---	---	---	---	---	Duplicates collected	Duplicates collected	---	---	---	---
Analyte grouping/Analyte			**Units**	**LOR**														
Moisture																		
					---		--	--	--	--	--	--						
Metals																		
Aluminium			mg/kg	10	---	11000	--	--	--	--	--	--	*7700*	*14000*	-	-	-	-
Arsenic	300	100	mg/kg	2	45.6	15	<LOD	*21*	<LOD	<LOD	45	27	*14*	*15*	-	-	-	-
Barium			mg/kg	2	924.35	170	665.38	--	--	--	--	--	447.16	*180*	<LOD	930.01	808.69	588.94
Beryllium	90		mg/kg	10	---	< 2	--	--	--	--	--	--	<LOD	*< 2*	-	-	-	-
Cadmium	90		mg/kg	0.4	<LOD	3.8	<LOD	--	--	--	--	--	*2.5*	*20*	<LOD	24.63	<LOD	<LOD
Chromium	300	424	mg/kg	5	16.84	14	<LOD	--	--	--	--	--	*26*	*13*	-	-	-	-
Cobalt	300		mg/kg	5	<LOD	5.2	<LOD	--	--	--	--	--	140.83	*20*	<LOD	<LOD	<LOD	<LOD
Copper	17000	125	mg/kg	5	**272.2**	**330**	**195.21**	***580***	**324**	**368**	**233**	**236**	***146***	***610***	**461.82**	<LOD	52.66	48.39
Iron			mg/kg	5	17106.94	19000	11842.94	--	--	--	--	--	*27700*	*16000*	16241.07	5355.59	11204.85	9208.56
Lead	600	1100	mg/kg	5	363.84	*740*	459.09	*1200*	782	484	337	329	*249*	*733*	653.74	31.11	28.72	12.73
Manganese	19000		mg/kg	0.1	296.78	450	402.67	--	--	--	--	--	*380*	847.76	899.62	121.76	321.78	103.09
Mercury	80		mg/kg	5	<LOD	< 0.1	<LOD	--	--	--	--	--	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
Nickel	1200	194	mg/kg	5	<LOD	9.6	<LOD	--	--	--	--	--	*12*	*22*	<LOD	<LOD	<LOD	<LOD
Zinc	30000	308	mg/kg	2	**604.04**	**580**	**368.63**	***1200***	**974**	**640**	**1214**	**1054**	**905.69**	**2581.7**	**1453.34**	61.38	240.64	45.17

LOR = Limit of Reporting
LOD = Limit of Detection
Concentrations below the LOR / LOD noted as <value
Concentrations in a grey box exceed the adoped HIL 'C' for Urban Residential and Open Public Space
Concentration in **bold green font** exceed the adopted EIL for Open Space and Recreational Land Use

Client: John Holland Rail
Job No: 318000780
Project Name: DSI Addendum

Table IV: Sediment Results (Drainage Lines)

	NEPM 2013 HIL C Open Space	NEPM 2013 EIL Residential / public Open Space	Sample Type:		Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
			Site:		Braidwood Road	Braidwood Road	Braidwood Road	Braidwood Road	Braidwood Road	Braidwood Road	Braidwood Road	Braidwood Road	Braidwood Road	Braidwood Road	Braidwood Road	Braidwood Road	Braidwood Road	Braidwood Road
			Lab Sample number:		---	---	---	---	---	---	---	---	---	---	---	S20-Oc25316	---	---
			Sample date:		13-10-20	13-10-20	13-10-20	13-10-20	13-10-20	13-10-20	13-10-20	13-10-20	13-10-20	13-10-20	13-10-20	13-10-20	12-10-20	12-10-20
			Sample ID:		XBRO04	XBRO05	XBRO06	XBRO07	XBRO08	XBRO09	XBRO10	XBRO11	XBRO12	XBRO13	XBRO14	SED_BR001	BR_SED1	BR_SED2
			Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
			Sampling Method:		Field Portable XRF	Field Portable XRF	Field Portable XRF	Field Portable XRF	Field Portable XRF	Field Portable XRF	Field Portable XRF	Field Portable XRF	Field Portable XRF	Field Portable XRF	Field Portable XRF	Sediment Sampler	Hand Auger	Hand Auger
			Comments:		---	---	---	---	---	---	---	---	---	---	---			
Analyte grouping/Analyte			**Units**	**LOR**														
Moisture																		
																30	-	-
Metals																		
Aluminium			mg/kg	10	-	-	-	-	-	-	-	-	-	-	-	10000	-	-
Arsenic	300	100	mg/kg	2	-	-	-	-	-	-	-	-	-	-	-	9.6	-	-
Barium			mg/kg	2	458.69	<LOD	233.81	<LOD	<LOD	524.69	<LOD	<LOD	484.8	<LOD	1167.84	84	<LOD	<LOD
Beryllium	90		mg/kg	10	-	-	-	-	-	-	-	-	-	-	-	< 2	-	-
Cadmium	90		mg/kg	0.4	<LOD	<LOD	17.97	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	51.79	< 0.4	<LOD	<LOD
Chromium	300	424	mg/kg	5	-	-	-	-	-	-	-	-	-	-	-	18	-	-
Cobalt	300		mg/kg	5	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	120.52	7.5	<LOD	<LOD
Copper	17000	125	mg/kg	5	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	26.05	<LOD	<LOD	<LOD	36.63	14	89.23	<LOD
Iron			mg/kg	5	13557.85	9488.67	10800.38	8168.78	7362.36	8417.44	6330.73	2274.46	7121.88	14810.29	11969.66	22000	16718.04	4360.83
Lead	600	1100	mg/kg	5	34.03	22.67	16.55	31.04	61.07	35.32	40.95	15.3	<LOD	31.93	<LOD	35	97.31	22.88
Manganese	19000		mg/kg	0.1	470.44	240.72	133.08	211.53	182.18	<LOD	270.99	185.79	233.97	704.16	738.6	310	431.88	101.89
Mercury	80		mg/kg	5	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	< 0.1	<LOD	<LOD
Nickel	1200	194	mg/kg	5	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	5.2	<LOD	<LOD
Zinc	30000	308	mg/kg	2	151.88	150.19	28.24	39.65	152.64	70.42	**601**	**606**	182.44	187.54	69.08	93	**841.15**	210.1

LOR = Limit of Reporting
LOD = Limit of Detection
Concentrations below the LOR / LOD noted as <value
Concentrations in a grey box exceed the adoped HIL 'C' for Urban Residential and Open Public Space
Concentration in **bold green font** exceed the adopted EIL for Open Space and Recreational Land Use

Client: John Holland Rail
Job No: 318000780
Project Name: DSI Addendum

Table V: Soil Results (Former Loudout Complex)

	NEPM 2013 HIL D Commercial Industrail	NEPM 2013 EIL Commercial Industrial															
			Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
			Site:		Former Loadout Complex	Former Loadout Complex	Former Loadout Complex	Former Loadout Complex	Former Loadout Complex	Former Loadout Complex	Former Loadout Complex	Former Loadout Complex	Former Loadout Complex	Former Loadout Complex	Former Loadout Complex	Former Loadout Complex	Former Loadout Complex
			Lab Sample number:		S19-JI39934	S19-JI39997	S19-JI39998	S19-Au39089	S19-Se37045	S20-Ap02702	S20-Ap02703	S20-Ap02704	S20-Ap44309	S20-Ap44310	S20-Ap44311	S20-Ap44312	S20-Ap44313
			Sample date:		26-07-19	26-07-19	26-07-19	27-08-20	22-09-19	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20
			Sample ID:		SS15	SS17	SS18	SS44	SS101	TP3_0.0-0.1	TP3_0.5-0.6	TP3_0.6-0.7	TP3_1.5-1.6	TP4_0.0-0.1	P4_0.5-0.6	TP4_1.0-1.1	TP4_1.9-2.0
			Project Name:		DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum
			Sampling Method:		Direct	Direct	Direct	Direct	Direct	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit
Analyte grouping/Analyte			**Units**	**LOR**													
Moisture																	
103°C)			%	1	-	-	-	-	-	7.6	4.2	9.5	10	9.7	8.8	7.3	8
Metals																	
Lead	2200*	1800	mg/kg	5	350	25	34	140	17	29	1100	< 5	44	380	170	90	29

Details of Guideline values are presented in **Section 6** of report (**Table 6-3**)
LOR= Limit of Reporting
Concentrations below the LOR / LOD noted as <value
Concentrations in a grey box exceed the adoped HIL 'D' for
Concentration in **green font** exceed the adopted EIL for Commerical Industrial land use

Client: John Holland Rail
Job No: 318000780
Project Name: DSI Addendum

Table V: Soil Results (Former Loudout Complex)

	NEPM 2013 HIL D Commercial Industrail	NEPM 2013 EIL Commercial Industrial	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
			Site:		Former Loadout Complex	Former Loadout Complex	Former Loadout Complex	Former Loadout Complex	Former Loadout Complex	Former Loadout Complex	Former Loadout Complex	Former Loadout Complex	Former Loadout Complex	Former Loadout Complex	Former Loadout Complex	Former Loadout Complex	Former Loadout Complex
			Lab Sample number:		S20-Ap02719	S20-Ap02720	S20-Ap02721	M20-Ma43435	M20-Ma43436	M20-Ma43437	M20-Ma43438	M20-Ma43439	MW2_4.5	N/A	N/A	N/A	N/A
			Sample date:		31-03-20	31-03-20	31-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	19-08-20	19-08-20	19-08-20	19-08-20
			Sample ID:		TP9_0.0-0.1	TP9_0.5-0.6	TP9_1.2-1.3	MW2_0-0.05	MW2_1.0	MW2_1.5	MW2_2.5	MW2_3.5	MW2_4.5	LO_TP01_0.0	LO_TP01_0.5	LO_TP01_1.0	LO_TP01_1.3
			Project Name:		DSI Addendum	DSI Addendum	DSI Addendum	DSI Addnedum	DSI Addnedum	DSI Addnedum	DSI Addnedum	DSI Addnedum	DSI Addnedum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum
			Sampling Method:		Test Pit	Test Pit	Test Pit	Borehole	Borehole	Borehole	Borehole	Borehole	Borehole	Test Pit	Test Pit	Test Pit	Test Pit
Analyte grouping/Analyte			**Units**	**LOR**													
Moisture																	
103°C)			%	1	8.8	7.6	7.3	< 1	5.5	4.9	4.4	7	7.9	-	-	-	-
Metals																	
Lead	2200*	1800	mg/kg	5	40	140	1200	51	3600	540	200	140	42	31	96	50	58

Details of Guideline values are presented in **Section 6** of report (**Table 6-3**)
LOR= Limit of Reporting
Concentrations below the LOR / LOD noted as <value
Concentrations in a grey box exceed the adoped HIL 'D' for
Concentration in **green font** exceed the adopted EIL for Commerical Industrial land use

Client: John Holland Rail
Job No: 318000780
Project Name: DSI Addendum

Table V: Soil Results (Former Loudout Complex)

	NEPM 2013 HIL D Commercial Industrail	NEPM 2013 EIL Commercial Industrial	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
			Site:		Former Loadout Complex	Former Loadout Complex	Former Loadout Complex	Former Loadout Complex	Former Loadout Complex	Former Loadout Complex	Former Loadout Complex	Former Loadout Complex	Former Loadout Complex	Former Loadout Complex	Former Loadout Complex	Former Loadout Complex	Former Loadout Complex
			Lab Sample number:		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Sample date:		19-08-20	19-08-20	19-08-20	19-08-20	19-08-20	19-08-20	19-08-20	19-08-20	19-08-20	19-08-20	19-08-20	19-08-20	19-08-20
			Sample ID:		LO_TP02_0.0	LO_TP02_0.5	LO_TP02_0.9	LO_TP02_1.1	LO_TP02_1.3	LO_TP02_1.35	LO_TP02_1.4	LO_TP03_0.9	LO_TP03_1.5	LO_TP03_1.6	LO_TP03_1.7	LO_TP04_0.25	LO_TP04_0.7
			Project Name:		DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum
			Sampling Method:		Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit
Analyte grouping/Analyte			**Units**	**LOR**													
Moisture																	
103°C)			%	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals																	
Lead	2200*	1800	mg/kg	5	176	16	11	*5700*	6900	85	83	158	1748	3662	117	18	199

Details of Guideline values are presented in **Section 6** of report (**Table 6-3**)
LOR= Limit of Reporting
Concentrations below the LOR / LOD noted as <value
Concentrations in a grey box exceed the adoped HIL 'D' for
Concentration in **green font** exceed the adopted EIL for Commerical Industrial land use

Client: John Holland Rail
Job No: 318000780
Project Name: DSI Addendum

Table V: Soil Results (Former Loudout Complex)

	NEPM 2013 HIL D Commercial Industrail	NEPM 2013 EIL Commercial Industrial												
			Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
			Site:		Former Loadout Complex	Former Loadout Complex	Former Loadout Complex	Former Loadout Complex	Former Loadout Complex	Former Loadout Complex	Former Loadout Complex	Former Loadout Complex	Former Loadout Complex
			Lab Sample number:		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Sample date:		19-08-20	19-08-20	19-08-20	19-08-20	19-08-20	19-08-20	19-08-20	19-08-20	19-08-20
			Sample ID:		LO_TP05_0.3	LO_TP05_0.7	LO_TP05_0.85	LO_TP05_1.1	LO_TP05_1.4	LO_TP06_0.05	LO_TP06_0.5	LO_TP06_0.7	LO_TP06_1.2
			Project Name:		DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum
			Sampling Method:		Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit
Analyte grouping/Analyte			**Units**	**LOR**									
Moisture													
103°C)			%	1	-	-	-	-	-	-	-	-	-
Metals													
Lead	2200*	1800	mg/kg	5	90	883	605	150	8	14	ND	273	31

Details of Guideline values are presented in **Section 6** of report (**Table 6-3**)
LOR= Limit of Reporting
Concentrations below the LOR / LOD noted as <value
Concentrations in a grey box exceed the adoped HIL 'D' for
Concentration in **green font** exceed the adopted EIL for Commerical Industrial land use

Client: John Holland Rail
Job No: 318000780
Project Name: DSI Addendum

Table VI: Characterisation of Materials to be Generated during Remediation

	NEPM 2013 HIL D Commercial Industrial	NEPM 2013 EIL Commercial Industrial												
Sample Type:					Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Site:					Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor
Lab Sample number:					S20-Au35780	S20-Au35781	S20-Au35782	S20-Au35783	S20-Au35784	S20-Au35785	S20-Au35786	S20-Au35787	S20-Au35788	S20-Au35789
Sample date:					19-08-20	19-08-20	19-08-20	19-08-20	19-08-20	19-08-20	19-08-20	19-08-20	19-08-20	19-08-20
Sample ID:					RRE_SP01	RRE_SP02	RRE_SP03	RRE_SP04	RRE_SP05	RRE_SP06	RRE_SP07	RRE_SP08	RRE_SP09	RRE_SP10
Project Name:					DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum
Sampling Method:					Composite Sample	Composite Sample	Composite Sample	Composite Sample	Composite Sample	Composite Sample	Composite Sample	Composite Sample	Composite Sample	Composite Sample
Analyte grouping/Analyte			**Units**	**LOR**										
Miscellaneous														
Moisture Content (dried @ 103°C)			%	1	6.4	7.1	7	6.1	5.3	6.3	8.1	9	7.9	9.5
Conductivity (1:5 aqueous extract at 25°C as rec.)			uS/cm	10	170	540	91	970	620	1100	970	1100	410	730
pH (1:5 Aqueous extract at 25°C as rec.)			pH Units	0.1	7.4	4.3	8.3	6.4	4.4	4.4	5.3	4	4.4	4.2
Sulphur			mg/kg	5	910	4300	460	14000	3900	11000	8600	16000	5900	4100
Total Organic Carbon			%	0.1	0.5	0.6	1.8	1.2	1.5	0.5	2.3	0.7	< 0.1	0.5
Metals														
Antimony			mg/kg	10	< 10	19	24	23	31	23	25	39	10	32
Arsenic	3000	160	mg/kg	2	21	70	48	130	**190**	150	130	**190**	49	**170**
Beryllium	500		mg/kg	2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Boron	300000		mg/kg	10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Cadmium	900		mg/kg	0.4	2.9	7	1.8	10	8.2	25	10	6	3.3	4.6
Chromium	3600	710	mg/kg	5	25	59	24	60	58	130	79	*81*	37	71
Cobalt	4000		mg/kg	5	7.4	14	30	8.3	11	14	12	*12*	8.4	11
Copper	240000	160	mg/kg	5	**510**	**960**	**450**	**2100**	**1700**	**2200**	**1900**	**1600**	**700**	**1200**
Lead	2200*	1800	mg/kg	5	**2600**	**5900**	1300	**5300**	**7000**	**5200**	**6800**	**19000**	**4100**	**7300**
Manganese	19000		mg/kg	5	340	640	520	550	630	970	680	710	540	1100
Mercury	730		mg/kg	0.1	0.2	0.5	0.2	0.7	1.2	1.2	1.1	1.6	0.4	0.6
Molybdenum			mg/kg	5	< 5	< 5	< 5	6.7	8.5	5.8	6.4	7.3	5.4	< 5
Nickel	6000	340	mg/kg	5	10	29	18	32	22	45	75	40	18	28
Selenium	10000		mg/kg	2	4.3	9.5	< 2	19	23	18	17	27	8.1	15
Tin			mg/kg	10	15	30	23	49	190	140	120	80	28	47
Vanadium			mg/kg	10	52	64	58	64	78	77	69	89	34	93
Zinc	400000	370	mg/kg	5	**550**	**1700**	**2100**	**1400**	**1500**	**2800**	**1500**	***1400***	**1100**	**1300**

Details of Guideline values are presented in **Section 6** of report (**Table 6-3**)
LOR = Limit of Reporting
Concentrations below the LOR noted as <value
Concentrations in a grey box exceed the adopted HIL 'D' for Commercial Industrial land use
Concentration in **bold green font** exceed the adopted EIL for Commercial Industrial land use

Client: John Holland Rail
Job No: 318000780
Project Name: DSI Addendum

Table VI: Characterisation of Materials to be Generated during Remediation

	NEPM 2013 HIL D Commercial Industrial	NEPM 2013 EIL Commercial Industrial												
Sample Type:					Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Site:					Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor
Lab Sample number:					S20-Au35790	S20-Au35791	S20-Au35792	S20-Au35793	S20-Au35794	S20-Au35795	S20-Au35796	S20-Au35797	S20-Au35798	S20-Au35799
Sample date:					19-08-20	19-08-20	19-08-20	19-08-20	19-08-20	19-08-20	19-08-20	19-08-20	19-08-20	19-08-20
Sample ID:					RRE_TP01	RRE_TP02	RRE_TP03	RRE_TP04	RRE_TP05	RRE_TP06	RRE_TP07	RRE_TP08	RRE_TP09	RRE_TP10
Project Name:					DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum
Sampling Method:					Composite Sample	Composite Sample	Composite Sample	Composite Sample	Composite Sample	Composite Sample	Composite Sample	Composite Sample	Composite Sample	Composite Sample
Analyte grouping/Analyte			**Units**	**LOR**										
Miscellaneous														
Moisture Content (dried @ 103°C)			%	1	4.3	6.1	14	7.6	10	9.3	11	14	13	9.3
Conductivity (1:5 aqueous extract at 25°C as rec.)			uS/cm	10	33	53	220	250	620	300	74	1000	29	38
pH (1:5 Aqueous extract at 25°C as rec.)			pH Units	0.1	6.7	6.1	4.9	5.2	4.2	6.5	5.7	5.1	5	5
Sulphur			mg/kg	5	79	260	2200	1700	3600	450	2900	12000	3400	2000
Total Organic Carbon			%	0.1	0.3	0.3	1.4	1.5	2.2	0.4	2.7	6.5	1.9	2
Metals														
Antimony			mg/kg	10	< 10	< 10	18	< 10	11	< 10	< 10	55	14	18
Arsenic	3000	160	mg/kg	2	15	14	130	25	77	31	40	79	52	66
Beryllium	500		mg/kg	2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Boron	300000		mg/kg	10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Cadmium	900		mg/kg	0.4	5.5	7.3	9.6	5.5	3.5	8	4	170	2.4	2.5
Chromium	3600	710	mg/kg	5	31	12	24	15	34	12	52	130	19	19
Cobalt	4000		mg/kg	5	7.5	< 5	< 5	< 5	< 5	< 5	8.2	18	< 5	< 5
Copper	240000	160	mg/kg	5	**490**	**280**	**1200**	**670**	**830**	**240**	**580**	**4100**	**1200**	**1300**
Lead	2200*	1800	mg/kg	5	570	820	**8700**	1600	**4000**	230	1600	**9200**	**4400**	**5300**
Manganese	19000		mg/kg	5	420	530	150	150	230	70	690	720	170	220
Mercury	730		mg/kg	0.1	0.2	0.1	2.9	0.5	0.3	< 0.1	0.2	0.9	0.4	0.4
Molybdenum			mg/kg	5	< 5	5.3	12	10	12	20	< 5	*5.6*	9.5	11
Nickel	6000	340	mg/kg	5	12	22	85	11	11	< 5	19	79	8.9	8.1
Selenium	10000		mg/kg	2	< 2	< 2	23	3.9	7.7	2.9	2.8	*16*	12	14
Tin			mg/kg	10	< 10	11	400	24	13	< 10	10	54	34	38
Vanadium			mg/kg	10	76	30	58	43	69	53	45	67	50	72
Zinc	400000	370	mg/kg	5	**810**	**770**	**1500**	**1100**	**600**	**1100**	**1300**	**12000**	**570**	**580**

Details of Guideline values are presented in **Section 6** of report (**Table 6-3**)
LOR = Limit of Reporting
Concentrations below the LOR noted as <value
Concentrations in a grey box exceed the adopted HIL 'D' for Commercial Industrial land use
Concentration in **bold green font** exceed the adopted EIL for Commercial Industrial land use

Client: John Holland Rail
Job No: 318000780
Project Name: DSI Addendum

Table VIb: XRF Measurements within Test Pits

	NEPM 2013 HIL D Commercial Industrail	NEPM 2013 EIL Commercial Industrial																
Sample Type:					Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Site:					Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor
Lab Sample number:					-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sample date:					19-Aug-20	19-Aug-20	19-Aug-20	19-Aug-20	19-Aug-20	19-Aug-20	19-Aug-20	19-Aug-20	19-Aug-20	19-Aug-20	19-Aug-20	19-Aug-20	19-Aug-20	19-Aug-20
Sample ID:					RRE_TP01_0.0	RRE_TP01_0.05	RRE_TP01_0.10	RRE_TP01_0.15	RRE_TP01_0.20	RRE_TP01_0.30	RRE_TP02_0.0	RRE_TP02_0.05	RRE_TP02_0.10	RRE_TP02_0.15	RRE_TP02_0.2	RRE_TP02_0.25	RRE_TP03_0.0
Project Name:					DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum
Sampling Method:					Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit
Analyte grouping/Analyte			**Units**	**LOR**														
Metals																		
Lead	2200*	1800	mg/kg	5	150	48	<6	<6	<6	<6	1091	**2172**	2785	1941	1206	75	2099	

LOD= Limit of Detection
Concentrations below the LOD noted as <value
Concentrations in a grey box exceed the adoped HIL 'D' for
Concentration in **green font** exceed the adopted EIL for Commerical Industrial land use

Client: John Holland Rail
Job No: 318000780
Project Name: DSI Addendum

Table VIb: XRF Measurements within Test Pits

	NEPM 2013 HIL D Commercial Industrail	NEPM 2013 EIL Commercial Industrial																
Sample Type:					Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Site:					Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor
Lab Sample number:					-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sample date:					19-Aug-20	19-Aug-20	19-Aug-20	19-Aug-20	19-Aug-20	19-Aug-20	19-Aug-20	19-Aug-20	19-Aug-20	19-Aug-20	19-Aug-20	19-Aug-20	19-Aug-20	19-Aug-20
Sample ID:					RRE_TP03_0.05	RRE_TP03_0.10	RRE_TP04_0.0	RRE_TP04_0.05	RRE_TP04_0.1	RRE_TP05_0.0	RRE_TP05_0.05	RRE_TP05_0.10	RRE_TP05_0.15	RRE_TP06_0.0	RRE_TP06_0.05	RRE_TP06_0.10	RRE_TP07_0.0
Project Name:					DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum
Sampling Method:					Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit
Analyte grouping/Analyte			**Units**	**LOR**														
Metals																		
Lead	2200*	1800	mg/kg	5	2231	1353	774	4867	73	1093	4681	4725	17	718	12300	67	4078	

LOD= Limit of Detection
Concentrations below the LOD noted as <value
Concentrations in a grey box exceed the adoped HIL 'D' for
Concentration in **green font** exceed the adopted EIL for Commerical Industrial land use

Client: John Holland Rail
Job No: 318000780
Project Name: DSI Addendum

Table VIb: XRF Measurements within Test Pits

	NEPM 2013 HIL D Commercial Industrail	NEPM 2013 EIL Commercial Industrial															
Sample Type:					Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Site:					Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor
Lab Sample number:					-	-	-	-	-	-	-	-	-	-	-	-	-
Sample date:					19-Aug-20	19-Aug-20	19-Aug-20	19-Aug-20	19-Aug-20	19-Aug-20	19-Aug-20	19-Aug-20	19-Aug-20	19-Aug-20	19-Aug-20	19-Aug-20	19-Aug-20
Sample ID:					RRE_TP07_0.05	RRE_TP07_0.10	RRE_TP08_0.0	RRE_TP08_0.05	RRE_TP08_0.1	RRE_TP08_0.15	RRE_TP08_0.20	RRE_TP09_0.0	RRE_TP09_0.05	RRE_TP10_0.0	RRE_TP10_0.05	RRE_TP10_0.1	
Project Name:					DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	
Sampling Method:					Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	
Analyte grouping/Analyte			**Units**	**LOR**													
Metals																	
Lead	2200*	1800	mg/kg	5	19	12	6003	3577	9862	18500	293	4762	67	3715	9523	29	

LOD= Limit of Detection
Concentrations below the LOD noted as <value
Concentrations in a grey box exceed the adopted HIL 'D' for
Concentration in **green font** exceed the adopted EIL for Commerical Industrial land use

Client: John Holland Rail
Job No: 318000780
Project Name: DSI Addendum

Table VII: Contaminants of Potential Concern

	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Sediment	Sediment	Sediment	Sediment
	Site:		Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor
	Lab Sample number:		S20-Jn50651	S20-Jn50652	S20-Jn50653	S20-Jn50654	S20-Jn50656	S20-Jn50657	S20-Jn50658	S20-Jn50647	S20-Jn50648	S20-Jn50649	S20-Jn50650
	Sample date:		29-06-20	29-06-20	29-06-20	29-06-20	18-03-20	19-03-20	19-03-20	01-04-20	01-04-20	01-04-20	01-04-20
	Sample ID:		TP3A	TP4A	TP5A	TP6A	MW2_0-0.05	MW4_0-0.05	MW5_0-0.05	SED2	SED3	SED4	SED6
	Project Name:		DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum
	Sampling Method:		Direct	Direct	Direct	Direct	Auger	Auger	Auger	Push Tube	Push Tube	Push Tube	Push Tube
Analyte grouping/Analyte	**Units**	**LOR**											
Organochlorine Pesticides													
4.4'-DDD	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
4.4'-DDE	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
4.4'-DDT	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
a-BHC	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aldrin	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
*Aldrin and Dieldrin (Total)**	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
b-BHC	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Chlordanes - Total	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
d-BHC	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
*DDT + DDE + DDD (Total)**	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dieldrin	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan I	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan II	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan sulphate	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Endrin	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Endrin aldehyde	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Endrin ketone	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
g-BHC (Lindane)	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor epoxide	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Hexachlorobenzene	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Methoxychlor	mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.05	< 0.05	< 0.05	< 0.2	< 0.2	< 0.2	< 0.2
Toxaphene	mg/kg	1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
*Vic EPA IWRG 621 OCP (Total)**	mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.1	< 0.1	< 0.1	< 0.2	< 0.2	< 0.2	< 0.2
*Vic EPA IWRG 621 Other OCP (Total)**	mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.1	< 0.1	< 0.1	< 0.2	< 0.2	< 0.2	< 0.2
Organophosphorus Pesticides													
Azinphos-methyl	mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Bolstar	mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chlorfenvinphos	mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chlorpyrifos	mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chlorpyrifos-methyl	mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Coumaphos	mg/kg	2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Demeton-O	mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Demeton-S	mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Diazinon	mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dichlorvos	mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dimethoate	mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Disulfoton	mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
EPN	mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Ethion	mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Ethoprop	mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Ethyl parathion	mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Fenitrothion	mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Fensulfothion	mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Fenthion	mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Malathion	mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Merphos	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5	< 0.5	< 0.5
Methyl parathion	mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Mevinphos	mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Monocrotophos	mg/kg	2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Naled	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5	< 0.5	< 0.5
Omethoate	mg/kg	2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Phorate	mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Pirimiphos-methyl	mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Pyrazophos	mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Ronnel	mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Terbufos	mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Tetrachlorvinphos	mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Tokuthion	mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Trichloronate	mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Polychlorinated Biphenyls													
Aroclor-1016	mg/kg	0.5	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	< 0.1	< 0.1	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5
Aroclor-1221	mg/kg	0.1	*< 0.1*	*< 0.1*	*< 0.1*	*< 0.1*	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aroclor-1232	mg/kg	0.5	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	< 0.1	< 0.1	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5
Aroclor-1242	mg/kg	0.5	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	< 0.1	< 0.1	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5
Aroclor-1248	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 0.1	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5
Aroclor-1254	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 0.1	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5
Aroclor-1260	mg/kg	0.5	< 0.5	< 1	< 0.5	< 0.5	< 0.1	< 0.1	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5
Total PCB*	mg/kg	0.5	< 0.5	< 1	< 0.5	< 0.5	< 0.1	< 0.1	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5

LOR= Limit of Reporting
Concentrations below the LOR noted as <value

Appendix E Regulatory Search Results

Heritage NSW

Search for NSW Heritage

Return to search page where you can refine/broaden your search.

Statutory listed items

Information and items listed in the State Heritage Inventory come from a number of sources. This means that there may be several entries for the same heritage item in the database. For clarity, the search results have been divided into three sections.

- **Section 1** - contains Aboriginal Places declared by the **Minister for the Environment** under the National Parks and Wildlife Act. This information is provided by Heritage NSW.
- **Section 2** - contains heritage items listed by the **Heritage Council of NSW** under the Heritage Act. This includes listing on the State Heritage Register, an Interim Heritage Order or protected under section 136 of the Heritage Act. This information is provided by Heritage NSW.
- **Section 3** - contains items listed by **local councils** on Local Environmental Plans under the Environmental Planning and Assessment Act and **State government agencies** under s.170 of the Heritage Act. This information is provided by local councils and State government agencies.

Section 1. Aboriginal Places listed under the National Parks and Wildlife Act.

Your search did not return any matching results.

Section 2. Items listed under the Heritage Act.

Your search returned 1 record.

Item name	Address	Suburb	LGA	SHR
Tarago Railway Station group	Goulburn-Bombala railway	Tarago	Goulburn Mulwaree	01262

Section 3. Items listed by Local Government and State Agencies.

Your search returned 4 records.

Item name	Address	Suburb	LGA	Information source
Tarago Railway Precinct		Tarago	Goulburn Mulwaree	SGOV
Tarago Railway Precinct		Tarago	Goulburn Mulwaree	SGOV
Tarago Railway Station	Goulburn Street	Tarago	Goulburn Mulwaree	LGOV
The Loaded Dog Hotel, Outbuildings	1 Wallace Street	Tarago	Goulburn Mulwaree	LGOV

There was a total of 5 records matching your search criteria.

Key:

LGA = Local Government Area

GAZ= NSW Government Gazette (statutory listings prior to 1997), HGA = Heritage Grant Application, HS = Heritage Study, LGOV = Local Government, SGOV = State Government Agency.

Note: While Heritage NSW seeks to keep the Inventory up to date, it is reliant on State agencies and local councils to provide their data. Always check with the relevant State agency or local council for the most up-to-date information.

Heritage NSW

Search for NSW Heritage

Item details

Name of item:
Tarago Railway Station group
Type of item:
Complex / Group
Group/Collection:
Transport - Rail
Category:
Railway Platform/ Station
Location:
Lat: -35.070982 Long: 149.650771
Primary address:
Goulburn-Bombala railway, Tarago, NSW 2580
Local govt. area:
Goulburn Mulwaree
Local Aboriginal Land Council:
Pejar

Boundary:

The listing boundary is the area immediately around the station building and platform for a distance of approximately 10 metres and the property boundary of the residence.

All addresses

Street Address	Suburb/town	LGA	Parish	County	Type
Goulburn-Bombala railway	Tarago	Goulburn Mulwaree			Primary Address

Owner/s

Organisation Name	Owner Category	Date Ownership Updated
RailCorp	State Government	16 Nov 98

Statement of significance:

Tarago Railway Precinct is of state significance as a significant Victorian period railway precinct that retains several original or early items from the 1880s including the 1884 roadside station building and the c1884 goods shed. The extant railway buildings and structures form an important landmark for the small town at Tarago and are important elements within the wider townscape. The station building and goods shed are good representative examples of a series of similar items located on the Main Southern Line and on the Bombala Line.
Date significance updated: 19 Jul 13
Note: The State Heritage Inventory provides information about heritage items listed by local and State government agencies. The State Heritage Inventory is continually being updated by local and State agencies as new information becomes available. Read the Department of Premier and Cabinet copyright and disclaimer.

Description

Builder/Maker:
G & C Horn
Construction years:
1884-1884
Physical description:
MAJOR STRUCTURES - Managed by RailCorp
Station Building - type 4, standard roadside third class brick (1884)
Platform
Signal Box - type Q, non-elevated fibro (1938)

MAJOR STRUCTURES - Managed by ARTC
Goods Shed - type 3 (1884)

STATION BUILDING (1884)
The building is simply planned with central waiting room flanked by SM office and ticket office with parcels at one end of the building and ladies waiting at the other. The station buildings are constructed of brick with a painted finish and feature gabled roofs clad in corrugated iron with corbelled brick chimneys. The central building features a rear porch entry to the central room which is marked by a transverse gable. Gable ends feature decorative timber barge boards and timber finials. The platform verandah has a decorative timber valance and is supported on timber posts with curved iron brackets. Timber sash windows have moulded surrounds and sills.

The brick platform also dates from 1884. The asphalt surface is modern.

SIGNAL BOX (1938)
The signal box is a simple square structure with a hipped roof clad in corrugated iron and timber framed walls clad in fibro.

GOODS SHED (1884)
The goods shed is a large rectangular structure with a gabled roof clad in corrugated iron extending to form awnings on either side of the building. The awnings are supported on timber brackets. The building is timber framed with corrugated iron wall cladding. A small weatherboard office wing is clad in weatherboard. The structure features a large timber platform and timber sliding doors with diagonal boarding.

Physical condition and/or
Archaeological potential:
Generally good condition.

Date condition updated:19 Jul 13

Modifications and dates:
The platform buildings and goods shed are largely intact. The Woodlawn mine loader is intrusive on the heritage precinct. No changes to the curtilage should be made that diminishes the significance of the precinct..

Current use:
Railway Station

Former use:
Railway Station

History

Historical notes:
Tarago Station is located along the Bombala Line which opened as a single line from Joppa Junction to Tarago on 3 January 1884. The construction contract for the Joppa Junction to Bungendore section was awarded to W S Topham & J Angus (tramway contractors) on 3 October 1882 (Forsyth, 1991).

The contract for construction of a station building, Station Master’s residence, and goods shed is recorded as being let to G & C Horn on 17 December 1883 and Tarago as being officially opened on 3 January 1884. The exact date that the station building and other original buildings were completed is unclear, but it is likely that it was much later than the official opening of January 1884. Either that or the construction of the station buildings began earlier than December 1883. The 83.8 metre long platform, station building, goods shed, and sidings were constructed on the Down (east) side, with the trucking yards situated on the Up side (Forsyth, 1991).

The building at Tarago is a five room example of a standard roadside station. This size of structure was allocated usually to urban areas with excess of 3,000 residents. The Tarago building, as well as those at Bungendore and Queanbeyan, reflect either large urban populations or, more likely, very powerful or influential residents in the region exercising strong political pressure on governments.

Major additions and changes at Tarago included alterations to the loop siding for conversion to a siding to service cattle yards (1891), provision of a cart weighbridge (1893), postal services accommodation constructed (1899), erection of a gantry crane and platform asphalt (1902), conversion of the stockyard siding into a loop (1911), improvements to stockyards (1914), additional siding accommodation at stockyards (1920), rest house transferred from Dunedoo re-erected at Tarago, kitchen and toilet added (1925), trucking yards modified (1940), and the stockyards removed in 1989 (Forsyth, 1991; Forsyth, 2008).

Tarago was closed to goods traffic in c1989 but remains a stopover for passenger trains on the Canberra to Sydney XPT service. The station buildings have since undergone some minor repair and conservation works (c1994).

The Station Master's residence is still extant to the north of the station, but is privately owned.

Historic themes

Australian theme (abbrev)	New South Wales theme	Local theme
3. Economy-Developing local, regional and national economies	Transport-Activities associated with the moving of people and goods from one place to another, and systems for the provision of such movements	(none)-

Assessment of significance

SHR Criteria a)

[Historical significance]

The site has historic significance through its ability to demonstrate the late 19th Century development of the NSW railways. The site includes several items dating from the opening of the line at Tarago in 1884 and demonstrates the layout of a late 19th Century railway precinct.

SHR Criteria c)

[Aesthetic significance]

The site has aesthetic significance as a railway precinct that retains several original items that demonstrate railway design in the 1880s. The 1884 station building is a fine example of a Victorian third class roadside station building with fabric and fine detailing typical of the period. The railway buildings, structures and the site are important elements within the wider townscape of Tarago.

SHR Criteria d)

[Social significance]

The site is of social significance to the local community on account of its lengthy association for providing an important source of employment, trade and social interaction for the local area. The site is significant for its ability to contribute to the local community's sense of place, is a distinctive feature of the daily life of many community members, and provides a connection to the local community's past.

SHR Criteria g)

[Representativeness]

The station building has representative significance as a fine example of a third class, brick standard roadside station building, similar in design to station buildings at Bungendore, Michelago and other locations in NSW. The goods shed is also a good representative example of a standard late 19th century goods shed. The collection of buildings demonstrate widespread late 19th and early 20th Century railway customs, activities and design in NSW and are representative of similar items that are found at other railway sites across the state.

Integrity/Intactness:

The station group including the station building, platforms, goods shed and signal box have a high level of integrity.

Assessment criteria:

Items are assessed against the State Heritage Register (SHR) Criteria to determine the level of significance. Refer to the Listings below for the level of statutory protection.

Procedures /Exemptions

Section of act	Description	Title	Comments	Action date
57(2)	Exemption to allow work	Standard Exemptions	SCHEDULE OF STANDARD EXEMPTIONS HERITAGE ACT 1977 Notice of Order Under Section 57 (2) of the Heritage Act 1977 I, the Minister for Planning, pursuant to subsection 57(2) of the Heritage Act 1977, on the recommendation of the Heritage Council of New South Wales, do by this Order: 1. revoke the Schedule of Exemptions to subsection 57(1) of the Heritage Act made under subsection 57(2) and published in the Government Gazette on 22 February 2008; and 2. grant standard exemptions from subsection 57(1) of the Heritage Act 1977, described in the Schedule attached. FRANK SARTOR Minister for Planning Sydney, 11 July 2008 To view the schedule click on the Standard Exemptions for Works Requiring Heritage Council Approval link below.	Sep 5 2008

Standard exemptions for works requiring Heritage Council approval

Listings

Heritage Listing	Listing Title	Listing Number	Gazette Date	Gazette Number	Gazette Page
Heritage Act - State Heritage Register		01262	02 Apr 99	27	1546
Heritage Act - s.170 NSW State agency heritage register					

References, internet links & images

None

Note: internet links may be to web pages, documents or images.

(Click on thumbnail for full size image and image details)

Data source

The information for this entry comes from the following source:

Name:

Heritage Office

Database number:

5012238

Return to previous page

Place Details

Send Feedback

Tarago Railway Station, Goulburn - Braidwood Rd, Tarago, NSW, Australia

Photographs

List	Register of the National Estate (Non-statutory archive)
Class	Historic
Legal Status	Registered (21/03/1978)
Place ID	1133
Place File No	1/08/297/0013

Statement of Significance

Tarago Railway Station has historical importance for its association, along with other stations along the line, with the extension of the railway into the region during the second half of the nineteenth century. The railway brought fundamental changes in transport, communications and local economies (Criterion A.4). Identical to several other stations (including nearby Bungendore; also registered) Tarago's station contributes to the continuity of station buildings on this line (Criterion D.2). The station is an important landmark feature of this small town, though this has been reduced to some extent by the construction of nearby mining company rail buildings (Criterion E.1).

Official Values Not Available

Description

Tarago Railway Station was built as part of the extension of the railway into the region. The railway reached Goulburn in 1869, Gunning in 1875, Tarago in about 1884, Bungendore the following year and Queanbeyan in 1887. Rail's arrival brought with it great changes in transport and communications and local economies. The station, identical to that at Bungendore and several other towns, consists of a main building flanked by two smaller buildings at either end. In addition there is a station master's house. The station buildings are symmetrical, single storey structures built of brick and with gable roofs clad with corrugated iron. There are simply decorated timber barge boards to the gables and some of the decorative timber work within the gables also survives. The sash windows have emphasised label moulds and simple sills. A gabled entrance porch is centrally placed on the main building. The platform verandah has a decorative valance and is supported on timber posts with curved iron brackets. Located a short distance from the station buildings is the station master's residence, which has a hipped iron roof, three chimneys, sash windows and a concave verandah with iron roof and timber posts. As with virtually any small town, the station is a major feature among Tarago's buildings.

History Not Available

Condition and Integrity

Some of the timber crosspiece infill detail to the gables is missing, and the construction of mining company rail buildings on the opposite side of the line has detracted from the station's landscape value. (As reported at time of nomination in May 1977. December 1991)

Location

Comprising station, including main building and two lavatory blocks, and station masters residence, Goulburn - Braidwood Road, Tarago.

Bibliography

Lea-Scarlett, Errol, "Queanbeyan District and People", Queanbeyan
1968.

Report Produced Fri Oct 2 13:54:26 2020

Appendix F Voluntary Management Plan

VOLUNTARY MANAGEMENT PROPOSAL UNDER THE CONTAMINATED LAND MANAGEMENT ACT 1997

Part 1

Preliminary Details

1. Proponent's Details

(a) Name and contact details

Trading as:	Transport for NSW
ABN:	18 804 239 602
Contact Name:	[redacted]
Phone:	[redacted]
Fax:	
Email:	[redacted]
Postal address:	Level 3, 237 Wharf Rd, Newcastle NSW
Postcode:	2300
EPA licence number (if applicable):	

(b) Who the EPA should contact with technical enquiries about the proposal

Name:	[redacted]
Employer/Company:	Transport for NSW
Position title:	Senior Manager, Regional Infrastructure
Services,	
Type of business:	
Phone (business):	[redacted]
Phone (after hours):	
Fax:	
Email:	[redacted]

2. Site to which proposal applies

The site to which the proposal applies ("the site") forms part of Lot 22 DP1202608 and falls within the Goulburn – Bombala rail corridor at Tarago. The Site is within the Goulburn Mulwaree LGA in New South Wales.

The land to which this declaration applies is shown on the attached map and is shaded blue.

3. The contamination

Soil and surface water (when present) at the site are contaminated with substances and the contamination is significant enough to warrant regulation under the *Contaminated Land Management Act 1997*. The substance of concern ("the Contaminant") in soil is lead described as follows:

- lead concentrations in soil within the rail corridor (Lot 22 DP1202608) exceed national guideline values for the protection of human health and the environment
- lead contamination has impacted adjacent land at 106 Goulburn Street, Tarago (Lot 1 DP816626), with soil found to contain lead at concentrations exceeding national guideline values for the protection of human health and the environment
- there are complete exposure pathways to lead for occupants of 106 Goulburn Street, as well as potentially complete exposure pathways for persons working within the rail corridor and
- there are potentially complete exposure pathways for onsite and offsite ecological receptors

4. The management proposal

The management proposal ("the proposal") comprises:

a) the information set out above;
b) the undertakings set out in Part 2 of this document; and
c) the performance schedule set out in Part 3 of this document.

Part 2

Undertakings Included in Voluntary Management Proposal

THE PROPOSAL INCLUDES THE FOLLOWING UNDERTAKINGS:

General

1. All works or activities carried out in connection with the proposal, including sampling and preparation of associated reports ("the activities"), will be carried out in accordance with applicable provisions of *State Environmental Planning Policy 55 – Remediation of Land* and any requirements imposed under it in relation to the activities.
2. All matters listed as relevant to a remediation action plan by the EPA's *Guidelines for Consultants Reporting on Contaminated Sites* (2020) will be taken into account in the carrying out of the activities.
3. All the activities will be carried out consistently with guidelines made or approved under section 105 of the CLM Act.
   (See www.epa.nsw.gov.au/clm/guidelines.htm)
4. All the activities will be carried out in compliance with applicable NSW environmental legislation, and in particular:
   i) All the activities, including:
      (1) the processing, handling, movement and storage of materials and substances used to carry out the activities; and
      (2) the treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activities

      will be carried out in a competent manner;
   ii) All plant and equipment installed at the site or used in connection with the activities:
      (1) will be maintained in a proper and efficient condition; and
      (2) will be operated in a proper and efficient manner.
5. All the activities at the site will be carried out in a manner that prevents or minimises the emission of dust, odour and noise from the site.
6. Waste generated or stored at the Site will be assessed and classified in accordance with the EPA's *Waste Classification Guidelines Part 1: Classifying Waste*.

   (See www.epa.nsw.gov.au/wasteregulation/classify-guidelines.htm)
7. All waste transported from the Site that is required by the *Protection of the Environment (Waste) Regulation 2014* to be tracked must be tracked using the EPA's on-line tracking system or an alternative tracking system approved in writing by the EPA.

   (See www.epa.nsw.gov.au/owt/aboutowt.htm)
8. The proponent will make this voluntary management proposal available to the public free of charge and consents to the EPA placing this proposal on its public website.
9. The proponent will make all documents referred to in, and required to be prepared under, this voluntary management proposal available to the public free of charge,

unless the proponent identifies commercial-in-confidence or private/personal information (including information relating to a third party) within those documents. In these cases, the proponent will remove such information from the documents to make the documents suitable for public release.

10. The proponent will:

    i) prior to the implementation of the proposal provide for the EPA's approval a strategy for communicating about that implementation, particularly the actual management works, with members of the public who are likely to have a real interest in or be affected by that implementation; and

    ii) implement the strategy as approved in writing by the EPA.

Monitoring, Record Keeping & Reporting

11. At least until the EPA has notified the proponent that the EPA no longer considers that the contamination is significant enough to warrant regulation under the *Contaminated Land Management Act 1997*, record and retain all monitoring data and information and provide this record to the EPA at any reasonable time if so requested by the EPA and as specifically provided under the proposal.

12. The EPA will be informed in writing within 7 days of the proponent becoming aware of information or data indicating a material change:

    a) in conditions at the site, or

    b) in its surrounding environment,

    which could adversely affect the prospects of successful management of the site or result in harm to the environment.

13. The EPA will be informed in writing within 7 days of the proponent becoming aware of any failure, either by the proponent or any other person, to comply with any term of the proposal.

14. The EPA will be informed immediately of the proponent becoming aware of any information or data that indicates harm to the environment, as defined by the *Protection of the Environment Operations Act 1997*.

15. The EPA will be informed in writing as soon as practicable of any notification by the proponent, its employees or its agents to an appropriate regulatory authority other than the EPA of any pollution incident at the site within the meaning of the *Protection of the Environment Operations Act 1997*.

    (See http://www.epa.nsw.gov.au/licensing/dutytonotify.htm)

Performance Schedule

16. The performance schedule which is in Part 3 of this document will be adhered to.

PERFORMANCE SCHEDULE

1. Objectives of the proposal

The objectives of this proposal are to achieve the following outcomes within the specified timeframes:

Stage 1
O1 Assess the nature and extent of the Contaminant at the Site and the migration of the Contaminant from the Site
O2 Develop an Action Plan for interim management of risks to off site receptors from the Contaminant originating from the Site

Stage 2
O3 Develop remedial action plan(s) "RAP(s)" defining how risks associated with the Contaminant originating from the Site will be addressed

Stage 3
O4 Implement the RAP(s)
O5 Validate the implementation of the RAP(s)

This Schedule describes how each objective will be satisfied.

2. Principal features of the proposal

The principal features of proposal include, but are not limited to:

Stage 1 - Assessment of Contaminant at or originating from the Site

P1. Appoint a NSW EPA auditor accredited under the *Contamination Land Management Act 1997*.

P2. Collate and review data from third parties in relation to the Contaminant in soil and water in the Tarago area.

P3. Undertake delineation of the Contaminant within the Site and at the former Ore Concentrate Load-Out Complex.

P4. Install groundwater monitoring wells to assess impacts to groundwater from the Contaminant originating from the Site.

P5. Assess the potential migration from the Site of the Contaminant in surface waters and sediments.

P6. Prepare a Detailed Site Investigation report.

P7. Develop an Action Plan to define responses to mitigate risks from the Contaminant originating from the Site to offsite receptors.

Stage 2 - Remediation Action Plan

P8. Assess remedial options to address risks from the Contaminant on, or originating from, the Site.

P9. Select a preferred remedial option integrating consultation with the community and other stakeholders.

P10. Prepare a RAP(s) to define how the selected remedial option will be implemented and validated.

P11. Obtain Section B Site Audit Statement(s) from an Auditor accredited under the NSW EPA Site Auditor Scheme confirming:

- The assessment adequately characterises the degree and extent of the Contaminant at the Site and originating from the Site
- The RAP(s) is suitable to address risks associated with the Contaminant at the Site and originating from the Site.

Stage 3 Remediation and Validation

P12. Obtain planning permits and approvals and procurement necessary to implement remediation

P13. Implement the RAP(s)

P14. Compile a validation report(s) that describes and provides evidence of the activities taken to effect remediation and concludes on the success of remediation.

P15. Provision of a Site Audit Statement(s) from an Auditor accredited under the NSW EPA Site Auditor Scheme confirming remediation has occurred in accordance with the RAP(s) and objectives of this VMP are met, i.e. a Section B4 Site Audit(s).

3. Key milestones for investigation, remediation and other actions

All works set out in the proposal must be completed by the deadlines specified below:

Works	***Deadline***
T1. Investigation of Contaminant at or originating from the Site (P1-P6)	31 July 2020
T2. Development of an Action Plan to mitigate risks from the Contaminant originating from the Site to offsite receptors (P7)	31 July 2020
T3. Remediation action planning (P8-P11)	30 September 2020
T4. Preliminaries required to implement remediation (P12) including planning permits and approvals and procurement	Within 6 months of completing T3, subject to obtaining necessary approvals
T5. Implement Remediation (P13)	Within 6 months of completing T4
T6. Complete validation reporting and Auditor review of remediation (P14-P15)	Within 6 months of completing T5

4. Reporting requirements and timeframe for submission of reports

The EPA will be provided with the following reports:

R1 Detailed Site Investigation – Tarago. This report will include:

- A description of all investigative works relevant to the Contaminant at the site that have been completed
- Description of the degree and extent of the Contaminant:
  - Within and/or from the site; and
  - Otherwise within the area surrounding the site
- A conceptual site model assessing risks associated with the site Contaminant through potential source, pathway, receptor linkages

R2 Action Plan for Offsite Impacts from Tarago Rail Corridor. This report will include:
- Detailed description of measures that will be implemented to mitigate risks associated with the Contaminant originating from the site
- Confirmation of how the effectiveness of risk mitigation will be validated

R3 Remedial Action Plan (s) – The RAP(s) will include:
- Assessment of remedial options to address risks associated with the Contaminant at the site
- Selection of a preferred remedial option integrating consultation with the community and other stakeholders
- A Remedial Action Works Plan to define how the selected remedial option will be implemented
- A validation plan to define how the success of remediation will be assessed.

More than one RAP may be prepared.

R4 Section B Site Audit Statement. The appointed Site Auditor will prepare a Section B SAS to determine the adequacy of the Detailed Site Investigation (R1) in assessing risks associated with Contaminant at or originating from the site and the suitability of the Remedial Action Plan (R3) to mitigate these identified risks.

R5 Validation Report (s). The validation report(s) will include:

- A summary of contamination associated with the site identified in the Detailed Site Investigation (R1)
- A summary of the RAP(s) (R3)
- Assessment of remedial works completed against the preferred remedial strategy as described in the RAP(s) (R3)
- Completion of confirmatory testing and other validation measures described within the validation plan as described in the RAP(s) (R3)
- A clear statement assessing completion of the tasks required under the VMP.

More than one validation report may be prepared

R6 Section B4 Site Audit Statement(s). The Auditor will provide a Section B4 Site Audit Statement(s) and Site Audit Report(s) to determine compliance with this Voluntary Management Proposal.

These reports will be provided by the deadlines specified below:

Report	***Deadline***
R1. Detailed Site Investigation – Tarago	14 August 2020
R2. Action Plan for Offsite Impacts from Tarago Rail Corridor	14 August 2020
R3. RAP(s)	18 September 2020
R4. Section B Site Audit Statement	16 October 2020
R5. Validation Report (s)	Within 3 months of completing T5
R6. Section B4 Site Audit Statement (s) and Site Audit Report (s)	Within 6 months of completing T5

Signature of proponent

This application for approval of this voluntary management proposal may only be signed by a person(s) with the legal authority to sign it. The various ways in which the application may be signed, and the people who may sign the application, are set out in the categories below.

Please tick (✓) the box next to the category that describes how this application is being signed.

If the proponent is:		**The application must be signed and certified by one of the following:**
an individual	☐	the individual.
a company	☐ ☐ ☐ ☐	the common seal being affixed in accordance with the *Corporations Act 2001, or* two directors, or a director and a company secretary, or if a proprietary company that has a sole director who is also the sole company secretary – by that director.
a public authority other than a council	☐ ☑	the chief executive officer of the public authority, or by a person delegated to sign on the public authority's behalf in accordance with its legislation (Please note: a copy of the relevant instrument of delegation must be attached to this application).
a local council	☐ ☐	the general manager in accordance with s.377 of the *Local Government Act 1993* ('LG Act'), or the seal of the council being affixed in a manner authorised under the LG Act.

I/We (the proponent):

- ***apply for approval of the voluntary management proposal set out in this proposal and in any documents referred to in Part 1.4 of this proposal***
- ***declare that the information in this proposal form (including any attachment or document referred to in Part 1.4 of this proposal) is not false or misleading.***

Signature	[redacted]	Signature	[redacted]
Name (printed)	Terry Brady	Name (printed)	Justin Perrott
Position	General Manager, Country Rail Contracts	Position	Assoc Director Environmental Management
Date	25/5/2020	Date	25 May 2020

Seal (if signing under seal):

Appendix G Specific Immobilisation Approval

Reference: DOC21/858835-1
Date: 30 September 2021

Andrew Radley
Transport for NSW
231 Elizabeth Street
Sydney NSW 2000

Dear Andrew,

Specific Immobilisation Approval SIA2021-S-02 – Tarago Rail Corridor

I refer to Specific Immobilisation Approval (SIA) application submitted to the NSW Environment Protection Authority (EPA) on 17 August 2021 by Ramboll Australia Pty Ltd (Ramboll) for lead impacted material within the Tarago rail corridor, Tarago NSW. Ramboll has submitted the SIA application as part of proposed remediation works within the Tarago rail corridor on behalf of Transport for NSW (TfNSW). I also refer to relevant correspondence between the EPA and TfNSW relating to the draft SIA received on 29 September 2021.

The EPA notes that you do not have any further comments to make to the draft SIA provided for comment and review. In that regard, please find attached the finalised Specific Immobilisation Approval for the treatment and disposal of lead impacted material identified within the Tarago Rail Corridor.

Thank you for discussing this matter with the EPA. If you have any questions or wish to discuss the matter further, please contact David Langston on (02) 6229 7002 or at info@epa.nsw.gov.au.

Yours sincerely

NIGEL SARGENT
Manager – Regulatory Operations Regional

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Specific Immobilisation Approval

Pursuant to Part 10 of the *Protection of the Environment Operations (Waste) Regulation 2014* (Waste Regulation), the NSW Environment Protection Authority (EPA) has granted the following Specific Immobilisation Approval (***SIA***).

A) Approval Number

SIA2021-S-02

B) Duration of Approval

This Approval commences on or after 30 September 2021 and is valid for a 12-month period from the commencement date unless sooner revoked.

C) Waste to which this Approval applies

This Approval applies to 3,400m^3 of soil requiring chemical immobilisation of elevated lead in soil. The soil is located adjacent to the rail formation and fouled ballast in the Woodlawn Siding located on part of the Tarago Rail Corridor, Tarago NSW 2580, part of Lot 22 DP1202608 ("the premises") as documented in the application submitted to the EPA on 17 August 2021 by Ramboll Australia Pty Ltd.

D) Contaminants to be immobilised under this Approval

The Approval covers the following contaminants:

(a) Lead (Pb)

This Approval does not apply to any other contaminants or wastes.

E) Responsible Person

This Approval is granted is *Transport Asset Holding Entity* (TAHE) *of NSW* ("responsible party"). Transport for NSW (TfNSW) acts on behalf of TAHE. The delegated authority within TfNSW is Tom Grosskopf, Executive Director Network & Assets.

F) Techniques for Immobilisation

Immobilisation is achieved by physical screening of material <20mm and chemical fixation from reaction with reagents of Magnesium oxide (5% MgO) and monoammonium phosphate (2% MAP). Material >20mm separated during the physical screening will be assessed in accordance with the *Waste Classification Guidelines* and potential beneficial re-use options.

G) Conditions

The EPA imposes the following requirements on the responsible person who generates the immobilised waste.

1. Treatment Requirements

1.1 Processing and handling of treated and untreated waste must not cause adverse impacts on human health, amenity or the environment.

1.2 The responsible person must only use the reagents and technique specified within the ***Application Document*** and ensure the remediated materials meet the definition of ***Immobilised Waste*** in Section I.

1.3 The immobilisation of material must only be carried out at a premises that has lawful authority for this activity.

1.4 Transport of all lead contaminated material (immobilised or other) must be undertaken lawfully.

1.5 All activities must be undertaken in a competent manner

Revision of the Remediation Action Plan

Note: The SIA does not override the requirements of the Remediation Action Plan (RAP) and Voluntary Management Plan (VMP). Regardless, the EPA recommends the RAP is revised to reflect the approved waste treatment and disposal.

The approved site Auditor must review and endorse the revised RAP and validation criteria.

2. Quality Assurance and Quality Control

The responsible person must implement a quality assurance and quality control program to ensure compliance with the conditions of this Approval. The program must include but not be limited to:

2.1 Acceptance/rejection procedures to ensure that only immobilised waste which satisfies all the requirements of this Approval are disposed to an authorised off-site landfill.

2.2 A suitable sampling methodology (not composite) that is statistically appropriate in relation to batch size and time scale.

2.3 Each batch must be classified separately and meet the Toxicity Characteristic Leaching Procedure (TCLP) waste classification criteria. The 95%UCL can be used to demonstrate compliance with the criteria where sufficient samples (minimum 10) have been collected to calculate the 95%UCL for each batch.

2.4 Monitoring and recording of the following parameters that must be representative of each treated batch transported to landfill:

- total concentration of Pb in the untreated waste
- total concentration of Pb in the treated waste
- leachable concentration of Pb in the treated waste; and
- quantities of reagents added per batch.

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2.5 Submission to the EPA of batch summary reports that captures the key information and records required in Condition G2.4 to permit disposal traceability based upon relatable analytical data.

3. Test Methods

3.1 The responsible person must ensure that all testing of samples required by this Approval is undertaken by analytical laboratories accredited by the National Association of Testing Authorities.

3.2 The leachable concentration of Pb must be measured using the TCLP as specified in the *Waste Classification Guidelines*.

4. Waste Classification Requirements

4.1 All material must be classified in accordance with the *Waste Classification Guidelines* and disposed of in a lawful manner. This includes, but may not be limited to contaminated soil, railway sleepers and ballast.

4.2 With respect to Pb, the total concentration (SCC) does not apply to the reclassification of treated waste provided the waste complies with all the conditions of this Approval.

4.3 With respect to Pb, treated waste is reclassified according to its leachable concentration (TCLP) value.

5. Disposal Restrictions

5.1 Treated, reclassified waste must be disposed at a facility lawfully able to receive it.

5.2 The disposal facility must have an operating leachate management system for the contaminant of concern.

6. Record Keeping Requirements

6.1 The responsible person must keep a written record of the following for six (6) years commencing from the date of issue:

- The date on which waste was treated and disposed under this SIA
- The quantity of waste disposed and the nominated receiving disposal facility; and
- All characterisation data, information, records and online waste tracking numbers required under this SIA.

6.2 The responsible person must provide to the EPA, on request, all reports that capture the key information and records required to permit disposal traceability based upon representative and relatable analytical data.

6.3 The responsible person must notify the EPA within 48 hours of receiving any test result which shows that the treated waste does not meet the requirements for disposal under this SIA. The notification must also include detailed information that explains the result and what actions have or will be implemented to address the issue.

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7. Waste Tracking Requirements

7.1 Waste subject to this SIA must, when transported, be tracked in accordance with Part 4 of the Waste Regulation.

7.2 The SIA number must be recorded as "SIA2021-S-02" on the Consignment Authorisations and Transport Certificates generated in the EPA's online waste tracking system.

7.3 Prior written approval must be obtained from the EPA if the waste is not to be tracked using the EPA's online waste tracking system.

H) Notification

Notifications or reports as required by this Approval must be sent to:

Director Regulatory Operations – Regional South
NSW Environment Protection Authority
e: info@epa.nsw.gov.au
or
4 Parramatta Square, 12 Darcy Street, Parramatta, NSW, 2150

I) Definitions

In this Approval:

Application Document	relates to SIA Application REF No. 31800078 submitted to the NSW EPA on 17 August 2021 by Ramboll Australia Pty Ltd.
Immobilised Waste	means soil waste that has been received at the premises for treatment and: (a) has been mixed using a high shear mechanical mixer to create a homogenous material; (b) treated by the addition of sufficient cement to immobilise the contaminants and mixed homogeneously in accordance with EPA Immobilisation Technical Note 1; (c) complies with the all conditions of the Approval.
Specific Contaminant Concentration (SCC)	The specific contaminant concentration value specified in the Waste Classification Guidelines
Toxicity Characteristic Leaching Procedure (TCLP)	Refers to the US EPA method 1311, a soil sample extraction method used as an analytical method to simulate contaminant leaching under simple landfill conditions.
Waste Classification Guidelines	means the NSW EPA Waste Classification Guidelines (November 2014)

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J) Notes

The responsible person must comply with the conditions of this SIA. The maximum penalty is 200 penalty units for a corporation and 100 penalty units for an individual. This approval may be varied or revoked by the EPA by way of written notice given to the responsible person.

The responsible person must also ensure that all other legislative requirements relating to the waste are complied with including, for example, the use of a licensed waste transporter in circumstances where one must be used.

Date: 30 September 2021
Signature:

Nigel Sargent
Manager Regulatory Operations – Regional South
NSW Environment Protection Authority
By Delegation

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Appendix H Remediation Action Plan

Intended for
John Holland Rail

Document type
Remedial Action Plan

Date
June 2021

TARAGO RAIL CORRIDOR
REMEDIAL ACTION PLAN

RAMBOLL Bright ideas. Sustainable change.

TARAGO RAIL CORRIDOR
REMEDIAL ACTION PLAN

Project name	**Tarago Rail Loop Lead Management**
Project no.	**318000780**
Recipient	**Michael Hooper**
Document type	**Remedial Action Plan**
Description	**This document describes the Remedial Action Plan for heavy metal contamination at the Tarago Rail Loop at Tarago, NSW.**

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Australia

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https://ramboll.com

Revision	Date	Prepared by	Checked by	Approved by
0	6/05/2021	Stephen Maxwell	Fiona Robinson	Fiona Robinson CEnvP (CS)
1	24/06/2021	Stephen Maxwell	Fiona Robinson	Fiona Robinson CEnvP (CS)

Ramboll Australia Pty Ltd.
ACN 095 437 442
ABN 49 095 437 442

CONTENTS

ABBREVIATIONS

Abbreviation	Description
%	per cent
°C	Degrees Celsius
µg/L	micrograms per Litre
µS/cm	Micro siemens per centimetre
m	metre(s)
bgl	below ground level
mg/kg	milligrams per Kilogram
mg/L	milligrams per Litre
mm	millimetre
ppm	parts per million
ADWG	Australian Drinking Water Guidelines
ANZECC	Australian and New Zealand Environment and Conservation Council
BTEXN	Benzene, Toluene, Ethylbenzene, Xylenes, Naphthalene (Monocyclic Aromatic Hydrocarbons)
CH	Chainage
CLM Act	NSW Contaminated Land Management Act 1997
CoC	Chain of Custody
DP	Deposited Plan
DQI	Data Quality Indicator
EIL	Ecological Investigation Level
EPA	Environment Protection Authority
fpXRF	Filed portable X-Ray Fluorescence metals analyser
HIL	Health Investigation Level
LOR	Limit of Reporting
Metals	As: Arsenic, Cd: Cadmium, Cr: Chromium, Cu: Copper, Fe: Iron, Ni: Nickel, Pb: Lead, Zn:Zinc, Hg: Mercury
NATA	National Association of Testing Authorities
ND	Not Detected
NEPM	National Environment Protection Measure
NHMRC	National Health and Medical Research Council
n	Number of Samples
OCPs	Organochlorine Pesticides
OPPs	Organophosphorus Pesticides
PCBs	Polychlorinated Biphenyls
pH	A measure of acidity, hydrogen ion activity
PQL	Practical Quantitation Limit
QA/QC	Quality Assurance/Quality Control
RPD	Relative Percent Difference
RRE	Resource Recovery Exemption
SAQP	Sampling Analysis and Quality Plan
TDS	Total Dissolved Solids
UCL	Upper Confidence Limit
US EPA	United States Environmental Protection Agency
-	On tables is "not calculated", "no criteria" or "not applicable"

EXECUTIVE SUMMARY

Ramboll Australia Pty Ltd (Ramboll) was retained by John Holland Rail (JHR) on behalf of Transport for NSW (TfNSW) to prepare a Remedial Action Plan (RAP) for contamination identified along approximately one kilometre of the Goulburn – Bombala rail corridor at Tarago, NSW (the site).

In November 2019 the site was notified to the NSW Environment Protection Authority (EPA) under Section 60 of the *Contaminated Land Management Act 1997* (CLM Act) and on 25 March 2020 the NSW EPA declared the site to be significantly contaminated under Section 11 of the CLM Act (Declaration Number: 20201103; Area Number 3455). The site was published on the EPA's list of notified sites as "contamination is regulated by the EPA under the CLM Act". The declaration defines the substance of concern in soil ("the Contaminant") to be lead.

A voluntary management proposal (VMP) was prepared to define how risks presented by the Contaminant would be managed and this was approved by the NSW EPA on 28 May 2020.

Site contamination appears limited to ballast in rail formations and surrounding soils to a maximum depth of approximately 0.5 meters below ground level. Contaminated rail formations include the redundant Woodlawn Siding (historically used to load ore concentrate for rail transport), the Tarago Yard Loop and the Goulburn – Bombala main line. Contaminated soils are generally limited to those adjacent the rail formation though include a vertically defined band beneath approximately one meter of uncontaminated clayey fill around the footprint of the former Ore Concentrate Loadout Complex buildings.

Contaminant migration from the site occurred in airborne dust and surface water. The Tarago Lead Management Action Plan was developed by Ramboll in 2020 to address associated exposure risks. This included removal of dust from affected houses and rainwater tanks, application of a polymer sealant to contaminated surfaces onsite and monitoring of surface water and air quality which are ongoing. Surface water and air quality monitoring completed to date indicates risks of exposure to site contamination in the surrounding environment are low and within this context remediation offsite is not considered necessary.

The objective of remediation is to address the risk to human health and the environment from contamination at the site.

The preferred remedial strategy comprises offsite disposal of ballast fines from the Woodlawn Siding and adjacent surface soils. Offsite disposal will include excavation and transport of soils to a compound established at a licensed waste facility. Ballast will be mechanically screened for reuse onsite following successful validation. Ballast fines will be chemically immobilised for disposal as General Solid Waste in accordance with a NSW EPA Specific Immobilisation Approval.

Contaminated ballast will remain within operational rail formations and at depth around the footprint of the former Ore Concentrate Loadout Complex buildings. Remnant contamination will be managed under a long term environmental management plan (LTEMP).

The former Station Masters Cottage adjacent the rail formation has been acquired by TfNSW. Contaminant exposure risks will be managed under the LTEMP prepared for other remnant contamination.

The effectiveness of remediation at mitigating exposure risks associated with site contamination in the receiving environment will be assessed through post remediation surface water and air quality monitoring.

1. INTRODUCTION

Ramboll Australia Pty Ltd (Ramboll) was retained by John Holland Rail (JHR) on behalf of Transport for NSW (TfNSW) to prepare a Remedial Action Plan (RAP) for contamination identified along approximately one kilometre of the Goulburn – Bombala rail corridor at Tarago, NSW. This area is presented on **Figure 1**, **Appendix 1** and is here-in referred to as the site.

1.1 Background

Ramboll has assisted JHR to date in the assessment and management of site contamination including assessment of risks to human health and ecological receptors within and surrounding the site. This previous assessment included identification of data gaps that limited capacity to assess potential risks to users of Tarago Station and sensitive offsite receptors.

In November 2019 the site was notified to the NSW Environment Protection Authority (EPA) under Section 60 of the *Contaminated Land Management Act 1997* (CLM Act) and on 25 March 2020 the NSW EPA declared the site to be significantly contaminated under Section 11 of the CLM Act (Declaration Number: 20201103; Area Number 3455). The site was published on the EPA's list of notified sites as "contamination is regulated by the EPA under the CLM Act". The declaration defines the substance of concern in soil ("the Contaminant") to be lead described as follows:

- Lead concentrations in soil within the rail corridor (Lot 22 DP1202608) exceed national guideline values for the protection of human health and the environment
- Lead contamination has impacted adjacent land at 106 Goulburn Street, Tarago (Lot 1 DP816626), with soil found to contain lead at concentrations exceeding national guideline values for the protection of human health and the environment
- There are complete exposure pathways to lead for occupants of 106 Goulburn Street, as well as potentially complete exposure pathways for persons working within the rail corridor and
- There are potentially complete exposure pathways for onsite and offsite ecological receptors.

A voluntary management proposal (VMP) was prepared to define how the Contaminant and associated risks would be managed and this was approved by the NSW EPA on 28 May 2020. Principal features of the VMP include:

P1. Collate and review data from third parties in relation to lead in soil and water in the Tarago area

P2. Complete delineation of lead impacts within the corridor through investigation footprint of the former Woodlawn Ore Concentrate Load-Out Complex

P3. Install seven groundwater monitoring wells within he rail corridor and on public land to the east between the rail corridor and the Mulwaree River to assess impacts to groundwater

P4. Assess vertical distribution of lead concentrations through the soil profile at monitoring well locations described above

P5. Assess concentrations of lead in surface waters and sediments downstream of the site

P6. Preparation of a Detailed Site Investigation (Ramboll 2020a)

P7. Preparation and implementation of an Action Plan (Ramboll 2020b) including interim management measures and verification monitoring to be implemented until completion of remediation.

P8. Assess remedial options to address site contamination

P9. Select a preferred remedial option integrating consultation with the community and other stakeholders

P10. Prepare a RAP(s) to define how the selected remedial option will be implemented and validated

P11. Obtain a Section B Site Audit Statement from an Auditor accredited under the NSW EPA Site Auditor Scheme confirming:

- The assessment adequately characterises the degree and extent of site contamination
- The RAP(s) are suitable to address risks associated with site contamination

P12. Implement the RAP(s)

P13. Compile a validation report that describes and provides evidence of the activities taken to effect remediation and concludes on the success of remediation

P14. Obtain a Site Audit Statement from an Auditor accredited under the NSW EPA Site Auditor Scheme confirming remediation has occurred in accordance with the RAP and objectives of this VMP are met, i.e. a Section B4 Site Audit.

Principal features P1 – P6 have been addressed. The Action Plan described under P7 has been prepared and continues to be implemented.

1.2 Objective

The objective of this RAP is to define a remedial strategy to address the risk to human health and the environment from contamination at the site. This includes addressing VMP principal features P8 – P10 and will underpin progression through P11 – P14.

1.3 Scope of Work

The scope of this Remedial Action Plan is to define the requirements for implementation of the preferred remedial strategy and associated validation to be undertaken at the site to achieve the remediation objective.

2. REGULATORY REQUIREMENTS

This Remedial Action Plan has been prepared in general accordance with the following guidance documents:

- National Environment Protection Council (NEPC), National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended 2013 (NEPM, 2013)
- NSW EPA, Contaminated Land – Consultants Reporting on Contaminated Land (NSW EPA, 2020)
- NSW EPA, Sampling Design Guidelines (EPA, 1995)
- NSW EPA, Guidelines for the Site Auditor Scheme (3rd Edition) (NSW EPA, 2017)
- NSW EPA, Waste Classification Guidelines, Part 1: Classifying Waste (NSW EPA, 2014)
- State Environmental Planning Policy 55 – Remediation of Land

2.1 Voluntary Management Proposal

In March 2020, the NSW EPA declared the site to be significantly contaminated under Section 11 of the CLM Act (Declaration Number: 20201103; Area Number 3455). The site was published on the EPA's list of notified sites as "contamination is regulated by the EPA under the CLM Act".

The site is now regulated under VMP (Notice Number: 20201711, dated 25 May 2020) which defines the requirements for management and remediation of the Contaminant, as well as a performance schedule for the management works. The performance schedule defines the relative timeline for completion of the staged management. The requirements for the preparation of this RAP are defined in the VMP including:

P8. Assess remedial options to address site contamination

P9. Select a preferred remedial option integrating consultation with the community and other stakeholders

P10. Prepare a RAP(s) to define how the selected remedial option will be implemented and validated

3. SITE DESCRIPTION

3.1 Site Identification

The site particulars are presented in **Table 3-1**.

Table 3-1: Site Particulars

Information	Description
Street Address:	Accessed from Stewart Street and Goulburn Street Tarago NSW
Identifier:	Part Lot 22 DP1202608 and Lot 1 DP816626
Site Area:	Approximately 7.5 ha
Local Government:	Goulburn Mulwaree Shire
Owner:	Transport for NSW
Current Site Use:	Forms part of the Goulburn to Bombala rail line and the Country Regional rail Network (CRN)

A site Locality Plan is presented as **Figure 1**, **Appendix 1.** Site features plans are presented as **Figures 2a – 2e**, **Appendix 1**.

3.2 Land Use

The site forms part of the Goulburn – Bombala rail corridor. Review of satellite imagery and site inspection identified land use within the surrounding environment including:

- Tarago Station (onsite).
- A former residence adjacent (east of) the site and adjacent (north of) Tarago Station, defined as 106 Goulburn Street Tarago (Lot 1 DP816626 - the Station Masters Cottage). The Station Masters Cottage is known to be impacted by the Contaminant and has been purchased by TfNSW to be reintegrated within the rail corridor and is no longer used as a residence. The future use of the Station Masters Cottage is not known however will not include residential land use until demonstrated suitable for this purpose.
- A farm with a dam that receives waters from the site (during surface water flow), located adjacent (east of) the northern end of site.
- Tarago Public School approximately 120 m east of the northern end of site.
- Residences approximately 70 m west of the south end of site and east of Goulburn Street.
- Tarago Recreation Area approximately 300 m east of site.

4. SITE HISTORY

Site history previously presented in the *Tarago Rail Corridor and Tarago Area Detailed Site Investigation* (Ramboll 2020a) is summarised in **Table 4-1**.

Table 4-1: Site History Summary

Site	Description
Zoning	The site is currently zoned RU2 Rural Landscape under the Goulburn Mulwaree Local Environmental Plan (LEP).
Council Records	Council held records identified as relevant to the former loadout complex were limited to the Woodlawn Project Environmental Impact Statement (Jododex Australia, 1976). The following excerpts from the EIS (Section 8.11 Transport of Concentrates) are considered relevant to the type and distribution of contamination associated with the former loadout complex: *The Woodlawn project will market four products. These are a zinc concentrate, a lead concentrate and two different copper concentrates, one from the 'complex ore' and one from the 'footwall copper ore'.* *The zinc concentrate consists mainly of sphalerite (zinc sulphide), the lead concentrate of galena (lead sulphide) and both copper concentrates of chalcopyrite (copper iron sulphide). Each of the concentrates contain various proportions of the other base metal sulphides and pyrite (iron sulphide) as the main contaminants…* *Separate storages for the various types of concentrates would be provided in the shed and a passageway between concentrate stockpiles and the railway spur line will allow trucks to enter and depart from opposite ends of the building. The tipped concentrates will be pushed up by front end loader to make best possible use of the available storage space. The amount of storage capacity provided at Tarago will not be large as it is anticipated that there will be frequent dispatches of concentrates by rail from Tarago. The average quantity of material involved will be about 775 wet tonnes per day, requiring about 35 truck movements.*
Mine Owner (Heron Resources Limited) Records	Review of records accessible from the website of Heron Resources Limited (the mine owner) (SRK, 2015) indicate the Woodlawn deposit was discovered in 1970 and mined by open-pit and underground methods between 1978 and 1998. Additionally, the SRK report references a rail siding in Tarago that was historically used to rail concentrates to smelters in Newcastle and Port Kembla and to a concentrate berth at Port Kembla.
Dangerous Goods	A search of the SafeWork NSW Dangerous Goods register has not been completed as previous inspection of the site indicates all infrastructure associated with the former loadout complex (except the rail formation) has been removed.
Licenses, Permits and Approvals	A search of the NSW Environment Protection Authority (EPA) Public Register (www.epa.nsw.gov.au/prpoeoapp) was undertaken on 13 January 2020 and identified JHR operate the CRN under EPL 13421. EPL 13421 includes environmental limits for pollution of waters, noise, blasting, odour and dust as well as requirements for notification of environmental harm.
EPA Records	The site was notified to the NSW EPA under section 60 of the Contaminated Land Management Act in November 2018.
Historical Aerial Photographs	Historical aerial photographs were obtained and reviewed for the years 1960, 1976, 1985, 1991, 1997 and 2005. Review indicates the loadout complex was located approximately 20 m north of Tarago Station adjacent/over the west side of the rail formation. Loadout complex infrastructure appears to have included a

Site	Description
Interview of loadout complex employee	loop road for truck access from the south, a truck dumping station, a conveyor from the dumping station to a larger square building and an undercover rail loading point extending over part of the rail formation (the former Woodlawn siding). The loadout complex appears to have been constructed between 1976 and 1985 with demolition between 1997 and 2005. Evidence of the loadout complex in satellite imagery after demolition appears limited to remnants of the haul road for truck access from the south. The loadout complex is identified as the main potential source of site contamination. Key points from interview of a former employee of the loadout complex (and long term resident of Tarago) are summarised below: • The load-out complex floor elevation was approximately the same elevation as the remnant Woodlawn Siding. The current elevation across the area of the load-complex footprint is approximately one meter higher. This is a result of soil that was imported to cap the area after demolition of the buildings. • During operation, ore was transported to the loadout complex by truck, tipped at a dump station, transported via conveyor into the main building and loaded onto rail cars using a front-end loader • The tail gates of trucks used to haul ore from the mine to the corridor used to bang all the way down Stewart Street as they drove off and the road was green from the ore. • Movement of sediment from the former ore concentrate load-out complex occurred during high rainfall weather events. A flood occurred in the early 1980s which washed through the load-out complex and knocked over the fences to the station masters cottage. Sediment was transported down Wallace Street and possibly across Boyd Street through the tennis courts to the River.
Historical Title Search	A historical title search was not completed based on the longstanding use of the site as a rail corridor.

5. GEOLOGY AND HYDROGEOLOGY

A summary of the site geology and hydrogeology is detailed in **Table 5-1**.

Table 5-1: Summary of Geology and Hydrogeology

Site	Details
Geology	Review of the Australian Geoscience Information Network (AUSGIN) portal (http://portal.geoscience.gov.au/ accessed 8/1/2020) identified regional geology including channel and flood plain alluvium (gravel, sand and clay) locally formed as calcrete overlying quaternary sedimentary rock (including some of low metamorphic grade).
Excavation Logs	Excavation logs reviewed to assess site geology included a registered onsite groundwater well, one test pit west of the rail formation opposite Tarago Station, and nine test pits through the rail formation. The bore log from the registered bore identified fill from surface to 0.6 mbgl overlying clay to 7 mbgl overlying sand to 12.2 mbgl (depth of bore). The test pit west of the rail formation identified silty gravel fill to 0.4 mbgl overlying clay to 0.8 mgl (depth of test pit) The nine test pits within the rail formation identified a profile consistent with expected layers of ballast, capping and base formation materials. These included silty gravel (ballast) from surface generally to 0.5 mbgl overlying black gravelly clay (capping) and grey / brown gravelly clay to depth of test pits (generally 0.7 mbgl).
Location and Extent of Fill	Fill was identified progressively through site assessments broadly across the site including in the area of the former loadout complex, the rail formation and adjacent the eastern side of the rail formation. At the loadout complex a maximum of approximately one meter of fill (battered to the road to the west, rail to the east and stormwater drain to the north) was observed during targeted test pitting (described within this report) consistent with anecdotal account of application of clay 'capping' following demolition of buildings. Localised stockpiles were identified east and west of the rail formation and north of Tarago Station. The identification of these stockpiles on an historic survey plan indicates presence before loop extension works. Stockpiles of contaminated spoil (approx. 750m^3 of fouled ballast and approx. 50m^3 of timber sleepers) were also created during construction west of the rail formation and opposite Tarago Station.
Onsite Wells	One groundwater well is present onsite. Review of the NSW Department of Planning Industry Environment MinView portal identified well ref: GW053976) was installed in 1984 to a depth of 12.2 mbgl with a water bearing zone in sands from 7 mbgl. No other wells were identified onsite. Records indicate the well was constructed using 0.15m diameter steel casing with 2 mm wide vertical screen slots.
Groundwater Bore Search	Review of the NSW Department of Planning Industry Environment MinView portal (https://minview.geoscience.nsw.gov.au/) identified 12 wells within a 500 m radius from the site.
Depth to Groundwater Flow	Review of drilling and construction details for registered wells indicates the shallowest regional aquifer is present in gravel layers from 5.5 – 18.6 mbgl with deeper aquifers present in fractures of underlying shale, siltstone and limestone from 50 – 74 mbgl.
Groundwater Usage	Assessment of groundwater usage has occurred including: • A search for registered groundwater bores (described above)

Site	Details
	• A groundwater usage survey delivered by JHR to 94 letter boxes in Tarago. A total of 17 responses were received. • Discussion with 43 private property owners during assessments of discrete properties Integrated findings of the groundwater usage survey and discussions with property owners included: • 20 properties were identified where groundwater bores had been installed. • At all properties, groundwater use included (or was assumed to include) watering gardens • At three properties groundwater was reported to include drinking and washing • At two properties groundwater use was reported for agriculture • At one property groundwater was reported to be used for filling a pool • At two properties groundwater use remained unclear
Direction and Rate of Groundwater Flow	It is considered likely that the shallower aquifer flows toward the Mulwaree River approximately 550 m east of site.
Direction of Surface Water Runoff	Regional surface water runoff is expected to flow toward the Mulwaree River approximately 500 m east of site.
Surface Water Usage	Surface water usage within the downstream receiving environment has been conservatively assessed as including recreational use and agriculture (irrigation and stock watering).
Background Groundwater Quality	Review of drilling and construction details indicates groundwater salinity is low.
Preferential Water Courses	Review of satellite imagery identified the Mulwaree river as the main water course close to site. Three culverts direct surface water beneath the rail formation onsite and then offsite to the east. Each culvert receives water from contaminated areas of site via cess drains on the west side of and running parallel to the rail line as described below: • The southernmost culvert is located at CH 262.660 and directs a local water course through the rail corridor. This water course is an unnamed tributary to the Mulwaree River. Water discharging from site flows (after high rainfall events only) under the Goulburn Street bridge and through agricultural land before discharging to the River. • The middle culvert is located at CH 262.354 and directs water to a shallow pond within the corridor and then offsite through a causeway on Boyd Street. From the Boyd Street causeway surface water is partly directed into a drain along the eastern side of Boyd Street and partly discharges into an adjacent paddock. • The northern culvert is located at CH 262.040 and directs water along an informal flow path to a dam on an adjacent agricultural property.

6. PREVIOUS INVESTIGATIONS

Assessment and management measures for site contamination at Tarago is described within the following documents:

- *Tarago – Rail Siding Extension, Preliminary Contaminated Site Assessment* (McMahon 2015).
- *August 2019 Surface Water Monitoring - Tarago Loop Extension* (Ramboll 2019a)
- *Tarago Loop Extension Further Intrusive Assessment and Lead Management Plan* (Ramboll 2019b)
- *Tarago Crossing Loop Extension Short-Term Lead Management Plan* (Ramboll 2019c)
- *Tarago Loop Extension Preliminary Human Health Risk Assessment* (Ramboll 2019d)
- *Tarago Rail Corridor Environmental Site Assessment* (Ramboll 2019e)
- *Tarago Loop Extension: Interim Lead Management Plan* (Ramboll 2019f)
- *Tarago Rail Corridor Environmental Data Gap Assessment* (Ramboll 2020a)
- *Rail Sleeper Waste Classification, Tarago Loop Extension* (Ramboll 2020b)
- *Tarago Rail Corridor and Tarago Area Detailed Site Investigation* (Ramboll 2020c)
- *Tarago Lead Management Action Plan* (Ramboll 2020d)
- *Tarago Rail Corridor and Tarago Area Detailed Site Investigation Addendum* (Ramboll 2020e)
- *Tarago Air Quality Monitoring Reports April 2020 – February 2021* (Ramboll 2020f – 2021b)
- *April 2021 Surface Water Monitoring Tarago NSW* (Ramboll 2021c)

Assessments were additionally completed at 44 discrete land parcels surrounding the site along with the following site specific risk assessments:

- *Advice on risks from metals in soil: Agricultural property at 2135 Braidwood Road, Tarago NSW* (EnRiskS 2020)
- *Advice on risks to human health and the environment: Boyd Street and publicly accessible areas, Tarago NSW* (EnRiskS 2021a)
- *Advice on risks from metals in soil: property P40, Tarago, NSW* (EnRiskS 2021b)

Cumulatively assessments included:

- Assessment of contaminant concentrations in soil onsite including:
    - Measurement of metals in surface soil / sediment at over 200 locations onsite
    - Measurement of TRH, BTEXN, PAH, asbestos in shallow soil at 30 locations onsite
    - Measurement of OCP, OPP and PCB in surface soil / sediment at 11 locations onsite
    - Measurement of metals at progressively increasing depth to vertically delineate metals concentrations at over 15 locations
- Assessment of lead in public road reserves surrounding the site and along the haul route from the mine to the site by field portable x-ray fluorescence (XRF) metals analyser at over 200 locations
- Assessment of offsite contaminant migration in surface water and sediment. This work included co-located sampling of surface water and sediment onsite and within the receiving environment at 11 locations. Analyses initially included TRH, BTEX, metals (dissolved and total) and inorganics though this was later refined to focus on metals (dissolved and total). Monitoring occurred during construction of the Loop Line and then on quarterly intervals since April 2020
- Assessment of offsite contaminant migration in groundwater through installation of seven groundwater monitoring wells targeting the site and surrounding environment. Groundwater from these wells was sampled and analysed for filtered metals
- Assessment of air quality monitoring surrounding the site over 11 months during implementation of the Action Plan (Ramboll 2020d). This has included installation and operation of a high-volume air sampler, real time air sampler and dust deposition gauge adjacent the site and dust deposition gauges at three other locations in the surrounding community. Air quality monitoring was established in April 2020 and continues to date

- Assessment of lead at 44 discrete private properties integrating assessment of shallow soils, tank water, tank sediment, internal dust and groundwater based on structures present at each site. These assessments were completed at community request though captured the downstream receiving environment
- Development of Site Specific Trigger Levels (SSTLs) for potential human health, ecological and agricultural receptors of site contamination within the surrounding environment

6.1 Results Summary

Analytical results are compared to criteria selected to assess risk to identified receptors in the investigative reports referred to above. Tabulated summaries and summary interpretations are descried in the sub-sections below. Sampling locations are presented on **Figure 2a 2e** and **Figure 3**, **Appendix 1**.

6.2 Onsite Soil

Data from previous investigations relied upon to assess the type and extent of onsite contamination is presented on figures as **Appendix 1**, in **Tables 1 – 9** in **Appendix 2** and in **Table 6-1** below.

Table 6-1: A summary of soil analyses for the type and extent of contaminants onsite

Contaminant of Potential Concern	Count	Min	Max	Average	No > Human Health Guideline
Asbestos					
Asbestos Detected	30	Nil	Nil	--	0
Metals					
Arsenic	30	<2	150	20	0
Cadmium	30	<0.4	14	3	0
Chromium	30	<5	57	13	0
Copper	30	<5	990	185	**11**
Lead	191	<5	184000	4200	**41**
Nickel	30	<5	17	5	0
Zinc	30	12	1600	410	**8**
Mercury					
Mercury	30	<0.1	0.6	0.1	0
PAH					
Naphthalene	30	<0.5	<0.5	<0.5	0
Benzo(a)pyrene	30	<0.5	0.7	0.3	0
Sum of polycyclic aromatic hydrocarbons	30	<0.5	6	0.7	0
Benzo(a)pyrene TEQ (LOR)	30	1.2	1.4	1.2	0
TRH					
C6 - C10 Fraction	30	<20	10	10	0
C6 - C10 Fraction minus BTEX (F1)	30	<20	10	10	0
>C10 - C16 Fraction	30	<50	92	28	0
>C16 - C34 Fraction (F3)	30	<50	310	110	0

Contaminant of Potential Concern	Count	Min	Max	Average	No > Human Health Guideline
>C34 - C40 Fraction (F4)	30	<100	140	60	0
>C10 - C40 Fraction (sum)	30	<100	506	130	---
>C10 - C16 Fraction minus Naphthalene (F2)	30	<50	92	28	0
BTEXN					
Benzene	30	<0.1	<0.1	<0.1	0
Toluene	30	<0.1	<0.1	<0.1	0
Ethylbenzene	30	<0.1	<0.1	<0.1	0
meta- & para-Xylene	30	<0.2	<0.2	<0.2	---
ortho-Xylene	30	<0.1	<0.1	<0.1	---
Total Xylenes	30	<0.3	<0.3	<0.3	0
Naphthalene	30	<0.5	<0.5	<0.5	---
Organochlorine Pesticides					
*Aldrin and Dieldrin (Total)**	11	<0.05	<0.05	<0.05	0
Chlordanes - Total	11	0.05	0.05	0.05	0
*DDT + DDE + DDD (Total)**	11	<0.05	<0.05	<0.05	0
Endosulfan sulphate	11	<0.05	<0.05	<0.05	0
Endrin	11	<0.05	<0.05	<0.05	0
Heptachlor	11	<0.05	<0.05	<0.05	0
Methoxychlor	11	<0.2	<0.2	<0.2	0
Organophosphorus Pesticides	11	<0.2	<0.2	<0.2	0
Polychlorinated Biphenyls					
Total PCB	11	<0.1	<1	0.2	0

All units are in mg/kg unless stated otherwise, --- - no guideline

Table 6-2: Lead in soil leachate

	TCLP	ASLP
Number of Samples (n)	3	3
Detections	3	2
Minimum (mg/L)	4.3	<0.01
Maximum (mg/L)	32	1.1

6.2.1.1 The Former Loadout Complex

Test pitting targeting contaminant delineation around the former Loadout Complex was completed in April on a systematic grid in April 2020 (Ramboll 2020c) and August 2020 (Ramboll 2020c and 2020e). A total of 20 test pits were advanced in August 2020 on a systematic grid pattern west of the Woodlawn Siding integrating the former loadout complex and surroundings. Lead concentrations are presented in **Table 6**, **Appendix 2**, and in summary as **Table 6-3** below.

Table 6-3: Summary of Loadout Complex Soil Lead Analytical Results from April 2020

Number of Samples (n)	64
Detections	63
Minimum (mg/kg)	<5
Maximum (mg/kg)	1,200
Mean (mg/kg)	130
n > Site specific human health guideline (2,200 mg/kg)	0
n > Site specific ecological guideline (1,800 mg/kg)	0

Further assessment of soils within the footprint of the former Load Out Complex was completed on 19 August 2020 and comprised the advancement of a further six test pits (LO_TP01 to LO_TP06). Lead concentrations are presented in **Table 6**, **Appendix 2**, and in summary as **Table 6-4** below.

Lead concentrations were reported above human health and ecological guideline values at three locations as follows:

- LO_TP02 at 1.1 m bgl (5,700 ppm) and 1.3 m bgl (6,900 ppm)
- LO_TP03 at 1.6 m bgl (3,662 ppm)
- MW2_1.0 at 1.0 m bgl (3,600 mg/kg), sampling completed by Ramboll 18 May 2020

Table 6-4 Summary of Loadout Complex Soil Lead Analytical Results from August 2020

Depth (m)	Analyte	No. of Samples	No. of Detects	Minimum	Maximum	Average	No > HIL D	No > EIL
0.0 – 0.5	Lead	17	16	ND	380	95	0	0
0.5 – 1.0		13	12	< 5	3,600	620	**1**	**1**
1.0 – 1.5		12	12	8	6,900	1,400	**2**	**2**
1.5 – 2.0		4	4	29	3,662	960	**1**	**1**
>2.0		3	3	42	200	130	0	0

Results indicated that lead contamination was present at depth beneath a clay capping layer approximately 1 m thick. During test pitting completed in August 2020, foreign material (i.e. plastic, metal, wire and glass) was noted at LO_TP03 and LO_TP05 at depths consistent with elevated lead concentrations. The highest lead concentration was reported at LO_TP02 at 1.3 m bgl.

6.2.1.2 Additional Assessment of Site Surface Soils

Evidence of ore concentrate was visually observed at the north of the former Loadout Complex adjacent a drainage channel upstream of the middle rail culvert. Results from field portable XRF are presented in **Table 6-5** below.

Table 6-5: XRF Results from Additional Assessment of Site Surface Soils

SAMPLE	As	Cu	Pb	Ni	Zn
WLB1_262.5	81.36	1172.52	5322.19	<LOD	3915.66
PIA-1	11.68	37.73	49.34	<LOD	133.27
PIA-2	842.35	2804.36	9404.2	236.66	3015.17
PIA-2_0.1	24.02	54.47	123.58	81.6	125.53
PIA-3	<LOD	56.72	215.66	<LOD	122.68
PIA-4	1576.36	5107.27	15510.1	224.52	3745.53
PIA-4_0.1	9.09	34.68	33.66	36.69	51.5
PIA-5	26.76	236.15	830.68	<LOD	1204.63
PIA-5_0.1	11.47	84.93	206.45	38.55	455.06
PIA-6	304.32	753.34	7040.33	146.81	1259.26
PIA-7	<LOD	140.34	396.68	69.73	296.26

<LOD – below the limit of detection.

6.2.2 Characterisation of Materials to be Generated During Remediation

During August 2020, twenty composite samples were collected from materials located within the rail corridor to facilitate application of a Resource Recovery Exception (RRE). The RRE application was negated however data obtained during the investigation is considered suitable for informing remedial options more generally and a summary of results is provided in **Table 6-6**.

Table 6-6 Onsite Soil Analytical Results Summary

Analyte	No. of Samples	No. of Detects	Minimum	Maximum	Average	No > HIL D	No > EIL
Inorganics							
Conductivity	20	20	29	1100	470	--	--
pH	20	20	4	8.3	5.4	--	--
Sulphur	20	20	79	16000	4900	--	--
Total Organic Carbon	20	19	< 0.1	6.5	1.5	--	--
Total Metals							
Antimony	20	14	< 10	55	25	--	--
Arsenic	20	20	14	190	84	0	**3**
Beryllium	20	0	< 2	0	--	0	--
Boron	20	0	< 20	0	--	0	--
Cadmium	20	20	1.8	170	15	0	--
Chromium	20	20	12	130	49	0	0
Cobalt	20	13	< 5	30	12	0	--
Copper	20	20	240	4,100	1,210	0	**20**
Lead[1]	20	20	230	19,000	5,050	**14**	**14**
Manganese	20	20	70	1,100	500	0	--
Mercury	20	19	< 0.1	2.9	0.7	0	--
Molybdenum	20	14	< 5	20	9.0	--	--
Nickel	20	19	< 5	85	30	0	0
Selenium	20	17	< 2	27	13	0	--
Tin	20	18	< 10	400	70	--	--
Vanadium	20	20	30	93	63	--	--
Zinc	20	20	550	12,000	1,780	0	**20**

[1] *indicates site-specific guideline value adopted from HHRA (Ramboll 2019c)*

6.2.3 Groundwater

6.2.3.1 Groundwater Gauging Data

Seven groundwater monitoring wells were gauged on 15 April 2020. Groundwater well locations are presented on **Figure 4** – **5**, **Appendix 1.** A summary of the groundwater gauging data is presented in **Table 6-7.**

Table 6-7: Groundwater level observations

Well ID	Coordinates MGA Zone 56S		Top of Casing Elevation	Standing Water Level		Depth of Well
	Easting	Northing	mAHD	mbtoc	mAHD	mbtoc
MW1	741504.21	6115627.04	690.59	6.15	684.44	10.79
MW2	741756.36	6116009.7	689.16	6.955	682.205	12.69
MW3	741875.76	6116215.04	688.33	6.1	682.23	9.48
MW4	741813.67	6116016.97	686.47	4.38	681.835	7.09
MW5	741938.29	6116212.86	688.27	6.435	682.09	12.25
MW6	741917.66	6116051.99	685.89	3.99	681.9	8.46
MW7	742268.21	6115965.68	682.35	1.21	681.14	8.51

mAHD – metres above Australian Height Datum

mbtoc – metres below top of casing

Groundwater level contours were developed using Surfer software and are presented in **Figure 5**, **Appendix 1**. The groundwater was inferred to flow to the east, towards the Mulwaree River.

6.2.3.2 Groundwater Quality Parameters

Groundwater quality parameters were measured in the field prior to sampling to ensure collection of water that is representative of the groundwater conditions. The groundwater quality parameters are presented in **Table 6-8**.

Table 6-8: Field physico-chemical groundwater quality parameters

Well ID	Date	Temp	Spec. Cond.	pH	Dissolved Oxygen	Redox Potential	Total Dissolved Solids	Comments
		°C	µS/cm	pH units	mg/L	mV	mg/L	
MW1	2/04/2020	17.26	682	7.55	6.12	114	446	Light brown, medium turbidity, no odour
MW2	2/04/2020	17.24	504	6.94	1.84	-72	322	Brown, low turbidity, no odour
MW3	2/04/2020	16.46	1,020	6.81	0.00	-154	655	Light brown, med-high turbidity, no odour
MW4	27/03/2020	16.60	615	7.04	2.97	125	393	Light brown, low turbidity, no odour
MW5	2/04/2020	18.1	601	6.86	1.07	112.9	390	
MW6	27/03/2020	17.0	643	7.06	1.14	114.5	416.0	Difficult to filter, cloudy
MW7	27/03/2020	16.0	475.5	6.77	0.75	-70.8	308.75	Difficult to filter
GW053976[1]	2/04/2020	16.63	260	7.57	2.19	126	169	Clear, no turbidity, no odour

[1] GW053976 is an old well located within the rail corridor located to the north of MW5. As the well depth and construction details are unknown, the well is excluded from the discussion below.

- pH was generally neutral, with measurements ranging from pH6.77 at MW7, closest to the Mulwaree River, to pH7.55 at MW1, located furthest from Mulwaree River.
- EC measurements ranged from 475.5 µS/cm at MW7 to 1,020 µS/cm at MW3, indicating fresh groundwater conditions.
- DO ranged from 0.0 mg/L (MW3) to 6.94 mg/L (MW1), with an average of 2.0 mg/L across the investigation area.
- Redox potential measurements varied between -154 mV at MW3 (reducing conditions) to 114.5 mV (oxidising conditions).
- TDS concentrations ranged from 308.75 ppm (MW7) to 655 ppm (MW3), indicating fresh groundwater.

6.2.3.3 Analytical Results

Soil lead analytical results from samples collected during the installation of the groundwater monitoring wells are summarised in **Table 6-9**.

Table 6-9: Summary of Groundwater Monitoring Well Soil Lead Analytical Results

Number of Samples (n)		46
Detections		466
Minimum (mg/kg)		13
Maximum (mg/kg)		3,600
Mean (mg/kg)		164
HILs	**n > Site specific human health guideline (2,200 mg/kg)**	1
	n > Public open space (HIL C)	0
EILs	**n > Site specific ecological guideline (1,800 mg/kg)**	1
	n > Urban residential and public open space	0

Notes: Site specific HIL and EIL adopted for monitoring wells MW-MW4 located within the rail corridor. HIL C and EIL for urban residential and public open space adopted for monitoring wells MW5-MW6 located outside of the rail corridor.

Groundwater analytical results are summarised in **Table 6-10** and tabulated in **Table 9**, **Appendix 2**.

Table 6-10: Summary of Groundwater Monitoring Well Results

Analyte / Grouping	Number of samples (n)	n = 'detects'	Maximum (mg/L)	Guidelines			
				n > 95% fresh water species protection	n > livestock use	n > irrigation use	n > drinking water
Filtered metal(loid)s							
Aluminium	5	0	<0.05	-	0	0	-
Arsenic	8	2	0.005	0	0	0	0
Barium	5	5	0.16	-	-	-	0
Beryllium	8	0	<0.001	0	-	0	0
Boron	3	0	<0.05	-	0	0	0
Cadmium	8	2	0.003	**1(MW5)**	0	0	0
Chromium	8	1	0.002	**1 (MW4)**	0	0	-
Cobalt	8	6	0.029	**5 (MW1, MW2, MW3, MW4 & MW7)**	0	0	0
Copper	8	2	0.003	**1 (GW053976)**	0	0	0
Lead	8	2	0.005	**1 (GW053976)**	-	0	0
Manganese	8	8	2	**1 (MW3)**	0	0	0
Mercury	8	0	<0.0001	0	0	0	0
Nickel	8	6	0.004	0	0	0	-
Selenium	3	0	<0.001	-	0	0	-
Zinc	8	7	0.27	**6 (MW1-MW5, GW053976**)	0	0	0

6.3 Surface Water

6.4 Monitoring Events

A total of eight monitoring events have been completed between August 2019 and April 2021. Surface water monitoring events were completed after a period of rainfall (when possible) as this is the only occasion where surface water is present in the drainage channels. Sampling locations are presented on **Figure 6**, **Appendix 1**. Results for all surface water monitoring at each location are presented in the April 2021 surface water monitoring report (Ramboll 2021 A summary of monitoring events is outlined in **Table 6-11**.

Table 6-11 includes information on rainfall conditions precedent to each monitoring event. The table includes comparison of the rainfall falling over the 48 hour period preceding the sampling event to the design rainfall events for the Mulwaree catchment (Wollondilly and Mulwaree Rivers Flood Study WMA Water 2016) in order to provide an indication of the significance of the rainfall event. Average monthly rainfall data compared to actual monthly rainfall data is also included to indicate the general climate conditions in the month of sampling.

Table 6-11: Indicative Summary of Rainfall Preceding Sampling Events

Event	Max Rainfall over 48hr Critical Duration (mm)	Rainfall in 48 hrs preceding monitoring events (mm)							
		13-Aug-19	24-Sep-19	29-Jan-20	1-Apr-20	11-Aug-20	13-Oct-20	28-Jan-21	14-Apr-21
>10% AEP	< 126	0	0	0	0	-	0	0	0
10% AEP	126	-	-	-	-	-	-	-	-
5% AEP	147	-	-	-	-	-	-	-	-
2% AEP	175	-	-	-	-	163	-	-	-
1% AEP	197	-	-	-	-	-	-	-	-
Monthly Rainfall Observed (mm)		19	41.2	22	79.2*	157.8	94.4	64	2.4
Average Monthly Rainfall (mm)		42.9	44	49	40.4*	42.9	44	63.9	25.9
Comment		Dry month, dry conditions precedent	Average rainfall month, dry conditions precedent	Dry month, dry conditions precedent	Wet month, dry conditions precedent	Wet month, high rainfall event precedent	Wet month. Dry conditions precedent	Average rainfall month, dry conditions precedent	Dry month, dry conditions precedent

Notes: All rainfall data was sourced from the Australian Bureau of Meteorology. Daily rainfall was sourced from the closest weather station with rainfall records preceding each monitoring event (Lake Bathurst, Windellama and Goulburn Airport). Monthly averages and records were sourced from the closest weather station with a complete record (Goulburn Airport). Monthly observations and averages are for rainfall in the calendar month in which each monitoring event occurred except for the 1 April 2020 event for which March data is presented. Based on this the monthly data is not a direct representation of rainfall preceding monitoring though is considered as an indicator of general conditions around each monitoring event.

AEP – Annual Exceedance Probability

Rainfall measured in August 2019, September 2019 and January 2020 was lower than the monthly average though rainfall measured in April, August and October 2020 exceeded the monthly averages. This indicates that monitoring has occurred across a dry period at the end of 2019 and a wet period from April 2020 onward. Further, average monthly rainfalls are based on a 25-year data set and so integrates effects of longer weather cycles such as El Nino. The monitoring data is considered representative of the effects of potential rainfall totals. Rainfall preceding the August 2020 monitoring event (163.4 mm Windellama) fell between Design Rainfalls for 5% and 2% Annual Exceedance Probability events. That is there is a 2 – 5% chance that the critical duration event preceding the August 2020 monitoring will be repeated any given year. The monitoring data is considered representative of the effects of high and low rainfall events.

It is considered that the effects of seasonal variability, total rainfall and high rainfall events on contaminant migration in surface water from the Site are adequately represented. Within this context the surface water monitoring data is considered adequately representative of the effects of potential meteorology to inform assessment of associated risks to human health and the environment.

The monitoring data presented in **Table 6-12** includes quarterly events 2019 to 2021 and is considered representative of the effects of recent seasonal variability.

6.4.1 Physico-Chemical Results

Surface water physico-chemical parameters were measured in the field during the majority of sampling rounds. The surface water parameters are summarised in **Table 6-12**.

Table 6-12: Summary of Surface Water Physico-Chemical Parameters

Sample ID	No. of Recordings		Temperature	SPC	pH	DO	ORP	TDS	Comments
			°C	µS/cm	pH units	mg/L	mV	mg/L	
Onsite									
SW1	5	Minimum	7.8	206.1	6.35	0.04	23.6	133.9	Dry during January 2020.
		Maximum	17.4	684	7.7	11	175.8	434	
		Average	12.9	552.2	7.3	5.9	121.8	332.9	
SW1-UP	5	Minimum	8	205.6	7.05	0.1	-41.4	133.25	Dry during January 2020. Parameters not recorded during September 2019.
		Maximum	19.94	704	7.43	10.86	186.9	431	
		Average	14.1	550.7	7.3	5.8	112.8	328.5	
SW2	6	Minimum	7.3	213.3	6.54	0.12	48.3	137.8	Dry during January 2020. Parameters not recorded during September 2019.
		Maximum	17.54	677	8.27	10.59	185.9	416	
		Average	12.6	519.6	7.7	5.6	140.9	314.3	
SW3	4	Minimum	8.9	142.5	6.23	4.84	64.8	92.3	Dry during January 2020 and January 2021. Parameters not recorded during September 2019.
		Maximum	21.75	245	7.96	9.43	178	159	
		Average	13.2	214.7	7.2	6.9	138.6	133.4	
SW4	7	Minimum	7.4	128.2	5.75	1.12	70	99.45	Dry during January 2020. Parameters not recorded during September 2019.
		Maximum	20.33	388.3	8.8	10.42	263.1	251.82	
		Average	13.0	247.5	7.5	6.5	171.4	177.9	
SW5	3	Minimum	11.2	117.9	6.85	4.06	-3	76.7	Dry during January and April 2020 and January 2021.
		Maximum	11.95	251.2	8.35	8.75	163.2	121	
		Average	11.6	185.4	7.5	6.9	78.4	98.9	
SW6	1	---	8.3	168.3	7.47	9.61	187	109.2	Dry during January, April and October 2020, and January and April 2021. Parameters for August 2020 presented.
Offsite									
SW7	6	Minimum	11.5	94.7	6.57	1.8	56	61.75	---
		Maximum	23.1	2342	8.92	8.76	168	396.6	
		Average	17.5	584.5	7.5	6.1	103.0	163.5	
SW8	6	Minimum	9.1	170.5	7.2	3.1	84.0	107.9	---
		Maximum	23.6	1007.0	8.5	9.3	124.0	656.5	
		Average	17.2	648.7	7.7	6.4	111.2	410.1	
SW9	6	Minimum	8.9	125.3	7.5	0.3	83.0	115.7	---
		Maximum	25.0	852.0	8.4	16.8	227.7	812.5	

Sample ID	No. of Recordings		Temperature	SPC	pH	DO	ORP	TDS	Comments
			°C	µS/cm	pH units	mg/L	mV	mg/L	
		Average	17.5	499.4	7.8	9.1	137.2	449.1	
SW10	3	Minimum	12.9	682.0	7.2	3.6	3.8	454.4	---
		Maximum	18.2	881.0	7.4	8.2	103.5	564.0	
		Average	15.7	757.7	7.3	5.3	62.1	509.2	

SPC – Specific Conductivity

DO – Dissolved Oxygen

ORP – Oxidation-Reduction Potential

TDS – Total Dissolved Solids

6.4.2 Analytical Results

A summary of the surface water analytical results for monitoring events from August 2019 to April 2021 is presented in Table 6-13 for on and near site and Table 6-14 for the Mulwaree River sampling locations.

Table 6-13: Summary of Onsite and Near Site Surface Water Analytical Results (SW1_UP, SW1, SW2, SW3, SW4, SW5, SW6, SW7)

Analyte	No. of Samples	No. of Detects	Min.	Max	Avg	No above site-specific criteria		No above Tier 1 criteria			
						Human Health	Ecology	ANZECC Fresh Water Guidelines - Irrigation	ANZECC Fresh Water Guidelines - Stock Water	Health-based Screening Criteria (Recreational Waters)	Eco Sceening Criteria (ANZG 95% Protection) Fresh Water
Aluminium	35	26	<0.05	11	1.0	-	-	-	-	**1**	-
Arsenic	36	21	<0.001	0.016	0.004	0	-	-	-	0	-
Barium	35	35	0.03	0.36	0.09	-	-	-	-	0	-
Beryllium	36	0	<0.0001	<0.0001	-	-	-	-	-	0	-
Cadmium	36	25	<0.0003	0.04	0.006	0	-	-	-	**2**	-
Chromium	35	20	<0.001	0.011	0.002	-	-	-	-	0	-
Cobalt	36	17	<0.001	0.014	0.004	-	-	-	-	-	-
Copper	36	31	<0.001	0.31	0.05	-	-	-	-	0	-
Iron	35	34	<0.05	8.9	1.6	-	-	-	-	**5**	-
Lead	41	34	<0.001	0.17	0.03	0	-	-	-	**2**	-
Manganese	36	36	0.012	1.1	0.2	0	-	-	-	0	-
Mercury	36	0	<0.0001	0	-	-	-	-	-	0	-
Nickel	36	26	<0.001	0.451	0.03	0	-	-	-	**1**	-
Zinc	36	35	<0.005	7	0.7	-	-	-	-	0	-
Dissolved Aluminium	33	21	<0.05	3.2	0.6	-	0	0	0	-	**20**
Dissolved Arsenic	34	21	<0.001	0.011	0.003	-	0	0	0	-	0
Dissolved Barium	33	33	0.04	0.12	0.07	-	-	-	-	-	-
Dissolved Beryllium	34	0	<0.0001	0	-	-	-	-	0	-	0
Dissolved Cadmium	34	21	<0.0003	0.018	0.003	-	**2**	**2**	0	-	**20**
Dissolved Chromium	33	11	<0.001	0.003	0.001	-	-	0	0	-	**3**
Dissolved Cobalt	34	9	<0.001	0.005	0.002	-	-	0	0	-	**5**
Dissolved Copper	34	28	<0.001	0.2	0.04	-	0	0	**3**	-	**28**

Analyte	No. of Samples	No. of Detects	Min.	Max	Avg	No above site-specific criteria		No above Tier 1 criteria			
						Human Health	Ecology	ANZECC Fresh Water Guidelines - Irrigation	ANZECC Fresh Water Guidelines - Stock Water	Health-based Screening Criteria (Recreational Waters)	Eco Sceening Criteria (ANZG 95% Protection) Fresh Water
Dissolved Iron	33	22	<0.05	2.4	0.8	-	-	-	0	-	**18**
Dissolved Lead	34	22	<0.001	0.033	0.011	-	0	0	0	-	**19**
Dissolved Manganese	34	33	<0.005	1	0.1	-	-	0	0	-	0
Dissolved Mercury	34	0	<0.0001	0	-	-	-	0	0	-	0
Dissolved Nickel	34	22	<0.001	0.421	0.027	-	0	0	0	-	**6**
Dissolved Zinc	34	30	<0.005	2.6	0.4	-	0	0	0	-	**27**

Table 6-14: Summary of Mulwaree River Surface Water Analytical Results (SW8, SW9, SW10)

Analyte	No. of Samples	No. of Detects	Min.	Max.	Average	Health-based Screening Criteria (Recreational Waters)	Ecological Screening Criteria (ANZG 95% Protection) Fresh Water	ANZECC Fresh Water Guidelines - Irrigation	ANZECC Fresh Water Guidelines - Stock Water
Aluminium	14	3	<0.05	0.72	0.4	0	NA	-	-
Arsenic	15	6	<0.001	0.002	0.001	0	NA	-	-
Barium	14	13	0.02	0.12	0.08	0	NA	-	-
Beryllium	15	0	<0.0001	0	-	0	NA	-	-
Cadmium	15	2	<0.0003	0.0004	0.0003	0	NA	-	-
Chromium	14	2	<0.001	0.002	0.002	0	NA	-	-
Cobalt	15	1	<0.001	0.003	0.002	-	NA	-	-
Copper	15	6	<0.001	0.01	0.00	0	NA	-	-
Iron	14	13	0.15	3.2	0.6	**1**	NA	-	-
Lead	15	5	<0.001	0.002	0.00	0	NA	-	-
Manganese	15	15	0.03	1.9	0.3	0	NA	-	-
Mercury	15	0	<0.0001	<0.0001		0	NA	-	-
Nickel	15	13	<0.001	0.002	0.001	0	NA	-	-
Zinc	15	12	<0.005	0.16	0.08	0	NA	-	-
Dissolved Aluminium	12	2	<0.05	0.41	0.4	-	**2**	0	0
Dissolved Arsenic	13	3	<0.001	0.003	0.003	-	0	0	0
Dissolved Barium	12	11	0.02	0.12	0.08	-	-	-	-
Dissolved Beryllium	13	0	<0.001	<0.001		-	0	-	0
Dissolved Cadmium	13	2	<0.0002	0.0004	0.0002	-	**1**	0	0
Dissolved Chromium	12	1	<0.001	0.001	0.001	-	0	0	0
Dissolved Cobalt	13	0	<0.001	<0.001		-	0	0	0
Dissolved Copper	13	5	<0.001	0.008	0.00	-	**5**	0	0

Analyte	No. of Samples	No. of Detects	Min.	Max.	Average	Health-based Screening Criteria (Recreational Waters)	Ecological Screening Criteria (ANZG 95% Protection) Fresh Water	ANZECC Fresh Water Guidelines - Irrigation	ANZECC Fresh Water Guidelines - Stock Water
Dissolved Iron	12	9	<0.05	0.8	0.2	-	**2**	-	0
Dissolved Lead	13	0	<0.05			-	0	0	0
Dissolved Manganese	13	13	0.012	0.33	0.1	-	0	0	0
Dissolved Mercury	13	0	<0.0001	<0.0001		-	0	0	0
Dissolved Nickel	13	8	<0.001	0.002	0.002	-	0	0	0
Dissolved Zinc	13	8	<0.005	0.14	0.0	-	**4**	0	0

6.5 Air Quality

The focus of the air quality monitoring program has been lead in particulate form, both for ambient airborne fractions and deposited dust. This program was commissioned during early April 2020.

Table 6-15: Measured lead content in deposited dust and deposited dust at four properties around Tarago, NSW

Month	DDG1, Stewart St		DDG2, Station Masters Cottage		DDG3, Boyd St		DDG4, Mulwaree St	
	Lead (µg)	Insoluble solids (g/m2 /month)	Lead (µg)	Insoluble solids (g/m2 /month)	Lead (µg)	Insoluble solids (g/m2 /month)	Lead (µg)	Insoluble solids (g/m2 /month)
April (1-4-2020 to 30-4-2020)	<0.01	1.0	<0.01	0.7	<0.01	0.6	<0.01	0.4
May (30-4-2020 to 1-6-2020)	<1	0.9	<1	0.4	<1	0.4	<1	0.3
June (1-6-2020 to 1-7-2020)	<1	0.9	<1	0.5	<1	1.3	<1	0.3
July (1-7-2020 to 13-08-2020)	<1	1.9	<1	0.8	<1	0.2	<1	0.7
August (13-08-2020 to 1-09-2020)	<1	0.5	<1	0.2	<1	0.2	<1	0.2
September (1-09-2020 to 30-09-2020)	<1	2.1	<1	1.2	<1	7.2[1]	<1	0.8
October (30-09-2020 to 30-10-2020)	<1	3.0	<1	3.9	<1	1.4	<1	1.2
November (30-10-2020 to 1-12-2020)	<1	0.9	<1	1.4	<1	1.2	<1	0.6
December (1-12-2020 to 29-12-2020)	<1	2.3	<1	1.0	<1	4.0	<1	1.0
January (29-12-2020 to 28-01-2021)	<1	1.8	<1	**4.3**	<1	4.2[2]	<1	1.5
February (28-01-2021 to 26-02-2021)	<1	1	<1	1.8	<1	**8.8**	<1	0.7
March (26-02-2021 to 29-03-2021)	<1	1.2	<1	1.2	<1	1.5	<1	0.2
Rolling annual average	**<1**	**1.5**	**<1**	**1.5**	**<1**	**2.0**	**<1**	**0.7**

Limit of reporting = 0.01 µg during April and 1 µg from May forward following change in laboratory facility completing analysis

[1] Sample invalidated – DDG3 September 2020 sample contaminated with animal faeces

[2] Sample invalidated – DDG3 January 2021 sample contaminated with spiders and insects

Lead has not been measured above the detection limit (1 μg) across the monitoring network at any point. All locations measured deposited dust (insoluble solids) below the annual average criteria of 4 g/m^2/month and the rolling annual average for each location remains under criteria.

6.6 Key Findings

Key findings were:

- The Contaminant has been delineated onsite within the rail formation, adjacent shallow soils and drainage lines. Investigation within the footprint of the former Loadout Complex identified the Contaminant at depth though this is considered unlikely to present a risk to human health or the environment. The extent of lead concentrations exceeding the SSTL in soil onsite is presented on **Figures 2a** – **2e** and **Figure 3**, **Appendix 1**
- The Contaminant has not impacted groundwater offsite. All contaminant concentrations measured in groundwater at all locations tested were reported below the Australian Drinking Water Guidelines and guidelines relevant for potable use. Some metals in groundwater exceed criteria relevant to protection of ecology. Impacts to groundwater from site contamination are considered to be low and acceptable and no further investigation is warranted
- Offsite migration of the Contaminant and other metals has occurred via surface water Deposition of elevated metal concentrations in surficial soils appears to have occurred in land immediately east of the site and across Boyd Street onto other nearby properties. Further site specific risk assessments (EnRiskS 2020, 2021a – b) concluded that risks from site contamination within the surrounding environment were acceptable
- Surface water impacts from the site to the Mulwaree River are not evident
- Offsite migration of the Contaminant has occurred in airborne dust. Elevated concentrations of lead in rainwater tank sediment and internal dust were identified in close proximity of the site indicating limited offsite migration of contaminants in air borne dust has occurred. Dust monitoring is ongoing however early data suggests migration of lead in dust from the site has been low and acceptable throughout implementation of the Action Plan (2020d)
- All contaminant concentrations measured in rainwater tank water at all locations tested were below the Australian Drinking Water Guidelines and guidelines relevant for all potable use. Based on risks from metals, rainwater tank water is considered suitable for all potable uses and unimpacted by contamination from the site
- High metal concentrations were identified in local public road reserves and (with the exception of Boyd Street) appear to be unrelated to the rail corridor

7. INTERIM ACTIONS

The *Tarago Lead Management Action Plan* (Ramboll 2020e) was prepared to minimise exposure pathways to human health and ecology to contamination at or originating from the site until such time as permanent remediation works are completed. Measures to minimise exposure included:

- Removal of rainwater tank sediment from tanks considered likely to have been affected by site contamination
- Removal of internal dust from properties considered likely to have been affected by site contamination
- Application of a polymer sealant to contaminated areas onsite to reduce potential for contaminant migration in airborne dust and/or via surface water
- Demarcation of contaminated areas with signage advising of the presence of contamination and requirement for induction to the Action Plan
- Controls for disturbance of contaminated materials onsite including notification to SafeWork NSW of Lead Risk Work
- Inspection and monitoring requirements to assess the adequacy of control measures including inspection of the polymer sealant, quarterly surface water monitoring and ongoing air quality monitoring.

Additionally, residents of 106 Goulburn Street, adjacent the site were relocated after potentially complete exposure pathways to site contamination were identified. TfNSW has since purchased this property and is incorporating this property in the CRN through amendment to the applicable Operation and Maintenance Deed and EPL. Measures to mitigate contaminant exposure risks associated with future use of 106 Goulburn Street will be defined under the LTEMP to be prepared for other areas of the site.

7.1 Additional delineation of site contamination

Assessment of the extent of contamination at the northern end of site east of the Goulburn – Bombala main line was refined through additional sampling on 2 March 2021. This included collection of two soil samples (SS202 and SS203) at locations presented on **Figures 2a 2b**, **Appendix 1**. SS203 was collected from surficial soils however localised application of imported clay appeared to have occurred around SS202 during rail loop extension. Clay was observed to be approximately 0.2 m thick and SS202 was collected from the historic site surface (ie: approximately 0.2 mbgl). SS202 and SS203 were submitted for laboratory analyses and lead concentrations were reported at 350 and 28 mg/kg respectively. The laboratory report (ref: 778274-S) are included in **Appendix 3**. Lead concentrations at SS202 and SS203 are below site assessment criteria and supported refinement of the extent of the lead impacted area at this location.

8. SITE CHARACTERISATION

A detailed site characterisation is presented in the Tarago Rail Corridor and Tarago Area Detailed Site Investigation and Addendum (Ramboll 2020a, 2020e). In summary, the primary source of the Contaminant was identified as the ore concentrate from the former Loadout Complex that has been deposited within the rail formation and adjacent shallow soils. Dust accumulated within buildings and as sediment in rainwater tanks close to the site and surface water (including offsite migration) were identified as secondary sources. Further risk assessment targeting the receiving environment concluded that risks within the downstream receiving environment were acceptable (EnRiskS 2021a).

9. CONCEPTUAL SITE MODEL

A Conceptual Site Model (CSM) is a site-specific qualitative description of the source(s) of contamination, the pathway(s) by which contaminants may migrate through the environment and the populations (human or ecological) that may potentially be exposed. This relationship is commonly known as a Source-Pathway-Receptor ("SPR") linkage. Where one or more elements of the SPR linkage are missing, the exposure pathway is considered to be incomplete and no further assessment is required. Where this linkage is found to be complete, it does not indicate that health or environmental risk is present, but rather triggers either a more detailed investigation or exposure controls. The findings of all assessments referenced here-in are considered in the exposure pathway assessment presented below.

CSM figures are presented **Sections A1 – A2** and **B1 – B2**, **Appendix 1** and support the following discussion of SPR linkages.

9.1 Sources of the Contaminant

The primary source of the Contaminant was identified as the ore concentrate from the former Loadout Complex that has been deposited within the rail formation and adjacent shallow soils.

Secondary sources were identified as:

- Surface water and sediment in drainage lines onsite and in the local offsite receiving environment; and
- Dust that has accumulated within buildings and as sediment in rainwater tanks close to the site.

Sources considered within this CSM are those clearly related to the Contaminant as defined above.

Lead contamination that has been identified but which is not related to the site (i.e.: is not the Contaminant) includes impacts on the haul route between the mine and the rail corridor and on Mulwaree Street. Additionally, several instances of localised lead contamination that were geographically separated from the site were identified on private properties. At some of these properties lead based paint was identified in poor condition and lead is generally known to be a cheap and useful metal found frequently in the environment and older homes (NSW EPA 2020). Lead contamination that has been identified but which is not related to the site should be considered further by the polluters, property owners and relevant regulatory stakeholders. Where it is reasonable to conclude that contamination is not the Contaminant at the site or related to the migration of the Contaminant from the site that contamination has been excluded from further consideration.

9.2 Receptors

The receptors identified in this CSM were based on a current and future use of the site and surrounding land, which currently includes residential and a range of community uses.

The human receptors identified were:

- Onsite workers (including intrusive maintenance and construction workers)
- Users of Tarago Train Station
- Local residents
- A range of community facilities including the Public School, Preschool and Townhall
- Workers in adjacent public road reserves.

The ecological receptors identified were:

- Onsite ecology
- Offsite ecology including crops and livestock
- Ecological receptors in the Mulwaree River.

9.3 SPR Linkages

An assessment of the SPR linkages for the Contaminant onsite (including the former loadout complex) is summarised in **Table 9-1**.

Table 9-1: Exposure Assessment Summary

Exposure Route	Potentially Complete SPR? (Y / N / P)							Justification
	Onsite Workers	Onsite Ecology	Residents	Community Activities	Offsite Workers	Offsite Ecology	Irrigation and Livestock	
Soil and Sediment								
Direct Contact	P[1]	P	N	N	N	N	N	Concentrations in soils exceed onsite assessment criteria however management measures have been defined to mitigate risks to onsite workers (Ramboll 2020e). Potential remains for impacts to onsite ecology. Concentrations in sediment / soil offsite fall below Tier 2 human health and ecological criteria(EnRiskS 2020, 2021a – b).
Inhalation	P[1]	P	N	N	N	N	N	
Incidental Ingestion	P[1]	P	N	N	N	N	N	
Root Uptake	N/A	P	N/A	N/A	N/A	N/A	N/A	
Surface Water								
Direct Contact	N	N	N	N	N	N	N	Concentrations of copper, lead and zinc in the Mulwaree River are consistent upstream and downstream of site discharge points and indicate site contamination has not impacted the River. Contaminant concentrations in surface water between the site and the Mulwaree River are below adopted assessment criteria indicating risks from site contamination in these areas are acceptable.
Incidental Ingestion	N	N	N	N	N	N	N	
Root Uptake	N/A	N	N/A	N/A	N/A	N	N/A	
Migration to groundwater	N	N	N	N	N	N	N	
Groundwater								
Potable use including drinking	N	N/A	N	N	N	N/A	N/A	Concentrations in groundwater reported below human health criteria. Some metals exceed ecological criteria onsite though not defined offsite and do not appear to discharge to the receiving Mulwaree River so
Direct Contact	N	N	N	N	N	N	N	
Incidental Ingestion	N	N	N	N	N	N	N	
Root Uptake	N/A	N	N/A	N/A	N/A	N	N	

Exposure Route	Potentially Complete SPR? (Y / N / P)							Justification
	Onsite Workers	Onsite Ecology	Residents	Community Activities	Offsite Workers	Offsite Ecology	Irrigation and Livestock	
								ecological exposure considered unlikely.
Dust								
Direct Contact	P[1]	N/A	N	N	N	N/A	N/A	Contaminant migration via airborne dust has occurred to several local houses and lead exceeds assessment criteria however (with one exception) dust has been removed from houses where elevated concentrations were observed. Air quality monitoring indicates levels of airborne lead from the site have been low since dust removal occurred.
Inhalation	P[1]	N/A	N	N	N	N/A	N/A	
Incidental Ingestion	P[1]	N/A	N	N	N	N/A	N/A	
Rain Tank Water								
Potable use including drinking	N/A	N/A	N	N	N/A	N	N	Rain tank water reported below criteria.
Direct Contact	N/A	N/A	N	N	N/A	N	N	
Incidental Ingestion	N/A	N/A	N	N	N/A	N	N	
Root Uptake	N/A	N/A	N	N	N/A	N	N	
Rain Tank Sediment								
Direct Contact	N/A	N/A	N	N	N/A	N	N	Contaminant migration via airborne dust has occurred and concentrations in tank sediment exceeded criteria for soil at some houses. Sediment form these tanks was removed and SPR linkages are not considered to exist.
Inhalation	N/A	N/A	N	N	N/A	N	N	
Incidental Ingestion	N/A	N/A	N	N	N/A	N	N	

[1]A complete SPR linkage for onsite workers to dust is not considered to exist because of the Action Plan. If not implemented correctly worker exposure could be expected.

Potential source-pathway-receptor linkages and associated potential exposure risks were identified for onsite workers and onsite ecology. Interim mitigation measures for onsite ecological and worker exposure risks are defined under the Action Pan (Ramboll 2020d).

9.5 Additional Characterisation to Inform Remediation

Further assessment of contaminant distribution by particle size within Woodlawn Siding ballast was completed to refine consideration of remedial requirements. This included:

- Collection of five bulk samples (approx. 20 kg)
- Particle Size Distribution (PSD) analyses presented in **Appendix 4**
- Crushing and analyses of the >19 mm fraction for lead
- Analyses of total lead in ballast (excluding fines) as described below.

Total lead was analysed in 18 sub-samples collected from eight bulk samples. Bulk samples were collected to provide targeted assessment of ballast (excluding fines) within the Woodlawn Siding around the historic loader and systematic assessment of ballast (excluding fines) within the remainder of the Woodlawn Siding. Sampling locations (TP3a, TP5a, TP6a and BAL_01 – BAL_05) are presented on **Figures 2a** – **2e**. Laboratory reports are presented as **Appendix 5**. Assessment of lead concentrations against the SSTL, 95% UCL calculations and laboratory reports are presented in **Appendix 6**. A summary assessment is presented as **Table 9-2**.

Table 9-2: Lead in Woodlawn Siding Ballast (excluding fines)

No. of Samples	Minimum	Maximum	No. > criteria[1]	Average	St Dev	95% UCL
0	13	2,800	0	546	756	1,041

[1]The site specific criterion for lead protective of human health (2200 mg/kg) was adopted.

Guidance endorsed by the NSW EPA makes provision for contaminant risks to be assessed through calculation of the 95% upper confidence limit (95% UCL) of the mean concentration. The 95% UCL is a value that, when calculated repeatedly for randomly drawn subsets of site data, equals or exceeds the true mean 95 percent of the time. The 95% UCL is only relevant where:

- 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 maximum lead concentration in Woodlawn Siding ballast (excluding fines) was 2,800 mg/kg (< 250% of the guideline) and the standard deviation was 756 mg/kg (< 50% of the guideline). The 95% UCL was therefore considered relevant and was calculated at 1,041 mg/kg and below the adopted guideline.

Assessment of lead in Woodlawn Siding ballast (excluding fines) indicates this material would be suitable for reuse onsite following separation of fines. A specific resource recovery exemption from the EPA would be required to allow return of these materials to site.

The arithmetic mean percentage of >20 mm and <20 mm fractions were calculated at 54% and 46% respectively and support volume estimates for material types projected for remediation (see waste volume projections presented in **Table 11-1**).[1]

10. REMEDIATION CRITERIA

The proposed remediation criterion is the human health SSTL for lead of 2,200 mg/kg (Ramboll 2019d). This is less than the site specific ecological criteria of 11,000 mg/kg developed for terrestrial ecosystems in the road verges surrounding the site (EnRiskS 2021a) and so is

[1] Projections of ballast and fines proportions are based on limited data and presented to provide an indication of potential volumes only.

considered protective of human health and ecology. Validation criteria including criteria for monitoring of surface water and air quality within the receiving environment are presented in **Section 14.1.5**.

Criteria for remediation waste streams are defined in the NSW EPA Waste Classification Guidelines (2014). Rationale for excluding total lead concentrations from waste classification will be presented in an SIA application to the NSW EPA.

11. REMEDIAL OPTIONS ASSESSMENT

11.1 Remedial Goal

The remedial goal is to address the following commitments made under the VMP:

P1. Assess remedial options to address risks from the Contaminant on, or originating from, the Site.

P2. Select a preferred remedial option integrating consultation with the community and other stakeholders.

P3. Prepare a RAP(s) to define how the selected remedial option will be implemented and validated.

Remedial options have been considered to address risks resulting from potential SPR linkages defined in the CSM in **Section 9**.

11.2 Extent of Remediation Required

Concentrations of the Contaminant were identified as a driver for remediation onsite across approximately 22,000 m^2 as presented on **Figures 2a – 2e**, **Appendix 1**. The depth of contamination was estimated at 0.5 mbgl within the ballast layer of the Woodlawn Siding and 0.3 mbgl in adjacent soils. This area includes approximately 9,000 m^2 of operational rail formation where excavation is not considered practical and where remedial options other than excavation are considered appropriate (See **Section 11.3**). The resultant area of ballast and soil that could practically be excavated during remediation was estimated at 13,000 m^2 and the volume of contaminated material that could be excavated was estimated at 4,850 m^3 (integrating 750 m^3 already stockpiled from Loop extension through the northern portion of the Woodlawn Siding). Additionally, rail sleepers remain within the Woodlawn Siding with a cumulative estimated volume of approximately 100 m^3. Concentrations of lead in rail sleepers are not consistently above the SSTL, however the sleepers are no longer required on site and are not suitable for reuse off site.

Estimate volumes of materials requiring excavation are shown in **Table 11-1.**

Table 11-1: Volume projections for remediation materials

Material Type	Volume (m^3)
>20 mm fraction – onsite reuse	1450
<20 mm fraction – ballast fines requiring immobilisation	1300
Soil adjacent the rail formation – requiring immobilisation	2,100
Railway sleepers – GSW[1]	100
Total	4,950

[1]Lead concentrations in rail sleepers do not consistently exceed site assessment criteria however offsite disposal was adopted during previous works and aesthetics may drive offsite disposal again.

11.3 Remedial Options Assessment

A hierarchy of remedial options was adopted from the NEPM (NEPC, 2013) and is presented as follows:

- Onsite treatment of the contaminant so that it is destroyed, or the associated risk is reduced to an acceptable level; and

- Offsite treatment of excavated soil, so that the contamination is destroyed, or the associated risk is reduced to an acceptable level, after which soil is returned to the site; or,

if the above are not practicable,

- Consolidation and isolation of the soil onsite by containment with a properly designed barrier; and
- Removal of contaminated material to an approved site or facility, followed, where necessary, by replacement with appropriate material.

or,

- Where the assessment indicates remediation would have no net environmental benefit or would have a net adverse environmental effect, implementation of an appropriate management strategy.

Remedial options for the site were considered consistent with this options hierarchy.

Remedial options not considered included:

- Options that disturb impacted soils can potentially result in dust emissions from the site. Options that include excessive manual handling of impacted soils, such as screening or onsite chemical treatment have been excluded. The proximity of the residential areas and added difficulty in maintaining dust controls through excessive manual handling of impacted soils made these options less preferrable than other remedial options. Even so the options that are considered each include excavation of readily accessible contaminated materials and dust mitigation will remain critical to successful remediation
- Any option to remove impacted soils from within the operational rail formation. Contaminant concentrations within the main Goulburn - Bombala line and the Tarago Loop line (the operational formation) are lower than in the former Woodlawn Siding and it is feasible that contaminant risks could be adequately reduced without removing contaminants from operational rail lines. The option of retaining contaminated materials beneath operational lines would remain subject to validation that active management measures are not required to mitigate contaminant risks during normal operation of the rail corridor. Remnant contamination within operational lines could be managed under a LTEMP describing controls such as identification of future excavation within active rail formations as lead risk work.
- Any option to transport waste across cadastral boundaries for temporary storage or long term management unless to an appropriately licensed waste receiving facility or under a resource recovery exemption (RRE).

Figures 2a – 2e, **Appendix 1** present the total area requiring remediation, the operational rail formation where disturbance is not proposed, the Woodlawn Siding (including rail sleepers which remain in-situ) and adjacent soils.

11.3.1 Options Evaluation Metrics

The sustainability (environmental, economic and social) of each option has been considered in terms of achieving an appropriate balance between the benefits and effects of undertaking each option. A semi-quantitative approach has been adopted through numeric ranking of the environmental and social elements scoring between 1 (best) and 5 (worst) and numeric scoring of economic sustainability based on 1 point per million dollars (or part thereof) in projected cost. The environmental and social rankings and economic scores are summed for each option and preferred remedial options are defined by the lowest sum.

Figure 11.1: Remedial Options Assessment

Option	Description	Environmental Sustainability	Ranking	Economic Sustainability[1]	Ranking	Social Sustainability	Ranking	Overall Ranking
Option 1 - Return of ore impacted materials from the site to Woodlawn Mine	Return of ore impacted materials to the mine could occur for beneficial reuse including ore recovery through hydraulic mining and tailings dam stabilisation works. This would include: 1. Confirmation with Heron Resources that it will receive ore impacted materials and any limitations associated with receipt (e.g.: chemical or geotechnical properties) 2. Application for a Resource Recovery Exemption and Order to be submitted to the NSW EPA 3. Excavation and cartage of ore impacted materials to the Woodlawn Mine 4. Beneficial reuse	Return of ore impacted materials to the Woodlawn Mine would consolidate contaminated materials in an area where similar contaminant concentrations occur. Extraction of ore through hydraulic mining processes already implemented at the mine represents the most favourable environmental outcome identified. Remnant materials could be beneficially reused in stabilisation of the tailings dam at the mine contributing to a positive environmental outcome at this location. Beneficial reuse at the mine is identified as a higher order remedial outcome than those considered under the hierarchy of remedial options recommended under the NEPM (NEPC 2013). Sustainability as measured by carbon footprint and landfill space consumption is favourable compared with other options.	1	The cost of progressing excavation and cartage to the mine is estimated at $250 – 500k (ex GST).	1	Intergenerational equity is achieved through this option as the contaminant is adequately managed with like materials in perpetuity.	1	**3**
Option 2 - Onsite containment [2]	The onsite containment option considered includes: 1. Location of a cell onsite to mitigate potential risks to human health or the environment in the event of disturbance to the containment system. Onsite containment could occur opposite Tarago Train Station across an area of approximately 6000 m2. Clay fill historically	Containment systems can provide durable long-term management options however environmental risks remain in the event of containment system failure. Future remediation may therefore be required, and this could place a burden on future generations. Environmental effects as measured by carbon footprint and landfill space consumption is favourable compared with other options.	3	The cost of progressing this option is estimated at $500 – 700k (ex GST) as an immediate investment. Costs for insitu would be less if maintained in-situ due to no requirement to excavate however these would be negated somewhat by the larger cap surface and the need to win clay. Additionally, a financial assurance value has been modelled based on a 100	2	A need to manage the contaminated soils in the future may impact future generations.	3	**8**

Option	Description	Environmental Sustainability	Ranking	Economic Sustainability[1]	Ranking	Social Sustainability	Ranking	Overall Ranking
	applied across the footprint of the former Loadout Complex could be excavated to the former site surface level and then reused as capping material for the containment cell. 2. Welded 2 mm thick High-Density Polyethylene (HDPE) geomembrane at the base and sides with a 750gm geofabric cushion layer inside the HDPE 3. Vegetation to mitigate erosion of capping or application of a durable surface layer 4. A 100-year design life is projected as a required parameter for engineering design. An insitu option is also considered and would involve retention of impact soils in situ, Soils would be capped with imported clay material of 0.5m thickness following placement of a marker layer over the area. The site surface would be shaped to promote drainage and vegetated. A 100 year design life may not be possible for this option.			year containment system design life and estimated at $550,000 (ex GST) net present value. This integrates costs projected for annual monitoring and replacement of topsoil every 10 years[3]. Costs for the financial assurance are likely to be more if maintained in situ due to the cap only containment, and the larger cap area. The cumulative investment is estimated at $1.05M - $1.25M (ex GST) and could be expected to be reset after 100 years.				
Option 3 - Offsite treatment and disposal[4]	A NSW waste facility capable of receiving the volume and type of material proposed to be generated during onsite remediation has not yet	Chemical immobilisation could be expected to reduce potential for migration of the Contaminant however the Contaminant in surficial soils has been present on site for decades and only	5	The cost of progressing this option is estimated at $1.9M – 2.9M (ex GST).	5	Intergenerational equity is however achieved as the contaminant is adequately managed within an appropriate	2	**12**

Option	Description	Environmental Sustainability	Ranking	Economic Sustainability[1]	Ranking	Social Sustainability	Ranking	Overall Ranking
	been identified. A pathway for offsite disposal exists however through amendment to the Environment Protection license (EPL) of the local landfill (Woodlawn Veolia) to allow treatment (where lead concentrations warrant treatment) as a precursor to disposal as General Solid Waste. This pathway would include: 1. A treatability trial to confirm an optimal treatment process 2. Application for an immobilisation approval for disposal of treated waste as GSW 3. Sieving to remove >20 mm fraction[5] 4. Reuse of >20 mm fraction onsite[6] 4. Chemical immobilisation of <20 mm fraction prior to offsite disposal as GSW	localised migration has been identified. Additionally, oversize materials sieved out before treatment would represent a significant secondary waste stream. This indicates the environmental benefit of chemical immobilisation may be limited. Offsite disposal would eliminate contaminant risks from a large part of the site. Further, the chemical immobilisation of contaminated materials as a preliminary stage of this option would reduce risks to an acceptable level before disposal to landfill. Environmental effects as measured by carbon footprint and landfill space consumption is unfavourable compared with other options.				management structure in perpetuity.		

Option	Description	Environmental Sustainability	Ranking	Economic Sustainability[1]	Ranking	Social Sustainability	Ranking	Overall Ranking
Option 4 – continue current management option	Onsite management of soils impacted with lead through a management plan that limits activity in this area, continues with dust suppression and outlines how any works in this area are to be undertaken	Short term environmental sustainable however longer term may see low level impacts to the environment and ultimately remediation requirements with one of the above options	5	Option is a low cost solution in the short term however long term costs are expected to increase as ultimately remediation of the area is likely to be required. Interim costs include dust suppression and continued periodic monitoring. Each work campaign in this area would require appropriate PPE, air and water management.	5	Low as the community have indicated preference to remediate the site and low intergenerational equity as this option does not provide a long term solution.	5	**15**

Notes:

1. Cost estimates have been developed for the purpose of comparing remedial options and are based on provision of limited information to potential remedial contractors. Further consultation with remedial contractors should occur to confirm costs and assumptions. Costs are based on 4100 m^3 or 7380T of material requiring remediation. Remedial cost calculations are presented for each option as **Appendix 7** and are based on preliminary assessment of industry rates in 2020.
2. Onsite containment options were identified within the CRN based on a multi-criteria constraints assessment (Ramboll 2020c).
3. The financial assurance model applied integrates an interest rate of 3%, inflation of 2%, annual inspection and reporting once established, $40k every 10 years for topsoil / capping surface reinstatement. No provision is made for acute damage to the containment system (e.g.: accidental penetration or potential damage from flooding) or for the management of contaminated materials after the 100 year design life. Assumptions adopted in the financial assurance calculation are presented in **Appendix 8**.
4. Offsite disposal options integrate consideration of two local landfills (Hi Quality - Minda landfill, Windellama and Veolia Woodlawn Waste Facility, Woodlawn). The disposal fee adopted for Minda was $115/t. The disposal fee adopted for Woodlawn was $225/t.
5. A nominal particle size upper limit of 20 mm was adopted for optimal operation of immobilization equipment. Particle sizes greater than 20 mm can be effectively immobilized though increase risk of equipment damage.
6. A laboratory scale screening trial of materials from the Woodlawn Siding was completed and included analyses of total and TCLP lead in >20 mm fraction. Significant volumes of >20 mm fraction were qualitatively observed to be limited to the Woodlawn Siding (i.e.: generally not present in adjacent soils). Targeted assessment of the Woodlawn Siding was adopted as a conservative approach to estimating lead concentrations that could be applied to >20 mm fraction in adjacent soils if observed as lead was most concentrated in the siding. Tabulated assessment of lead concentration against site criteria following laboratory scale screening is presented as **Appendix 5** and indicates the >20 mm fraction would be suitable for onsite reuse.

11.4 Preferred Remedial Option

Return of contaminated material to Woodlawn Mine was identified as the most sustainable option and based on preliminary communication with Heron Resources planning for this option was progressed. Woodlawn Mine activities subsequently shifted from Operational to Care and Maintenance modes and Heron Resources has advised that return of contaminated material to the mine is no longer feasible.

Containment of impacted soils within the rail corridor was identified as the second most sustainable option however containment within the Tarago rail yard was considered unsuitable based on limitations to future development / functionality of this area. Alternate locations within the CRN were also considered though considered unsuitable due to complexities in associated environmental planning pathways.

Within this context the remedial strategy that was selected was offsite treatment and disposal. All options considered include in-situ retention of contamination within operational rail formations and so management of remnant contamination will be required under an LTEMP.

TfNSW will implement a structured process of consultation with the community and other stakeholders that will focus on implementation of the preferred remedial option.

12. SUMMARY OF SELECTED REMEDIAL OPTION

The proposed remedial strategy comprises:

- Planning including:
    - A treatability trial to demonstrate a viable process for chemical immobilisation. See attached as **Appendix 12**.
    - Procurement of a waste receiving facility licensed for receipt of GSW including provision to lease a space for screening and immobilisation of site won materials
    - Application for and receipt of a Specific Immobilisation Approval (SIA) from the NSW EPA. See attached as **Appendix 12**.
    - Co-ordination of amendments to the EPL and/or development consent conditions for the nominated receiving facility including provisions for a screening and immobilisation area at the receiving facility.
- Establishment of the screening and immobilisation area including:
    - Heavy vehicle access and a temporary stockpile area for site won materials
    - A mechanical vibratory screen
    - Temporary stockpile areas for oversize material (rail ballast) and screen fines
    - A pugmill to facilitate full scale immobilisation
    - Temporary stockpile areas for validation of immobilised materials
    - Heavy vehicle access to enable excavation and transport of waste streams for placement in the landfill
- Excavation of the non-operational Woodlawn Siding and surrounding contaminated soils and transport by road to the screening and immobilisation area
- Mechanical screening to remove rail ballast and returned to site for beneficial reuse under a Specific Resource Recovery Exemption.
- Design and implementation of an appropriate validation program
- Disposal of immobilised materials as GSW.

Contaminated soils within the active rail formation and at depth around the former loadout complex building and on the eastern side of the rail formation will remain in-situ. These materials will be managed under a long term EMP for the site described further under **Section 13.15**.

13. REMEDIAL ACTION WORKS PLAN

13.1 Key Personnel

All site personnel (including JHR and its contractors) have the responsibility of protecting human health and the environment. Key personnel and their roles and responsibilities are outlined in **Table 13-1**.

Table 13-1: Key Personnel roles and Responsibilities

Personnel	Name and Contact Details	Role / Responsibility
Land Owner	TfNSW	Responsible for addressing the VMP.
Principal	JHR	Current custodian of the CRN and responsible for all works carried out at the site. Responsible for engaging / contracting all other parties.
Principals Environmental Representative	TBA	Personnel employed by JHR or sub-contracted to JHR to oversee / provide technical advice on remediation works and ensure works are completed in accordance with relevant guidelines.
Remediation Contractor	TBA	Company contracted to undertake remediation works. Responsible for supplying all plant and personnel to conduct the works as outlined in this RAP and as required under local, state and federal legislation.
Remediation Supervisor or Project Manager	TBA	Responsible person appointed by contractor to supervise / coordinate all aspects of remedial works on behalf of the contractor. The primary point of contact for the project.
Contaminated Land Auditor	TBA	A Part B4 Contaminated Land Audit will be prepared for the site in accordance with the Contaminated Land Management Act 1997. Approval of remedial plans prior to commencement of works

13.2 Licenses and Approvals

SEPP 55 defines a framework for management of contamination in NSW. It defines requirements for engagement with consent authorities and local councils according to whether remediation is considered Category 1 (requiring development consent) or Category 2 (requiring notification 30 days before remediation). Ramboll consider the long-term management of contamination associated with the Tarago Loop to be Category 2 remediation. Category 2 remediation work is deemed remediation work that is not Category 1 remediation as described in Clause 9 of SEPP 55.

The proposed remediation works do not trigger the criteria in clause 9 (a) – (f) and the proposed remediation works are not ancillary to any other current development requiring Development Consent. Based upon the above information and criteria the remediation works are deemed to be Category 2 works under SEPP55. Refer Notification Letter included in **Appendix 9** which must be provided to Goulburn Mulwaree Council a minimum of 30 days before commencement of remediation. However, modifications to SEPP 55 are currently being made and, once ratified, will require any retention of contamination on sites to be Category 1 remediation. Depending on the timing for remediation this would therefore require development consent for the long-term management of contamination associated with Tarago Loop.

The return of ballast to the site after screening will likely require a Specific Resource Recovery Exemption. Further correspondence with the EPA is recommended to define the appropriate planning pathway.

The proposed chemical immobilization will require a Speciifc Immobilzation Approval from the NSW EPA. A treatability trial and immobilization application are presented as **Appendix 12**. The proposed offsite chemical immobilisation and disposal of immobilised waste can only occur at a waste facility with specific development consent and environment protection license conditions allowing for these activities. It is preferred that these activities occur at a waste facility close to the site however preliminary review indicates local waste facilities do not have required consent and licensing. As a result additional planning will likely be required for the waste facility including assessment of environmental impacts associated with immobilization and applications to modify development consent and EPL conditions.

13.3 Remediation Methodology

The proposed remedial methodology comprises the following key steps:

- Acquire necessary approvals for the selected remedial option including:
    - A Specific Immobilisation Approval (SIA) for lead in waste streams not suitable for disposal as GSW
    - Amendment to development consent conditions and the EPL for the nominated receiving facility[2]
    - Apply for a specific resource recovery exemption from the NSW EPA for return of ballast to site.
- Prepare a Remedial Works Plan that details the remediation actions and addresses all consent requirements.
- Contractor to prepare ancillary plans to complete the works. Plans required as a minimum are included in **Sections 13.7** to **13.9**. Plans are required to address consent requirements.
- Remove remnant rails for recycling and sleeper for disposal as GSW. A waste classification for sleepers is presented as **Appendix 10**
- Establish a work zone at the nominated receiving facility for temporary storage, mechanical screening and immobilisation of material excavated from the Woodlawn Siding and adjacent soils
- Excavate and transport materials from the Woodlawn Siding and adjacent soils to the work zone at the receiving facility. Materials will be excavated until lead concentrations at the remnant site surface (as measured by fpXRF) are lower than the site assessment criteria (2200 mg/kg)
- Mechanically screen materials excavated from the Woodlawn Siding and adjacent soils into <20 mm and >20 mm fractions[3]
- Validate suitability of >20 mm fraction for beneficial reuse onsite under a specific resource recovery exemption. Validation of ballast must occur before immobilisation to enable mixing with the >20 mm fraction to allow for contingency actions if characterisation fails, refer **to Section 13.14**.
- Immobilise the <20 mm fraction in accordance with the SIA (TBC)

Dispose of immobilised materials as GSW at the nominated facility

A process diagram for screening and immobilisation is presented as **Figure 2** below.

[2] Screening and immobilization could occur at a location other than the waste receival facility however such a facility would need to have development consent as a contaminated soil treatment facility and hold an appropriate license.

[3] A nominal particle size upper limit of 20 mm was adopted for optimal operation of immobilization equipment. Particle sizes greater than 20 mm can be effectively immobilized though increase risk of equipment damage.

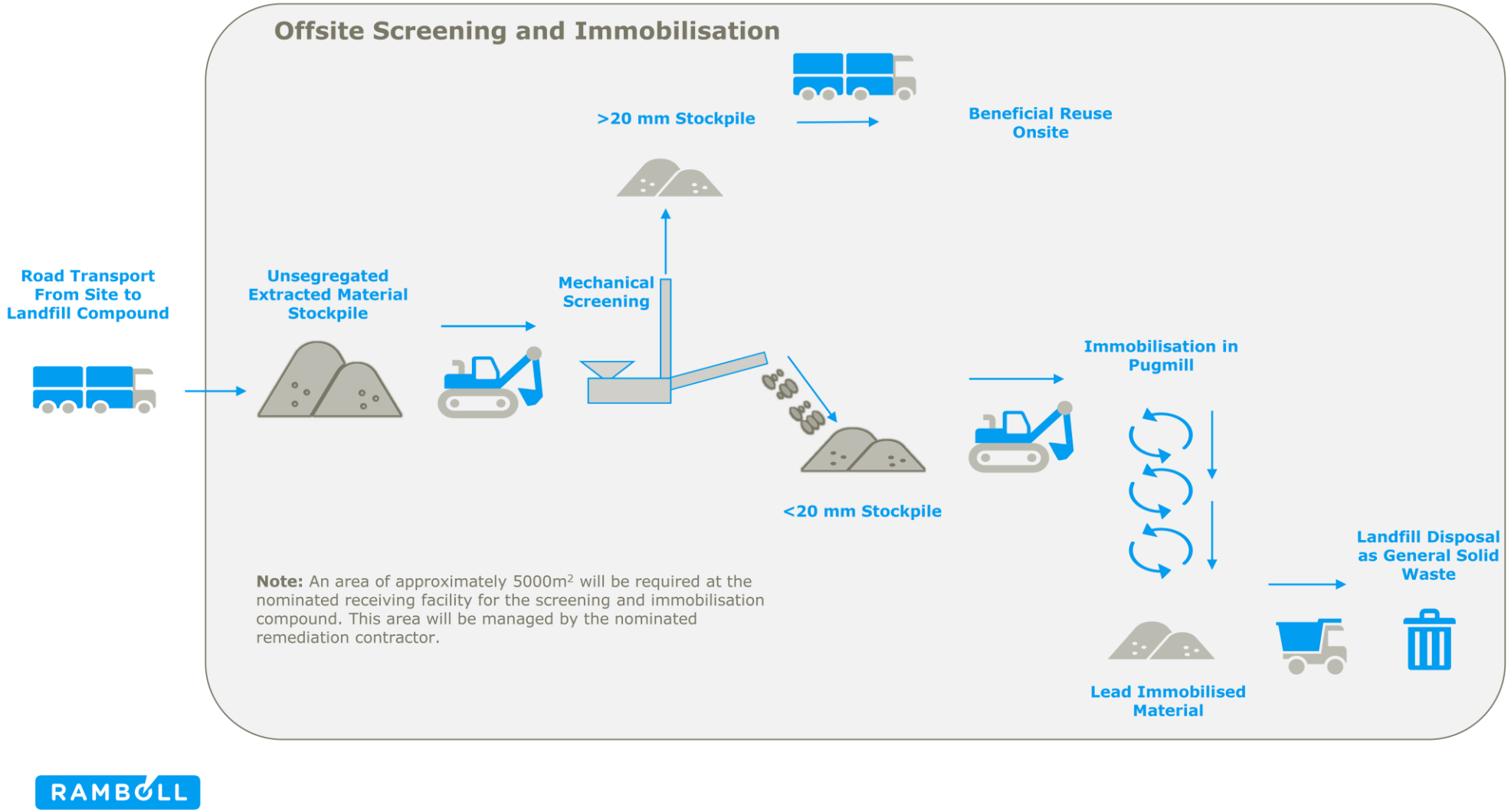

Figure 2: Screening and Immobilisation Process Diagram

13.4 Preliminaries

Environmental impact assessment, co-ordination of a SIA, amendment to receiving facility EPL and/or development consent conditions are key preliminary elements of the remedial strategy. Concurrent with these planning elements, the Remediation Contractor will provide a detailed methodology to JHR and Ramboll for written approval. The methodology is to describe:

- Safety controls that minimise disturbance to the operational Goulburn – Bombala main and Tarago Yard Loop lines. A project specific health and safety plan must be prepared by the Remediation Contractor that satisfies all requirements of the JHR CRN integrated management system. The Principal will retain responsibility for health and safety throughout remediation
- Methods of excavation and materials tracking including specification of environmental control procedures to address relevant provisions within the Action Plan (Ramboll 2020c)
- A detailed description of proposed immobilisation procedures and a plan for the screening and immobilisation compound to be established within the nominated receiving facility. This will address each element of the process as described here-in and include environmental controls to mitigate potential for contamination to migrate from the screening and immobilisation compound

The Remediation Contractor's methodology will include schedule allowances for validation as described in **Section 14** and allowance for earthworks to ensure free drainage across the site in accordance with a final landform design to be provided by the Principal.

13.5 Protection of Infrastructure, Heritage and Vegetation

The Remediation Contractor's methodology will include measures to ensure the protection of operational infrastructure (including but not limited to rail formations, the railway station, underground and above ground services), heritage (including structures associated with the Tarago Rail Precinct heritage item) and vegetation immediately surrounding the southern rail culvert (refer to **Figure 3**, **Appendix 1**).

The Principal will provide current service plans covering proposed areas of excavation. The Remediation Contractor will make provision for onsite location of services and measures to ensure services are not disturbed.

Excavation that may disturb operational infrastructure, heritage or vegetation around the southern rail culvert (**Figure 2**) is explicitly excluded from the scope of remediation.

13.6 Site Establishment

The required personnel and plant are required to mobilise to site, set up boundaries for the remedial works and implement current lead work controls per the Action Plan (Ramboll 2020c) including notification to WorkSafe NSW.

The Principal's Environmental Representative will refine excavation extents through fpXRF measurement of surface lead concentrations in/around proposed excavation areas and work with the Remediation Contractor to mark-out excavation areas onsite.

13.7 Management Plans

Prior to commencing works at the site management plans are required to be developed and approved by the Site Auditor. Management plans required, at a minimum are as follows.

1. A Remedial Works Plan providing specific detail on the remediation requirements.
2. A Construction Environmental Management Plan that details the controls proposed by the contractor to minimise impacts on the community and the environment during the works.

This plan is to include the following subplans as a minimum the plans outlined in Section 13.8 to 13.10.

3. A worker health and safety plan that includes the specific details for working with these materials.

Plans are to be reviewed and approved by the Auditor prior to the commencement of remedial works.

- Stormwater Soil and Water Management Plan

The Remediation Contractor will prepare a Soil and Water management plan to manage soil and water during the works. The Remediation Contractor must define and implement controls to prevent offsite contaminant migration above criteria protective of the receiving environment. Preliminary guidance provided in the Action Plan (Ramboll 2020c) must be addressed.

13.8 Noise Management Plan

The remediation contractor will prepare a noise management plan to manage noise during the works. The Noise Management Planshall comply with the noise management requirements for the CRN and include monitoring to demonstrate effective implementation of the plan during the works. The following noise control measures should be considered:

- Construction vehicles and machinery would be selected with consideration of noise emissions. Equipment should be fitted with appropriate silencers (where applicable) and be maintained in accordance with manufacturer's requirements. Machines found to produce excessive noise compared to typical noise levels should be removed and replaced or repaired or modified prior to recommencing works
- Where possible construction vehicles and machinery would be turned off or throttled down when not in use
- All site personnel would be informed of their obligations to minimise potential noise impacts on residents during the site induction and need to take reasonable and practical measures to minimise noise

13.9 Dust Management Plan

The remediation contractor will prepare a dust management plan to manage dust during the works. The Dust Management Plan shall comply with the dust management requirements for the CRN and include monitoring to demonstrate effective implementation of the plan during the works. The Remediation Contractor must define and implement dust controls to prevent offsite contaminant migration above criteria protective of the receiving environment. Controls will prevent offsite migration of visible dust.

The Dust Management Plan should include onsite air quality monitoring specific to the Remediation Contractor's methodology. Monitoring will include real-time dust sampling on site boundaries upwind and downwind of excavation areas. The Remediation Contractor will include provision for management measures to ensure offsite migration of dust (as indicated by increase in dust on downwind boundaries compared to upwind boundaries) does not occur. This may include requirement to stop work during windy conditions.

The Dust Management Plan is to consider historical remediation activities completed in the Tarago area and the sensitivities of neighbouring properties to impacts from dust.

13.10 Material Tracking

All material handled during excavation of lead impacted materials is to be tracked to verify appropriate movement and handling. The system will track materials from cradle-to-grave, and will provide detailed information on the origin, quantity and fate of all materials excavated during remediation. Records will be maintained by Remediation Contractor site personnel defining chainage of origin, material types loaded, and material fate (temporary stockpile ID). These records shall be consolidated digitally according to the tracking spreadsheet attached as **Appendix 11**.

13.11 Survey

The Remediation Contractor will co-ordinate survey to ensure all excavation areas and remnant contamination is accurately defined.

This survey forms part of the validation requirements described in **Table 14-6**.

13.12 Remediation Schedule

The final remediation schedule will be discussed with the Remediation Contractor. A proposed indicative schedule up to the completion of a draft validation report is outlined in **Table 13-2**.

Table 13-2: Remediation Schedule

Task	Estimated Duration
Planning, engagement of Remediation Contractor and receiving facility	3 – 6 months
Establishment of Site and Screening + Immobilisation Compound	2 weeks
Excavation, immobilisation and return of screened ballast	4 – 6 weeks
Total Duration	19 – 32 weeks

13.13 Hours of Operation

The Remediation Contractor shall only undertake works associated with validation works that may generate an audible noise at the closest residential receptor (20 Stewart Street and 17 Wallace Street) during the following hours, unless under direction from relevant authority for safety reasons or in the event of an emergency:

- 7:00 am to 6:00 pm Monday to Friday
- 7:00 am to 1:00 pm Saturdays
- At no time on Sundays or public holidays

Works may also be undertaken outside of these hours if in accordance with EPL 13421.

13.14 Contingency Plan

The contingencies presented in **Table 13-3** are to be implemented where unexpected site conditions or circumstances occur.

Table 13-3: Contingency Plan

Contingency Event	Contingency Action	Personnel Responsible
Receival of a dust complaint	Stop Work Identify dust source and review control measures. Assess requirements for additional monitoring or investigation of impact.	Remediation Contractor following consideration from Principal and Principal's Environmental Representative
Validation sampling indicates screened ballast is unsuitable for onsite reuse	Further removal of contaminated fines or immobilisation and disposal	Remediation Contractor following consideration from Principal and Principal's Environmental Representative
Validation sampling of immobilised material indicates not suitable for disposal as immobilised GSW	Further immobilisation will occur	Remediation Contractor following consideration from Principal and Principal's Environmental Representative
Validation sampling of screened ballast indicates concentrations unsuitable to return to site, or a specific RRE cannot be obtained	Characterise ballast for disposal to landfill or mix with <20 mm soils and immobilise for disposal to landfill	Remediation Contractor following consideration from Principal and Principal's Environmental Representative
Surface water or air quality monitoring post remediation indicates unacceptable offsite risk	Consider further remediation of remnant contamination	Principal and Principal's Environmental Representative
Discovery of unexpected materials	Contact the Principal's representative, sort materials into a segregated stockpile and discuss possible disposal options with the Principal or the Principal's Representative	Principal, following notification from the Remediation Contractor
Receival of a noise complaint	Identify noise source and implement noise control measures	Remediation Contractor

13.15 Long Term Environmental Management Plan

A Long-Term Environmental Management Plan (LTEMP) will be required to provide guidance for ongoing maintenance of remnant contamination. The LTEMP will include survey of excavation areas and areas of remnant contamination. A legal requirement to implement the LTEMP should be defined through a covenant to the land title.

14. VALIDATION PLAN

The following is the validation Sampling and Analysis Quality plan (SAQP) to be implemented to validate the remedial objective has been achieved for the site.

14.1 Validation Data Quality Objectives

Specific Data Quality Objectives (DQOs) have been developed for the validation of field and analytical data obtained during the remediation. The DQO process is a systemic, seven step process that defines the criteria that the validation sampling should satisfy in accordance with the requirements of NSW EPA (2017) *Guidelines for the NSW Site Auditor Scheme* (3rd Edition). The DQOs are as follows:

14.1.1 Step 1: State the Problem

Lead impacted soil exists at the site. Remediation is required to mitigate potential exposure risks into the future.

14.1.2 Step 2: Identify the Decisions

The validation SAQP is to ensure that excavation of the Woodlawn Siding and surrounding soils (described in further detail on **Figures 2a** – **2e**) occurs such that remnant lead concentrations are below remediation criteria described in **Section 10**.

Excavation areas will be surveyed after validation as the basis of documenting where contamination remains.

The site will be considered remediated when the remediation and validation program has been carried out successfully.

14.1.3 Step 3: Identify Inputs to the Decision

The following inputs into the decision-making process are required:

- fpXRF measurement of lead concentrations to refine excavation areas onsite before excavation commences
- Documented materials tracking of all material movements including source excavation, transport. Screening and immobilisation, return of ballast to site and disposal of immobilised GSW
- fpXRF measurement of lead during remediation to define vertical and horizontal excavation limits onsite
- Validation sampling of screened ballast and analyses for total lead to confirm suitability for reuse onsite
- Validation sampling of immobilised ballast fines for TCLP lead to confirm suitability for disposal as immobilised GSW
- fpXRF measurement of lead in the screening and immobilisation compound before establishment of the compound and at completion of remediation
- Survey of validation excavations to define contaminated areas remaining onsite
- Completion of surface water and air quality monitoring in the receiving environment. One round of surface water monitoring will occur after >10 mm rainfall in a 24 hour period post remediation. Three months of air quality monitoring will occur post remediation.

14.1.4 Step 4: Define the Study Boundary

The study boundary includes proposed excavation areas onsite (the Woodlawn Siding and surrounding soils as defined on **Figures 2a** – **2e**) and the screening and immobilisation compound.

14.1.5 Step 5: Development of Decision Rules

Data will be considered reliable if it satisfies the limits of decision error defined in **Section 14.1.6**.

Excavation will be considered sufficient when lead concentrations in remnant soils onsite are below the nominated remediation criteria of 2,200 mg/kg or excavation must be limited to preserve the structural integrity of operational lines.

Screened ballast will be considered suitable for reuse if the 95% UCL of lead concentrations in screened ballast after remediation is less than the nominated remediation criteria of 2,200 mg/kg.

Ballast fines will be considered suitable for disposal as immobilised GSW if the 95% UCL of lead leachate (TCLP) is less than the limit for lead leachate in GSW defined in the NSW EPA Waste Classification Guidelines (TCLP1 – 5 mg/L).

Clean-up of the screening and immobilisation compound after remediation will be considered complete when the 95% UCL of lead concentrations in remnant surface soils is below either the Tier 1 health investigation level for lead industrial land or the 95% UCL of lead concentrations in remnant surface soils before establishing the compound.

Potential for offsite contaminant migration after remediation will be considered to be satisfactorily low if contaminant concentrations in surface water and air quality monitoring are reported below validation criteria. Surface water validation criteria are presented in **Table 14-3**.

14.1.5.1 Environmental Monitoring

The effectiveness of remediation at mitigating exposure risks associated with site contamination in the receiving environment will be assessed through post remediation surface water and air quality monitoring. Existing monitoring data indicates exposure risks within the receiving environment are low. A polymer sealant was applied over areas of contamination onsite to limit potential contaminant migration offsite and while continued polymer application is not proposed post remediation, potential for offsite contaminant migration post remediation (integrating removal of the Woodlawn Siding) is likely to be low. Within this context one round of surface water monitoring after >10 mm rainfall in a 24hr period and 3 months of continuous air quality monitoring will be completed. This monitoring program is detailed further in **Section 14**.

Surface Water Criteria

The criteria adopted for the assessment of surface water contamination are sourced from the following references:

- National Environment Protection Council (NEPC), National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended 2013 (NEPM, 2013)
- National Health and Medical Research Council (NHMRC) (2001) National Resource Management Ministerial Council (NRMMC) Australian Drinking Water Guidelines 6, Version 3.6 updated March 2021, (ADWG 2011)
- National Health and Medical Research Council (NHMRC), National Resource Management Ministerial Council (NRMMC) Guidelines for Managing Risks in Recreational Water (NHMRC, 2008)
- Department of Environment and Conservation (DEC) Guidelines for the Assessment and Management of Groundwater Contamination (DEC, 2007)
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG 2018) (available at www.waterquality.gov.au/anz-guidelines)
- Australian and New Zealand Environment and Conservation Council (ANZECC) & Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC, 2000)
- Advice on risks to human health and the environment: Boyd Street and publicly accessible areas, Tarago NSW, Site specific criteria – Protection of human health and terrestrial and/or aquatic ecosystems (EnRiskS, 2020)

Rationale for Application of Surface Water Guidelines

The relevance of guidelines was determined based on iterative screening from the broadest and most sensitive water usage scenario which occurs in the Mulwaree River back through agricultural land and public roads to the least sensitive scenario which occurs at site.

All results from Mulwaree River samples (SW8 – SW10) have been screened against Tier 1 / screening guidelines relevant to human health (incidental ingestion), freshwater ecology, irrigation and stock watering as each of these receptors occur within the receiving waters (the Mulwaree River). Should results exceed screening guidelines and indicate site contamination may be the source, it would be appropriate to apply the guidelines that were exceeded to sampling locations upstream as this would inform further assessment of the site as the potential source. Previous monitoring results do not indicate site contamination is adversely affecting the Mulwaree River and site specific guidelines were developed for As, Cd, Pb, Mn, Ni (EnRiskS 2020) that integrate the ephemeral nature of surface water features between the Mulwaree River and the site and in these areas that results have been applied to samples from drainage features onsite (SW1 – SW6) and immediately downstream (SW7) have been applied to the exclusion of Tier 1 criteria.

Additionally, several technical refinements were identified and are relevant to guideline application. These were:

- ADWG Section 6.3.1 (2011) states that guideline values refer to the total amount of the substance present, regardless of its form (e.g. in solution or attached to suspended matter) and so analytical results from unfiltered samples should be assessed against human health criteria
- ANZG (2018) guidelines for metals in freshwater are adopted from the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC 2000) which states the major toxic effect of metals comes from the dissolved fraction, so it is valid to filter samples (e.g. to 0.45 µm) and compare the filtered concentration against the trigger values

- Water hardness is identified as a physical parameter with a quantifiable effects correction factors are defined in the guidelines to address the effect of water hardness on the bioavailability of cadmium, chromium, lead, nickel and zinc.

To define appropriate hardness correction factors, water was conservatively presumed to be moderately hard based on the Goulburn Mulwaree Regional State of the Environment Report 2004-2009 (Goulburn Mulwaree Council 2009). Hardness correction factors were adopted from Table 3.4.4 of the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC 2000) to develop refine Tier 1 criteria as described in **Table 14-1** below.

Table 14-1: Hardness Corrections for Tier 1 Freshwater Ecology Guidelines

	Original guideline value (mg/L)	Hardness Correction Factor	Corrected guideline value (mg/L)
Cadmium	0.0002	2.7	0.00054
Chromium	0.001	2.5	0.0025
Lead	0.0034	4	0.0136
Nickel	0.011	2.5	0.0275
Zinc	0.008	2.5	0.02

Application of guidelines at each sampling point is summarised in **Table 14-2**.

Table 14-2: Guidelines Applied to Sampling Points

Sampling Point	Location	Human Health - Site Specific[A]	Ecology - Site Specific[A]	Human Health - Recreational Sceening[B]	Ecology - Screening[C]	Irrigation - Screening[D]	Stock Water - Screening[E]
SW1-UP	Upstream of Southern Culvert (offsite)	✓	✓	✓	✓	-	-
SW1	Upstream of Southern Culvert	✓	✓	✓	✓	-	-
SW2	Downstream of Southern Culvert	✓	✓	✓	✓	-	-
SW3	Upstream of Middle Culvert	✓	✓	✓	✓	-	-
SW4	Downstream of Middle Culvert	✓	✓	✓	✓	-	-
SW5	Upstream of Northern Culvert	✓	✓	✓	✓	-	-
SW6	Downstream of Northern Culvert	✓	✓	✓	✓	-	-
SW7	Dam on farm downstream of Northern Culvert (offsite)	-	-	✓	✓	✓	✓
SW8	Mulwaree River upstream of Middle and Northern Culvert Discharge	-	-	✓	✓	✓	✓
SW9	Mulwaree River upstream of Southern Culvert Discharge	-	-	✓	✓	✓	✓
SW10	Mulwaree River downstream of Middle and Northern Culvert Discharge	-	-	✓	✓	✓	✓

Assessment criteria adopted under each guideline are presented in **Table 14-3**.

Table 14-3: Guideline Criteria (mg/L)

Contaminant	Human Health - Site Specific Criteria	Human Health - Recreation Screening	Ecology - Site Specific Criteria	95% Fresh water (ANZG 2018)	Irrigation - Screening	Stock Water - Screening
Total Metals						
Aluminium	-	2	NA	NA	NA	NA
Arsenic	7	0.1	NA	NA	NA	NA
Barium	-	2	NA	NA	NA	NA
Beryllium	-	0.6	NA	NA	NA	NA
Cadmium	1.4	0.002	NA	NA	NA	NA
Chromium	-	0.5	NA	NA	NA	NA
Cobalt	-	-	NA	NA	NA	NA
Copper	-	20	NA	NA	NA	NA
Iron	-	3	NA	NA	NA	NA
Lead	7	0.1	NA	NA	NA	NA
Manganese	350	5	NA	NA	NA	NA
Mercury	-	0.01	NA	NA	NA	NA
Nickel	14	0.2	NA	NA	NA	NA
Zinc	-	30	NA	NA	NA	NA
Dissolved Metals						
Aluminium	NA	NA	-	0.055[a]	20	5
Arsenic	NA	NA	0.5	0.024[b]	2	0.5-5
Barium	NA	NA	-	-	-	-
Beryllium	NA	NA	-	-	0.5	-
Cadmium	NA	NA	10	0.00054[g]	0.05	0.01
Chromium	NA	NA	-	0.002.5[g]	1	1
Cobalt	NA	NA	-	0.0014	0.1	1
Copper	NA	NA	0.5	0.0014	5	0.4-5
Iron	NA	NA	-	-	10	not sufficiently toxic
Lead	NA	NA	0.1	0.0034	5	0.1
Manganese	NA	NA	-	1.9	10	not sufficiently toxic
Mercury	NA	NA	-	0.00006[d, e]	0.002	0.002
Nickel	NA	NA	1	0.0275[g]	2	1
Zinc	NA	NA	20	0.02[g]	5	20

blank cell denoted with – indicates no criterion available.

[a] Aluminium guidelines for pH > 6.5, based on the pH of groundwater measured at the Site and surrounding area.This is an aesthetic criteria only based on post flocculation problems,

[b] Guideline value for arsenic (III).

[c] Guideline value for chromium (VI).

[d] Guideline value for inorganic mercury.

[e] 99% species protection level DGV has been adopted to account for the bioaccumulating nature of this contaminant.

[f] Guideline value for m-xylene. Guideline values also exist for both o-xylene and p-xylene as per ANZG (2018). The default guideline value for m-xylene guideline has been adopted as it is the most conservative

*[g] Hardness correction factor applied to the threshold value as detailed in **Table 14-1**.*

Air Quality Criteria
Air quality criteria are defined in **Table 14-4**.

Table 14-4: Air Quality Criteria

Pollutant	Averaging period	Criteria	Source
Lead	Annual	0.5 μg/m³	NEPC (1998)
TSP	Annual	90 μg/m³	NHMRC (1996)
$PM_{2.5}$	24 hours	25 μg/m³	DoE (2016)
	Annual	8 μg/m³	DoE (2016)
PM_{10}	24 hours	50 μg/m³	DoE (2016)
	Annual	25 μg/m³	DoE (2016)
Deposited dust	Annual	4 g/m²/month	NERDDC (1988)

14.1.6 Step 6: Specify Performance Criteria

Validation performance criteria are defined to assess potential for a false positive or false negative in validation data. Performance criteria for fpXRF measurements of lead in soil, and sampling for laboratory analyses of surface water and airborne dust are presented in **Table 14-5** below.

Table 14-5 Performance Criteria for Validation Sampling

Category	Performance Criteria			
	fpXRF Measurements	**Sampling of Screened Ballast and Immobilised Ballast Fines**	**Surface Water Sampling**	**Air Quality Monitoring**
Accuracy: Accuracy in the collection of field data will be controlled by:	Appropriate sampling methodologies utilised and complied with. Works to be completed in accordance with US EPA 2007, *Method 6200, Field Portable X-Ray Fluorescence Spectrometry for the Determination of Elemental Concentrations in Soil and Sediment*.	Soil sampling for laboratory analyses will occur in general accordance with *AS 4482.1-2005 Guide to the investigation and sampling of sites with potentially contaminated soil - Non-volatile and semi-volatile compounds* and *AS 1141.3.1 – 2012 Methods for Sampling and Testing Aggregates, Method 3.1: Sampling – Aggregates*	• Calibrated measurement equipment used. The water quality meter will be calibrated by the technical rental company prior to use. • Appropriate sampling methodologies utilised and complied with. Works to be completed with regard for *AS NZS 5667.6-1998 Water quality - Sampling - Guidance on sampling of rivers and streams*. • Collection of one intra-laboratory duplicate for surface water and one intra-laboratory duplicate for sediment. • Rinsate samples are not proposed to be collected due to surface water samples being collected directly into dedicated sampling containers (or field filtered using single use syringes and filters) using disposable nitrile gloves. Sediment samples will be collected using plastic tubing (bailers) cut down to act as disposable sediment core samplers.	Dust deposition will be measured in accordance with *AS/NZS 3580.10.1 Determination of Particulate Matter – Deposited Matter – Gravimetric method.* Suspended particulates will be measured in accordance with *AS/NZS.9.15 Determination of suspended particulate matter – Particulate metals high or low volume sampler gravimetric collection – Inductively coupled plasma (ICP) spectrometric method.* Continuous airborne dust monitoring will occur using a particle counter (QAMS DMP 7000) configured to measure PM10 and PM2.5 at 5-minute intervals over the course of the program.
Precision: The degree to which data generated from replicate or repetitive measurements differ from one another due to random errors. Precision of field data will be maintained by:	• XRF readings will be collected by a experienced scientist holding a NSW EPA license required for field based XRF testing • XRF readings will be collected from soil in-situ and measurements will be taken by placing the XRF directly on the ground surface. • the soil surface to be measured will be cleared of debris and	In the field, precision will be maintained by: • Using standard operating procedures for the collection of soil samples. • Collection of soil samples by suitably experienced environmental scientists. • Use of disposable nitrile rubber gloves between sampling locations.	• Surface water sampling will be completed by experienced scientists • A new pair of disposable nitrile gloves to handle each sample. • Samples will be placed immediately into laboratory supplied and appropriately preserved sampling vessels • Samples will be stored in chilled, insulated containers with ice for transportation to the laboratory	In the field, precision will be maintained by: • Using standard operating procedures for air quality monitoring. • Completion of air quality monitoring by suitably experienced environmental scientists. • Recording of sample identification and analytical

Category	Performance Criteria			
	fpXRF Measurements	**Sampling of Screened Ballast and Immobilised Ballast Fines**	**Surface Water Sampling**	**Air Quality Monitoring**
	grass prior to taking the measurement to ensure that there is no obstruction, that the analyser window is protected and that contact with the sample surface is maintained during measurements. • As moisture is known to affect measured concentrations, visually dry surfaces will be chosen for measurement. • Soil sampling for confirmatory laboratory analyses will occur in general accordance with *AS 4482.1-2005 Guide to the investigation and sampling of sites with potentially contaminated soil - Non-volatile and semi-volatile compounds*. This will include: ○ Collection of samples by a suitably experienced environmental scientist ○ Use of disposable nitrile rubber gloves between locations ○ Soil samples will be placed immediately into laboratory supplied and appropriately preserved sampling vessels. ○ Sample numbers, preservation and analytical requirements are to be recorded on chain of custody documents.	• Placement of samples directly into designated single use sampling containers. • Collection of intra-laboratory and inter-laboratory duplicate samples at a rate of 1 in 20 primary samples. • Collection of one rinsate sample on reusable sampling equipment at the end of each day. • Recording of sample identification and analytical requirements on chain of custody documents. • Samples transported to the laboratory under chain of custody conditions to a laboratory with NATA accreditation for the analytical methods prescribed. • XRF readings collected by an experienced scientist holding a NSW EPA license required for field based XRF testing. • In the laboratory, precision will be assessed using blind duplicate samples and split duplicates.	• Sample numbers, preservation and analytical requirements will be recorded on chain of custody documents. • 5. Samples will be transported to the laboratory under chain of custody conditions.	requirements on chain of custody documents. • Samples transported to the laboratory under chain of custody conditions to a laboratory with NATA accreditation for the analytical methods prescribed.

Category	Performance Criteria			
	fpXRF Measurements	**Sampling of Screened Ballast and Immobilised Ballast Fines**	**Surface Water Sampling**	**Air Quality Monitoring**
	• Samples are to be transported to the laboratory under chain of custody conditions to a laboratory with NATA accreditation for COPCs.			
Completeness: The completeness of the data set shall be judged by:	• All locations sampled as outlined in **Section 14.1.7**. • Sampling completed by experienced personnel • Field documentation completed correctly	• All locations sampled as outlined in **Section 14.1.7**. • Sampling completed by experienced personnel • Field documentation completed correctly	• All locations sampled as outlined in **Section 14.1.7**. • Sampling completed by experienced personnel • Field documentation completed correctly	• All locations sampled as outlined in **Section 14.1.7**. • Sampling completed by experienced personnel • Field documentation completed correctly
Representativeness: The representativeness of the field data will be judged by:	• Non-disposable sampling equipment, such as the hand auger, will be thoroughly decontaminated between locations using Decon 90 solution and deionised rinsate water. • At each location, a pair of disposable nitrile gloves will be worn while sampling and handling the sample; gloves will be replaced between each successive sample. • Soil analytical samples will be collected directly into the sampling vessels.	• Non-disposable sampling equipment, such as the hand auger, will be thoroughly decontaminated between locations using Decon®90 solution and deionised rinsate water. • At each location, a pair of disposable nitrile gloves will be worn while sampling and handling the sample; gloves will be replaced between each successive sample. • Soil analytical samples will be collected directly into the sampling containers following size reduction and splitting.	• Non-disposable sampling equipment, such as the grab sampler and water quality meter, will be thoroughly decontaminated between locations using Decon 90 solution and deionised rinsate water. • At each location, a pair of disposable nitrile gloves will be worn while sampling and handling the sample; gloves will be replaced between each successive sample. • Surface water analytical samples will be collected directly into the sampling vessels using an extendable pole sampler where appropriate.	• Dust deposition gauge bottles will be sourced from a NATA accredited laboratory • At each location, a pair of disposable nitrile gloves will be worn while sampling and handling the sample; gloves will be replaced between each successive sample • Dust HV filters will be transported in disposable zip-lock bags
Comparability: Comparability to existing field data will be maintained by:	• Use of the same appropriate sampling methodologies • Same sampling depths will be used (i.e.: 0-0.05 mbgl) • Analytical samples will be collected for submission to the laboratory • Photographs will be taken of sampling location conditions at the time of sampling.	• Use of the same appropriate sampling methodologies • Same sampling depths will be used (where practical) • Analytical samples will be collected for submission to the laboratory • Photographs will be taken of sampling location conditions at the time of sampling.	• Use of the same appropriate sampling methodologies • Same sampling depths for surface water (where practical) • Visual and olfactory observations will also be recorded on the field sheet. • Photographs will be taken of sampling location conditions at the time of sampling.	• Use of the same appropriate sampling methodologies • Same sampling locations will be used • Analytical samples will be collected for submission to the laboratory • Photographs will be taken of sampling location conditions at the time of sampling.

Performance criteria for analyses of soil duplicates, surface water samples and air quality samples are defined as follows:

- Data will be analysed adopting RPD control limits of +/- 30%.
  Where concentration levels are less than two times the PQL, the Absolute Difference (AD) shall be calculated. Data will be considered acceptable if the: AD <2.5 times the PQL. Any data which does not conform to these acceptance criteria will be examined for determination of suitability.

- Blank samples will be submitted with the analytical samples and analysed for the contaminants of concern: One Field Blank will be collected each day.

- The laboratory will additionally undertake a method blank with each analytical batch of samples. Laboratory method blank analyses are to be below the PQLs. Results shall be examined, and any positive results shall be examined. Positive blank results may not be subtracted from sample results.

  Positive results may be acceptable if sample analyte concentrations are significantly greater than the amount reported in the blank (ten times for laboratory reagents such as methylene chloride, chloroform, and acetone etc., and five times for all other analytes). Alternatively, the laboratory PQL may be raised to accommodate blank anomalies provided that regulatory guidelines are not compromised by any adjustment made to the PQL.

Decision Error Protocol

If the data received is not in accordance with the defined acceptable limits outlined in Steps 5 and 6, it may be considered to be an estimate or be rejected. Determination of whether this data may be used or if re-sampling is required will be based on the following considerations:

- Closeness of the result to the guideline concentrations
- Specific contaminant of concern (e.g. response to carcinogens may be more conservative)
- The area of site and the potential lateral and vertical extent of questionable information
- Whether the uncertainty can be effectively incorporated into site management controls

Rectifying Non-conformances

If any of the validation procedures or criteria identified are not followed or met, this will constitute a non-conformance. The significance of the non-conformance will determine if rectification is required after discussion with the site auditor. In order to address any non-conformances, the Principal's Environmental Representative must assess the significance of each non-conformance and put their conclusion and recommendation to the auditor for approval.

14.1.7 Step 7: Optimise the Design for Obtaining Data

All validation samples are to be collected in accordance with the DQOs outlined in this Section.

Validation samples, frequency of collection, the analysis required, and justification is presented in **Table 14-6**.

Table 14-6: Validation Plan

Validation Method	Validation Requirements	Measurement / Analyses
Validation of remnant soils	fpXRF measurements onsite demonstrating lead in excavation surface soils is < 2200 mg/kg. fpXRF measurements at the immobilsiation compound deomnstrating the 95% UCL of lead concentrations in remnant surface soils is below either the Tier 1 health investigation level for lead industrial land or the 95% UCL of lead concentrations in remnant surface soils before establishing the compound. Measurements will occur to achieve a density of 1/100 m^2 across the base of excavation areas on 10 meter icnrements along excavation walls. Measurements will occur to achieve a density of 1/100 m^2 across the immobilisation compound. Validation sampling has occurred in areas where excavation of lead impacted soils occurred during loop extension. Analytical results will be provided in the validation report though were observed to fall below site assessment criteria. Excavation for rail loop construction was followed by importation and placemnet of rail construction materials. Further validation is not considered warranted though would also not be feasible without disturbing active rail formation. Review of material tracking demonstrating appropriate and controlled movement of lead impacted materials. Lead impacted soils will remain in onsite following remediation and will be managed under a long term EMP.	fpXRF measurements of lead supplemented by laboratory QC samples and existing primary laboratory analyses.
Validation of screened ballast and immobilised fines	Screened ballast will be considered suitable for reuse if the 95% UCL of lead concentrations in screened ballast after remediation is less than the Industrial Health Investigation Level for lead of 1,500 mg/kg (NEPC 2013). Ballast fines will be considered suitable for disposal as immobilised GSW if the 95% UCL of lead leachate (TCLP) is less than the limit for lead leachate in GSW defined in the NSW EPA Waste Classification Guidelines (TCLP1 – 5 mg/L). Validation sampling of screened ballast and immobilised fines stockpiles will be completed by the Principals environmental representative. Sampling will occur to achieve a density of 1/25 m^3 with a minimum of three samples.	Laboratory analyses of screened ballast for total lead and immobilised fines for lead leachate (TCLP).

Surface water monitoring	One round of surfae water monitoring is proposed post remediation. Risks from site contamination within the downstream receiving environment will be considered acceptable when metals concentrations from surface water samples collected at locations presented on **Figure 3**, **Appendix 1** are below criteria nominated in **Section 14.1.6** or where contaminant concentrations upstream and downstream are comparable.	Laboratory analyses of total and dissolved metals (Al, As, Ba, Be, Cd, Cr, Cu, Fe, Pb, Mg, Hg, Ni, Zn)
Air quality monitoring	Three months of air quality monitoring are proposed post remediation. Risks from site contamination in airborne dust within the surrounding environment will be considered acceptable when lead in samples from airborne and/or deposited dust collected at locations presented on **Figure 3**, **Appendix 1** are below criteria nominated in **Section 14.1.6**.	Laboratory analyses for lead, TSP and deposited dust.

14.1.7.1 Validation Reporting

A validation Report will be prepared in general accordance with the relevant sections of NSW OEH (2020) *Guidelines for Consultants Reporting on Contaminated Land* and the NSW EPA *Guidelines for the NSW Site Auditor Scheme 3rd Edition* (NSW EPA 2017). The Validation Report will include:

- Executive summary
- Scope of work
- Site Description
- Summary of site history and previous investigations
- Remediation activities undertaken, including the extent of the excavation works (survey information) and observations made during excavation works
- Supporting factual evidence of the remediation work including photographic and field records and materials tracking data
- Validation sampling and analysis results
- Quality assurance/ quality control (QA/QC) protocols for field work and laboratory analysis and
- A statement indicating the adequacy of the remediation completed, degree to which lead impacts have been removed and if / where impacts remain.

14.1.7.2 Long Term Environmental Management Plan

A long term EMP will be prepared to define the location of remnant contamination and management measures required to mitigate risks associated with future disturbance of these areas. The Long Term EMP will be prepared in accordance with *Consultants Reporting on Contaminated Land – Contaminated Land Guidelines* (NSW EPA 2020) and will include:

- Purpose
- Background
- Definition of remnant contamination integrating survey data presented on site plans
- Management activities
- Monitoring and inspection requirements
- Triggers for review of the LTEMP
- Mechanism for enforceability

15. CONCLUSIONS

The preferred remedial strategy includes offsite disposal of ballast fines from the Woodlawn Siding and adjacent surface soils. Ballast will be mechanically screened for reuse onsite. Impacted soils will be excavated. Ballast fines and soils will be transported off site to a compound established at a licensed waste facility and chemically immobilised for disposal as General Solid Waste in accordance with a NSW EPA Specific Immobilisation Approval.

Contaminated ballast will remain within operational rail formations and at depth around the footprint of the former Ore Concentrate Loadout Complex buildings. Remnant contamination will be managed under a long term environmental management plan (LTEMP).

The effectiveness of remediation at mitigating exposure risks associated with site contamination in the receiving environment will be assessed through post remediation surface water and air quality monitoring.

It is anticipated that the proposed remedial strategy will appropriately mitigate risks associated with site contamination and that the LTEMP will effective manage risk from residual contamination.

16. LIMITATIONS

Ramboll Australia Pty Ltd (Ramboll) prepared this report in accordance with its engagement with John Holland Rail and in accordance with our understanding and interpretation of current regulatory standards.

A representative program of sampling and laboratory analyses was undertaken to assess site contamination, based on past and present known uses of the site. While every care has been taken, concentrations of contaminants measured may not be representative of conditions between the locations sampled and investigated. We cannot therefore preclude the presence of materials that may be hazardous. Site conditions may change over time. This report is based on conditions encountered at the Site at the time of the report and Ramboll disclaims responsibility for any changes that may have occurred after this time.

The conclusions presented in this report represent Ramboll's professional judgment based on information made available during the course of this assignment and are true and correct to the best of Ramboll's knowledge as at the date of the assessment.

Ramboll did not independently verify all of the written or oral information provided to Ramboll during the course of this investigation. While Ramboll has no reason to doubt the accuracy of the information provided to it, the report is complete and accurate only to the extent that the information provided to Ramboll was itself complete and accurate.

This report does not purport to give legal advice. This advice can only be given by qualified legal advisors.

16.1 User Reliance

This report has been prepared exclusively for John Holland Rail and may not be relied upon by any other person or entity without Ramboll's express written permission.

17. REFERENCES

ANZECC. (2000). *Australia and New Zealand Environment and Conservation Council, Guidelines for Fresh and Marine Water Quality.*

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Ramboll (2019c) *Tarago Crossing Loop Extension Short-Term Lead Management Plan*

Ramboll (2019d) *Tarago Loop Extension Preliminary Human Health Risk Assessment*

Ramboll (2019e) *Tarago Rail Corridor Environmental Site Assessment*

Ramboll (2019f) *Tarago Loop Extension: Interim Lead Management Plan*

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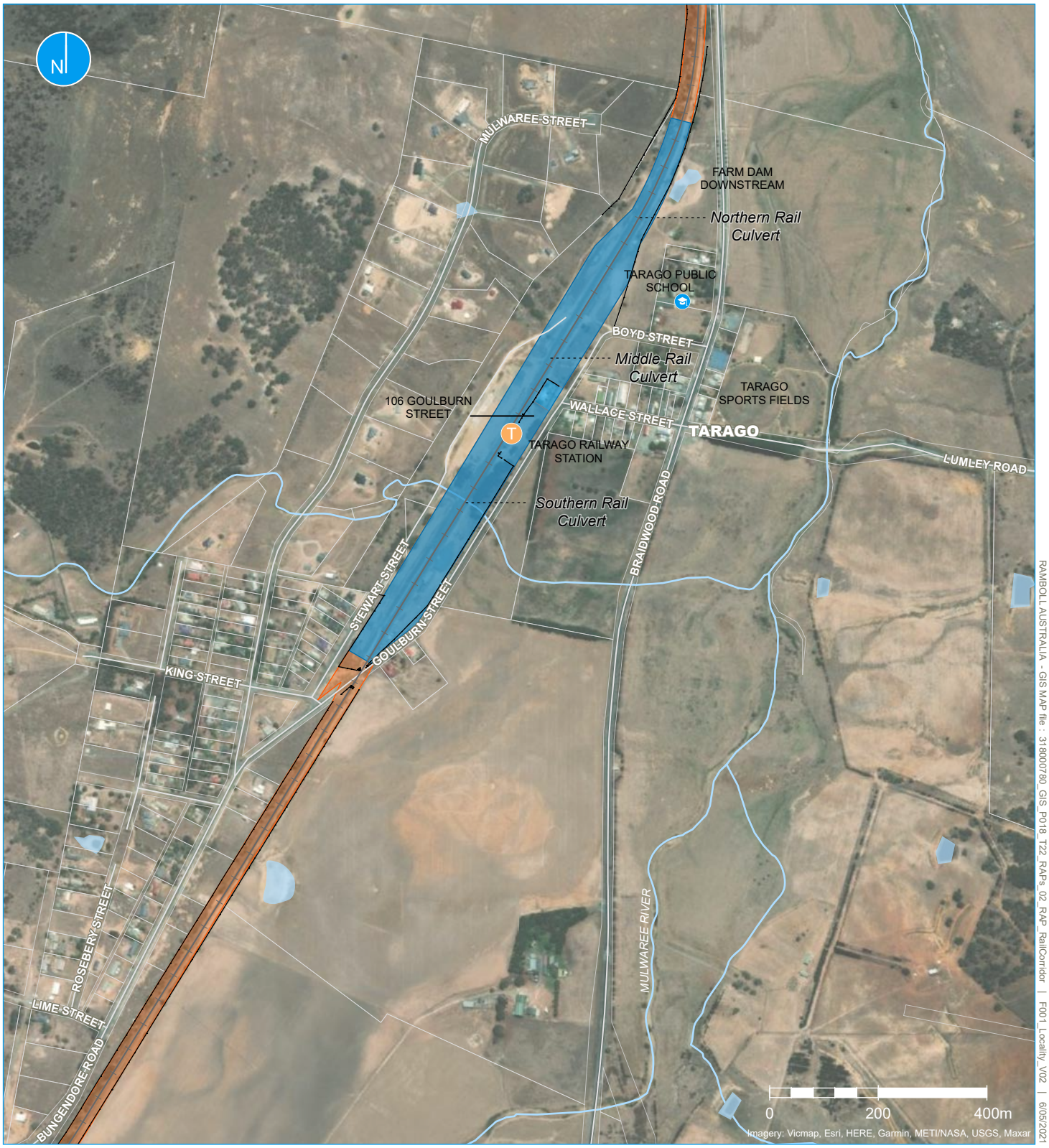
APPENDIX 1
FIGURES



RAMBOLL AUSTRALIA - GIS MAP file : 318000780_GIS_P018_T22_RAPs_02_RAP_RailCorridor | F001_Locality_V02 | 6/05/2021

A4
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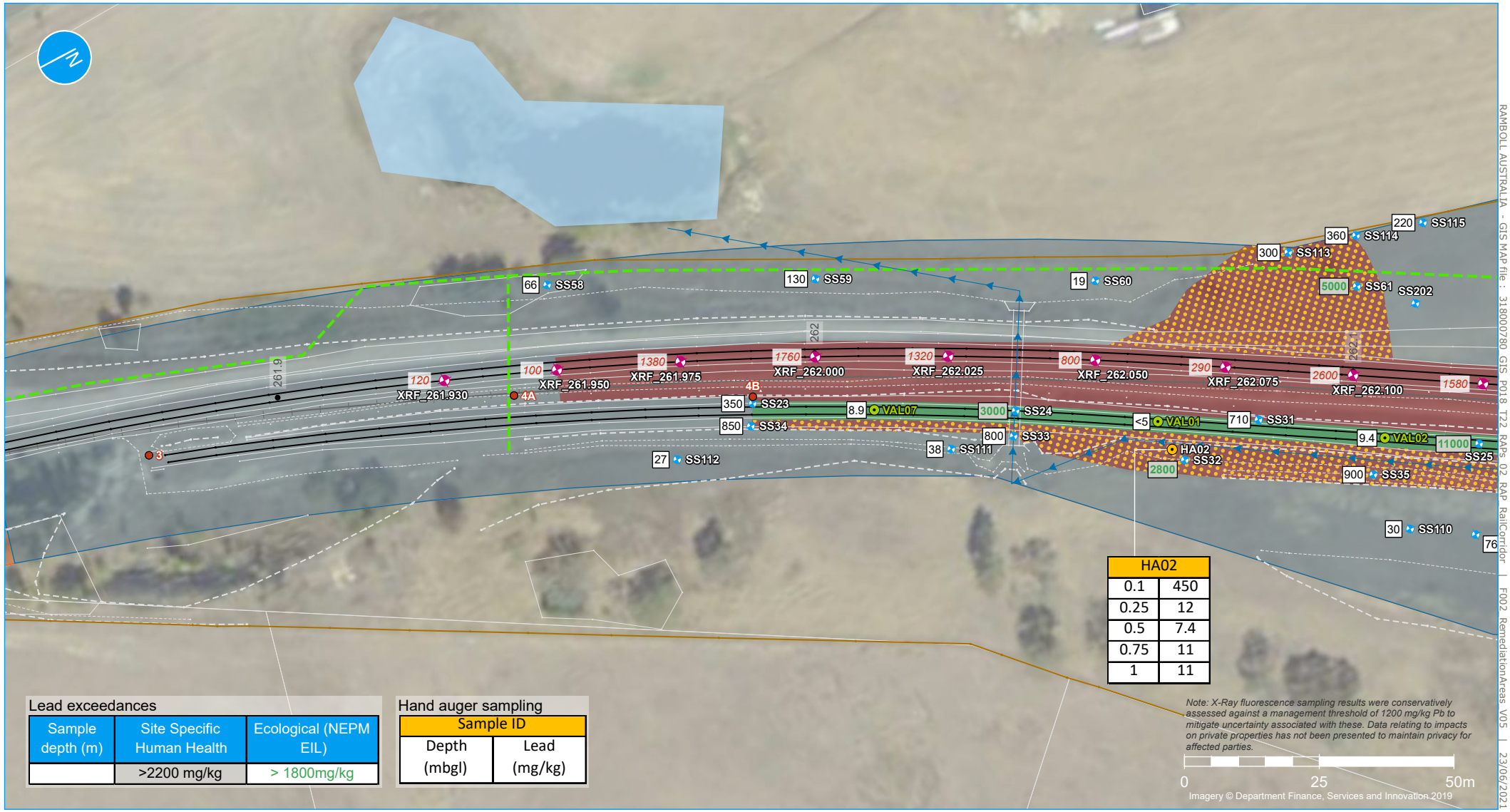
Legend

- Site boundary
- Rail corridor
- Rail corridor fence

Figure 1 | Locality Plan



Legend

- Site boundary
- Rail corridor fence
- 0.1km chainage point
- Signal trench (approximate)
- Surface water flow (indicative)

Survey lines

- Rail track
- Top of bank
- Bottom of bank
- Other elements

- X-Ray fluorescence sampling (Ramboll 2019, 2020)
- Previous sampling location (McMahon)
- Shallow soil (Ramboll 2019)
- Hand auger (Ramboll 2019)
- 1200 Lead concentration for XRF sample (mg/kg)
- Validation sample (Ramboll 2019)

- Lead impacted area to remain
- Lead impacted area surrounding the siding (excluding all rail formation) - proposed excavation depth 0.3 mbgl
- Area of excavation during loop extension (no further excavation proposed)

A4
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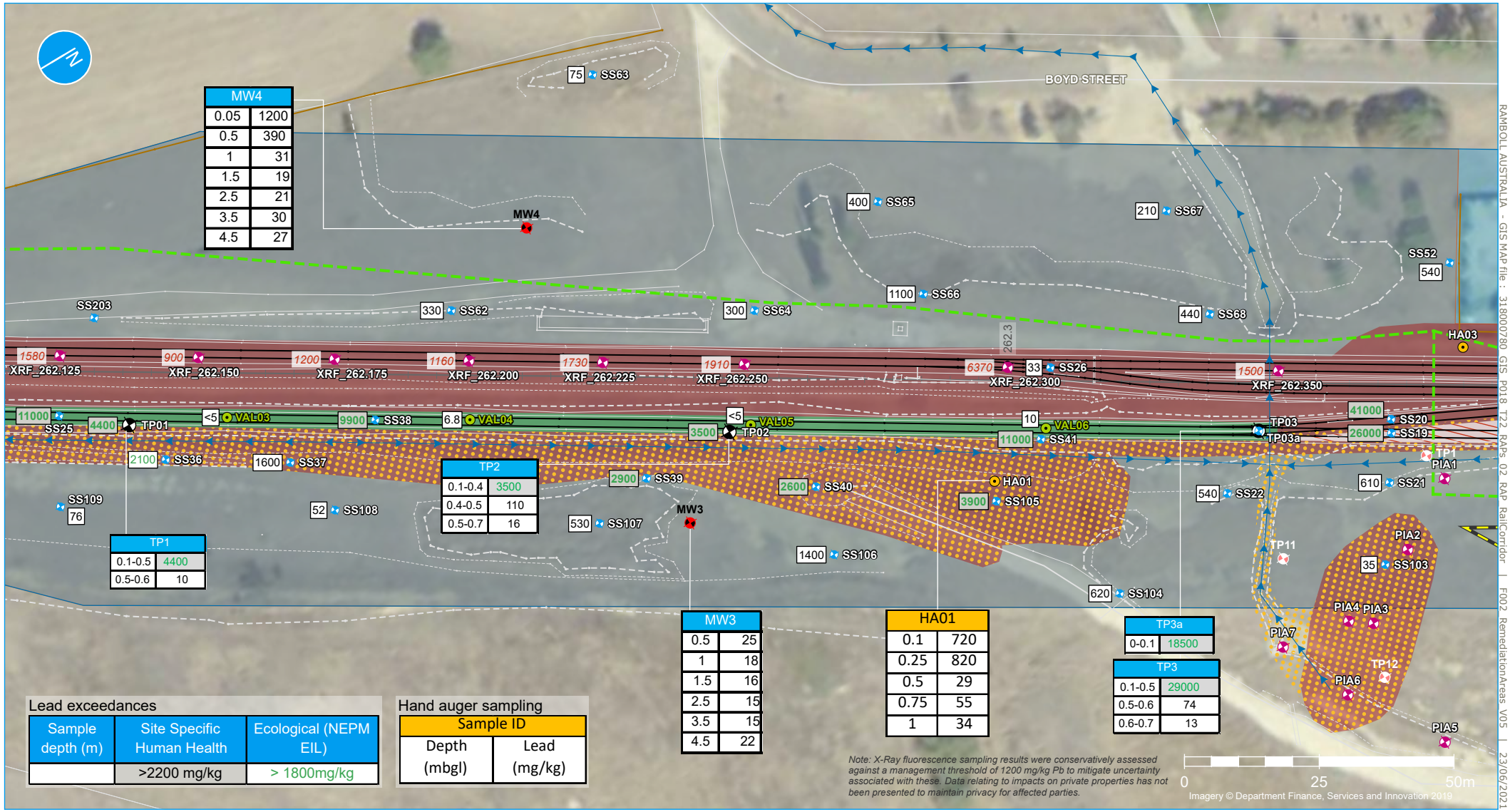
Figure 2a | Site Plan



RAMBOLL AUSTRALIA - GIS MAP file : 318000780 GIS P018 T22 RAPs 02 RAP RailCorridor | F002 RemediationAreas V05 | 23/06/2021

Legend

- Site boundary
- Rail corridor fence
- 0.1km chainage point
- Signal trench (approximate)
- Surface water flow (indicative)
- Former loadout road (approximate)

Survey lines
- Rail track
- Top of bank
- Bottom of bank
- Other elements

- X-Ray fluorescence sampling (Ramboll 2019, 2020)
- Shallow soil (Ramboll 2019)
- Test pit (Ramboll 2019)
- Hand auger (Ramboll 2019)
- 1200 Lead concentration for XRF sample (mg/kg)
- Validation sample (Ramboll 2019)
- Groundwater monitoring location
- Test pit (loadout complex)

- Lead impacted area to remain
- Redundant Woodlawn siding - propopsed excavation depth 0.5 mbgl
- Lead impacted area surrounding the siding (excluding all rail formation) - proposed excavation depth 0.3 mbgl
- Area of excavation during loop extension (no further excavation proposed)

A4
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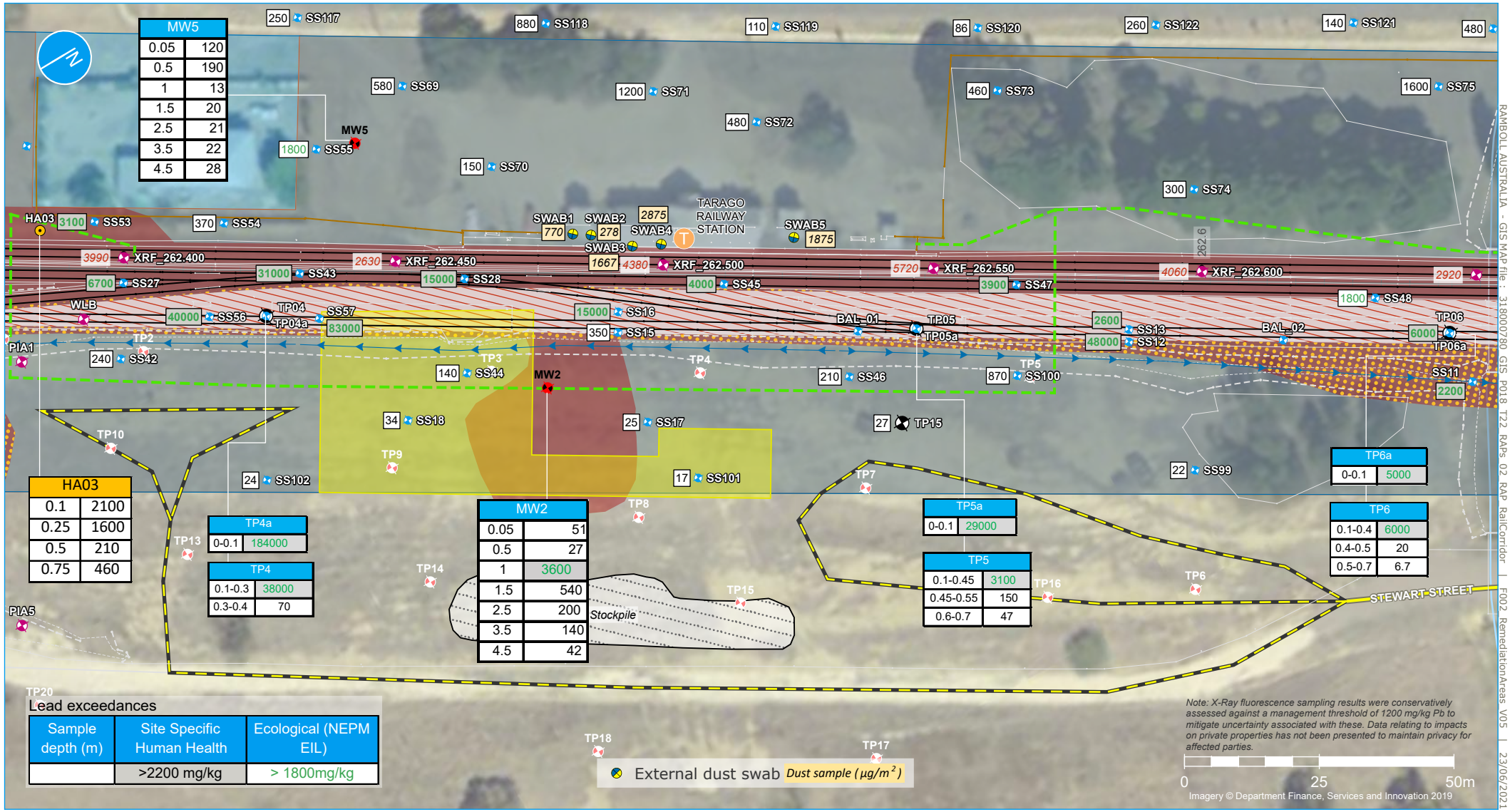
Location

Figure 2b | Site Plan



Legend

- Site boundary
- Rail corridor fence
- 0.1km chainage point
- Signal trench (approximate)
- Surface water flow (indicative)
- Former loadout road (approximate)
- Former loadout complex building footprint

Survey lines
- Rail track
- Top of bank
- Bottom of bank
- Other elements

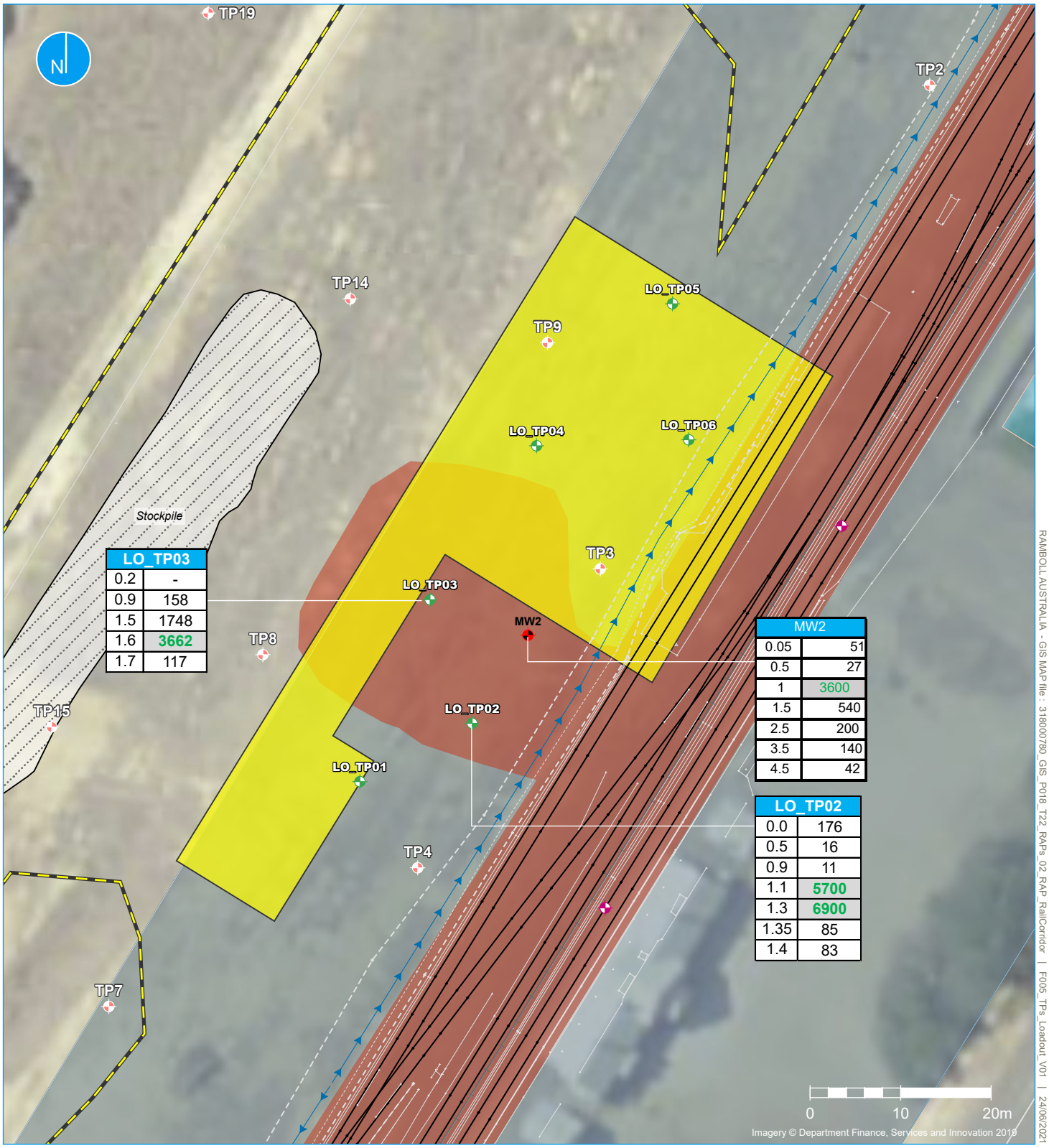
- X-Ray fluorescence sampling (Ramboll 2019, 2020)
- Shallow soil (Ramboll 2019)
- Test pit (Ramboll 2019)
- Hand auger (Ramboll 2019)
- 1200 Lead concentration for XRF sample (mg/kg)
- Groundwater monitoring location
- Test pit (loadout complex)

- Lead impacted area to remain
- Redundant Woodlawn siding - propopsed excavation depth 0.5 mbgl
- Lead impacted area surrounding the siding (excluding all rail formation) - proposed excavation depth 0.3 mbgl
- Haul route

A4 1:1,000

Location

Figure 2c | Site Plan



RAMBOLL AUSTRALIA - GIS MAP file : 318000780_GIS_P018_T22_RAPs_02_RAP_RailCorridor | F005_TPs_Loadout_V01 | 24/06/2021

A4
1:600

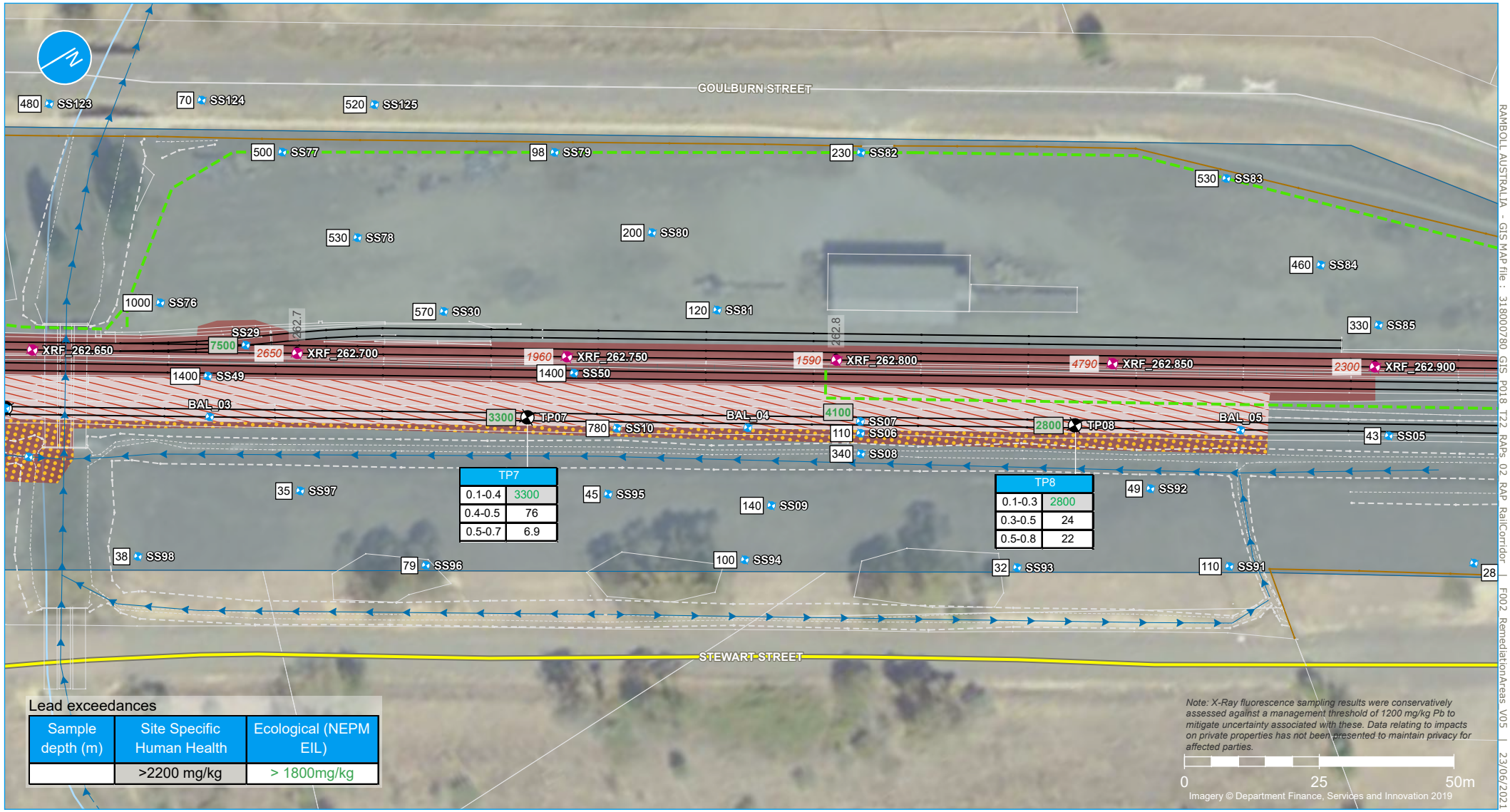
Legend

- Former loadout complex building footprint
- Former loadout road (approximate)
- Site boundary
- Surface water flow (indicative)
- Lead impacted area
- Loadout complex testpit (March 2020)
- Loadout complex testpit (August 2020)
- Groundwater monitoring location

Lead exceedance criteria

Sample depth (m)	Site Specific Human Health	EIL Commercial/Ind. (NEPM 2013)
	>2200 mg/kg	>1800 mg/kg

Figure 2ci | Loadout complex sampling locations



Legend

- Site boundary
- Rail corridor fence
- 0.1km chainage point
- Signal trench (approximate)
- Surface water flow (indicative)

Survey lines

- Rail track
- Top of bank
- Bottom of bank
- Other elements

- X-Ray fluorescence sampling (Ramboll 2019, 2020)
- Shallow soil (Ramboll 2019)
- Test pit (Ramboll 2019)
- 1200 Lead concentration for XRF sample (mg/kg)

- Lead impacted area to remain
- Redundant Woodlawn siding - propopsed excavation depth 0.5 mbgl
- Lead impacted area surrounding the siding (excluding all rail formation) - proposed excavation depth 0.3 mbgl
- Haul route

A4
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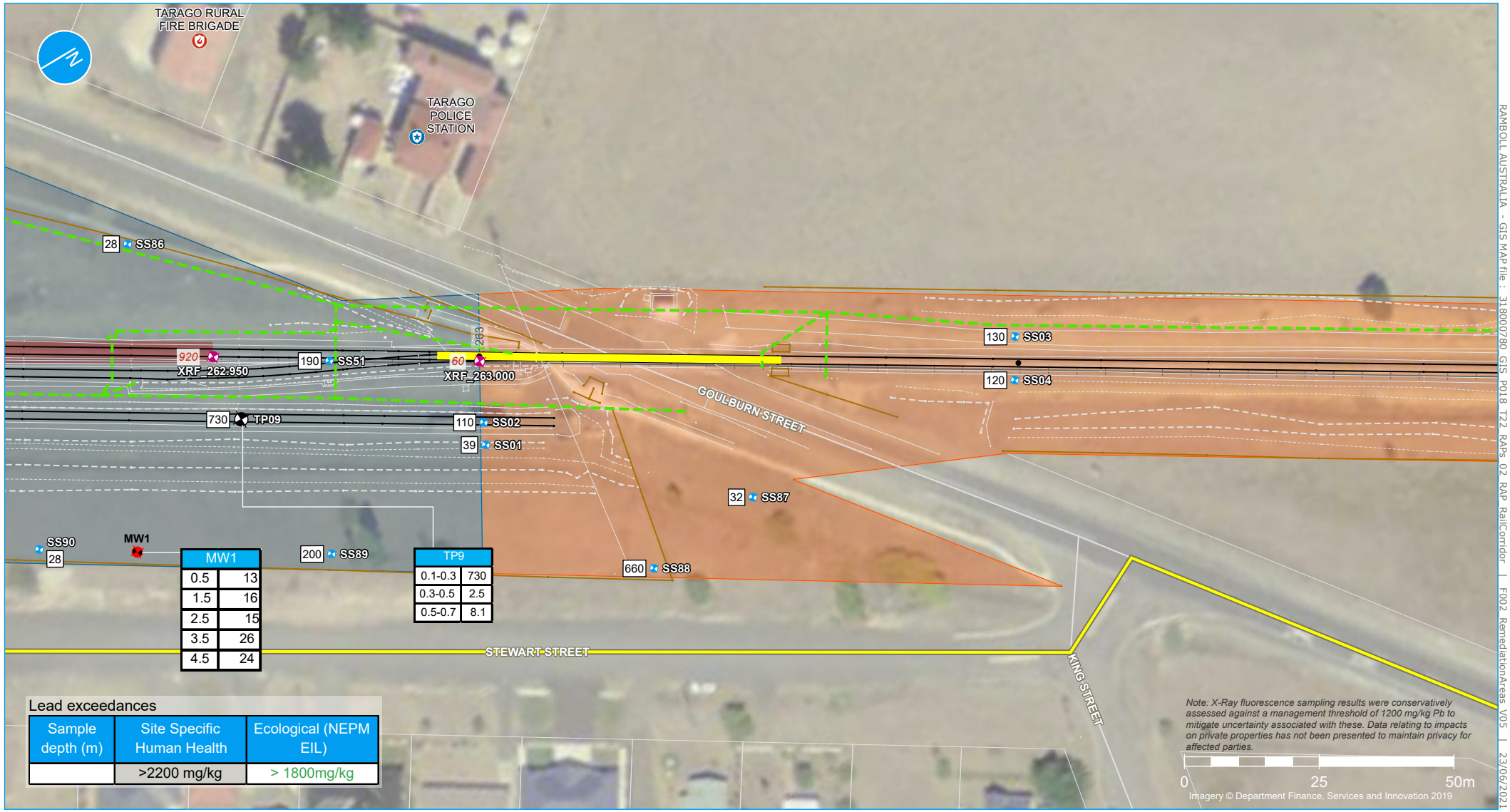
Location

Figure 2d | Site Plan



Legend

- Site boundary
- Rail corridor fence
- 0.1km chainage point
- Goulburn Street level crossing
- Signal trench (approximate)
- Surface water flow (indicative)

Survey lines

- Rail track
- Top of bank
- Bottom of bank
- Other elements

- X-Ray fluorescence sampling (Ramboll 2019, 2020)
- Shallow soil (Ramboll 2019)
- Test pit (Ramboll 2019)
- 1200 Lead concentration for XRF sample (mg/kg)
- Groundwater monitoring location

- Lead impacted area to remain
- Haul route

A4
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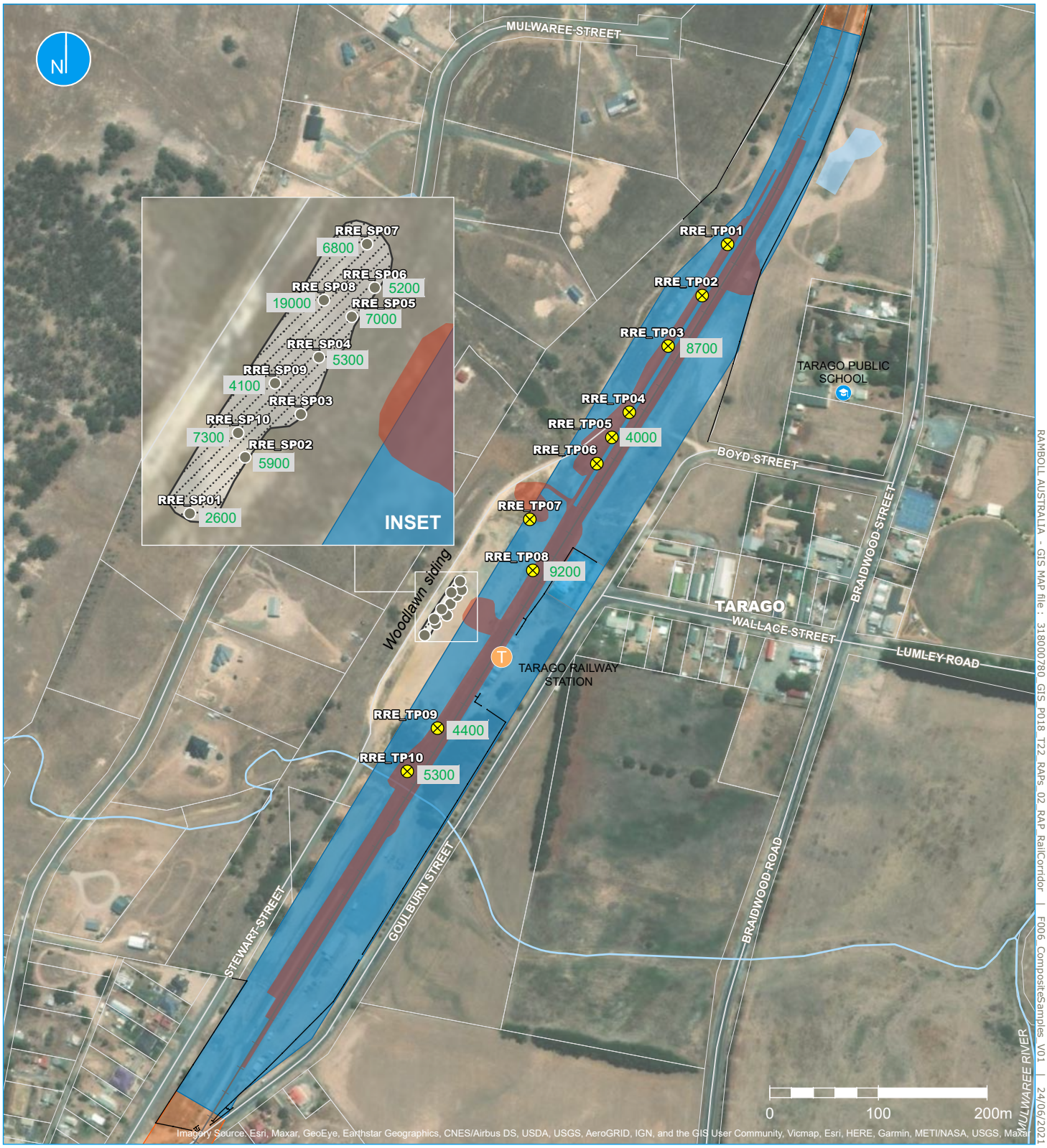
Figure 2e | Site Plan



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Legend

- Site boundary
- Rail corridor
- Rail corridor fence
- Lead impacted area
- Stockpile (JHR)

Composite sampling (Ramboll 2020)

- Stockpile sample
- Test pit
- 400 Lead (mg/kg)

Figure 3 | Soil Sampling for the Resource Recovery Exemption

RAMBOLL AUSTRALIA - GIS MAP file : 31800780_GIS_P018_T22_RAPs_02_RAP_RailCorridor | F007_GWcontours_V01 | 24/06/2021

Legend

- Groundwater monitoring location
- Site boundary
- Rail corridor
- Rail corridor fence
- Lead impacted area

Groundwater contours

- 1m contour
- 0.25m contour
- 0.05m contour

Note: MW1 has been excluded from contouring as groundwater is likely to be influenced by the nearby tributary to the Mulwaree River.

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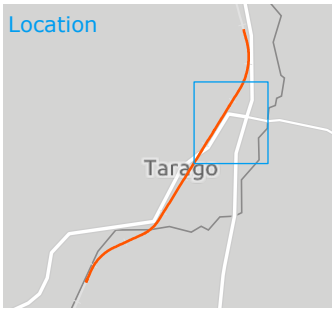
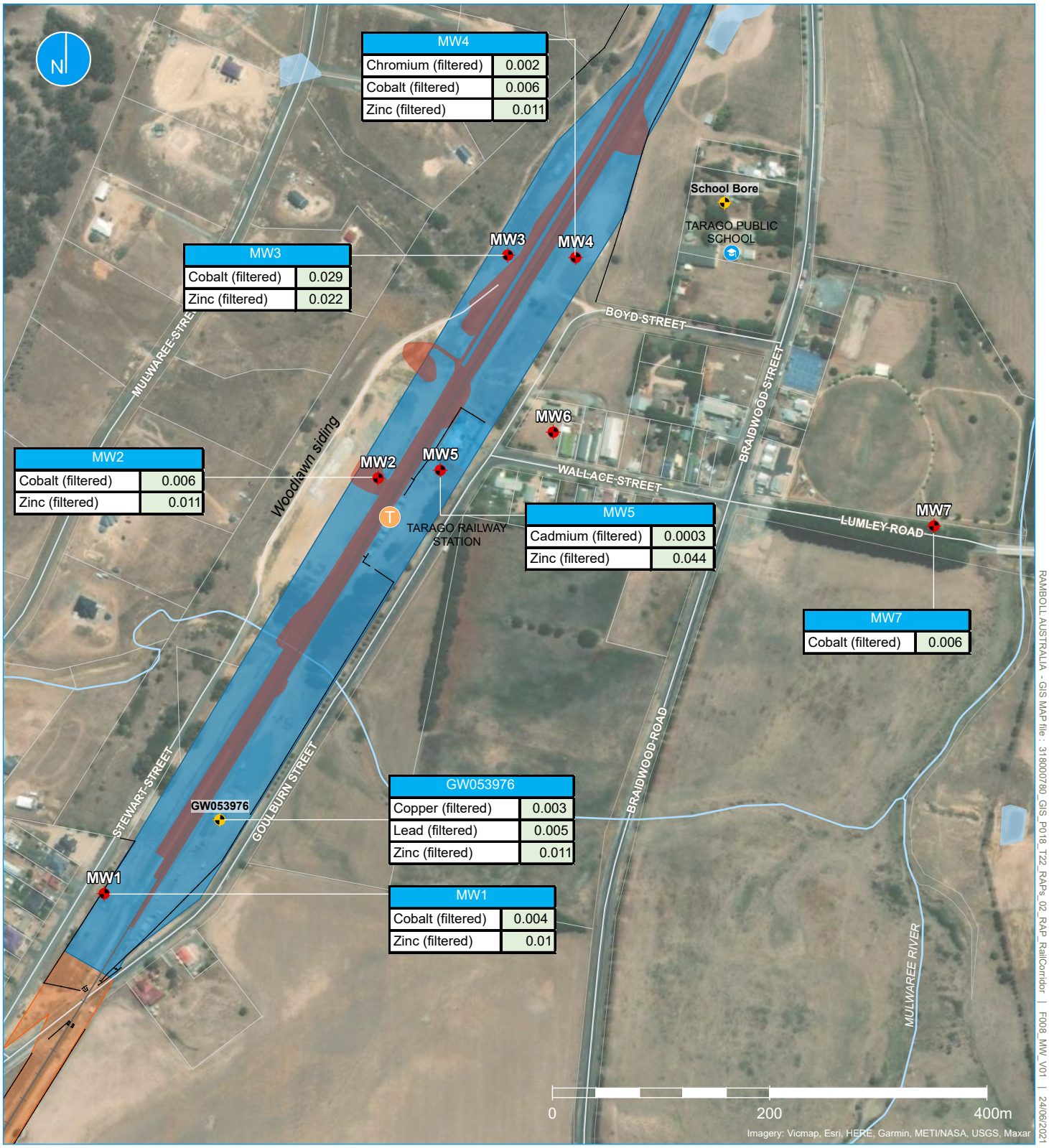


Figure 4 | Groundwater contours



RAMBOLL AUSTRALIA - GIS MAP file : 318000780_GIS_P018_T22_RAPs_02_RAP_RailCorridor | F008_MW_V01 | 24/06/2021

Legend

- Groundwater monitoring location
- Groundwater monitoring location (registered, approximate location)
- Site boundary
- Rail corridor
- Rail corridor fence
- Lead impacted area

Exceedances

Contaminant (mg/L)	> ANZG 2018 Freshwater Ecosystems
Cadmium (filtered)	0.0002
Chromium (filtered)	0.001
Cobalt (filtered)	0.0014
Lead (filtered)	0.0034
Zinc (filtered)	0.008

A4
1:5,000

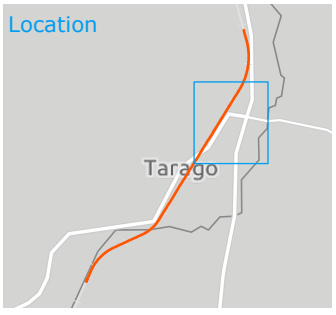


Figure 5 | Groundwater monitoring well locations

RAMBOLL AUSTRALIA - GIS MAP file - 318000780_GIS_P018_T22_RAPs_02_RAP_RailCorridor | F003_SurfaceWaterSamples_V03 | 24/06/2021

A4
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Legend

- Surface water sampling location
- Rail corridor
- Rail corridor fence
- Lead impacted area
- Indicative surface water flow path (ie: not ephemeral)
- Indicative ephemeral surface water flow path

Figure 6 | Surface Water Monitoring

A4
1:5,000

Legend

- Site boundary
- Rail corridor
- Rail corridor fence
- Lead impacted area

Sampling locations

- Deposited dust and lead (from dust deposition guage)
- TSP and lead (from high volume air samper)
- Continuous PM10 and PM2.5 (from particle counter)
- Regional meteorological monitoring from DPIE Air quality monitoring station (see location inset)

Figure 7 | Air quality monitoring locations

APPENDIX 2
HISTORIC RESULTS REMEDIAL OPTION COST ASSESSMENT

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Lead Management
22-06-21

Table 1:
Summary of EIL Inputs

		SS94	SS95	SS101	SS112	D03_230919	Average
	Units						
Cation exchange capacity	cmol/kg	15	15	10	15	9	12.8
pH (calcium chloride method)	pH Units	5.9	5.4	5.2	4.7	4.9	5.22
Organic carbon content	%	2.2	2.5	0.8	1.3	2.1	1.78
Iron content (aqua regia method)	%	1.1	0.76	0.88	1.4	1.1	1.048
% clay	%	13	13	8.5	18	7.5	12
Measured background concentration							
Copper	mg/kg	-	-	6.9	-	-	-
Nickel	mg/kg	-	-	2.5	-	-	-
Chromium	mg/kg	-	-	7.2	-	-	-
Zinc	mg/kg	-	-	31	-	-	-

Sourced from *Tarago Rail Corridor and Tarago Area Detailed Site Investigation* (Ramboll 2020a).

Underlined values were reported <LOR and have been halved to allow for comparison of data.

SS101 selected for background due to low concentrations.

Table 2:
Soil Sampling Results - Asbestos, metals, PAH, TRH, BTEXN

	NEPM 2013 HIL D Commercial / Industrial	NEPM 2013 ESLCommercial / Industrial [B]	NEPM 2013 Management Limits Commercial/ Industrial [C]	CRC CARE 2011 Direct Contact[D] HSL D	CRC CARE 2011 Direct Contact[D]HSL for Intrusive Maintenance Workers	CRC CARE 2011 Vapour Intrusion HSL for Intrusive Maintenance Workers Sand 0-<2m[A]	NEPC EIL Commercial / Industrial (site specific)	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
								ALS Sample number:		S19-JI39840	S19-JI39841	S19-JI39842	S19-JI39843	S19-JI39844	S19-JI39845	S19-JI39846	S19-JI39847	S19-JI39848	S19-JI39849	S19-JI39850	S19-JI39851	S19-Se36992	S19-Se36993	S19-Se36994	S19-Se36995
								Sample date:		26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	22-09-19	22-09-19	22-09-19	22-09-19
								Sample ID:		TP4 0.1-0.3	TP5 0.1-0.45	TP6 0.1-0.4	TP7 0.1-0.4	TP8 0.1-0.3	TP9 0.1-0.3	TP10 0.2	TP11 0.1	TP12 0.1	TP13 0.1	TP14 0.1	TP16 0.1	SS52	SS53	SS54	SS55
								Project Name:		Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop Lead Management	Tarago Loop Lead Management	Tarago Loop Lead Management	Tarago Loop Lead Management
								Sampling Method:		Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit				
								Sample Description																	
Analyte grouping/Analyte								**Units**	**LOR**																
EA055: Moisture Content																									
Moisture Content (dried @ 103°C)								%	--	3	3.7	2.4	< 1	1.1	21	9.1	10	9.4	11	2.3	7.3	8	2.5	14	17
EA200: AS 4964 - 2004 Identification of Asbestos in Soils																									
Asbestos Detected								g/kg	0.1	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Asbestos Type								--	--	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sample weight (dry)								g	0.1	594	540	65	247	430	259	59	53	68	51	66	751	853	1120	937	574
Description								--	--	Brown fine-grained soil and rocks	Brown fine-grained soil and rocks	Brown fine-grained soil and rocks	Brown fine-grained soil and rocks	Brown fine-grained soil and rocks	Brown fine-grained soil and rocks	Brown fine-grained soil and rocks	Brown fine-grained soil and rocks	Brown fine-grained soil and rocks	Brown fine-grained soil and rocks	Brown fine-grained soil and rocks	Brown fine-grained soil and rocks	Brown coarse-grained soil and rocks	Brown coarse-grained soil, rocks and bitumous material	Brown coarse-grained soil, rocks and bitumous material	Brown coarse-grained soil, rcoks and organic debris
EG005T: Total Metals by ICP-AES																									
Arsenic	3000						160	mg/kg	2	47	13	11	5.8	23	8.6	6.1	6.6	1	9.6	1	2.1	25	150	19	32
Cadmium	900							mg/kg	0.4	3.3	1.1	1	0.7	1.6	1	0.2	0.2	0.2	2.1	0.2	0.2	5.6	8.1	0.2	12
Chromium	3600						710	mg/kg	5	25	7.4	7.6	2.5	11	6.8	2.5	29	2.5	8.7	2.5	2.5	12	15	9	13
Copper	240000						160	mg/kg	5	950	180	190	62	150	91	2.5	9.9	2.5	21	2.5	2.5	220	660	95	320
Lead	2200[E]						1800	mg/kg	5	38,000	3,100	6,000	3,300	2800	730	18	43	11	39	6.4	10	540	3100	370	1800
Nickel	6000						340	mg/kg	5	8.8	2.5	2.5	2.5	5.7	2.5	2.5	5.9	2.5	2.5	2.5	2.5	2.5	11	2.5	6.6
Zinc	400000						370	mg/kg	5	940	320	350	130	320	200	17	81	15	300	14	12	770	1300	47	1500
EG035T: Total Recoverable Mercury by FIMS																									
Mercury	730							mg/kg	0.1	0.4	0.1	0.05	0.05	0.05	0.05	0.05	0.05	0.3	0.05	0.05	0.05	0.05	0.6	0.05	0.2
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons																									
Naphthalene				11000	29000	NL	370	mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Acenaphthylene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Acenaphthene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Fluorene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Phenanthrene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Anthracene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Fluoranthene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.6
Pyrene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.7	0.5	0.25	0.5
Benz(a)anthracene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.7	0.6	0.25	0.6
Chrysene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Benzo(b+j)fluoranthene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Benzo(k)fluoranthene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Benzo(a)pyrene		172						mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.7	0.6	0.25	0.6
Indeno(1.2.3.cd)pyrene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.6	0.25	0.25	0.6
Dibenz(a.h)anthracene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Benzo(g.h.i)perylene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.6	0.25	0.25	0.5
Sum of polycyclic aromatic hydrocarbons	4000							mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	3.3	1.7	0.25	3.4
Benzo(a)pyrene TEQ (zero)								mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.8	0.7	0.25	0.7
Benzo(a)pyrene TEQ (half LOR)								mg/kg	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	1.1	1	0.6	1
Benzo(a)pyrene TEQ (LOR)	40							mg/kg	0.5	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.4	1.3	1.2	1.3
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions																									
C6 - C10 Fraction			700	26000	82000	NL		mg/kg	20	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
C6 - C10 Fraction minus BTEX (F1)		215						mg/kg	20	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
>C10 - C16 Fraction			1000	20000	62000	NL		mg/kg	50	25	25	25	92	25	25	25	25	25	25	25	25	25	25	25	25
>C16 - C34 Fraction (F3)		1700	3500	27000	85000			mg/kg	100	50	140	50	220	50	50	50	50	50	50	150	50	130	300	50	220
>C34 - C40 Fraction (F4)		3300	10000	38000	120000			mg/kg	100	50	50	50	120	50	50	50	50	50	50	50	50	50	130	50	50
>C10 - C40 Fraction (sum)								mg/kg	100	50	140	50	432	50	50	50	50	50	50	150	50	130	430	50	220
>C10 - C16 Fraction minus Naphthalene (F2)		170						mg/kg	50	25	25	25	92	25	25	25	25	25	25	25	25	25	25	25	25
EP080: BTEXN																									
Benzene		75		430	1100	77		mg/kg	0.1	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Toluene		135		99000	120000	NL		mg/kg	0.1	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Ethylbenzene		165		27000	85000	NL		mg/kg	0.1	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
meta- & para-Xylene								mg/kg	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
ortho-Xylene								mg/kg	0.1	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Total Xylenes		95		81000	130000	NL		mg/kg	0.3	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Naphthalene				11000	29000	NL	370	mg/kg	1	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25

Sourced from *Tarago Rail Corridor and Tarago Area Detailed Site Investigation* (Ramboll 2020a).

Blank Cell indicates no criterion available

LOR = Limit of Reporting

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

CRC Care Technical Report no.10, *Health Screening Levels for petroleum hydrocarbons in soil and groundwater* September 2011

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[B] The most conservative ESL guideline value has been adopted for all analytes

[C] Management limits are applied after consideration of relevant ESLs and HSLs. Separate management limits for BTEX and naphthalene are not available hence these should not be subtracted from the relevant fractions to obtain F1 and F2.

[D] Direct Contact are applied to surface soils or soils that could result in immediate contact.

[E] Human Health Guideline for Lead adopted from the Human Health Risk Assessment (Ramboll 2019d)

NL = Non Limiting. No HSL is presented for these chemicals as a soil vapour source concentration for a petroleum mixture could not exceed a level that would result in the maximum allowable vapour risk for the given scenario.

Health Investigation Levels for chromium based on chromium (VI)

Chromium (III) EIL, based on a low clay content (% clay) of 1%

Nickel EIL, based on CEC of 5cmol/kg

Copper EIL, based on CEC of 5cmol/kg

Zinc EIL, based on slightly acidic soil pH of 4.0 and CEC of 5cmol/kg

To obtain F1 subtract the sum of BTEX concentrations from the C6-C10 fraction.

To obtain F2 subtract naphthalene from the >C10-C16 fraction.

Benzo(a)Pyrene ESL derived ecological guideline (95% confidence limits) based on CRC CARE Technical Report no. 39 Risk-based remediation and management guidance for benzo(a)pyrene developed using a species sensitivity distribution (SSD) for eco-toxicity data from five independent studies involving one soil bacteria, three soil invertebrate taxa and four plant taxa (13 endpoints) in preference to NEPM low reliability data.

Concentration in **red** font and grey box exceed the adopted HIL/HSL 'D' for Commercial/Industrial

Concentration in **orange** font and grey box exceed the adopted EIL/ESL 'D' for Commercial/Industrial use

Concentrations in box exceed the screening value >2.5 times

Where one or more guideline value is exceeded, the highest guideline exceeded will be highlighted

Underlined values were reported <LOR and have been halved to allow for comparison of data.

Table 2:
Soil Sampling Results - Asbestos, metals, PAH, TRH, BTEXN

	NEPM 2013 HIL D Commercial / Industrial	NEPM 2013 ESLCommercial / Industrial [B]	NEPM 2013 Management Limits Commercial/ Industrial [C]	CRC CARE 2011 Direct Contact[D] HSL D	CRC CARE 2011 Direct Contact[D]HSL for Intrusive Maintenance Workers	CRC CARE 2011 Vapour Intrusion HSL for Intrusive Maintenance Workers Sand 0-<2m[A]	NEPC EIL Commercial / Industrial (site specific)	Sample Type:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
								ALS Sample number:	S19-Se37002	S19-Se37007	S19-Se37010	S19-Se37012	S19-Se37016	S19-Se37018	S19-Se37036	S19-Se37039	S19-Se37043	S19-Se37046	S19-Se37049	S19-Se37051	S19-Se37052	S19-Se37054
								Sample date:	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19
								Sample ID:	SS58	SS63	SS66	SS68	SS72	SS74	SS92	SS95	SS99	SS102	SS105	SS107	SS108	SS110
								Project Name:	Tarago Loop Lead Management	Tarago Loop Lead Management	Tarago Loop Lead Management	Tarago Loop Lead Management	Tarago Loop Lead Management	Tarago Loop Lead Management	Tarago Loop Lead Management	Tarago Loop Lead Management	Tarago Loop Lead Management	Tarago Loop Lead Management	Tarago Loop Lead Management	Tarago Loop Lead Management	Tarago Loop Lead Management	Tarago Loop Lead Management
								Sampling Method:														
								Sample Description														
Analyte grouping/Analyte								**Units**	**LOR**													
EA055: Moisture Content																						
Moisture Content (dried @ 103°C)								%	--	7.1	9.4	15	12	6.7	11	8.7	14	11	3.5	13	24	9.4	11
EA200: AS 4964 - 2004 Identification of Asbestos in Soils																						
Asbestos Detected								g/kg	0.1	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Asbestos Type								--	--	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sample weight (dry)								g	0.1	735	652	690	701	892	742	776	649	823	1006	892	588	673	521
Description								--	--	Brown coarse-grained soil, rocks and organic debris	Brown coarse-grained soil, rocks and bitumous material	Brown coarse-grained soil, rocks and organic debris	Brown coarse-grained soil, rocks and plaster-like material	Brown coarse-grained soil, rocks and cement fragments	Brown coarse-grained soil and rocks	Brown coarse-grained soil and rocks	Brown coarse-grained soil and rocks	Brown coarse-grained soil and rocks	Brown coarse-grained soil and rocks	Brown coarse-grained soil and rocks	Brown coarse-grained soil and rocks	Brown coarse-grained soil and rocks	Brown coarse-grained soil and rocks
EG005T: Total Metals by ICP-AES																						
Arsenic	3000						160	mg/kg	2	3.7	5.4	20	12	15	15	2.9	2.4	3.1	6.2	65	11	4.9	13
Cadmium	900							mg/kg	0.4	0.8	1.6	14	7.4	2.3	6.6	0.8	0.7	0.2	0.2	4.3	3.2	0.9	0.2
Chromium	3600						710	mg/kg	5	7.2	2.5	57	8.2	22	14	8.6	8.3	7.3	9.3	27	13	11	36
Copper	240000						160	mg/kg	5	26	44	700	240	85	76	16	20	8.9	11	750	480	20	14
Lead	2200^						1800	mg/kg	5	66	75	1100	440	480	300	49	45	22	24	3900	530	52	30
Nickel	6000						340	mg/kg	5	2.5	2.5	17	5.4	5.3	8.9	8.4	2.5	2.5	2.5	9.2	6.4	2.5	5.9
Zinc	400000						370	mg/kg	5	210	180	1600	650	320	1300	130	120	38	42	780	350	170	27
EG035T: Total Recoverable Mercury by FIMS																						
Mercury	730							mg/kg	0.1	0.05	0.05	0.05	0.05	0.05	0.6	0.05	0.05	0.05	0.05	0.2	0.05	0.05	0.05
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons																						
Naphthalene				11000	29000	NL	370	mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Acenaphthylene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Acenaphthene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Fluorene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Phenanthrene								mg/kg	0.5	0.25	0.25	0.25	0.25	1.3	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Anthracene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Fluoranthene								mg/kg	0.5	0.25	0.25	0.25	0.25	1.2	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Pyrene								mg/kg	0.5	0.25	0.25	0.25	0.25	1	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Benz(a)anthracene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.7	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Chrysene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Benzo(b+j)fluoranthene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Benzo(k)fluoranthene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Benzo(a)pyrene		172						mg/kg	0.5	0.25	0.25	0.25	0.25	0.7	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Indeno(1.2.3.cd)pyrene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.6	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Dibenz(a.h)anthracene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Benzo(g.h.i)perylene								mg/kg	0.5	0.25	0.25	0.25	0.25	0.5	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Sum of polycyclic aromatic hydrocarbons	4000							mg/kg	0.5	0.25	0.25	0.25	0.25	6	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Benzo(a)pyrene TEQ (zero)								mg/kg	0.5	0.25	0.25	0.25	0.25	0.8	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Benzo(a)pyrene TEQ (half LOR)								mg/kg	0.5	0.6	0.6	0.6	0.6	1.1	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (LOR)	40							mg/kg	0.5	1.2	1.2	1.2	1.2	1.4	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions																						
C6 - C10 Fraction			700	26000	82000	NL		mg/kg	20	10	10	10	10	10	10	10	10	10	10	10	10	10	10
C6 - C10 Fraction minus BTEX (F1)		215						mg/kg	20	10	10	10	10	10	10	10	10	10	10	10	10	10	10
>C10 - C16 Fraction			1000	20000	62000	NL		mg/kg	50	25	25	25	25	25	25	25	25	25	25	56	25	25	25
>C16 - C34 Fraction (F3)		1700	3500	27000	85000			mg/kg	100	150	130	160	140	140	250	50	50	50	50	310	50	50	50
>C34 - C40 Fraction (F4)		3300	10000	38000	120000			mg/kg	100	50	50	50	50	50	100	50	50	50	50	140	50	50	50
>C10 - C40 Fraction (sum)								mg/kg	100	150	130	160	140	140	350	50	50	50	50	506	50	50	50
>C10 - C16 Fraction minus Naphthalene (F2)		170						mg/kg	50	25	25	25	25	25	25	25	25	25	25	56	25	25	25
EP080: BTEXN																						
Benzene		75		430	1100	77		mg/kg	0.1	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Toluene		135		99000	120000	NL		mg/kg	0.1	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Ethylbenzene		165		27000	85000	NL		mg/kg	0.1	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
meta- & para-Xylene								mg/kg	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
ortho-Xylene								mg/kg	0.1	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Total Xylenes		95		81000	130000	NL		mg/kg	0.3	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Naphthalene				11000	29000	NL	370	mg/kg	1	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25

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Concentration in **red** font and grey box exceed the adopted HIL/HSL 'D' for Commercial/Industrial

Concentration in **orange** font and grey box exceed the adopted EIL/ESL 'D' for Commercial/Industrial use

Concentrations in box exceed the screening value >2.5 times

Where one or more guideline value is exceeded, the highest guideline exceeded will be highlighted

Underlined values were reported <LOR and have been halved to allow for comparison of data.

Table 3:
Soil Sampling Results - OCP, OPP, PCB

		Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Sediment	Sediment	Sediment	Sediment
		Site:		Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor
	NEPM 2013 HIL D Commercial Industrial	Lab Sample number:		S20-Jn50651	S20-Jn50652	S20-Jn50653	S20-Jn50654	S20-Jn50656	S20-Jn50657	S20-Jn50658	S20-Jn50647	S20-Jn50648	S20-Jn50649	S20-Jn50650
		Sample date:		29-06-20	29-06-20	29-06-20	29-06-20	18-03-20	19-03-20	19-03-20	01-04-20	01-04-20	01-04-20	01-04-20
		Sample ID:		TP3A	TP4A	TP5A	TP6A	MW2_0-0.05	MW4_0-0.05	MW5_0-0.05	SED2	SED3	SED4	SED6
		Project Name:		DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum
		Sampling Method:		Direct	Direct	Direct	Direct	Auger	Auger	Auger	Push Tube	Push Tube	Push Tube	Push Tube
Analyte grouping/Analyte		**Units**	**LOR**											
Organochlorine Pesticides														
4.4'-DDD		mg/kg	0.05	< 0.05	< 0.05	< 0.05	o	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
4.4'-DDE		mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
4.4'-DDT		mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
a-BHC		mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aldrin		mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
*Aldrin and Dieldrin (Total)**	45	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
b-BHC		mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Chlordanes - Total	530	mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
d-BHC		mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
*DDT + DDE + DDD (Total)**	3600	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dieldrin		mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan I		mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan II		mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan sulphate	2000	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Endrin	100	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Endrin aldehyde		mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Endrin ketone		mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
g-BHC (Lindane)		mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor	50	mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor epoxide		mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Hexachlorobenzene		mg/kg	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Methoxychlor	2500	mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.05	< 0.05	< 0.05	< 0.2	< 0.2	< 0.2	< 0.2
Toxaphene		mg/kg	1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
*Vic EPA IWRG 621 OCP (Total)**		mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.1	< 0.1	< 0.1	< 0.2	< 0.2	< 0.2	< 0.2
*Vic EPA IWRG 621 Other OCP (Total)**		mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.1	< 0.1	< 0.1	< 0.2	< 0.2	< 0.2	< 0.2
Organophosphorus Pesticides														
Azinphos-methyl		mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Bolstar		mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chlorfenvinphos		mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chlorpyrifos	2000	mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chlorpyrifos-methyl		mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Coumaphos		mg/kg	2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Demeton-O		mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Demeton-S		mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Diazinon		mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dichlorvos		mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dimethoate		mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Disulfoton		mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
EPN		mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Ethion		mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Ethoprop		mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Ethyl parathion		mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Fenitrothion		mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Fensulfothion		mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Fenthion		mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Malathion		mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Merphos		mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5	< 0.5	< 0.5
Methyl parathion		mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Mevinphos		mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Monocrotophos		mg/kg	2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Naled		mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.5	< 0.5	< 0.5	< 0.5
Omethoate		mg/kg	2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Phorate		mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Pirimiphos-methyl		mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Pyrazophos		mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Ronnel		mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Terbufos		mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Tetrachlorvinphos		mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Tokuthion		mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Trichloronate		mg/kg	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Polychlorinated Biphenyls														
Aroclor-1016		mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 0.1	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5
Aroclor-1221		mg/kg	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aroclor-1232		mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 0.1	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5
Aroclor-1242		mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 0.1	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5
Aroclor-1248		mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 0.1	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5
Aroclor-1254		mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	< 0.1	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5
Aroclor-1260		mg/kg	0.5	< 0.5	< 1	< 0.5	< 0.5	< 0.1	< 0.1	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5
Total PCB*		mg/kg	0.5	< 0.5	< 1	< 0.5	< 0.5	< 0.1	< 0.1	< 0.1	< 0.5	< 0.5	< 0.5	< 0.5

Sourced from *Tarago Rail Corridor and Tarago Area Detailed Site Investigation Addendum* (2020b)

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

[A] For soil texture classification undertaken in accord with AS 1726, the classifications of sand, silt and clay may be applied as coarse, fine with liquid limit <50% and fine with liquid limit>50% respectively, as the underlying properties to develop the HSLs may reasonably be selected to be similar. Where there is uncertainty, either a conservative approach may be adopted or laboratory analysis should be carried out.

Health Investigation Levels for chromium based on chromium (VI)

Concentrations in *italics* have been moisture adjusted

Concentrations in green box exceed the adopted EIL 'C' for Urban Residential and Open Public Space

Concentration in **bold red font** exceed the adopted HIL/HSL 'C' for Open Space and Recreational Land Use

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Lead Management
22-06-21

Table 4:
Soil Results - Lead

	HHRA (Ramboll 2019d)	NEPM 2013 EIL Commercial / Industrial	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil
			Laboratory Sample number:		S19-Jl39891	S19-Jl39892	S19-Jl39893	S19-Jl39894	S19-Jl39895	Report 677385
			Sample date:		26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	16-09-19
			Sample ID:		TP1 0.1-0.5	TP1 0.5-0.6	TP2 0.1-0.4	TP2 0.4-0.5	TP2 0.5-0.7	TP3a 0-0.1
			Site:		Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop
			Sampling Method:		Test pit	Test pit	Test pit	Test pit	Test pit	Test pit
Analyte grouping/Analyte				**Units**	**LOR**					
EG005T: Total Metals by ICP-AES										
Lead	2,200	1,800		mg/kg	5	**4,400**	10	**3,500**	110	16	**18,500**

Sourced from *Tarago Rail Corridor and Tarago Area Detailed Site Investigation* (Ramboll 2020a).

Blank Cell indicates no criterion available

LOR = Limit of Reporting

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

Concentration in **red** font and grey box exceed the adopted Human Health Guideline for Commercial/Industrial (Ramboll 2019d)

Concentration in **orange** font and grey box exceed the adopted EIL 'D' for Commercial/Industrial use

Concentrations in box exceed the screening value >2.5 times

Where one or more guideline value is exceeded, the highest guideline exceeded will be highlighted

* indicates higher duplicate value adopted

Underlined values were reported <LOR and have been halved to allow for comparison of data.

Concentrations at TP3a, TP4a, TP5a, SS12, SS20 and SS29 are reported based on 250um fractions separated and analysed to inform bio-accessibility analyses completed as part of HHRA (Ramboll 2019c)

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Lead Management
22-06-21

Table 4:
Soil Results - Lead

	HHRA (Ramboll 2019d)	NEPM 2013 EIL Commercial / Industrial		Sample Type:	Soil	Soil	Soil	Soil	Soil	Soil
				Laboratory Sample number	S19-Jl39896	S19-Jl39897	S19-Jl39898	Report 677385	S19-Jl39899	S19-Jl39900
				Sample date:	26/07/19	26/07/19	26/07/19	16-09-19	26/07/19	26/07/19
				Sample ID:	TP3 0.1-0.5	TP3 0.5-0.6	TP3 0.6-0.7	TP4a 0-0.1	TP4 0.1-0.3	TP4 0.3-0.4
				Site:	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop
				Sampling Method:	Test pit	Test pit	Test pit	Test pit	Test pit	Test pit
Analyte grouping/Analyte				**Units**	**LOR**					
EG005T: Total Metals by ICP-AES										
Lead	2,200	1,800		mg/kg	5	**29,000**	74	13	**184,000**	**38,000**	70

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Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Lead Management
22-06-21

Table 4:
Soil Results - Lead

	HHRA (Ramboll 2019d)	NEPM 2013 EIL Commercial / Industrial	Sample Type:	Soil	Soil	Soil	Soil	Soil	Soil
			Laboratory Sample number:	Report 677385	S19-Jl39901	S19-Jl39902	S19-Jl39903	S19-Jl39904	S19-Jl39905
			Sample date:	16-09-19	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19
			Sample ID:	TP5a 0-0.1	TP5 0.1-0.45	TP5 0.45-0.55	TP5 0.6-0.7	TP6 0.1-0.4	TP6 0.4-0.5
			Site:	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop
			Sampling Method:	Test pit	Test pit	Test pit	Test pit	Test pit	Test pit
Analyte grouping/Analyte			**Units**	**LOR**					
EG005T: Total Metals by ICP-AES									
Lead	2,200	1,800	mg/kg	5	**29,000**	**3,100**	150	47	**6,000**	20

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Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Lead Management
22-06-21

Table 4:
Soil Results - Lead

	HHRA (Ramboll 2019d)	NEPM 2013 EIL Commercial / Industrial	Sample Type:	Soil	Soil	Soil	Soil	Soil	Soil
			Laboratory Sample number	S19-Jl39906	S19-Jl39907	S19-Jl39908	S19-Jl39909	S19-Jl39910	S19-Jl39911
			Sample date:	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19
			Sample ID:	TP6 0.5-0.7	TP7 0.1-0.4	TP7 0.4-0.5	TP7 0.5-0.7	TP8 0.1-0.3	TP8 0.3-0.5
			Site:	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop
			Sampling Method:	Test pit	Test pit	Test pit	Test pit	Test pit	Test pit
Analyte grouping/Analyte			**Units**	**LOR**					
EG005T: Total Metals by ICP-AES									
Lead	2,200	1,800	mg/kg	5	7	**3,300**	76	7	**2,800**	24

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Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Lead Management
22-06-21

Table 4:
Soil Results - Lead

	HHRA (Ramboll 2019d)	NEPM 2013 EIL Commercial / Industrial		Sample Type:	Soil	Soil	Soil	Soil	Soil	Soil
				Laboratory Sample number	S19-Jl39912	S19-Jl39845	S19-Jl39914	S19-Jl39915	S19-Jl39846	S19-Jl39847
				Sample date:	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19
				Sample ID:	TP8 0.5-0.8	TP9 0.1-0.3	TP9 0.3-0.5	TP9 0.5-0.7	TP10 0.2	TP11 0.1
				Site:	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop
				Sampling Method:	Test pit	Test pit	Test pit	Test pit	Test pit	Test pit
Analyte grouping/Analyte				**Units**	**LOR**					
EG005T: Total Metals by ICP-AES										
Lead	2,200	1,800		mg/kg	5	22	730	2.50	8	18	43

Sourced from *Tarago Rail Corridor and Tarago Area Detailed Site Investigation* (Ramboll 2020a).

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Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Lead Management
22-06-21

Table 4:
Soil Results - Lead

	HHRA (Ramboll 2019d)	NEPM 2013 EIL Commercial / Industrial		Sample Type:	Soil	Soil	Soil	Soil	Soil	Soil
				Laboratory Sample number	S19-Jl39848	S19-Jl39849	S19-Jl39850	S19-Jl39918	S19-Jl39919	S19-Jl39851
				Sample date:	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19
				Sample ID:	TP12 0.1	TP13 0.1	TP14 0.1	TP15 0.1	TP15 0.8	TP16 0.1
				Site:	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop
				Sampling Method:	Test pit	Test pit	Test pit	Test pit	Test pit	Test pit
Analyte grouping/Analyte				**Units**	**LOR**					
EG005T: Total Metals by ICP-AES										
Lead	2,200	1,800		mg/kg	5	11	39	6.4	27	26	10

Sourced from *Tarago Rail Corridor and Tarago Area Detailed Site Investigation* (Ramboll 2020a).

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Project Name: Tarago Lead Management
22-06-21

Table 4:
Soil Results - Lead

	HHRA (Ramboll 2019d)	NEPM 2013 EIL Commercial / Industrial		Sample Type:	Soil	Soil	Soil	Soil	Soil	Soil
				Laboratory Sample number	S19-Jl39920	S19-Jl39921	S19-Jl39922	S19-Jl39923	S19-Jl39924	S19-Jl39925
				Sample date:	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19
				Sample ID:	SS1 0.0-0.1	SS2 0.0-0.1	SS3 0.0-0.1	SS4 0.0-0.1	SS5 0.0-0.1	SS6 0.0-0.1
				Site:	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop
				Sampling Method:	Test pit	Test pit	Test pit	Test pit	Test pit	Test pit
Analyte grouping/Analyte				**Units**	**LOR**					
EG005T: Total Metals by ICP-AES										
Lead	2,200	1,800		mg/kg	5	39	110	130	120	43	110

Sourced from *Tarago Rail Corridor and Tarago Area Detailed Site Investigation* (Ramboll 2020a).

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Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Lead Management
22-06-21

Table 4:
Soil Results - Lead

	HHRA (Ramboll 2019d)	NEPM 2013 EIL Commercial / Industrial		Sample Type:	Soil	Soil	Soil	Soil	Soil	Soil
				Laboratory Sample number	S19-Jl39926	S19-Jl39927	S19-Jl39928	S19-Jl39929	S19-Jl39930	Report 67385
				Sample date:	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19
				Sample ID:	SS7 0.0-0.1	SS8 0.0-0.1	SS9 0.0-0.1	SS10 0.0-0.1	SS11 0.0-0.1	SS12 0.0-0.1
				Site:	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop
				Sampling Method:	Test pit	Test pit	Test pit	Test pit	Test pit	Test pit
Analyte grouping/Analyte				**Units**	**LOR**					
EG005T: Total Metals by ICP-AES										
Lead	2,200	1,800		mg/kg	5	**4,100**	340	140	780	**2,200**	**48,000**

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Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Lead Management
22-06-21

Table 4:
Soil Results - Lead

	HHRA (Ramboll 2019d)	NEPM 2013 EIL Commercial / Industrial		Sample Type:	Soil	Soil	Soil	Soil	Soil	Soil
				Laboratory Sample number	S19-JI39932	S19-JI39933	S19-JI39934	S19-JI39935	S19-JI39997	S19-JI39998
				Sample date:	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19	26/07/19
				Sample ID:	SS13 0.0-0.1	SS14 0.0-0.1	SS15 0.0-0.1	SS16 0.0-0.1	SS17_0.0-0.1	SS18_0.0-0.1
				Site:	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop
				Sampling Method:	Test pit	Test pit	Test pit	Test pit	Shallow Soil	Shallow Soil
Analyte grouping/Analyte				**Units**	**LOR**					
EG005T: Total Metals by ICP-AES										
Lead	2,200	1,800		mg/kg	5	**2,600**	31	350	**15,000**	25	34

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Job No: 318000780
Project Name: Tarago Lead Management
22-06-21

Table 4:
Soil Results - Lead

	HHRA (Ramboll 2019d)	NEPM 2013 EIL Commercial / Industrial		Sample Type:	Soil	Soil	Soil	Soil	Soil	Soil
				Laboratory Sample number	S19-Jl39999	Report 67385	S19-Jl40001	S19-Jl40002	S19-Au17274	S19-Au17275
				Sample date:	26/07/19	26/07/19	26/07/19	26/07/19	12-08-19	12-08-19
				Sample ID:	SS19_0.0-0.1	SS20_0.0-0.1	SS21	SS22	SS23	SS24
				Site:	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop
				Sampling Method:	Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil
Analyte grouping/Analyte				**Units**	**LOR**					
EG005T: Total Metals by ICP-AES										
Lead	2,200	1,800		mg/kg	5	**26,000**	**41,000**	610	540	350	**3,000**

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Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Lead Management
22-06-21

Table 4:
Soil Results - Lead

	HHRA (Ramboll 2019d)	NEPM 2013 EIL Commercial / Industrial		Sample Type:	Soil	Soil	Soil	Soil	Soil	Soil
				Laboratory Sample number	S19-Au17276	S19-Au17277	S19-Au17278	S19-Au17279	Report 67385	S19-Au17281
				Sample date:	12-08-19	12-08-19	12-08-19	12-08-19	12-08-19	12-08-19
				Sample ID:	SS25	SS26	SS27	SS28	SS29	SS30
				Site:	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop
				Sampling Method:	Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil
Analyte grouping/Analyte				**Units**	**LOR**					
EG005T: Total Metals by ICP-AES										
Lead	2,200	1,800		mg/kg	5	**11,000**	33	**6,700**	**15000***	**7,500**	570*

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Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Lead Management
22-06-21

Table 4:
Soil Results - Lead

	HHRA (Ramboll 2019d)	NEPM 2013 EIL Commercial / Industrial		Sample Type:	Soil	Soil	Soil	Soil	Soil	Soil
				Laboratory Sample number	S19-Au39076	S19-Au39077	S19-Au39078	S19-Au39079	S19-Au39080	S19-Au39075
				Sample date:	27-08-19	27-08-19	27-08-19	27-08-19	27-08-19	27-08-19
				Sample ID:	SS31	SS32	SS33	SS34	SS35	SS36
				Site:	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop
				Sampling Method:	Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil
Analyte grouping/Analyte				**Units**	**LOR**					
EG005T: Total Metals by ICP-AES										
Lead	2,200	1,800		mg/kg	5	710	**2800***	800	850	900	**2,100**

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Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Lead Management
22-06-21

Table 4:
Soil Results - Lead

	HHRA (Ramboll 2019d)	NEPM 2013 EIL Commercial / Industrial	Sample Type:	Soil	Soil	Soil	Soil	Soil	Soil
			Laboratory Sample number	S19-Au39082	S19-Au39083	S19-Au39084	S19-Au39085	S19-Au39086	S19-Au39087
			Sample date:	27-08-19	27-08-19	27-08-19	27-08-19	27-08-19	27-08-19
			Sample ID:	SS37	SS38	SS39	SS40	SS41	SS42
			Site:	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop
			Sampling Method:	Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil
Analyte grouping/Analyte			**Units**	**LOR**					
EG005T: Total Metals by ICP-AES									
Lead	2,200	1,800	mg/kg	5	1,600	**9,900**	**2,900**	**2,600**	**11,000**	240

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Job No: 318000780
Project Name: Tarago Lead Management
22-06-21

Table 4:
Soil Results - Lead

	HHRA (Ramboll 2019d)	NEPM 2013 EIL Commercial / Industrial		Sample Type:	Soil	Soil	Soil	Soil	Soil	Soil
				Laboratory Sample number	S19-Au39088	S19-Au39089	S19-Au39090	S19-Au39091	S19-Au39092	S19-Au39093
				Sample date:	27-08-19	27-08-19	27-08-19	27-08-19	27-08-19	27-08-19
				Sample ID:	SS43	SS44	SS45	SS46	SS47	SS48
				Site:	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop	Tarago Loop
				Sampling Method:	Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil
Analyte grouping/Analyte				**Units**	**LOR**					
EG005T: Total Metals by ICP-AES										
Lead	2,200	1,800		mg/kg	5	**31,000**	140	**4,000**	210	**3,900**	**1,800**

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Job No: 318000780
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22-06-21

Table 4:
Soil Results - Lead

	HHRA (Ramboll 2019d)	NEPM 2013 EIL Commercial / Industrial		Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil
				Laboratory Sample number		S19-Au39094	S19-Au39095	S19-Au39096	S19-Se36992	S19-Se36993	S19-Se36994
				Sample date:		27-08-19	27-08-19	27-08-19	22-09-19	22-09-19	22-09-19
				Sample ID:		SS49	SS50	SS51	SS52	SS53	SS54
				Site:		Tarago Loop	Tarago Loop	Tarago Loop	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor
				Sampling Method:		Shallow Soil	Shallow Soil	Shallow Soil	Discrete	Discrete	Discrete
Analyte grouping/Analyte				**Units**	**LOR**						
EG005T: Total Metals by ICP-AES											
Lead	2,200	1,800		mg/kg	5	1,400	1,400	190	540	**3,100**	370

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Table 4:
Soil Results - Lead

	HHRA (Ramboll 2019d)	NEPM 2013 EIL Commercial / Industrial	Sample Type:	Soil	Soil	Soil	Soil	Soil	Soil
			Laboratory Sample number	S19-Se36995	S19-Se36998	S19-Se37001	S19-Se37002	S19-Se37003	S19-Se37004
			Sample date:	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19
			Sample ID:	SS55	SS56_0.1g	SS57_0.1g	SS58	SS59	SS60
			Site:	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor
			Sampling Method:	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete
Analyte grouping/Analyte			**Units**	**LOR**					
EG005T: Total Metals by ICP-AES									
Lead	2,200	1,800	mg/kg	5	1,800	40,000	83,000	66	130	19

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	HHRA (Ramboll 2019d)	NEPM 2013 EIL Commercial / Industrial	Sample Type:	Soil	Soil	Soil	Soil	Soil	Soil
			Laboratory Sample number	S19-Se37005	S19-Se37006	S19-Se37007	S19-Se37008	S19-Se37009	S19-Se37010
			Sample date:	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19
			Sample ID:	SS61	SS62	SS63	SS64	SS65	SS66
			Site:	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor
			Sampling Method:	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete
Analyte grouping/Analyte			**Units**	**LOR**					
EG005T: Total Metals by ICP-AES									
Lead	2,200	1,800	mg/kg	5	**5,000**	330	75	300	400	1,100

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	HHRA (Ramboll 2019d)	NEPM 2013 EIL Commercial / Industrial	Sample Type:	Soil	Soil	Soil	Soil	Soil	Soil
			Laboratory Sample number	S19-Se37011	S19-Se37012	S19-Se37013	S19-Se37014	S19-Se37015	S19-Se37016
			Sample date:	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19
			Sample ID:	SS67	SS68	SS69	SS70	SS71	SS72
			Site:	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor
			Sampling Method:	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete
Analyte grouping/Analyte			**Units**	**LOR**					
EG005T: Total Metals by ICP-AES									
Lead	2,200	1,800	mg/kg	5	210	440	580	150	1,200	480

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	HHRA (Ramboll 2019d)	NEPM 2013 EIL Commercial / Industrial		Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil
				Laboratory Sample number		S19-Se37017	S19-Se37018	S19-Se37019	S19-Se37020	S19-Se37021	S19-Se37022
				Sample date:		22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19
				Sample ID:		SS73	SS74	SS75	SS76	SS77	SS78
				Site:		Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor
				Sampling Method:		Discrete	Discrete	Discrete	Discrete	Discrete	Discrete
Analyte grouping/Analyte				**Units**	**LOR**						
EG005T: Total Metals by ICP-AES											
Lead	2,200	1,800		mg/kg	5	460	300	1,600	1,000	500	530

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	HHRA (Ramboll 2019d)	NEPM 2013 EIL Commercial / Industrial	Sample Type:	Soil	Soil	Soil	Soil	Soil	Soil
			Laboratory Sample number	S19-Se37023	S19-Se37024	S19-Se37025	S19-Se37026	S19-Se37027	S19-Se37028
			Sample date:	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19
			Sample ID:	SS79	SS80	SS81	SS82	SS83	SS84
			Site:	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor
			Sampling Method:	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete
Analyte grouping/Analyte			**Units**	**LOR**					
EG005T: Total Metals by ICP-AES									
Lead	2,200	1,800	mg/kg	5	98	200	120	230	530	460

Sourced from *Tarago Rail Corridor and Tarago Area Detailed Site Investigation* (Ramboll 2020a).

Blank Cell indicates no criterion available

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

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Concentration in **orange** font and grey box exceed the adopted EIL 'D' for Commercial/Industrial use

Concentrations in box exceed the screening value >2.5 times

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Concentrations at TP3a, TP4a, TP5a, SS12, SS20 and SS29 are reported based on 250um fractions separated and analysed to inform bio-accessibility analyses completed as part of HHRA (Ramboll 2019c)

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Lead Management
22-06-21

Table 4:
Soil Results - Lead

	HHRA (Ramboll 2019d)	NEPM 2013 EIL Commercial / Industrial		Sample Type:	Soil	Soil	Soil	Soil	Soil	Soil
				Laboratory Sample number	S19-Se37029	S19-Se37030	S19-Se37031	S19-Se37032	S19-Se37033	S19-Se37034
				Sample date:	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19
				Sample ID:	SS85	SS86	SS87	SS88	SS89	SS90
				Site:	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor
				Sampling Method:	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete
Analyte grouping/Analyte				**Units**	**LOR**					
EG005T: Total Metals by ICP-AES										
Lead	2,200	1,800		mg/kg	5	330	28	32	660	200	28

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Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Lead Management
22-06-21

Table 4:
Soil Results - Lead

	HHRA (Ramboll 2019d)	NEPM 2013 EIL Commercial / Industrial		Sample Type:	Soil	Soil	Soil	Soil	Soil	Soil
				Laboratory Sample number	S19-Se37035	S19-Se37036	S19-Se37037	S19-Se37038	S19-Se37039	S19-Se37040
				Sample date:	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19
				Sample ID:	SS91	SS92	SS93	SS94	SS95	SS96
				Site:	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor
				Sampling Method:	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete
Analyte grouping/Analyte				**Units**	**LOR**					
EG005T: Total Metals by ICP-AES										
Lead	2,200	1,800		mg/kg	5	110	49	32	100	45	79

Sourced from *Tarago Rail Corridor and Tarago Area Detailed Site Investigation* (Ramboll 2020a).

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Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Lead Management
22-06-21

Table 4:
Soil Results - Lead

	HHRA (Ramboll 2019d)	NEPM 2013 EIL Commercial / Industrial		Sample Type:	Soil	Soil	Soil	Soil	Soil	Soil
				Laboratory Sample number	S19-Se37041	S19-Se37042	S19-Se37043	S19-Se37044	S19-Se37045	S19-Se37046
				Sample date:	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19
				Sample ID:	SS97	SS98	SS99	SS100	SS101	SS102
				Site:	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor
				Sampling Method:	Discrete	Discrete	Discrete	Discrete	Discrete	Discrete
Analyte grouping/Analyte				**Units**	**LOR**					
EG005T: Total Metals by ICP-AES										
Lead	2,200	1,800		mg/kg	5	35	38	22	870	17	24

Sourced from *Tarago Rail Corridor and Tarago Area Detailed Site Investigation* (Ramboll 2020a).

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Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Lead Management
22-06-21

Table 4:
Soil Results - Lead

	HHRA (Ramboll 2019d)	NEPM 2013 EIL Commercial / Industrial		Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil
				Laboratory Sample number		S19-Se37047	S19-Se37048	S19-Se37049	S19-Se37050	S19-Se37051	S19-Se37052
				Sample date:		22-09-19	22-09-19	22-09-19	22-09-19	22-09-19	22-09-19
				Sample ID:		SS103	SS104	SS105	SS106	SS107	SS108
				Site:		Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor
				Sampling Method:		Discrete	Discrete	Discrete	Discrete	Discrete	Discrete
Analyte grouping/Analyte				**Units**	**LOR**						
EG005T: Total Metals by ICP-AES											
Lead	2,200	1,800		mg/kg	5	35	620	**3,900**	1,400	530	52

Sourced from *Tarago Rail Corridor and Tarago Area Detailed Site Investigation* (Ramboll 2020a).

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Concentrations at TP3a, TP4a, TP5a, SS12, SS20 and SS29 are reported based on 250um fractions separated and analysed to inform bio-accessibility analyses completed as part of HHRA (Ramboll 2019c)

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Lead Management
22-06-21

Table 4:
Soil Results - Lead

	HHRA (Ramboll 2019d)	NEPM 2013 EIL Commercial / Industrial		Sample Type:	Soil	Soil	Soil	Soil
				Laboratory Sample number	S19-Se37053	S19-Se37054	S19-Se37145	S19-Se37146
				Sample date:	22-09-19	22-09-19	22-09-19	22-09-19
				Sample ID:	SS109	SS110	SS111	SS112
				Site:	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor	Tarago Rail Corridor
				Sampling Method:	Discrete	Discrete	Discrete	Discrete
Analyte grouping/Analyte				**Units**	**LOR**			
EG005T: Total Metals by ICP-AES								
Lead	2,200	1,800		mg/kg	5	76	30	38	27

Sourced from *Tarago Rail Corridor and Tarago Area Detailed Site Investigation* (Ramboll 2020a).

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Concentrations at TP3a, TP4a, TP5a, SS12, SS20 and SS29 are reported based on 250um fractions separated and analysed to inform bio-accessibility analyses completed as part of HHRA (Ramboll 2019c)

Table 5: Lead Leachate

	Sample Type:		Leachate	Leachate	Leachate	Leachate	Leachate	Leachate
	Sample number:		S19-JI50740	S19-JI50741	S19-JI50742	S19-JI50743	S19-JI50744	S19-JI50745
	Sample date:		26-Jul-19	26-Jul-19	26-Jul-19	26-Jul-19	26-Jul-19	26-Jul-19
	Sample ID:		TP1 0.1-0.5	TP5 0.1-0.45	TP7 0.1-0.4	TP3 0.1-0.5	SS20 0-0.1	TP4 0.1-0.3
	Project Name:		John Holland	John Holland	John Holland	John Holland	John Holland	John Holland
	Compound:							
	Site:		US Leachate	US Leachate	US Leachate	AUS Leachate - Reagent Water	AUS Leachate - Reagent Water	AUS Leachate - Reagent Water
	Sampling Method:		NA	NA	NA	NA	NA	NA
	Sample Description		Leachate	Leachate	Leachate	Leachate	Leachate	Leachate
Analyte grouping/Analyte	**Units**	**LOR**						
Metals TCLP								
Arsenic	mg/L	0.1	--	--	--	--	--	--
Cadmium	mg/L	0.05	--	--	--	--	--	--
Chromium (VI)	mg/L	0.1	--	--	--	--	--	--
Copper	mg/L	0.1	--	--	--	--	--	--
Lead	mg/L	0.1	4.3	32	8.2	1.1	0.03	<0.01
Nickel	mg/L	0.1	--	--	--	--	--	--
Zinc	mg/L	0.1	--	--	--	--	--	--
Mercury	mg/L	0.001	--	--	--	--	--	--

Blank Cell indicates no criterion available
LOR = Limit of Reporting
PFOS/PFOA values adopted from Addendum to the Waste Classification Guidelines (2014) – Part 1: classifying waste, October 2016 (NSW EPA). Noting these values have been based on the enHealth TDI values
Blank cell indicates no screening criterion available
For Limit of Reporting (LOR) refer to laboratory certificates of analysis
--- Indicates sample not analysed
Concentrations below the LOR noted as <value

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Lead Management
22-06-21

Table 6:
Loadout Complex Soil Results

	NEPM 2013 HIL D Commercial / Industrial	NEPM EIL Commercial / Industrial (site specific)	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
			Site:		Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor
			Lab Sample number:		S20-Ap02695	S20-Ap02696	S20-Ap02697	S20-Ap02698	S20-Ap02699	S20-Ap02700	S20-Ap02701	S20-Ap02702	S20-Ap02703	S20-Ap02704
			Sample date:		31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20
			Sample ID:		TP1_0.0-0.1	TP1_0.2-0.3	TP1_1.0-1.1	TP1_1.8-1.9	TP2_0.0-0.1	TP2_0.5-0.6	TP2_1.0-1.1	TP3_0.0-0.1	TP3_0.5-0.6	TP3_0.6-0.7
			Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
			Sampling Method:		Excavator	Excavator	Excavator	Excavator	Excavator	Excavator	Excavator	Excavator	Excavator	Excavator
Analyte grouping/Analyte			**Units**	**LOR**										
LTM-GEN-7080 Moisture														
Moisture Content (dried @ 103°C)			%	--	12	8.1	10	12	8.3	5.9	5.9	7.6	4.2	9.5
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS														
Lead	2200[a]	1800	mg/kg	5	290	490	42	28	140	38	16	29	1100	< 5

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[a] Human Health Guideline for Lead adopted from the Human Health Risk Assessment (Ramboll 2019d)

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Lead Management
22-06-21

Table 6:
Loadout Complex Soil Results

	NEPM 2013 HIL D Commercial / Industrial	NEPM EIL Commercial / Industrial (site specific)	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
			Site:		Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor
			Lab Sample number:		S20-Ap44310	S20-Ap44311	S20-Ap44312	S20-Ap44313	S20-Ap02705	S20-Ap02706	S20-Ap02707	S20-Ap02708	S20-Ap02709	S20-Ap02710
			Sample date:		31-05-20	31-05-20	31-05-20	31-05-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20
			Sample ID:		TP4_0.0-0.1	TP4_0.5-0.6	TP4_1.0-1.1	TP4_1.9-2.0	TP5_0.0-0.1	TP5_0.6-0.7	TP5_1.0-1.1	TP5_1.9-2.0	TP6_0.0-0.1	TP6_0.5-0.6
			Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
			Sampling Method:		Excavator	Excavator	Excavator	Excavator	Excavator	Excavator	Excavator	Excavator	Excavator	Excavator
Analyte grouping/Analyte			**Units**	**LOR**										
LTM-GEN-7080 Moisture														
Moisture Content (dried @ 103°C)			%	--	9.7	8.8	7.3	8	6.5	11	10	14	4.2	17
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS														
Lead	2200[a]	1800	mg/kg	5	380	170	90	29	51	160	28	18	33	16

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			Site:		Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor
			Lab Sample number:		S20-Ap02711	S20-Ap02712	S20-Ap02713	S20-Ap02714	S20-Ap02715	S20-Ap02716	S20-Ap02717	S20-Ap02718	S20-Ap02719	S20-Ap02720
			Sample date:		31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20
			Sample ID:		TP6_1.9-2.0	TP7_0.0-0.1	TP7_0.5-0.6	TP7_1.9-2.0	TP8_0.0-0.1	TP8_0.5-0.6	TP8_1.1-1.2	TP8_1.9-2.0	TP9_0.0-0.1	TP9_0.5-0.6
			Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
			Sampling Method:		Excavator	Excavator	Excavator	Excavator	Excavator	Excavator	Excavator	Excavator	Excavator	Excavator
Analyte grouping/Analyte			**Units**	**LOR**										
LTM-GEN-7080 Moisture														
Moisture Content (dried @ 103°C)			%	--	13	6.4	19	13	6.9	7.7	7.4	6.6	8.8	7.6
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS														
Lead	2200[a]	1800	mg/kg	5	15	13	22	16	37	83	210	220	40	140

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			Site:		Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor
			Lab Sample number:		S20-Ap02721	S20-Ap02722	S20-Ap02723	S20-Ap02724	S20-Ap02725	S20-Ap02726	S20-Ap02727	S20-Ap02728	S20-Ap02729	S20-Ap02730
			Sample date:		31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20
			Sample ID:		TP9_1.2-1.3	TP10_0.05-0.15	TP10_0.5-0.6	TP10_1.5-1.6	TP11_0.0-0.1	TP11_0.5-0.6	TP12_0.0-0.1	TP12_0.5-0.6	TP13_0.0-0.1	TP13_0.5-0.6
			Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
			Sampling Method:		Excavator	Excavator	Excavator	Excavator	Excavator	Excavator	Excavator	Excavator	Excavator	Excavator
Analyte grouping/Analyte			**Units**	**LOR**										
LTM-GEN-7080 Moisture														
Moisture Content (dried @ 103°C)			%	--	7.3	8.8	12	9.3	9.8	19	15	18	6.7	7.1
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS														
Lead	2200[a]	1800	mg/kg	5	1200	25	140	17	550	23	810	130	17	18

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22-06-21

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Loadout Complex Soil Results

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			Site:		Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor
			Lab Sample number:		S20-Ap02731	S20-Ap02732	S20-Ap02733	S20-Ap02734	S20-Ap02735	S20-Ap02736	S20-Ap06337	S20-Ap06338	S20-Ap06339	S20-Ap06340
			Sample date:		31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	31-03-20	01-04-20	01-04-20	01-04-20	01-04-20
			Sample ID:		TP13_1.2-1.3	TP13_1.9-2.0	TP14_0.0-0.1	TP14_0.5-0.6	TP14_0.8-0.9	TP14_1.9-2.0	TP15_0.0-0.1	TP15_0.5-0.6	TP15_1.9-2.0	TP16_0.0-0.1
			Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
			Sampling Method:		Excavator	Excavator	Excavator	Excavator	Excavator	Excavator	Excavator	Excavator	Excavator	Excavator
Analyte grouping/Analyte			**Units**	**LOR**										
LTM-GEN-7080 Moisture														
Moisture Content (dried @ 103°C)			%	--	7.4	11	7	8.1	5.9	8.1	7.1	8.4	5.6	13
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS														
Lead	2200[a]	1800	mg/kg	5	7.9	18	23	29	72	52	49	17	21	31

LOR = Limit of Reporting

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

Concentration in **red** font and grey box exceed the adopted HIL for Commercial/Industrial use

Concentration in **orange** font and grey box exceed the adopted EIL/ESL 'D' for Commercial/Industrial use

Concentrations in box exceed the screening value >2.5 times

Where one or more guideline value is exceeded, the highest guideline exceeded will be highlighted

[a] Human Health Guideline for Lead adopted from the Human Health Risk Assessment (Ramboll 2019d)

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Lead Management
22-06-21

Table 6:
Loadout Complex Soil Results

	NEPM 2013 HIL D Commercial / Industrial	NEPM EIL Commercial / Industrial (site specific)	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
			Site:		Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor
			Lab Sample number:		S20-Ap06341	S20-Ap06342	S20-Ap06343	S20-Ap06344	S20-Ap06345	S20-Ap06346	S20-Ap06347	S20-Ap06348	S20-Ap06349	S20-Ap06350
			Sample date:		01-04-20	01-04-20	01-04-20	01-04-20	01-04-20	01-04-20	01-04-20	01-04-20	01-04-20	01-04-20
			Sample ID:		TP16_0.5-0.6	TP16_1.5-1.6	TP17_0.0-0.1	TP17_0.5-0.6	TP18_0.0-0.1	TP18_0.5-0.6	TP18_1.0-1.1	TP19_0.0-0.1	TP19_0.3-0.4	TP19_1.0-1.1
			Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
			Sampling Method:		Excavator	Excavator	Excavator	Excavator	Excavator	Excavator	Excavator	Excavator	Excavator	Excavator
Analyte grouping/Analyte			**Units**	**LOR**										
LTM-GEN-7080 Moisture														
Moisture Content (dried @ 103°C)			%	--	8.6	19	9.5	5.1	18	15	12	17	11	12
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS														
Lead	2200[a]	1800	mg/kg	5	31	24	49	18	210	23	46	180	25	33

LOR = Limit of Reporting

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

Concentration in **red** font and grey box exceed the adopted HIL for Commercial/Industrial use

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[a] Human Health Guideline for Lead adopted from the Human Health Risk Assessment (Ramboll 2019d)

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Lead Management
22-06-21

Table 6:
Loadout Complex Soil Results

	NEPM 2013 HIL D Commercial / Industrial	NEPM EIL Commercial / Industrial (site specific)	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
			Site:		Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Load Out Footprint	Load Out Footprint	Load Out Footprint	Load Out Footprint	Load Out Footprint	Load Out Footprint
			Lab Sample number:		S20-Ap06351	S20-Ap06352	S20-Ap06353	S20-Ap44309	N/A	N/A	N/A	N/A	N/A	N/A
			Sample date:		01-04-20	01-04-20	01-04-20	31-05-20	19-08-20	19-08-20	19-08-20	19-08-20	19-08-20	19-08-20
			Sample ID:		TP20_0.0-0.1	TP20_0.5-0.6	TP20_1.2-1.3	TP3_1.5-1.6	LO_TP01_0.0	LO_TP01_0.5	LO_TP01_1.0	LO_TP01_1.3	LO_TP02_0.0	LO_TP02_0.5
			Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum
			Sampling Method:		Excavator	Excavator	Excavator	Excavator	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit
Analyte grouping/Analyte			**Units**	**LOR**										
LTM-GEN-7080 Moisture														
Moisture Content (dried @ 103°C)			%	--	7.6	15	13	10						
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS														
Lead	2200[a]	1800	mg/kg	5	62	95	28	44	31	96	50	58	176	16

LOR = Limit of Reporting

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

Concentration in **red** font and grey box exceed the adopted HIL for Commercial/Industrial use

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[a] Human Health Guideline for Lead adopted from the Human Health Risk Assessment (Ramboll 2019d)

Client: John Holland Rail
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22-06-21

Table 6:
Loadout Complex Soil Results

	NEPM 2013 HIL D Commercial / Industrial	NEPM EIL Commercial / Industrial (site specific)	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
			Site:		Load Out Footprint	Load Out Footprint	Load Out Footprint	Load Out Footprint	Load Out Footprint	Load Out Footprint	Load Out Footprint	Load Out Footprint	Load Out Footprint	Load Out Footprint
			Lab Sample number:		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Sample date:		19-08-20	19-08-20	19-08-20	19-08-20	19-08-20	19-08-20	19-08-20	19-08-20	19-08-20	19-08-20
			Sample ID:		LO_TP02_0.9	LO_TP02_1.1	LO_TP02_1.3	LO_TP02_1.35	LO_TP02_1.4	LO_TP03_0.2	LO_TP03_0.9	LO_TP03_1.5	LO_TP03_1.6	LO_TP03_1.7
			Project Name:		DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum
			Sampling Method:		Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit
Analyte grouping/Analyte			**Units**	**LOR**										
LTM-GEN-7080 Moisture														
Moisture Content (dried @ 103°C)			%	--										
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS														
Lead	2200[a]	1800	mg/kg	5	11	*5700*	6900	85	83		158	1748	3662	117

LOR = Limit of Reporting

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

Concentration in **red** font and grey box exceed the adopted HIL for Commercial/Industrial use

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[a] Human Health Guideline for Lead adopted from the Human Health Risk Assessment (Ramboll 2019d)

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Lead Management
22-06-21

Table 6:
Loadout Complex Soil Results

	NEPM 2013 HIL D Commercial / Industrial	NEPM EIL Commercial / Industrial (site specific)	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
			Site:		Load Out Footprint	Load Out Footprint	Load Out Footprint	Load Out Footprint	Load Out Footprint	Load Out Footprint	Load Out Footprint	Load Out Footprint	Load Out Footprint	Load Out Footprint
			Lab Sample number:		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Sample date:		19-08-20	19-08-20	19-08-20	19-08-20	19-08-20	19-08-20	19-08-20	19-08-20	19-08-20	19-08-20
			Sample ID:		LO_TP04_0.25	LO_TP04_0.7	LO_TP05_0.3	LO_TP05_0.7	LO_TP05_0.85	LO_TP05_1.1	LO_TP05_1.4	LO_TP06_0.05	LO_TP06_0.5	LO_TP06_0.7
			Project Name:		DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum
			Sampling Method:		Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit
Analyte grouping/Analyte			**Units**	**LOR**										
LTM-GEN-7080 Moisture														
Moisture Content (dried @ 103°C)			%	--										
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS														
Lead	2200[a]	1800	mg/kg	5	18	199	90	883	605	150	8	14	ND	273

LOR = Limit of Reporting

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

Concentration in **red** font and grey box exceed the adopted HIL for Commercial/Industrial use

Concentration in **orange** font and grey box exceed the adopted EIL/ESL 'D' for Commercial/Industrial use

Concentrations in box exceed the screening value >2.5 times

Where one or more guideline value is exceeded, the highest guideline exceeded will be highlighted

[a] Human Health Guideline for Lead adopted from the Human Health Risk Assessment (Ramboll 2019d)

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Lead Management
22-06-21

Table 6:
Loadout Complex Soil Results

	NEPM 2013 HIL D Commercial / Industrial	NEPM EIL Commercial / Industrial (site specific)			
			Sample Type:		**Soil**
			Site:		**Load Out Footprint**
			Lab Sample number:		N/A
			Sample date:		19-08-20
			Sample ID:		LO_TP06_1.2
			Project Name:		DSI Addendum
			Sampling Method:		Test Pit
Analyte grouping/Analyte			**Units**	**LOR**	
LTM-GEN-7080 Moisture					
Moisture Content (dried @ 103°C)			%	--	
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS					
Lead	2200[a]	1800	mg/kg	5	31

LOR = Limit of Reporting

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

Concentration in **red** font and grey box exceed the adopted HIL for Commercial/Industrial use

Concentration in **orange** font and grey box exceed the adopted EIL/ESL 'D' for Commercial/Industrial use

Concentrations in box exceed the screening value >2.5 times

Where one or more guideline value is exceeded, the highest guideline exceeded will be highlighted

[a] Human Health Guideline for Lead adopted from the Human Health Risk Assessment (Ramboll 2019d)

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Lead Management
22-06-21

Table 7:
Resource Recovery Exemption Soil Sampling

	NEPM 2013 HIL D Commercial Industrail	NEPM 2013 EIL Commercial Industrial										
Sample Type:					**Soil**	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**
Site:					**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**
Lab Sample number:					S20-Au35780	S20-Au35781	S20-Au35782	S20-Au35783	S20-Au35784	S20-Au35785	S20-Au35786	S20-Au35787
Sample date:					19-08-20	19-08-20	19-08-20	19-08-20	19-08-20	19-08-20	19-08-20	19-08-20
Sample ID:					RRE_SP01	RRE_SP02	RRE_SP03	RRE_SP04	RRE_SP05	RRE_SP06	RRE_SP07	RRE_SP08
Project Name:					DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum
Sampling Method:					Composite Sample	Composite Sample	Composite Sample	Composite Sample	Composite Sample	Composite Sample	Composite Sample	Composite Sample
Analyte grouping/Analyte			**Units**	**LOR**								
LTM-GEN-7080 Moisture												
Moisture Content (dried @ 103°C)			%	1	6.4	7.1	7	6.1	5.3	6.3	8.1	9
Conductivity (1:5 aqueous extract at 25°C as rec.)			uS/cm	10	170	540	91	970	620	1100	970	1100
pH (1:5 Aqueous extract at 25°C as rec.)			pH Units	0.1	7.4	4.3	8.3	6.4	4.4	4.4	5.3	4
Sulphur			mg/kg	5	910	4300	460	14000	3900	11000	8600	16000
Total Organic Carbon			%	0.1	0.5	0.6	1.8	1.2	1.5	0.5	2.3	0.7
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS												
Antimony			mg/kg	10	< 10	19	24	23	31	23	25	39
Arsenic	3000	160	mg/kg	2	21	70	48	130	**190**	150	130	**190**
Beryllium	500		mg/kg	2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Boron	300000		mg/kg	10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Cadmium	900		mg/kg	0.4	2.9	7	1.8	10	8.2	25	10	6
Chromium	3600	710	mg/kg	5	25	59	24	60	58	130	79	*81*
Cobalt	4000		mg/kg	5	7.4	14	30	8.3	11	14	12	*12*
Copper	240000	160	mg/kg	5	**510**	**960**	**450**	**2100**	**1700**	**2200**	**1900**	**1600**
Lead	2200*	1800	mg/kg	5	**2600**	**5900**	1300	**5300**	**7000**	**5200**	**6800**	**19000**
Manganese	19000		mg/kg	5	340	640	520	550	630	970	680	710
Mercury	730		mg/kg	0.1	0.2	0.5	0.2	0.7	1.2	1.2	1.1	1.6
Molybdenum			mg/kg	5	< 5	< 5	< 5	6.7	8.5	5.8	6.4	7.3
Nickel	6000	340	mg/kg	5	10	29	18	32	22	45	75	40
Selenium	10000		mg/kg	2	4.3	9.5	< 2	19	23	18	17	27
Tin			mg/kg	10	15	30	23	49	190	140	120	80
Vanadium			mg/kg	10	52	64	58	64	78	77	69	89
Zinc	400000	370	mg/kg	5	**550**	**1700**	**2100**	**1400**	**1500**	**2800**	**1500**	***1400***

National Environment Protection Council (2013) National Environmental Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1) (NEPM).
^ For soil texture classification undertaken in accord with AS 1726, the classifications of sand, silt and clay may be applied as coarse, fine with liquid limit <50% and fine with liquid limit>50% respectively, as the underlying properties to develop the HSLs may reasonably be selected to be similar. Where there is uncertainty, either a conservative approach may be adopted or laboratory Health Investigation Levels for chromium based on chromium (VI)

Concentrations in *italics* have been moisture adjusted

Concentrations in green box exceed the adoped EIL 'C' for Urban Residential and Open Public Space

Concentration in **bold red font** exceed the adopted HIL/HSL 'C' for Open Space and Recreational Land Use

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Lead Management
22-06-21

Table 7:
Resource Recovery Exemption Soil Sampling

Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Rail Corridor	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**
S20-Au35788	S20-Au35789	S20-Au35790	S20-Au35791	S20-Au35792	S20-Au35793	S20-Au35794	S20-Au35795	S20-Au35796	S20-Au35797	S20-Au35798	S20-Au35799
19-08-20	19-08-20	19-08-20	19-08-20	19-08-20	19-08-20	19-08-20	19-08-20	19-08-20	19-08-20	19-08-20	19-08-20
RRE_SP09	RRE_SP10	RRE_TP01	RRE_TP02	RRE_TP03	RRE_TP04	RRE_TP05	RRE_TP06	RRE_TP07	RRE_TP08	RRE_TP09	RRE_TP10
DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum
Composite Sample	Composite Sample	Composite Sample	Composite Sample	Composite Sample	Composite Sample	Composite Sample	Composite Sample	Composite Sample	Composite Sample	Composite Sample	Composite Sample
7.9	9.5	4.3	6.1	14	7.6	10	9.3	11	14	13	9.3
410	730	33	53	220	250	620	300	74	1000	29	38
4.4	4.2	6.7	6.1	4.9	5.2	4.2	6.5	5.7	5.1	5	5
5900	4100	79	260	2200	1700	3600	450	2900	12000	3400	2000
< 0.1	0.5	0.3	0.3	1.4	1.5	2.2	0.4	2.7	6.5	1.9	2
10	32	< 10	< 10	18	< 10	11	< 10	< 10	55	14	18
49	**170**	15	14	130	25	77	31	40	79	52	66
< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
3.3	4.6	5.5	7.3	9.6	5.5	3.5	8	4	170	2.4	2.5
37	71	31	12	24	15	34	12	52	130	19	19
8.4	11	7.5	< 5	< 5	< 5	< 5	< 5	8.2	18	< 5	< 5
700	**1200**	**490**	**280**	**1200**	**670**	**830**	**240**	**580**	**4100**	**1200**	**1300**
4100	**7300**	570	820	**8700**	1600	**4000**	230	1600	**9200**	**4400**	**5300**
540	1100	420	530	150	150	230	70	690	720	170	220
0.4	0.6	0.2	0.1	2.9	0.5	0.3	< 0.1	0.2	0.9	0.4	0.4
5.4	< 5	< 5	5.3	12	10	12	20	< 5	*5.6*	9.5	11
18	28	12	22	85	11	11	< 5	19	79	8.9	8.1
8.1	15	< 2	< 2	23	3.9	7.7	2.9	2.8	*16*	12	14
28	47	< 10	11	400	24	13	< 10	10	54	34	38
34	93	76	30	58	43	69	53	45	67	50	72
1100	**1300**	**810**	**770**	**1500**	**1100**	**600**	**1100**	**1300**	**12000**	**570**	**580**

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Lead Management
22-06-21

Table 7:
Resource Recovery Exemption Soil Sampling

20	4.3	14	8.6			
20	29	1100	465.9			
20	4	8.3	5.4			
20	79	16000	4888.0			
19	0.3	6.5	1.5			

count	min	max	average	> HIL		
14	10	55	24.4			
20	14	190	83.9	0	3	160
0	0	0	#DIV/0!	0		
0	0	0	#DIV/0!	0		
20	1.8	170	14.9	0		
20	12	130	48.6	0	0	710
13	7.4	30	12.4	0		
20	240	4100	1210.5	0	20	160
20	230	19000	5046.0	14	14	1800
20	70	1100	501.5	0		
19	0.1	2.9	0.7	0		
14	5.3	20	9.0			
19	8.1	85	30.2	0	0	340
17	2.8	27	13.1	0		
18	10	400	72.6			
20	30	93	62.1			
20	550	12000	1784.0	0	20	370

Analyte	Unit	Count	Min	Max	Average
Antimony	mg/kg	14	10	55	24.42857143
Arsenic	mg/kg	20	14	190	83.85
Beryllium	mg/kg	0	0	0	#DIV/0!
Boron	mg/kg	0	0	0	#DIV/0!
Cadmium	mg/kg	20	1.8	170	14.855
Chromium	mg/kg	20	12	130	48.6
Cobalt	mg/kg	13	7.4	30	12.44615385
Copper	mg/kg	20	240	4100	1210.5
Lead	mg/kg	20	230	19000	5046
Manganese	mg/kg	20	70	1100	501.5
Mercury	mg/kg	19	0.1	2.9	0.715789474
Molybdenum	mg/kg	14	5.3	20	8.964285714
Nickel	mg/kg	19	8.1	85	30.15789474
Selenium	mg/kg	17	2.8	27	13.12941176
Tin	mg/kg	18	10	400	72.55555556
Vanadium	mg/kg	20	30	93	62.05
Zinc	mg/kg	20	550	12000	1784

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Lead Management
22-06-21

Table 8:
Waste Classification Total Contaminant Concentrations

	CT1 - General Solid Waste[1]	CT2 - Restricted Solid Waste[1]	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
			ALS Sample number:		S19-Jl39840	S19-Jl39841	S19-Jl39842	S19-Jl39843	S19-Jl39844	S19-Jl39845	S19-Au17281	S19-Au39076
			Sample date:		26-07-2019	26-07-2019	26-07-2019	26-07-2019	26-07-2019	26-07-2019	12-08-2019	27-08-2019
			Sample ID:		TP4 0.1-0.3	TP5 0.1-0.45	TP6 0.1-0.4	TP7 0.1-0.4	TP8 0.1-0.3	TP9 0.1-0.3	SS30	SS31
			Project Name:		Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management
			Sampling Method:		Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Shallow Soil	Shallow Soil
			Sample Description									
Analyte grouping/Analyte			**Units**	**LOR**								
EA055: Moisture Content												
Moisture Content (dried @ 103°C)			%	--	3	3.7	2.4	0.5	1.1	21	---	---
Conductivity (1:5 aqueous extract at 25°C as rec.)			uS/cm	10	---	---	---	---	---	---	---	---
pH (1:5 Aqueous extract at 25°C as rec.)			pH Units	0.1	---	---	---	---	---	---	---	---
Sulphur			mg/kg	5	---	---	---	---	---	---	---	---
Total Organic Carbon			%	0.1	---	---	---	---	---	---	---	---
EA200: AS 4964 - 2004 Identification of Asbestos in Soils												
Asbestos Detected			g/kg	0.1	Nil	Nil	Nil	Nil	Nil	Nil	---	---
Asbestos Type			--	--	N/A	N/A	N/A	N/A	N/A	N/A	---	---
Sample weight (dry)			g	0.1	594	540	65	247	430	259	---	---
Description			--	--	Brown fine-grained soil and rocks	Brown fine-grained soil and rocks	Brown fine-grained soil and rocks	Brown fine-grained soil and rocks	Brown fine-grained soil and rocks	Brown fine-grained soil and rocks	---	---
EG005T: Total Metals by ICP-AES												
Antimony			mg/kg	10	---	---	---	---	---	---	---	---
Arsenic	100	400	mg/kg	2	47	13	11	5.8	23	8.6	---	---
Beryllium			mg/kg	2	---	---	---	---	---	---	---	---
Boron			mg/kg	10	---	---	---	---	---	---	---	---
Cadmium	20	80	mg/kg	0.4	3.3	1.1	1	0.7	1.6	1	7.4	2.2
Chromium	100	400	mg/kg	5	25	7.4	7.6	2.5	11	6.8	---	---
Cobalt			mg/kg	5	---	---	---	---	---	---	---	---
Copper			mg/kg	5	990	180	190	62	190	91	---	---
Lead	100	400	mg/kg	5	**38,000**	**3,100**	**6,000**	**3,300**	**2800**	**730**	570*	710
Manganese			mg/kg	5	---	---	---	---	---	---	---	---
Mercury	4	16	mg/kg	0.1	0.4	0.1	0.05	0.05	0.05	0.05	---	---
Molybdenum	100	400	mg/kg	5	---	---	---	---	---	---		
Nickel	40	160	mg/kg	5	8.8	2.5	2.5	2.5	5.7	2.5	---	---
Selenium	20	80	mg/kg	2	---	---	---	---	---	---	---	---
Tin			mg/kg	10	---	---	---	---	---	---	---	---
Vanadium			mg/kg	10	---	---	---	---	---	---	---	---
Zinc			mg/kg	5	940	320	350	130	320	200	---	---
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons												
Naphthalene			mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	---	---
Acenaphthylene			mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25		
Acenaphthene			mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	---	---
Fluorene			mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	---	---
Phenanthrene			mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	---	---
Anthracene			mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	---	---
Fluoranthene			mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	---	---
Pyrene			mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	---	---
Benz(a)anthracene			mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25		
Chrysene			mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	---	---
Benzo(b+j)fluoranthene			mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	---	---
Benzo(k)fluoranthene			mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	---	---
Benzo(a)pyrene	0.8	3.2	mg/kg	0.5	0.25	0.25	0.25	0.25	0.25	0.25	---	---

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Lead Management
22-06-21

Table 8:
Waste Classification Total Contaminant Concentrations

	CT1 - General Solid Waste[1]	CT2 - Restricted Solid Waste[1]												
Sample Type:						**Soil**	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**	**Soil**
ALS Sample number:						S19-JI39840	S19-JI39841	S19-JI39842	S19-JI39843	S19-JI39844	S19-JI39845	S19-Au17281	S19-Au39076
Sample date:						26-07-2019	26-07-2019	26-07-2019	26-07-2019	26-07-2019	26-07-2019	12-08-2019	27-08-2019
Sample ID:						TP4 0.1-0.3	TP5 0.1-0.45	TP6 0.1-0.4	TP7 0.1-0.4	TP8 0.1-0.3	TP9 0.1-0.3	SS30	SS31
Project Name:						Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management
Sampling Method:						Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Test Pit	Shallow Soil	Shallow Soil
Sample Description													
Indeno(1.2.3.cd)pyrene			mg/kg	0.5		0.25	0.25	0.25	0.25	0.25	0.25	---	---
Dibenz(a.h)anthracene			mg/kg	0.5		0.25	0.25	0.25	0.25	0.25	0.25	---	---
Benzo(g.h.i)perylene			mg/kg	0.5		0.25	0.25	0.25	0.25	0.25	0.25		
Sum of polycyclic aromatic hydrocarbons	200	800	mg/kg	0.5		0.25	0.25	0.25	0.25	0.25	0.25	---	---
Benzo(a)pyrene TEQ (zero)			mg/kg	0.5		0.25	0.25	0.25	0.25	0.25	0.25	---	---
Benzo(a)pyrene TEQ (half LOR)			mg/kg	0.5		0.6	0.6	0.6	0.6	0.6	0.6	---	---
Benzo(a)pyrene TEQ (LOR)			mg/kg	0.5		1.2	1.2	1.2	1.2	1.2	1.2	---	---
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions													
C6 - C10 Fraction			mg/kg	20		10	10	10	10	10	10	---	---
C6 - C10 Fraction minus BTEX (F1)			mg/kg	20		10	10	10	10	10	10	---	---
>C10 - C16 Fraction			mg/kg	50		25	25	25	92	25	25	---	---
>C16 - C34 Fraction (F3)			mg/kg	100		50	140	50	220	50	50	---	---
>C34 - C40 Fraction (F4)			mg/kg	100		50	50	50	120	50	50	---	---
>C10 - C40 Fraction (sum)			mg/kg	100		50	140	50	432	50	50	---	---
>C10 - C16 Fraction minus Naphthalene (F2)			mg/kg	50		25	25	25	92	25	25	---	---
EP080: BTEXN													
Benzene	10	40	mg/kg	0.1		0.05	0.05	0.05	0.05	0.05	0.05	---	---
Toluene	288	1152	mg/kg	0.1		0.05	0.05	0.05	0.05	0.05	0.05	---	---
Ethylbenzene	600	2400	mg/kg	0.1		0.05	0.05	0.05	0.05	0.05	0.05	---	---
meta- & para-Xylene			mg/kg	0.2		0.1	0.1	0.1	0.1	0.1	0.1	---	---
ortho-Xylene			mg/kg	0.1		0.05	0.05	0.05	0.05	0.05	0.05	---	---
Total Xylenes	1000	4000	mg/kg	0.3		0.15	0.15	0.15	0.15	0.15	0.15	---	---
Naphthalene			mg/kg	1		0.25	0.25	0.25	0.25	0.25	0.25	---	---

2019 - 2020 analytical data sourced from *Tarago Rail Corridor and Tarago Area Detailed Site Investigation (Ramboll 2020a)* and the *Tarago Rail Corridor and Tarago Area Detailed Site Investigation Addendum* (Ramboll 2020e). 2021 data sourced by sub-sampling bulk samples collected in 2020 and held by Ramboll.

[1] Maximum values of specific contaminant concentration (SCC) for classification without TCLP

[2] Assumed chromium VI

LOR = Limit of Reporting

Concentrations below the LOR noted as <value

Concentrations in a grey box exceed CT1 screening criteria

Concentrations in **red font** exceed CT2 screening

Underlined values were reported <LOR and have been halved to allow for comparison of data.

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Lead Management
22-06-21

Table 8:
Waste Classification Total Contaminant Concentrations

	CT1 - General Solid Waste[1]	CT2 - Restricted Solid Waste[1]	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
			S19-Au39077	S19-Au39078	S19-Au39079	S19-Au39080	S19-Au39075	S19-Au39082	S19-Au39083	S19-Au39084	S19-Au39085	S19-De30523
			27-08-2019	27-08-2019	27-08-2019	27-08-2019	27-08-2019	27-08-2019	27-08-2019	27-08-2019	27-08-2019	18-12-2019
			SS32	SS33	SS34	SS35	SS36	SS37	SS38	SS39	SS40	HA01_0.1
			Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management
			Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil	Hand Auger
Analyte grouping/Analyte												
EA055: Moisture Content												
Moisture Content (dried @ 103°C)			---	---	---	---	---	---	---	---	---	---
Conductivity (1:5 aqueous extract at 25°C as rec.)			---	---	---	---	---	---	---	---	---	---
pH (1:5 Aqueous extract at 25°C as rec.)			---	---	---	---	---	---	---	---	---	---
Sulphur			---	---	---	---	---	---	---	---	---	---
Total Organic Carbon			---	---	---	---	---	---	---	---	---	---
EA200: AS 4964 - 2004 Identification of Asbestos in Soils												
Asbestos Detected			---	---	---	---	---	---	---	---	---	---
Asbestos Type			---	---	---	---	---	---	---	---	---	---
Sample weight (dry)			---	---	---	---	---	---	---	---	---	---
Description			---	---	---	---	---	---	---	---	---	---
EG005T: Total Metals by ICP-AES												
Antimony			---	---	---	---	---	---	---	---	---	---
Arsenic	100	400	---	---	---	---	---	---	---	---	---	---
Beryllium			---	---	---	---	---	---	---	---	---	---
Boron			---	---	---	---	---	---	---	---	---	---
Cadmium	20	80	2.2	4.2	3.4	2.1	7.2	4.2	14	5.9	8.7	4.2
Chromium	100	400	---	---	---	---	---	---	---	---	---	---
Cobalt			---	---	---	---	---	---	---	---	---	---
Copper			---	---	---	---	---	---	---	---	---	---
Lead	100	400	2800*	800	850	900	2100	1600	9900	2900	2600	720
Manganese			---	---	---	---	---	---	---	---	---	---
Mercury	4	16	---	---	---	---	---	---	---	---	---	---
Molybdenum	100	400										
Nickel	40	160	---	---	---	---	---	---	---	---	---	---
Selenium	20	80	---	---	---	---	---	---	---	---	---	---
Tin			---	---	---	---	---	---	---	---	---	---
Vanadium			---	---	---	---	---	---	---	---	---	---
Zinc			---	---	---	---	---	---	---	---	---	---
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons												
Naphthalene			---	---	---	---	---	---	---	---	---	---
Acenaphthylene												
Acenaphthene			---	---	---	---	---	---	---	---	---	---
Fluorene			---	---	---	---	---	---	---	---	---	---
Phenanthrene			---	---	---	---	---	---	---	---	---	---
Anthracene			---	---	---	---	---	---	---	---	---	---
Fluoranthene			---	---	---	---	---	---	---	---	---	---
Pyrene			---	---	---	---	---	---	---	---	---	---
Benz(a)anthracene												
Chrysene			---	---	---	---	---	---	---	---	---	---
Benzo(b+j)fluoranthene			---	---	---	---	---	---	---	---	---	---
Benzo(k)fluoranthene			---	---	---	---	---	---	---	---	---	---
Benzo(a)pyrene	0.8	3.2	---	---	---	---	---	---	---	---	---	---

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Lead Management
22-06-21

Table 8:
Waste Classification Total Contaminant Concentrations

	CT1 - General Solid Waste[1]	CT2 - Restricted Solid Waste[1]	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
			S19-Au39077	S19-Au39078	S19-Au39079	S19-Au39080	S19-Au39075	S19-Au39082	S19-Au39083	S19-Au39084	S19-Au39085	S19-De30523
			27-08-2019	27-08-2019	27-08-2019	27-08-2019	27-08-2019	27-08-2019	27-08-2019	27-08-2019	27-08-2019	18-12-2019
			SS32	SS33	SS34	SS35	SS36	SS37	SS38	SS39	SS40	HA01_0.1
			Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management
			Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil	Shallow Soil	Hand Auger
Indeno(1.2.3.cd)pyrene			---	---	---	---	---	---	---	---	---	---
Dibenz(a.h)anthracene			---	---	---	---	---	---	---	---	---	---
Benzo(g.h.i)perylene												
Sum of polycyclic aromatic hydrocarbons	200	800	---	---	---	---	---	---	---	---	---	---
Benzo(a)pyrene TEQ (zero)			---	---	---	---	---	---	---	---	---	---
Benzo(a)pyrene TEQ (half LOR)			---	---	---	---	---	---	---	---	---	---
Benzo(a)pyrene TEQ (LOR)			---	---	---	---	---	---	---	---	---	---
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 F												
C6 - C10 Fraction			---	---	---	---	---	---	---	---	---	---
C6 - C10 Fraction minus BTEX (F1)			---	---	---	---	---	---	---	---	---	---
>C10 - C16 Fraction			---	---	---	---	---	---	---	---	---	---
>C16 - C34 Fraction (F3)			---	---	---	---	---	---	---	---	---	---
>C34 - C40 Fraction (F4)			---	---	---	---	---	---	---	---	---	---
>C10 - C40 Fraction (sum)			---	---	---	---	---	---	---	---	---	---
>C10 - C16 Fraction minus Naphthalene (F2)			---	---	---	---	---	---	---	---	---	---
EP080: BTEXN												
Benzene	10	40	---	---	---	---	---	---	---	---	---	---
Toluene	288	1152	---	---	---	---	---	---	---	---	---	---
Ethylbenzene	600	2400	---	---	---	---	---	---	---	---	---	---
meta- & para-Xylene			---	---	---	---	---	---	---	---	---	---
ortho-Xylene			---	---	---	---	---	---	---	---	---	---
Total Xylenes	1000	4000	---	---	---	---	---	---	---	---	---	---
Naphthalene			---	---	---	---	---	---	---	---	---	---

2019 - 2020 analytical data sourced from *Tarago Rail Corridor and Tarago Area Detailed Site Investigation (Ramboll 2020a)* and the *Tarago Rail Corridor and Tarago Area Detailed Site Investigation Addendum* (Ramboll 2020e). 2021 data sourced by sub-sampling bulk samples collected in 2020 and held by Ramboll.

[1] Maximum values of specific contaminant concentration (SCC) for classific

[2] Assumed chromium VI

LOR = Limit of Reporting

Concentrations below the LOR noted as <value

Concentrations in a grey box exceed CT1 screening criteria

Concentrations in **red font** exceed CT2 screening

Underlined values were reported <LOR and have been halved to allow for c

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Lead Management
22-06-21

Table 8:
Waste Classification Total Contaminant Concentrations

	CT1 - General Solid Waste[1]	CT2 - Restricted Solid Waste[1]	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
			S19-De30524	S19-Se36992	S19-Se36993	S19-Se36995	S19-Se37049	S19-Se37052	S20-Au35780	S20-Au35781	S20-Au35782	S20-Au35783
			18-12-2019	22-09-2019	22-09-2019	22-09-2019	22-09-2019	22-09-2019	19-08-2020	19-08-2020	19-08-2020	19-08-2020
			HA01_0.25	SS52	SS53	SS55	SS105	SS108	RRE_SP01	RRE_SP02	RRE_SP03	RRE_SP04
			Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management
			Hand Auger						DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum
									Composite Sample	Composite Sample	Composite Sample	Composite Sample
Analyte grouping/Analyte												
EA055: Moisture Content												
Moisture Content (dried @ 103°C)			---	8	2.5	17	13	9.4	6.4	7.1	7	6.1
Conductivity (1:5 aqueous extract at 25°C as rec.)			---	---	---	---	---	---	170	540	91	970
pH (1:5 Aqueous extract at 25°C as rec.)			---	---	---	---	---	---	7.4	4.3	8.3	6.4
Sulphur			---	---	---	---	---	---	910	4300	460	14000
Total Organic Carbon			---	---	---	---	---	---	0.5	0.6	1.8	1.2
EA200: AS 4964 - 2004 Identification of Asbestos in Soils												
Asbestos Detected			---	Nil	Nil	Nil	Nil	Nil	---	---	---	---
Asbestos Type			---	N/A	N/A	N/A	N/A	N/A	---	---	---	---
Sample weight (dry)			---	853	1120	574	892	673	---	---	---	---
Description			---	Brown coarse-grained soil and rocks	Brown coarse-grained soil, rocks and bitumous material	Brown coarse-grained soil, rcoks and organic debris	Brown coarse-grained soil and rocks	Brown coarse-grained soil and rocks	---	---	---	---
EG005T: Total Metals by ICP-AES												
Antimony			---	**---**	**---**	**---**	**---**	**---**	5	19	24	23
Arsenic	100	400	---	25	150	32	65	4.9	21	70	48	130
Beryllium			---	**---**	**---**	**---**	**---**	**---**	1	1	1	1
Boron			---	**---**	**---**	**---**	**---**	**---**	5	5	5	5
Cadmium	20	80	1.9	5.6	8.1	12	4.3	0.9	2.9	7	1.8	10
Chromium	100	400	---	12	15	13	27	11	25	59	24	60
Cobalt			---	**---**	**---**	**---**	**---**	**---**	7.4	14	30	8.3
Copper			---	220	660	320	790	20	510	960	450	2100
Lead	100	400	820	**540**	**3100**	**1800**	**3900**	52	**2600**	**5900**	**1300**	**5300**
Manganese			---	**---**	**---**	**---**	**---**	**---**	340	640	520	550
Mercury	4	16	---	0.05	0.6	0.2	0.2	0.05	0.2	0.5	0.2	0.7
Molybdenum	100	400		**---**	**---**	**---**	**---**	**---**	2.5	2.5	2.5	6.7
Nickel	40	160	---	2.5	11	6.6	9.2	2.5	10	29	18	32
Selenium	20	80	---	**---**	**---**	**---**	**---**	**---**	4.3	9.5	1	19
Tin			---	**---**	**---**	**---**	**---**	**---**	15	30	23	49
Vanadium			---	**---**	**---**	**---**	**---**	**---**	52	64	58	64
Zinc			---	770	1300	1500	780	170	550	1700	2100	1400
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons												
Naphthalene			---	0.25	0.25	0.25	0.25	0.25	**---**	**---**	**---**	**---**
Acenaphthylene				0.25	0.25	0.25	0.25	0.25	**---**	**---**	**---**	**---**
Acenaphthene			---	0.25	0.25	0.25	0.25	0.25	**---**	**---**	**---**	**---**
Fluorene			---	0.25	0.25	0.25	0.25	0.25	**---**	**---**	**---**	**---**
Phenanthrene			---	0.25	0.25	0.25	0.25	0.25	**---**	**---**	**---**	**---**
Anthracene			---	0.25	0.25	0.25	0.25	0.25	**---**	**---**	**---**	**---**
Fluoranthene			---	0.25	0.25	0.6	0.25	0.25	**---**	**---**	**---**	**---**
Pyrene			---	0.7	0.5	0.5	0.25	0.25	**---**	**---**	**---**	**---**
Benz(a)anthracene				0.7	0.6	0.6	0.25	0.25	**---**	**---**	**---**	**---**
Chrysene			---	0.25	0.25	0.25	0.25	0.25	**---**	**---**	**---**	**---**
Benzo(b+j)fluoranthene			---	0.25	0.25	0.25	0.25	0.25	**---**	**---**	**---**	**---**
Benzo(k)fluoranthene			---	0.25	0.25	0.25	0.25	0.25	**---**	**---**	**---**	**---**
Benzo(a)pyrene	0.8	3.2	---	0.7	0.6	0.6	0.25	0.25	**---**	**---**	**---**	**---**

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Lead Management
22-06-21

Table 8:
Waste Classification Total Contaminant Concentrations

	CT1 - General Solid Waste[1]	CT2 - Restricted Solid Waste[1]	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
			S19-De30524	S19-Se36992	S19-Se36993	S19-Se36995	S19-Se37049	S19-Se37052	S20-Au35780	S20-Au35781	S20-Au35782	S20-Au35783
			18-12-2019	22-09-2019	22-09-2019	22-09-2019	22-09-2019	22-09-2019	19-08-2020	19-08-2020	19-08-2020	19-08-2020
			HA01_0.25	SS52	SS53	SS55	SS105	SS108	RRE_SP01	RRE_SP02	RRE_SP03	RRE_SP04
			Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management
			Hand Auger						DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum
									Composite Sample	Composite Sample	Composite Sample	Composite Sample
Indeno(1.2.3.cd)pyrene			---	0.6	0.25	0.6	0.25	0.25	---	---	---	---
Dibenz(a.h)anthracene			---	0.25	0.25	0.25	0.25	0.25	---	---	---	---
Benzo(g.h.i)perylene				0.6	0.25	0.5	0.25	0.25	---	---	---	---
Sum of polycyclic aromatic hydrocarbons	200	800	---	3.3	1.7	3.4	0.25	0.25	---	---	---	---
Benzo(a)pyrene TEQ (zero)			---	0.8	0.7	0.7	0.25	0.25	---	---	---	---
Benzo(a)pyrene TEQ (half LOR)			---	1.1	1	1	0.6	0.6	---	---	---	---
Benzo(a)pyrene TEQ (LOR)			---	1.4	1.3	1.3	1.2	1.2	---	---	---	---
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 F												
C6 - C10 Fraction			---	10	10	10	10	10	---	---	---	---
C6 - C10 Fraction minus BTEX (F1)			---	10	10	10	10	10	---	---	---	---
>C10 - C16 Fraction			---	25	25	25	25	25	---	---	---	---
>C16 - C34 Fraction (F3)			---	130	300	220	50	50	---	---	---	---
>C34 - C40 Fraction (F4)			---	50	130	50	50	50	---	---	---	---
>C10 - C40 Fraction (sum)			---	130	430	220	50	50	---	---	---	---
>C10 - C16 Fraction minus Naphthalene (F2)			---	25	25	25	25	25	---	---	---	---
EP080: BTEXN												
Benzene	10	40	---	0.05	0.05	0.05	0.05	0.05	---	---	---	---
Toluene	288	1152	---	0.05	0.05	0.05	0.05	0.05	---	---	---	---
Ethylbenzene	600	2400	---	0.05	0.05	0.05	0.05	0.05	---	---	---	---
meta- & para-Xylene			---	0.1	0.1	0.1	0.1	0.1	---	---	---	---
ortho-Xylene			---	0.05	0.05	0.05	0.05	0.05	---	---	---	---
Total Xylenes	1000	4000	---	0.15	0.15	0.15	0.15	0.15	---	---	---	---
Naphthalene			---	0.25	0.25	0.25	0.25	0.25	---	---	---	---

2019 - 2020 analytical data sourced from *Tarago Rail Corridor and Tarago Area Detailed Site Investigation (Ramboll 2020a)* and the *Tarago Rail Corridor and Tarago Area Detailed Site Investigation Addendum* (Ramboll 2020e). 2021 data sourced by sub-sampling bulk samples collected in 2020 and held by Ramboll.

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Job No: 318000780
Project Name: Tarago Lead Management
22-06-21

Table 8:
Waste Classification Total Contaminant Concentrations

	CT1 - General Solid Waste[1]	CT2 - Restricted Solid Waste[1]	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
			S20-Au35784	S20-Au35785	S20-Au35786	S20-Au35787	S20-Au35788	S20-Au35789	S20-Au35790	S20-Au35791	S20-Au35792	S20-Au35793
			19-08-2020	19-08-2020	19-08-2020	19-08-2020	19-08-2020	19-08-2020	19-08-2020	19-08-2020	19-08-2020	19-08-2020
			RRE_SP05	RRE_SP06	RRE_SP07	RRE_SP08	RRE_SP09	RRE_SP10	RRE_TP01	RRE_TP02	RRE_TP03	RRE_TP04
			Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management
			DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum
			Composite Sample	Composite Sample	Composite Sample	Composite Sample	Composite Sample	Composite Sample	Composite Sample	Composite Sample	Composite Sample	Composite Sample
Analyte grouping/Analyte												
EA055: Moisture Content												
Moisture Content (dried @ 103°C)			5.3	6.3	8.1	9	7.9	9.5	4.3	6.1	14	7.6
Conductivity (1:5 aqueous extract at 25°C as rec.)			620	1100	970	1100	410	730	33	53	220	250
pH (1:5 Aqueous extract at 25°C as rec.)			4.4	4.4	5.3	4	4.4	4.2	6.7	6.1	4.9	5.2
Sulphur			3900	11000	8600	16000	5900	4100	79	260	2200	1700
Total Organic Carbon			1.5	0.5	2.3	0.7	0.05	0.5	0.3	0.3	1.4	1.5
EA200: AS 4964 - 2004 Identification of Asbestos in Soils												
Asbestos Detected			---	---	---	---	---	---	---	---	---	---
Asbestos Type			---	---	---	---	---	---	---	---	---	---
Sample weight (dry)			---	---	---	---	---	---	---	---	---	---
Description			---	---	---	---	---	---	---	---	---	---
EG005T: Total Metals by ICP-AES												
Antimony			31	23	25	39	10	32	5	5	18	5
Arsenic	100	400	190	150	130	190	49	170	15	14	130	25
Beryllium			1	1	1	1	1	1	1	1	1	1
Boron			5	5	5	5	5	5	5	5	5	5
Cadmium	20	80	8.2	25	10	6	3.3	4.6	5.5	7.3	9.6	5.5
Chromium	100	400	58	130	79	*81*	37	71	31	12	24	15
Cobalt			11	14	12	*12*	8.4	11	7.5	2.5	2.5	2.5
Copper			1700	2200	1900	1600	700	1200	490	280	1200	670
Lead	100	400	**7000**	**5200**	**6800**	**19000**	**4100**	**7300**	**570**	**820**	**8700**	**1600**
Manganese			630	970	680	710	540	1100	420	530	150	150
Mercury	4	16	1.2	1.2	1.1	1.6	0.4	0.6	0.2	0.1	2.9	0.5
Molybdenum	100	400	8.5	5.8	6.4	7.3	5.4	2.5	2.5	5.3	12	10
Nickel	40	160	22	45	75	40	18	28	12	22	85	11
Selenium	20	80	23	18	17	27	8.1	15	1	1	23	3.9
Tin			190	140	120	80	28	47	5	11	400	24
Vanadium			78	77	69	89	34	93	76	30	58	43
Zinc			1500	2800	1500	*1400*	1100	1300	810	770	1500	1100
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons												
Naphthalene			---	---	---	---	---	---	---	---	---	---
Acenaphthylene			---	---	---	---	---	---	---	---	---	---
Acenaphthene			---	---	---	---	---	---	---	---	---	---
Fluorene			---	---	---	---	---	---	---	---	---	---
Phenanthrene			---	---	---	---	---	---	---	---	---	---
Anthracene			---	---	---	---	---	---	---	---	---	---
Fluoranthene			---	---	---	---	---	---	---	---	---	---
Pyrene			---	---	---	---	---	---	---	---	---	---
Benz(a)anthracene			---	---	---	---	---	---	---	---	---	---
Chrysene			---	---	---	---	---	---	---	---	---	---
Benzo(b+j)fluoranthene			---	---	---	---	---	---	---	---	---	---
Benzo(k)fluoranthene			---	---	---	---	---	---	---	---	---	---
Benzo(a)pyrene	0.8	3.2	---	---	---	---	---	---	---	---	---	---

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Table 8:
Waste Classification Total Contaminant Concentrations

	CT1 - General Solid Waste[1]	CT2 - Restricted Solid Waste[1]	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
			S20-Au35784	S20-Au35785	S20-Au35786	S20-Au35787	S20-Au35788	S20-Au35789	S20-Au35790	S20-Au35791	S20-Au35792	S20-Au35793
			19-08-2020	19-08-2020	19-08-2020	19-08-2020	19-08-2020	19-08-2020	19-08-2020	19-08-2020	19-08-2020	19-08-2020
			RRE_SP05	RRE_SP06	RRE_SP07	RRE_SP08	RRE_SP09	RRE_SP10	RRE_TP01	RRE_TP02	RRE_TP03	RRE_TP04
			Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management
			DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum
			Composite Sample	Composite Sample	Composite Sample	Composite Sample	Composite Sample	Composite Sample	Composite Sample	Composite Sample	Composite Sample	Composite Sample
Indeno(1.2.3.cd)pyrene			---	---	---	---	---	---	---	---	---	---
Dibenz(a.h)anthracene			---	---	---	---	---	---	---	---	---	---
Benzo(g.h.i)perylene			---	---	---	---	---	---	---	---	---	---
Sum of polycyclic aromatic hydrocarbons	200	800	---	---	---	---	---	---	---	---	---	---
Benzo(a)pyrene TEQ (zero)			---	---	---	---	---	---	---	---	---	---
Benzo(a)pyrene TEQ (half LOR)			---	---	---	---	---	---	---	---	---	---
Benzo(a)pyrene TEQ (LOR)			---	---	---	---	---	---	---	---	---	---
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 F												
C6 - C10 Fraction			---	---	---	---	---	---	---	---	---	---
C6 - C10 Fraction minus BTEX (F1)			---	---	---	---	---	---	---	---	---	---
>C10 - C16 Fraction			---	---	---	---	---	---	---	---	---	---
>C16 - C34 Fraction (F3)			---	---	---	---	---	---	---	---	---	---
>C34 - C40 Fraction (F4)			---	---	---	---	---	---	---	---	---	---
>C10 - C40 Fraction (sum)			---	---	---	---	---	---	---	---	---	---
>C10 - C16 Fraction minus Naphthalene (F2)			---	---	---	---	---	---	---	---	---	---
EP080: BTEXN												
Benzene	10	40	---	---	---	---	---	---	---	---	---	---
Toluene	288	1152	---	---	---	---	---	---	---	---	---	---
Ethylbenzene	600	2400	---	---	---	---	---	---	---	---	---	---
meta- & para-Xylene			---	---	---	---	---	---	---	---	---	---
ortho-Xylene			---	---	---	---	---	---	---	---	---	---
Total Xylenes	1000	4000	---	---	---	---	---	---	---	---	---	---
Naphthalene			---	---	---	---	---	---	---	---	---	---

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22-06-21

Table 8:
Waste Classification Total Contaminant Concentrations

	CT1 - General Solid Waste[1]	CT2 - Restricted Solid Waste[1]	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
			S20-Au35794	S20-Au35795	S20-Au35796	S20-Au35797	S20-Au35798	S20-Au35799	S20-Au35801	S20-Au35802	N21-Jn00912	N21-Jn00913
			19-08-2020	19-08-2020	19-08-2020	19-08-2020	19-08-2020	19-08-2020	19-08-20	19-08-20	01-06-21	01-06-21
			RRE_TP05	RRE_TP06	RRE_TP07	RRE_TP08	RRE_TP09	RRE_TP10	RRE_DUP1	RRE_DUP2	TP3a_01	TP3a_02
			Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management
			DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum			Sub-sampling from bulk sample	Sub-sampling from bulk sample
			Composite Sample	Composite Sample	Composite Sample	Composite Sample	Composite Sample	Composite Sample				
Analyte grouping/Analyte												
EA055: Moisture Content												
Moisture Content (dried @ 103°C)			10	9.3	11	14	13	9.3	10	18	---	---
Conductivity (1:5 aqueous extract at 25°C as rec.)			620	300	74	1000	29	38	1000	1200	---	---
pH (1:5 Aqueous extract at 25°C as rec.)			4.2	6.5	5.7	5.1	5	5	4	5.1	---	---
Sulphur			3600	450	2900	12000	3400	2000	12000	4200	---	---
Total Organic Carbon			2.2	0.4	2.7	6.5	1.9	2	0.5	3.2	---	---
EA200: AS 4964 - 2004 Identification of Asbestos in Soils												
Asbestos Detected			---	---	---	---	---	---	---	---	---	---
Asbestos Type			---	---	---	---	---	---	---	---	---	---
Sample weight (dry)			---	---	---	---	---	---	---	---	---	---
Description			---	---	---	---	---	---	---	---	---	---
EG005T: Total Metals by ICP-AES												
Antimony			11	5	5	55	14	18	28	29	---	---
Arsenic	100	400	77	31	40	79	52	66	130	60	---	---
Beryllium			1	1	1	1	1	1	1	1	---	---
Boron			5	5	5	5	5	5	5	5	---	---
Cadmium	20	80	3.5	8	4	**170**	2.4	2.5	5.6	**140**	51	30
Chromium	100	400	34	12	52	130	19	19	81	120	---	---
Cobalt			2.5	2.5	8.2	18	2.5	2.5	12	9.6	---	---
Copper			830	240	580	4100	1200	1300	1300	3400	---	---
Lead	100	400	**4000**	**230**	**1600**	**9200**	**4400**	**5300**	**9100**	9000	---	---
Manganese			230	70	690	720	170	220	660	520	---	---
Mercury	4	16	0.3	0.05	0.2	0.9	0.4	0.4	1	0.9	---	---
Molybdenum	100	400	12	20	2.5	5.6	9.5	11	5.2	5.6	---	---
Nickel	40	160	11	2.5	19	79	8.9	8.1	37	61	---	---
Selenium	20	80	7.7	2.9	2.8	16	12	14	18	16	---	---
Tin			13	5	10	54	34	38	62	53	---	---
Vanadium			69	53	45	67	50	72	76	48	---	---
Zinc			600	1100	1300	12000	570	580	1400	8600	---	---
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons												
Naphthalene			---	---	---	---	---	---	---	---		
Acenaphthylene			---	---	---	---	---	---	---	---	---	---
Acenaphthene			---	---	---	---	---	---	---	---	---	---
Fluorene			---	---	---	---	---	---	---	---	---	---
Phenanthrene			---	---	---	---	---	---	---	---	---	---
Anthracene			---	---	---	---	---	---	---	---	---	---
Fluoranthene			---	---	---	---	---	---	---	---	---	---
Pyrene			---	---	---	---	---	---	---	---	---	---
Benz(a)anthracene			---	---	---	---	---	---	---	---	---	---
Chrysene			---	---	---	---	---	---	---	---	---	---
Benzo(b+j)fluoranthene			---	---	---	---	---	---	---	---	---	---
Benzo(k)fluoranthene			---	---	---	---	---	---	---	---	---	---
Benzo(a)pyrene	0.8	3.2	---	---	---	---	---	---	---	---	---	---

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Table 8:
Waste Classification Total Contaminant Concentrations

	CT1 - General Solid Waste[1]	CT2 - Restricted Solid Waste[1]	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
			S20-Au35794	S20-Au35795	S20-Au35796	S20-Au35797	S20-Au35798	S20-Au35799	S20-Au35801	S20-Au35802	N21-Jn00912	N21-Jn00913
			19-08-2020	19-08-2020	19-08-2020	19-08-2020	19-08-2020	19-08-2020	19-08-20	19-08-20	01-06-21	01-06-21
			RRE_TP05	RRE_TP06	RRE_TP07	RRE_TP08	RRE_TP09	RRE_TP10	RRE_DUP1	RRE_DUP2	TP3a_01	TP3a_02
			Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management
			DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum	DSI Addendum			Sub-sampling from bulk sample	Sub-sampling from bulk sample
			Composite Sample	Composite Sample	Composite Sample	Composite Sample	Composite Sample	Composite Sample				
Indeno(1.2.3.cd)pyrene			---	---	---	---	---	---	---	---	---	---
Dibenz(a.h)anthracene			---	---	---	---	---	---	---	---	---	---
Benzo(g.h.i)perylene			---	---	---	---	---	---	---	---	---	---
Sum of polycyclic aromatic hydrocarbons	200	800	---	---	---	---	---	---	---	---	---	---
Benzo(a)pyrene TEQ (zero)			---	---	---	---	---	---	---	---	---	---
Benzo(a)pyrene TEQ (half LOR)			---	---	---	---	---	---	---	---	---	---
Benzo(a)pyrene TEQ (LOR)			---	---	---	---	---	---	---	---	---	---
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 F												
C6 - C10 Fraction			---	---	---	---	---	---	---	---	---	---
C6 - C10 Fraction minus BTEX (F1)			---	---	---	---	---	---	---	---	---	---
>C10 - C16 Fraction			---	---	---	---	---	---	---	---	---	---
>C16 - C34 Fraction (F3)			---	---	---	---	---	---	---	---	---	---
>C34 - C40 Fraction (F4)			---	---	---	---	---	---	---	---	---	---
>C10 - C40 Fraction (sum)			---	---	---	---	---	---	---	---	---	---
>C10 - C16 Fraction minus Naphthalene (F2)			---	---	---	---	---	---	---	---	---	---
EP080: BTEXN												
Benzene	10	40	---	---	---	---	---	---	---	---	---	---
Toluene	288	1152	---	---	---	---	---	---	---	---	---	---
Ethylbenzene	600	2400	---	---	---	---	---	---	---	---	---	---
meta- & para-Xylene			---	---	---	---	---	---	---	---	---	---
ortho-Xylene			---	---	---	---	---	---	---	---	---	---
Total Xylenes	1000	4000	---	---	---	---	---	---	---	---	---	---
Naphthalene			---	---	---	---	---	---	---	---	---	---

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Table 8:
Waste Classification Total Contaminant Concentrations

	CT1 - General Solid Waste[1]	CT2 - Restricted Solid Waste[1]	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
			N21-Jn00914	N21-Jn00915	N21-Jn00916	N21-Jn00917	N21-Jn00918	N21-Jn00919	N21-Jn00920	N21-Jn00921	N21-Jn00922	N21-Jn00923
			01-06-21	01-06-21	01-06-21	01-06-21	01-06-21	01-06-21	01-06-21	01-06-21	01-06-21	01-06-21
			TP3a_03	TP4a_01	TP4a_02	TP4a_03	TP5a_01	TP5a_02	TP5a_03	TP6a_01	TP6a_02	TP6a_03
			Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management
			Sub-sampling from bulk sample	Sub-sampling from bulk sample	Sub-sampling from bulk sample	Sub-sampling from bulk sample	Sub-sampling from bulk sample	Sub-sampling from bulk sample	Sub-sampling from bulk sample	Sub-sampling from bulk sample	Sub-sampling from bulk sample	Sub-sampling from bulk sample
Analyte grouping/Analyte												
EA055: Moisture Content												
Moisture Content (dried @ 103°C)			---	---	---	---	---	---	---	---	---	---
Conductivity (1:5 aqueous extract at 25°C as rec.)			---	---	---	---	---	---	---	---	---	---
pH (1:5 Aqueous extract at 25°C as rec.)			---	---	---	---	---	---	---	---	---	---
Sulphur			---	---	---	---	---	---	---	---	---	---
Total Organic Carbon			---	---	---	---	---	---	---	---	---	---
EA200: AS 4964 - 2004 Identification of Asbestos in Soils												
Asbestos Detected			---	---	---	---	---	---	---	---	---	---
Asbestos Type			---	---	---	---	---	---	---	---	---	---
Sample weight (dry)			---	---	---	---	---	---	---	---	---	---
Description			---	---	---	---	---	---	---	---	---	---
EG005T: Total Metals by ICP-AES												
Antimony			---	---	---	---	---	---	---	---	---	---
Arsenic	100	400	---	---	---	---	---	---	---	---	---	---
Beryllium			---	---	---	---	---	---	---	---	---	---
Boron			---	---	---	---	---	---	---	---	---	---
Cadmium	20	80	27	190	130	170	430	270	440	12	9.6	7.1
Chromium	100	400	---	---	---	---	---	---	---	---	---	---
Cobalt			---	---	---	---	---	---	---	---	---	---
Copper			---	---	---	---	---	---	---	---	---	---
Lead	100	400	---	---	---	---	---	---	---	---	---	---
Manganese			---	---	---	---	---	---	---	---	---	---
Mercury	4	16	---	---	---	---	---	---	---	---	---	---
Molybdenum	100	400	---	---	---	---	---	---	---	---	---	---
Nickel	40	160	---	---	---	---	---	---	---	---	---	---
Selenium	20	80	---	---	---	---	---	---	---	---	---	---
Tin			---	---	---	---	---	---	---	---	---	---
Vanadium			---	---	---	---	---	---	---	---	---	---
Zinc			---	---	---	---	---	---	---	---	---	---
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons												
Naphthalene												
Acenaphthylene			---	---	---	---	---	---	---	---	---	---
Acenaphthene			---	---	---	---	---	---	---	---	---	---
Fluorene			---	---	---	---	---	---	---	---	---	---
Phenanthrene			---	---	---	---	---	---	---	---	---	---
Anthracene			---	---	---	---	---	---	---	---	---	---
Fluoranthene			---	---	---	---	---	---	---	---	---	---
Pyrene			---	---	---	---	---	---	---	---	---	---
Benz(a)anthracene			---	---	---	---	---	---	---	---	---	---
Chrysene			---	---	---	---	---	---	---	---	---	---
Benzo(b+j)fluoranthene			---	---	---	---	---	---	---	---	---	---
Benzo(k)fluoranthene			---	---	---	---	---	---	---	---	---	---
Benzo(a)pyrene	0.8	3.2	---	---	---	---	---	---	---	---	---	---

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Lead Management
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Table 8:
Waste Classification Total Contaminant Concentrations

	CT1 - General Solid Waste[1]	CT2 - Restricted Solid Waste[1]	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
			N21-Jn00914	N21-Jn00915	N21-Jn00916	N21-Jn00917	N21-Jn00918	N21-Jn00919	N21-Jn00920	N21-Jn00921	N21-Jn00922	N21-Jn00923
			01-06-21	01-06-21	01-06-21	01-06-21	01-06-21	01-06-21	01-06-21	01-06-21	01-06-21	01-06-21
			TP3a_03	TP4a_01	TP4a_02	TP4a_03	TP5a_01	TP5a_02	TP5a_03	TP6a_01	TP6a_02	TP6a_03
			Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management
			Sub-sampling from bulk sample	Sub-sampling from bulk sample	Sub-sampling from bulk sample	Sub-sampling from bulk sample	Sub-sampling from bulk sample	Sub-sampling from bulk sample	Sub-sampling from bulk sample	Sub-sampling from bulk sample	Sub-sampling from bulk sample	Sub-sampling from bulk sample
Indeno(1.2.3.cd)pyrene			---	---	---	---	---	---	---	---	---	---
Dibenz(a.h)anthracene			---	---	---	---	---	---	---	---	---	---
Benzo(g.h.i)perylene			---	---	---	---	---	---	---	---	---	---
Sum of polycyclic aromatic hydrocarbons	200	800	---	---	---	---	---	---	---	---	---	---
Benzo(a)pyrene TEQ (zero)			---	---	---	---	---	---	---	---	---	---
Benzo(a)pyrene TEQ (half LOR)			---	---	---	---	---	---	---	---	---	---
Benzo(a)pyrene TEQ (LOR)			---	---	---	---	---	---	---	---	---	---
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 F												
C6 - C10 Fraction			---	---	---	---	---	---	---	---	---	---
C6 - C10 Fraction minus BTEX (F1)			---	---	---	---	---	---	---	---	---	---
>C10 - C16 Fraction			---	---	---	---	---	---	---	---	---	---
>C16 - C34 Fraction (F3)			---	---	---	---	---	---	---	---	---	---
>C34 - C40 Fraction (F4)			---	---	---	---	---	---	---	---	---	---
>C10 - C40 Fraction (sum)			---	---	---	---	---	---	---	---	---	---
>C10 - C16 Fraction minus Naphthalene (F2)			---	---	---	---	---	---	---	---	---	---
EP080: BTEXN												
Benzene	10	40	---	---	---	---	---	---	---	---	---	---
Toluene	288	1152	---	---	---	---	---	---	---	---	---	---
Ethylbenzene	600	2400	---	---	---	---	---	---	---	---	---	---
meta- & para-Xylene			---	---	---	---	---	---	---	---	---	---
ortho-Xylene			---	---	---	---	---	---	---	---	---	---
Total Xylenes	1000	4000	---	---	---	---	---	---	---	---	---	---
Naphthalene			---	---	---	---	---	---	---	---	---	---

2019 - 2020 analytical data sourced from *Tarago Rail Corridor and Tarago Area Detailed Site Investigation (Ramboll 2020a)* and the *Tarago Rail Corridor and Tarago Area Detailed Site Investigation Addendum* (Ramboll 2020e). 2021 data sourced by sub-sampling bulk samples collected in 2020 and held by Ramboll.

[1] Maximum values of specific contaminant concentration (SCC) for classific

[2] Assumed chromium VI

LOR = Limit of Reporting

Concentrations below the LOR noted as <value

Concentrations in a grey box exceed CT1 screening criteria

Concentrations in **red font** exceed CT2 screening

Underlined values were reported <LOR and have been halved to allow for c

Client: John Holland Rail
Job No: 318000780
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Table 9:
Cadmium Leachate

	TCLP1 - General Solid Waste[1]	Sample Type:		Soil Leachate	Soil Leachate	Soil Leachate	Soil Leachate	Soil Leachate	Soil Leachate
		Lab Sample number:		N21-Jn00956	N21-Jn00957	N21-Jn00958	N21-Jn00959	N21-Jn00960	N21-Jn00961
		Sample date:		01-06-21	01-06-21	01-06-21	01-06-21	01-06-21	01-06-21
		Sample ID:		TP3a_01	TP3a_02	TP3a_03	TP4a_01	TP4a_02	TP4a_03
		Project Name:		Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management
		Sampling Method:		Sub-sampling from bulk sample	Sub-sampling from bulk sample	Sub-sampling from bulk sample	Sub-sampling from bulk sample	Sub-sampling from bulk sample	Sub-sampling from bulk sample
		Sample Description							
Analyte grouping/Analyte		**Units**	**LOR**						
EG005T: Total Metals by ICP-AES									
Cadmium	20	mg/kg	0.4	0.63	0.58	0.44	1.2	0.92	0.91

2021 data sourced by sub-sampling bulk samples collected in 2020 and held by Ramboll.
[1] Maximum TCLP contaminant concentration for GSW
LOR = Limit of Reporting
Concentrations below the LOR noted as <value
Concentrations in a grey box

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Lead Management
22-06-21

Table 9:
Cadmium Leachate

	TCLP1 - General Solid Waste[1]	Sample Type:		Soil Leachate	Soil Leachate	Soil Leachate	Soil Leachate	Soil Leachate	Soil Leachate
		Lab Sample number:		N21-Jn00962	N21-Jn00963	N21-Jn00964	N21-Jn00965	N21-Jn00966	N21-Jn00967
		Sample date:		01-06-21	01-06-21	01-06-21	01-06-21	01-06-21	01-06-21
		Sample ID:		TP5a_01	TP5a_02	TP5a_03	TP6a_01	TP6a_02	TP6a_03
		Project Name:		Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management	Tarago Lead Management
		Sampling Method:		Sub-sampling from bulk sample	Sub-sampling from bulk sample	Sub-sampling from bulk sample	Sub-sampling from bulk sample	Sub-sampling from bulk sample	Sub-sampling from bulk sample
		Sample Description							
Analyte grouping/Analyte		**Units**	**LOR**						
EG005T: Total Metals by ICP-AES									
Cadmium	20	mg/kg	0.4	0.33	0.35	0.36	0.22	0.19	0.19

2021 data sourced by sub-sampling bulk samples collected ir

[1] Maximum TCLP contaminant concentration for GSW

LOR = Limit of Reporting

Concentrations below the LOR noted as <value

Concentrations in a grey box

Table 10: Rail Sleeper Results

	NEPM 2013 HIL D Commercial / Industrial	Sample Type:	Primary	Primary	Primary	Primary	Duplicate
		Sample number:	S20-Ma28575	S20-Ma28576	S20-Ma28577	S20-Ma28578	S20-Ma28579
		Sample date:	18-Mar-20	18-Mar-20	18-Mar-20	18-Mar-20	18-Mar-20
		Sample ID:	SLE01	SLE02	SLE03	SLE04	D01_180320
		Project Name:	John Holland	John Holland	John Holland	John Holland	John Holland
		Compound:					
		Site:	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop
		Sampling Method:	NA	NA	NA	NA	NA
		Sample Description	Woodchips	Woodchips	Woodchips	Woodchips	Woodchips

Analyte grouping/Analyte		Units	LOR					
Total Metals								
Arsenic	**3000**	mg/kg	5	< 2	6.9	6.5	< 2	4.6
Cadmium	**900**	mg/kg	1	15	11	7.6	11	11
Chromium (VI)	**3600**	mg/kg	2	< 5	11	14	< 5	< 5
Copper	**240000**	mg/kg	5	140	430	1700	230	590
Lead	**2200**[a]	mg/kg	5	240	1300	1300	560	**2700**
Mercury	**6000**	mg/kg	0.1	< 0.1	< 0.1	0.2	< 0.1	< 0.1
Nickel	**400000**	mg/kg	2	< 5	11	11	5.7	< 5
Zinc		mg/kg	5	2800	1200	1300	1100	1300
Organophosphorus Pesticides (OP)								
Azinphos-methyl		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Bolstar		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chlorfenvinphos		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chlorpyrifos	**2000**	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chlorpyrifos-methyl		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Coumaphos		mg/kg	< 2	< 2	< 2	< 2	< 2	< 2
Demeton-O		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Demeton-S		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Diazinon		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dichlorvos		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dimethoate		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Disulfoton		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
EPN		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Ethion		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Ethoprop		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Ethyl parathion		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Fenitrothion		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Fensulfothion		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Fenthion		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Malathion		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Merphos		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Methyl parathion		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Mevinphos		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Monocrotophos		mg/kg	< 2	< 2	< 2	< 2	< 2	< 2
Naled		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Omethoate		mg/kg	< 2	< 2	< 2	< 2	< 2	< 2
Phorate		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Pirimiphos-methyl		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Pyrazophos		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Ronnel		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Terbufos		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Tetrachlorvinphos		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Tokuthion		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Trichloronate		mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Polynuclear Aromatic Hydrocarbons								
Acenaphthene		mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene		mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene		mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene		mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene		mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (lower bound) *	**40**	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *		mg/kg	< 0.6	0.6	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *		mg/kg	< 0.7	1.2	1.2	1.2	1.2	1.2
Benzo(b&j)fluoranthene		mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene		mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene		mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene		mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene		mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene		mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene		mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene		mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene		mg/kg	< 0.6	1.7	1.1	0.5	< 0.5	< 0.5
Phenanthrene		mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene		mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Total PAH*	**4000**	mg/kg	< 0.6	1.7	1.1	0.5	< 0.5	< 0.5
TRH - 1999 NEPM Fractions (after silica gel clean-up)								
TRH C10-C14 (after silica gel clean-up)		mg/kg	< 100	< 100	< 100	< 100	220	< 100
TRH C10-C36 (Total) (after silica gel clean-up)	**10000**	mg/kg	< 250	1200	< 250	750	< 250	2110
TRH C15-C28 (after silica gel clean-up)		mg/kg	< 250	300	< 250	320	< 250	510
TRH C29-C36 (after silica gel clean-up)		mg/kg	< 250	900	< 250	430	< 250	1600
Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
TRH >C10-C16 (after silica gel clean-up)		mg/kg	< 250	< 250	< 250	< 250	< 250	< 250
TRH >C16-C34 (after silica gel clean-up)		mg/kg	< 500	1100	< 500	650	< 500	1700
TRH >C34-C40 (after silica gel clean-up)		mg/kg	< 500	< 500	< 500	< 500	< 500	840

Blank Cell indicates no criterion available

LOR = Limit of Reporting

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

CRC Care Technical Report no.10, *Health Screening Levels for petroleum hydrocarbons in soil and groundwater* September 2011

[a] Human Health Guideline for Lead adopted from the Human Health Risk Assessment (Ramboll 2019d)

Health Investigation Levels for chromium based on chromium (VI)

Chromium (III) EIL, based on a low clay content (% clay) of 1%

Client: John Holland Rail
Job No: 318000780
Project Name: Targo Lead Management Plan
22-06-21

Table 11:
Groundwater Monitoring Well Soil Results

	NEPM 2013 HIL D Commercial / Industrial	NEPM EIL Commercial / Industrial (site specific)	NEPM 2013 HIL C Open Space	NEPM 2013 EIL Residential / public Open Space	Sample Type:		Soil	Soil	Soil	Soil	Soil	Soil	Soil
					Site:		Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor
					Lab Sample number:		M20-Ma43430	M20-Ma43431	M20-Ma43432	M20-Ma43433	M20-Ma43434	M20-Ma43435	M20-Ma43436
					Sample date:		18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20
					Sample ID:		MW01_0.5	MW01_1.5	MW01_2.5	MW01_3.5	MW01_4.5	MW2_0-0.05	MW2_1.0
					Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
					Sampling Method:		Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig
Analyte grouping/Analyte					**Units**	**LOR**							
LTM-GEN-7080 Moisture													
Moisture Content (dried @ 103°C)					%	--	14	12	8.7	7.8	14	< 1	5.5
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS													
Lead	2200[e]	1800	600	1100	mg/kg	5	13	16	15	26	24	51	**3600**

LOR = Limit of Reporting

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

Concentration in **red** font and grey box exceed the adopted HIL/HSL 'D' for Commercial/Industrial use (Applicable for MW01, MW02, MW03 and MW04)
Concentration in **orange** font and grey box exceed the adopted EIL/ESL 'D' for Commercial/Industrial use (Applicable for MW01, MW02, MW03 and MW04)
Concentration in **blue** font and grey box exceed the adopted HIL/HSL 'C' for Open Space and Recreational Land Use (Applicable for MW5, MW6 and MW7)
Concentration in **green** font and grey box exceed the adopted EIL/ESL 'C' for Residential and Open Space and Recreational Land Use (Applicable for MW5, MW6 and MW7)

Concentrations in box exceed the screening value >2.5 times

Where one or more guideline value is exceeded, the highest guideline exceeded will be highlighted

Underlined values were reported <LOR and have been halved to allow for comparison of data.

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Lead Management Plan
22-06-21

Table 11:
Groundwater Monitoring Well Soil Results

Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Rail Corridor	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**
M20-Ma43437	M20-Ma43438	M20-Ma43439	M20-Ma43440	M20-Ma43441	M20-Ma43442	M20-Ma43443	M20-Ma43444	M20-Ma43445	M20-Ma43583	M20-Ma43584	M20-Ma43446	M20-Ma43447	M20-Ma43448
18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	18-03-20	19-03-20	19-03-20	19-03-20
MW2_1.5	MW2_2.5	MW2_3.5	MW2_4.5	MW3_0.5	MW3_1.0	MW3_1.5	MW3_2.5	MW3_3.5	MW3_4.5	MW2_0.5	MW4_0-0.05	MW4_0.5	MW4_1.0
Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig
4.9	4.4	7	7.9	9.3	8.4	10	9.1	12	15	5.5	3.1	6.5	3.6
540	200	140	42	25	18	16	15	15	22	27	1200	390	31

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Lead Management Plan
22-06-21

Table 11:
Groundwater Monitoring Well Soil Results

Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Rail Corridor	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**
M20-Ma43449	M20-Ma43450	M20-Ma43451	M20-Ma43452	M20-Ma43453	M20-Ma43454	M20-Ma43455	M20-Ma43456	M20-Ma43457	M20-Ma43458	M20-Ma43459	M20-Ma43460	M20-Ma43461	M20-Ma43462
19-03-20	19-03-20	19-03-20	19-03-20	19-03-20	19-03-20	19-03-20	19-03-20	19-03-20	19-03-20	19-03-20	19-03-20	19-03-20	19-03-20
MW4_1.5	MW4_2.5	MW4_3.5	MW4_4.5	MW5_0.05	MW5_0.5	MW5_1.0	MW5_1.5	MW5_3.5	MW5_4.5	MW6_0.05	MW6_0.5	MW6_1.0	MW6_1.5
Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig
8.3	14	6.6	12	5.1	8.1	3.2	4.4	6.2	5.3	14	9	2.9	6.6
19	21	30	27	120	190	13	20	22	28	57	25	21	18

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Lead Management Plan
22-06-21

Table 11:
Groundwater Monitoring Well Soil Results

Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Rail Corridor	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**	**Rail Corridor**
M20-Ma43463	M20-Ma43464	M20-Ma43465	M20-Ma43585	M20-Ma43466	M20-Ma43467	M20-Ma43468	M20-Ma43469	M20-Ma43470	M20-Ma43471	M20-Ma43472
19-03-20	19-03-20	19-03-20	19-03-20	20-03-20	20-03-20	20-03-20	20-03-20	20-03-20	20-03-20	20-03-20
MW6_2.5	MW6_3.5	MW6_4.5	MW5_2.5	MW7_0.05	MW7_0.5	MW7_1.0	MW7_1.5	MW7_2.5	MW7_3.5	MW7_4.5
Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig	Drill Rig
4.1	7.5	5.8	5.5	7.6	8.9	7.2	9.9	17	13	< 1
14	19	28	21	210	43	52	18	43	44	20

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Lead Management
22-06-21

Table 12:
Groundwater Monitoring Well Results

	NHMRC Australian Drinking Water Guidelines[A]	ANZECC Fresh Water Guidelines - 95% Species Protection[B]	ANZECC Fresh Water Guidelines - Irrigation[B]	ANZECC Fresh Water Guidelines - Stock Water[B]	Sample Type:		Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater
					Site:		Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Rail Corridor	Goulburn Street	Wallace Street	Wallace Street
					Lab Sample number:		S20-Ap16796	S20-Ap16797	S20-Ap16798	S20-Ap16799	S20-Ap16800	S20-Ma43288	S20-Ma43289	S20-Ma43290
					Sample date:		02-04-20	02-04-20	02-04-20	02-04-20	02-04-20	27-03-20	27-03-20	27-03-20
					Sample ID:		MW1	MW2	MW3	MW4	GW053976	MW05	MW06	MW07
					Project Name:		Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI	Community DSI
					Sampling Method:		Peristaltic	Peristaltic	Peristaltic	Peristaltic	Peristaltic	Peristaltic	Peristaltic	Peristaltic
Analyte grouping/Analyte					**Units**	**LOR**								
LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS														
Aluminium (filtered)	0.01	0.055	20	5	mg/L	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	--	--	--
Arsenic (filtered)	0.01	0.024	2	0.5	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.005	< 0.001	< 0.001	0.003
Barium (filtered)	2				mg/L	0.02	0.14	0.16	0.08	0.11	0.05	--	--	--
Beryllium (filtered)	0.06		0.5		mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Boron (filtered)	4				mg/L	0.05	--	--	--	--	--	< 0.05	< 0.05	< 0.05
Cadmium (filtered)	0.002	0.0002	0.002	0.01	mg/L	0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	0.0002	**0.0003**	< 0.0002	< 0.0002
Chromium (filtered)	0.05	0.001	0.05	1	mg/L	0.001	< 0.001	< 0.001	< 0.001	**0.002**	< 0.001	< 0.001	< 0.001	< 0.001
Cobalt (filtered)		0.0014	0.1	1	mg/L	0.001	**0.004**	**0.006**	**0.029**	**0.006**	< 0.001	0.001	< 0.001	**0.006**
Copper (filtered)	2	0.0014	5	0.4	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	**0.003**	0.001	< 0.001	< 0.001
Lead (filtered)	0.01	0.0034	5	0.1	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	**0.005**	0.002	< 0.001	< 0.001
Manganese (filtered)	0.5	1.9	10		mg/L	0.005	0.77	0.6	**2**	0.71	0.02	0.085	0.026	1.4
Mercury (filtered)	0.001	0.00006	0.002	0.002	mg/L	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Nickel (filtered)	0.02	0.011	2	1	mg/L	0.001	0.003	0.003	0.003	0.004	< 0.001	0.001	< 0.001	0.002
Selenium (filtered)	0.01				mg/L	0.001	--	--	--	--	--	< 0.001	< 0.001	< 0.001
Zinc (filtered)		0.008	5	20	mg/L	0.005	**0.01**	**0.011**	**0.022**	**0.011**	**0.27**	**0.044**	0.007	< 0.005

LOR = Limit of Reporting

Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG 2018)

Australia and New Zealand Environment and Conservation Council (2000) Australian and New Zealand Guidelines for Fresh and Marine Water Quality.

[A]NRMMC (2011 updated 2018) Australian Drinking Water Guidelines (ADWG) Paper 6 National Water Quality Management Strategy.
National Health and Medical Research Council.

Concentration in **green bold** font exceed the ANZG 2018 95% Species Protection

Where one or more guideline value is exceeded, the highest guideline exceeded will be highlighted

APPENDIX 3
LABORATORY REPORT FOR ADDITIONAL DELINEATION SAMPLING

eurofins | Environment Testing

ABN: 50 005 085 521 web: www.eurofins.com.au email: EnviroSales@eurofins.com

Australia

Melbourne
6 Monterey Road
Dandenong South VIC 3175
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

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

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

Perth
2/91 Leach Highway
Kewdale WA 6105
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

Newcastle
4/52 Industrial Drive
Mayfield East NSW 2304
PO Box 60 Wickham 2293
Phone : +61 2 4968 8448

New Zealand

Auckland
35 O'Rorke Road
Penrose, Auckland 1061
Phone : +64 9 526 45 51
IANZ # 1327

Christchurch
43 Detroit Drive
Rolleston, Christchurch 7675
Phone : 0800 856 450
IANZ # 1290

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: SOIL
Project ID: 318000780-A

Order No.:
Report #: 778274
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Mar 4, 2021 12:18 PM
Due: Mar 11, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Lead	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271							
Sydney Laboratory - NATA Site # 18217						X	X
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 23736							
Mayfield Laboratory							
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	SS202	Mar 02, 2021		Soil	S21-Ma10625	X	X
2	SS203	Mar 02, 2021		Soil	S21-Ma10626	X	X
Test Counts						2	2

Ramboll Environ Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

NATA Accredited
Accreditation Number 1261
Site Number 18217

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

Attention: **Stephen Maxwell**

Report **778274-S**
Project name SOIL
Project ID 318000780-A
Received Date Mar 04, 2021

Client Sample ID			**SS202**	**SS203**
Sample Matrix			**Soil**	**Soil**
Eurofins Sample No.			**S21-Ma10625**	**S21-Ma10626**
Date Sampled			**Mar 02, 2021**	**Mar 02, 2021**
Test/Reference	LOR	Unit		
Heavy Metals				
Lead	5	mg/kg	350	28
% Moisture	1	%	5.9	< 1

Sample History

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

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

Description	Testing Site	Extracted	Holding Time
Heavy Metals	Sydney	Mar 07, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
% Moisture	Sydney	Mar 04, 2021	14 Days
- Method: LTM-GEN-7080 Moisture			

eurofins | Environment Testing

ABN: 50 005 085 521 web: www.eurofins.com.au email: EnviroSales@eurofins.com

Australia

Melbourne
6 Monterey Road
Dandenong South VIC 3175
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

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

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

Perth
2/91 Leach Highway
Kewdale WA 6105
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

Newcastle
4/52 Industrial Drive
Mayfield East NSW 2304
PO Box 60 Wickham 2293
Phone : +61 2 4968 8448

New Zealand

Auckland
35 O'Rorke Road
Penrose, Auckland 1061
Phone : +64 9 526 45 51
IANZ # 1327

Christchurch
43 Detroit Drive
Rolleston, Christchurch 7675
Phone : 0800 856 450
IANZ # 1290

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: SOIL
Project ID: 318000780-A

Order No.:
Report #: 778274
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Mar 4, 2021 12:18 PM
Due: Mar 11, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Lead	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271							
Sydney Laboratory - NATA Site # 18217						X	X
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 23736							
Mayfield Laboratory							
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	SS202	Mar 02, 2021		Soil	S21-Ma10625	X	X
2	SS203	Mar 02, 2021		Soil	S21-Ma10626	X	X
Test Counts						2	2

eurofins | Environment Testing

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

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

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

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

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

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

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

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

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

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

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

Results <10 times the LOR : No Limit

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

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

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

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

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

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Lab Sample ID	QA Source	Units	Result 1	Result 2	RPD	Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Heavy Metals									
Lead			mg/kg	< 5			5	Pass	
LCS - % Recovery									
Heavy Metals									
Lead			%	102			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Heavy Metals				Result 1					
Lead	S21-Ma07313	NCP	%	105			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S21-Ma10593	NCP	%	15	14	9.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S21-Ma10626	CP	mg/kg	28	37	29	30%	Pass	

Comments

Sample Integrity

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

Authorised by:

Andrew Black	Analytical Services Manager
John Nguyen	Senior Analyst-Metal (NSW)

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

Measurement uncertainty of test data is available on request or please click here.

APPENDIX 4
PSD ANALYSES OF WOODLAWN SIDING BALLAST

SESL AUSTRALIA
Environment & Soil Sciences

Particle Size Distribution

- Australian Standard sieves

Sample Drop Off: 16 Chilvers Road, Thornleigh NSW 2120
Mailing Address: PO Box 357, Pennant Hills NSW 1715
Tel: 1300 30 40 80
Fax: 1300 64 46 89
Em: info@sesl.com.au
Web: www.sesl.com.au

Batch N°: 59642	Sample N°: 1	Date Received: 10/3/21	Report Status: Final

Client Name:	**Eurofins Environment Testing Australia Pty Ltd - VIC**	Project Name:	**Ref: 778817**
		SESL Quote N°:	
Client Contact:	**Harry Bacalis**	Sample Name:	**BAL_01 / 21-Ma15043**
Client Order N°:	**21-434-1176-778817**	Description:	**Soil**
Address:	6 Monterey Road Dandenong South **VIC 3175**	Test Type:	**SIEVE_AS_Dry**

SUMMARY

Analysed by SESL Australia Pty Ltd, NATA # 15633.

Results only requested.

Recommendations by SESL Australia not requested.

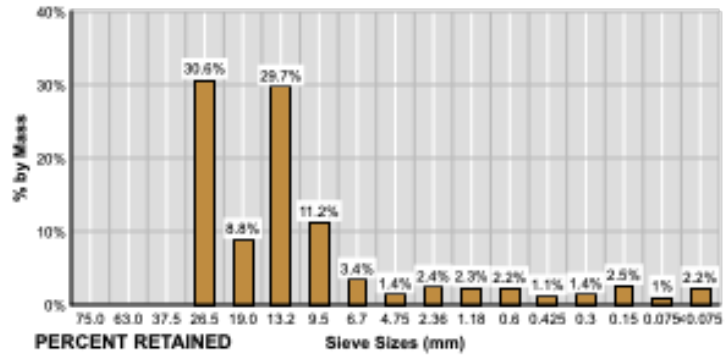
D VALUES

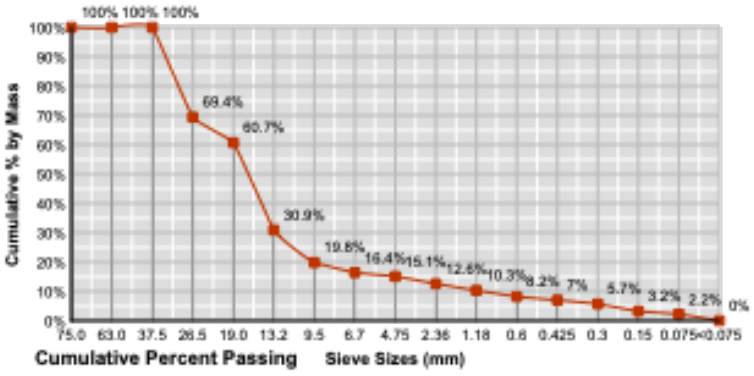
D_{95}:	35.7
D_{90}:	33.9
D_{85}:	32.1
D_{60}:	18.9
D_{50}:	16.9
D_{15}:	4.7
D_{10}:	1.09
D_5:	0.259

PERFORMANCE FACTORS

Gradation Index (D_{90}/D_{10}):	31.00
Coefficient of Uniformity: (D_{60}/D_{10})	17.00

PARTICLE SIZE DISTRIBUTION GRAPH





PARTICLE SIZE ANALYSIS

Sieve (mm)	Fraction	% Retained by mass	% Passing by mass
75.0	Cobbles	0	100
63.0	Very Coarse Gravel	0	100
37.5	Coarse Gravel	0	100
26.5	Coarse Gravel	30.57	69.43
19.0	Medium Gravel	8.77	60.65
13.2	Medium Gravel	29.71	30.94
9.5	Medium Gravel	11.15	19.79
6.7	Fine Gravel	3.35	16.43
4.75	Fine Gravel	1.38	15.05
2.36	Fine Gravel	2.44	12.61
1.18	Very Coarse Sand	2.29	10.32
0.6	Medium Sand	2.16	8.16
0.425	Medium Sand	1.13	7.03
0.3	Medium Sand	1.35	5.68
0.15	Fine Sand	2.47	3.21
0.075	Fine Sand	1.04	2.17
<0.075	Fine Particles	2.17	N/A

Consultant: Neena Goundar

Authorised Signatory: Simon Leake

Date Report Generated 17/03/2021

Method Reference: SESL PM 0001 : Particle Size Analysis

SESL AUSTRALIA
Environment & Soil Sciences

Particle Size Distribution

- Australian Standard sieves

Sample Drop Off: 16 Chilvers Road, Thornleigh NSW 2120
Mailing Address: PO Box 357, Pennant Hills NSW 1715
Tel: 1300 30 40 80
Fax: 1300 64 46 89
Em: info@sesl.com.au
Web: www.sesl.com.au

Batch N°: 59642	Sample N°: 2	Date Received: 10/3/21	Report Status: Final

Client Name:	**Eurofins Environment Testing Australia Pty Ltd - VIC**	Project Name:	**Ref: 778817**
		SESL Quote N°:	
Client Contact:	**Harry Bacalis**	Sample Name:	**BAL_02 / 21-Ma15044**
Client Order N°:	**21-434-1176-778817**	Description:	**Soil**
Address:	6 Monterey Road Dandenong South **VIC 3175**	Test Type:	**SIEVE_AS_Dry**

SUMMARY

Analysed by SESL Australia Pty Ltd, NATA # 15633.

Results only requested.

Recommendations by SESL Australia not requested.

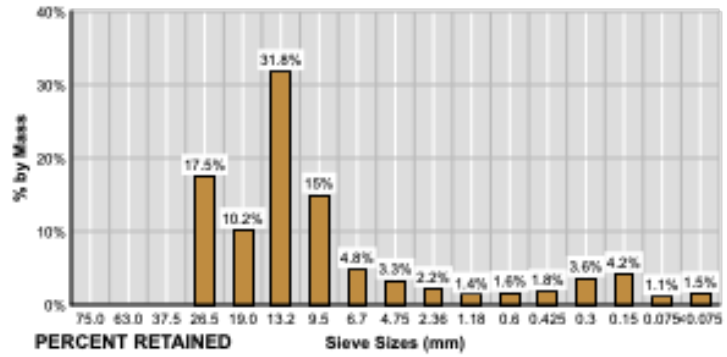
D VALUES

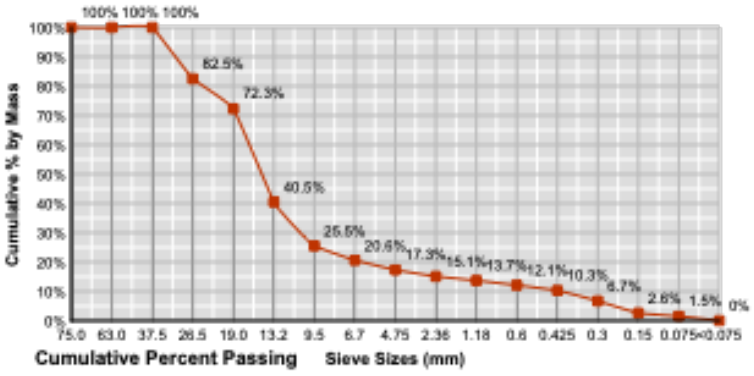
D_{95}:	34.4
D_{90}:	31.2
D_{85}:	28.1
D_{60}:	16.8
D_{50}:	14.9
D_{15}:	2.25
D_{10}:	0.415
D_5:	0.238

PERFORMANCE FACTORS

Gradation Index (D_{90}/D_{10}):	75.00
Coefficient of Uniformity: (D_{60}/D_{10})	40.00

PARTICLE SIZE DISTRIBUTION GRAPH





PARTICLE SIZE ANALYSIS

Sieve (mm)	Fraction	% Retained by mass	% Passing by mass
75.0	Cobbles	0	100
63.0	Very Coarse Gravel	0	100
37.5	Coarse Gravel	0	100
26.5	Coarse Gravel	17.54	82.46
19.0	Medium Gravel	10.2	72.26
13.2	Medium Gravel	31.78	40.48
9.5	Medium Gravel	15.03	25.45
6.7	Fine Gravel	4.84	20.61
4.75	Fine Gravel	3.3	17.31
2.36	Fine Gravel	2.18	15.13
1.18	Very Coarse Sand	1.4	13.73
0.6	Medium Sand	1.63	12.1
0.425	Medium Sand	1.83	10.28
0.3	Medium Sand	3.56	6.72
0.15	Fine Sand	4.16	2.56
0.075	Fine Sand	1.07	1.48
<0.075	Fine Particles	1.48	N/A

Consultant: Neena Goundar

Authorised Signatory: Simon Leake

Date Report Generated 17/03/2021

Method Reference: SESL PM 0001 : Particle Size Analysis

SESL AUSTRALIA
Environment & Soil Sciences

Particle Size Distribution

- Australian Standard sieves

Sample Drop Off: 16 Chilvers Road
Thornleigh NSW 2120
Tel: 1300 30 40 80
Fax: 1300 64 46 89

Mailing Address: PO Box 357
Pennant Hills NSW 1715
Em: info@sesl.com.au
Web: www.sesl.com.au

Batch N°: 59642	**Sample N°: 3**	**Date Received: 10/3/21**	**Report Status: Final**

Client Name: **Eurofins Environment Testing Australia Pty Ltd - VIC**
Client Contact: **Harry Bacalis**
Client Order N°: **21-434-1176-778817**
Address: 6 Monterey Road Dandenong South **VIC 3175**

Project Name: **Ref: 778817**
SESL Quote N°:
Sample Name: **BAL_03 / 21-Ma15045**
Description: **Soil**
Test Type: **SIEVE_AS_Dry**

SUMMARY

Analysed by SESL Australia Pty Ltd, NATA # 15633.

Results only requested.

Recommendations by SESL Australia not requested.

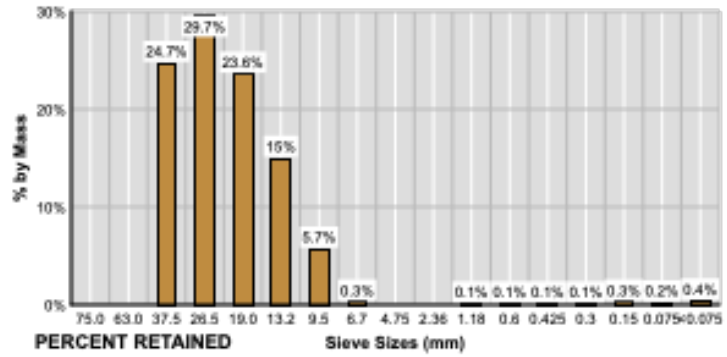
D VALUES

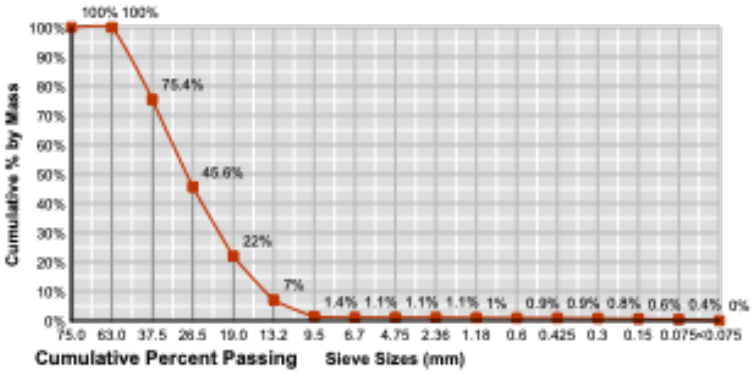
D_{95}:	57.8
D_{90}:	52.7
D_{85}:	47.5
D_{60}:	31.8
D_{50}:	28.1
D_{15}:	16.3
D_{10}:	14.4
D_5:	11.9

PERFORMANCE FACTORS

Gradation Index (D_{90}/D_{10}):	3.70
Coefficient of Uniformity: (D_{60}/D_{10})	2.20

PARTICLE SIZE DISTRIBUTION GRAPH





PARTICLE SIZE ANALYSIS

Sieve (mm)	Fraction	% Retained by mass	% Passing by mass
75.0	Cobbles	0	100
63.0	Very Coarse Gravel	0	100
37.5	Coarse Gravel	24.65	75.35
26.5	Coarse Gravel	29.74	45.62
19.0	Medium Gravel	23.61	22.01
13.2	Medium Gravel	14.99	7.02
9.5	Medium Gravel	5.65	1.36
6.7	Fine Gravel	0.25	1.11
4.75	Fine Gravel	0.03	1.09
2.36	Fine Gravel	0.02	1.07
1.18	Very Coarse Sand	0.07	1
0.6	Medium Sand	0.06	0.94
0.425	Medium Sand	0.05	0.89
0.3	Medium Sand	0.08	0.81
0.15	Fine Sand	0.26	0.55
0.075	Fine Sand	0.16	0.39
<0.075	Fine Particles	0.39	N/A

Consultant:
Neena Goundar

Authorised Signatory:
Simon Leake

Date Report Generated
17/03/2021

Method Reference: SESL PM 0001 : Particle Size Analysis

SESL AUSTRALIA
Environment & Soil Sciences

Particle Size Distribution

- Australian Standard sieves

Sample Drop Off: 16 Chilvers Road
Thornleigh NSW 2120
Tel: 1300 30 40 80
Fax: 1300 64 46 89

Mailing Address: PO Box 357
Pennant Hills NSW 1715
Em: info@sesl.com.au
Web: www.sesl.com.au

Batch N°: 59642	**Sample N°: 4**	**Date Received: 10/3/21**	**Report Status: Final**

Client Name: **Eurofins Environment Testing Australia Pty Ltd - VIC**
Client Contact: **Harry Bacalis**
Client Order N°: **21-434-1176-778817**
Address: 6 Monterey Road Dandenong South **VIC 3175**

Project Name: **Ref: 778817**
SESL Quote N°:
Sample Name: **BAL_04 / 21-Ma15046**
Description: **Soil**
Test Type: **SIEVE_AS_Dry**

SUMMARY

Analysed by SESL Australia Pty Ltd, NATA # 15633.

Results only requested.

Recommendations by SESL Australia not requested.

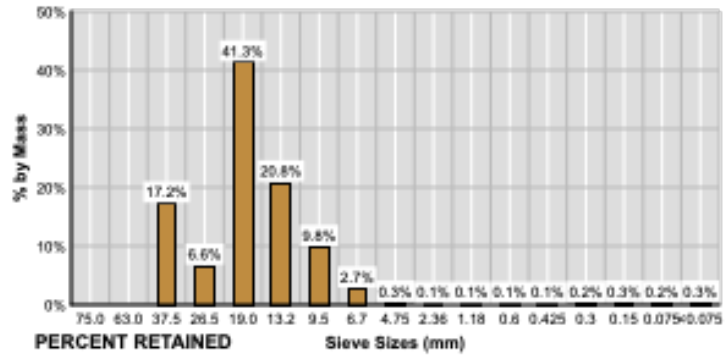
D VALUES

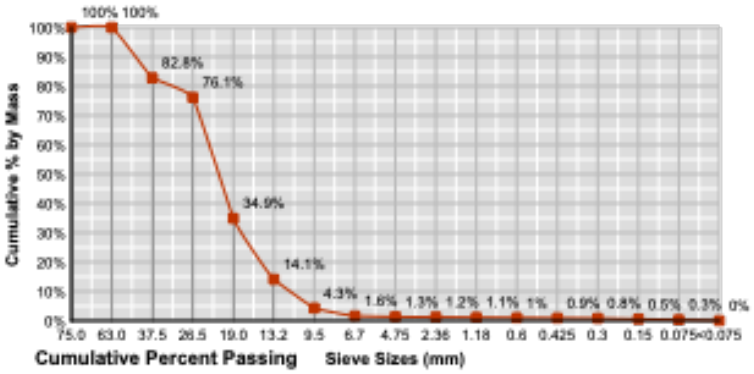
D_{95}:	55.6
D_{90}:	48.2
D_{85}:	40.8
D_{60}:	23.6
D_{50}:	21.8
D_{15}:	13.5
D_{10}:	11.7
D_5:	9.78

PERFORMANCE FACTORS

Gradation Index (D_{90}/D_{10}):	4.10
Coefficient of Uniformity: (D_{60}/D_{10})	2.00

PARTICLE SIZE DISTRIBUTION GRAPH





PARTICLE SIZE ANALYSIS

Sieve (mm)	Fraction	% Retained by mass	% Passing by mass
75.0	Cobbles	0	100
63.0	Very Coarse Gravel	0	100
37.5	Coarse Gravel	17.23	82.77
26.5	Coarse Gravel	6.64	76.13
19.0	Medium Gravel	41.27	34.86
13.2	Medium Gravel	20.81	14.05
9.5	Medium Gravel	9.78	4.27
6.7	Fine Gravel	2.69	1.58
4.75	Fine Gravel	0.28	1.29
2.36	Fine Gravel	0.1	1.19
1.18	Very Coarse Sand	0.12	1.07
0.6	Medium Sand	0.09	0.98
0.425	Medium Sand	0.07	0.9
0.3	Medium Sand	0.15	0.75
0.15	Fine Sand	0.26	0.49
0.075	Fine Sand	0.15	0.34
<0.075	Fine Particles	0.34	N/A

Consultant: Neena Goundar

Authorised Signatory: Simon Leake

Date Report Generated 17/03/2021

Method Reference: SESL PM 0001 : Particle Size Analysis

SESL AUSTRALIA
Environment & Soil Sciences

Particle Size Distribution

- Australian Standard sieves

Sample Drop Off: 16 Chilvers Road
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Tel: 1300 30 40 80
Fax: 1300 64 46 89

Mailing Address: PO Box 357
Pennant Hills NSW 1715
Em: info@sesl.com.au
Web: www.sesl.com.au

Batch N°: 59642	**Sample N°: 5**	**Date Received: 10/3/21**	**Report Status: Final**

Client Name: **Eurofins Environment Testing Australia Pty Ltd - VIC**
Client Contact: **Harry Bacalis**
Client Order N°: **21-434-1176-778817**
Address: 6 Monterey Road Dandenong South **VIC 3175**

Project Name: **Ref: 778817**
SESL Quote N°:
Sample Name: **BAL_05 / 21-Ma15047**
Description: **Soil**
Test Type: **SIEVE_AS_Dry**

SUMMARY

Analysed by SESL Australia Pty Ltd, NATA # 15633.

Results only requested.

Recommendations by SESL Australia not requested.

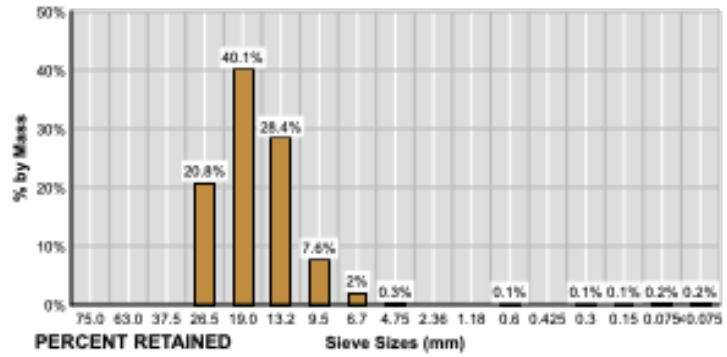
D VALUES

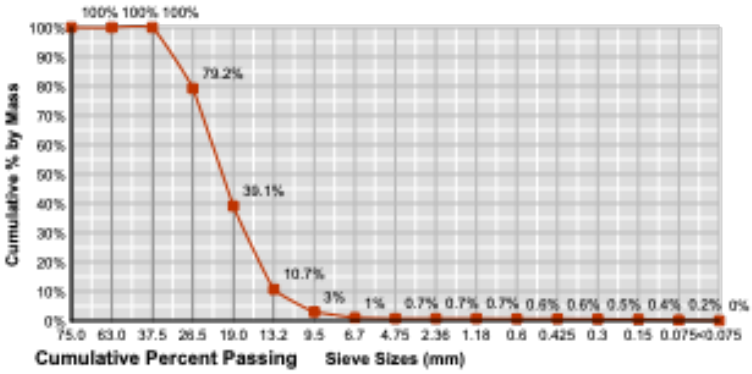
D_{95}:	34.9
D_{90}:	32.2
D_{85}:	29.6
D_{60}:	22.9
D_{50}:	21
D_{15}:	14.1
D_{10}:	12.9
D_5:	10.5

PERFORMANCE FACTORS

Gradation Index (D_{90}/D_{10}):	2.50
Coefficient of Uniformity: (D_{60}/D_{10})	1.80

PARTICLE SIZE DISTRIBUTION GRAPH





PARTICLE SIZE ANALYSIS

Sieve (mm)	Fraction	% Retained by mass	% Passing by mass
75.0	Cobbles	0	100
63.0	Very Coarse Gravel	0	100
37.5	Coarse Gravel	0	100
26.5	Coarse Gravel	20.81	79.19
19.0	Medium Gravel	40.08	39.11
13.2	Medium Gravel	28.43	10.68
9.5	Medium Gravel	7.64	3.03
6.7	Fine Gravel	2.01	1.02
4.75	Fine Gravel	0.32	0.7
2.36	Fine Gravel	0	0.7
1.18	Very Coarse Sand	0.04	0.65
0.6	Medium Sand	0.05	0.6
0.425	Medium Sand	0.03	0.57
0.3	Medium Sand	0.05	0.52
0.15	Fine Sand	0.13	0.39
0.075	Fine Sand	0.15	0.24
<0.075	Fine Particles	0.24	N/A

Consultant:
Neena Goundar

Authorised Signatory:
Simon Leake

Date Report Generated
17/03/2021

Method Reference: SESL PM 0001 : Particle Size Analysis

Ramboll Environ Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

Attention: **Stephen Maxwell**

Report **778817-S**
Project name TARAGO BALLAST SAMPLING
Project ID 31800780
Received Date Mar 05, 2021

Client Sample ID			**BAL_01**	**BAL_02**	**BAL_03**	**BAL_04**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S21-Ma15043**	**S21-Ma15044**	**S21-Ma15045**	**S21-Ma15046**
Date Sampled			**Mar 02, 2021**	**Mar 02, 2021**	**Mar 02, 2021**	**Mar 02, 2021**
Test/Reference	LOR	Unit				
Particle Size Distribution by Sieve and Hydrometer			See attached	See attached	See attached	See attached

Client Sample ID			**BAL_05**
Sample Matrix			**Soil**
Eurofins Sample No.			**S21-Ma15047**
Date Sampled			**Mar 02, 2021**
Test/Reference	LOR	Unit	
Particle Size Distribution by Sieve and Hydrometer			See attached

Sample History

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

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

Description	Testing Site	Extracted	Holding Time

eurofins | Environment Testing

ABN: 50 005 085 521 web: www.eurofins.com.au email: EnviroSales@eurofins.com

Australia

Melbourne
6 Monterey Road
Dandenong South VIC 3175
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

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

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

Perth
2/91 Leach Highway
Kewdale WA 6105
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

Newcastle
4/52 Industrial Drive
Mayfield East NSW 2304
PO Box 60 Wickham 2293
Phone : +61 2 4968 8448

New Zealand

Auckland
35 O'Rorke Road
Penrose, Auckland 1061
Phone : +64 9 526 45 51
IANZ # 1327

Christchurch
43 Detroit Drive
Rolleston, Christchurch 7675
Phone : 0800 856 450
IANZ # 1290

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: TARAGO BALLAST SAMPLING
Project ID: 31800780

Order No.: 31800780
Report #: 778817
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Mar 5, 2021 1:35 PM
Due: Mar 12, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Particle Size Distribution by Sieve and Hydrometer
Melbourne Laboratory - NATA Site # 1254 & 14271						
Sydney Laboratory - NATA Site # 18217						
Brisbane Laboratory - NATA Site # 20794						
Perth Laboratory - NATA Site # 23736						
Mayfield Laboratory						
External Laboratory						X
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**	
1	BAL_01	Mar 02, 2021		Soil	S21-Ma15043	X
2	BAL_02	Mar 02, 2021		Soil	S21-Ma15044	X
3	BAL_03	Mar 02, 2021		Soil	S21-Ma15045	X
4	BAL_04	Mar 02, 2021		Soil	S21-Ma15046	X
5	BAL_05	Mar 02, 2021		Soil	S21-Ma15047	X
Test Counts						5

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

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

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

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

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

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

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

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

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

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

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

Results <10 times the LOR : No Limit

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

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

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

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

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

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Comments

Particle Size Distribution analysed by SESL, report reference 59642.

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	N/A
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	Yes

Authorised by:

Ursula Long — Analytical Services Manager

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

Measurement uncertainty of test data is available on request or please click here.

APPENDIX 5
ADDITIONAL LABORATORY ANALYSES: LEAD CONCENTRATION BY PARTICLE SIZE, CADMIUM AND CADMIUM LEACHATE

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Rail Corridor RAP
06-05-21

Table A5:
Lead in Woodlawn Siding Ballast (excluding fines)

	HHRA (Ramboll 2019d)		**Sample Type:**		**Soil**	**Soil**	**Soil**	**Soil**	**Soil**
			Lab Sample number:		S21-Fe16479	S21-Fe16480	S21-Fe16481	S21-Fe16482	S21-Fe16483
			Sample date:		16-09-19	16-09-19	16-09-19	16-09-19	16-09-19
			Sample ID:		TP3A_BALA	TP3A_BALB	TP3A_BALC	TP5A_BALA	TP5A_BALB
			Site:		Woodawn Siding	Woodawn Siding	Woodawn Siding	Woodawn Siding	Woodawn Siding
			Sampling Method:		Shovel	Shovel	Shovel	Shovel	Shovel
Analyte grouping/Analyte			**Units**	**LOR**					
EG005T: Total Metals by ICP-AES									
Lead	2,200		mg/kg	5	550	**2,800**	2,100	560	420

Blank Cell indicates no criterion available

LOR = Limit of Reporting

Concentration in **red** font and grey box exceed the adopted Human Health Guideline for Commercial/Industrial (Ramboll 2019d)

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Rail Corridor RAP
06-05-21

Table A5:
Lead in Woodlawn Siding Ballast (excluding fines)

	HHRA (Ramboll 2019d)		**Sample Type:**		**Soil**	**Soil**	**Soil**	**Soil**	**Soil**
			Lab Sample number:		S21-Fe16484	S21-Fe16485	S21-Fe16486	S21-Ma53832	S21-Ma53833
			Sample date:		16-09-19	16-09-19	16-09-19	02-03-21	02-03-21
			Sample ID:		TP5A_BALC	TP6A_BALA	TP6A_BALB	BAL_01 >26.5MM - 1	BAL_01 >26.5MM - 2
			Site:		Woodawn Siding	Woodawn Siding	Woodawn Siding	Woodawn Siding	Woodawn Siding
			Sampling Method:		Shovel	Shovel	Shovel	Shovel	Shovel
Analyte grouping/Analyte			**Units**	**LOR**					
EG005T: Total Metals by ICP-AES									
Lead	2,200		mg/kg	5	390	1,100	360	620	130

Blank Cell indicates no criterion available

LOR = Limit of Reporting

Concentration in **red** font and grey box exceed the adopted Human Health Guideline for Commercial/Industrial (Ramboll 2019d)

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Rail Corridor RAP
06-05-21

Table A5:
Lead in Woodlawn Siding Ballast (excluding fines)

	HHRA (Ramboll 2019d)		**Sample Type:**		**Soil**	**Soil**	**Soil**	**Soil**	**Soil**
			Lab Sample number:		S21-Ma53834	S21-Ma53835	S21-Ma53838	S21-Ma53839	S21-Ma53842
			Sample date:		02-03-21	02-03-21	02-03-21	02-03-21	02-03-21
			Sample ID:		BAL_02 >26.5MM - 1	BAL_02 >26.5MM - 2	BAL_03 >26.5MM - 1	BAL_03 >26.5MM - 2	BAL_04 >26.5MM - 1
			Site:		Woodawn Siding	Woodawn Siding	Woodawn Siding	Woodawn Siding	Woodawn Siding
			Sampling Method:		Shovel	Shovel	Shovel	Shovel	Shovel
Analyte grouping/Analyte			**Units**	**LOR**					
EG005T: Total Metals by ICP-AES									
Lead	2,200		mg/kg	5	18	42	250	100	150

Blank Cell indicates no criterion available

LOR = Limit of Reporting

Concentration in **red** font and grey box exceed the adopted Human Health Guideline for Commercial/Industrial (Ramboll 2019d)

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Rail Corridor RAP
06-05-21

Table A5:
Lead in Woodlawn Siding Ballast (excluding fines)

	HHRA (Ramboll 2019d)		**Sample Type:**		**Soil**	**Soil**	**Soil**
			Lab Sample number:		S21-Ma53843	S21-Ma53844	S21-Ma53845
			Sample date:		02-03-21	02-03-21	02-03-21
			Sample ID:		BAL_04 >26.5MM - 2	BAL_05 >26.5MM - 1	BAL_05 >26.5MM - 2
			Site:		Woodawn Siding	Woodawn Siding	Woodawn Siding
			Sampling Method:		Shovel	Shovel	Shovel
Analyte grouping/Analyte			**Units**	**LOR**			
EG005T: Total Metals by ICP-AES							
Lead	2,200		mg/kg	5	210	13	22

Blank Cell indicates no criterion available

LOR = Limit of Reporting

Concentration in **red** font and grey box exceed the adopted Human Health Guideline for Commercial/Industrial (Ramboll 2019d)

UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.104-May-21 10:21:34 AM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Lead in Woodlawn Siding Ballast

General Statistics

Total Number of Observations	18	Number of Distinct Observations	18
		Number of Missing Observations	0
Minimum	13	Mean	546.4
Maximum	2800	Median	305
SD	755.5	Std. Error of Mean	178.1
Coefficient of Variation	1.383	Skewness	2.224

Normal GOF Test

Shapiro Wilk Test Statistic	0.69	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.897	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.295	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.202	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	856.2	95% Adjusted-CLT UCL (Chen-1995)	939
		95% Modified-t UCL (Johnson-1978)	871.7

Gamma GOF Test

A-D Test Statistic	0.292	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.785	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.137	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.213	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.672	k star (bias corrected MLE)	0.597
Theta hat (MLE)	812.8	Theta star (bias corrected MLE)	914.8
nu hat (MLE)	24.2	nu star (bias corrected)	21.5
MLE Mean (bias corrected)	546.4	MLE Sd (bias corrected)	707
		Approximate Chi Square Value (0.05)	11.97
Adjusted Level of Significance	0.0357	Adjusted Chi Square Value	11.29

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	981.9	95% Adjusted Gamma UCL (use when n<50)	1041

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.957	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.897	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.123	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.202	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.565	Mean of logged Data	5.399
Maximum of Logged Data	7.937	SD of logged Data	1.559

Assuming Lognormal Distribution

95% H-UCL	2835	90% Chebyshev (MVUE) UCL	1510
95% Chebyshev (MVUE) UCL	1897	97.5% Chebyshev (MVUE) UCL	2434
99% Chebyshev (MVUE) UCL	3488		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	839.3	95% Jackknife UCL	856.2
95% Standard Bootstrap UCL	822.1	95% Bootstrap-t UCL	1290
95% Hall's Bootstrap UCL	2256	95% Percentile Bootstrap UCL	830.8
95% BCA Bootstrap UCL	944.3		
90% Chebyshev(Mean, Sd) UCL	1081	95% Chebyshev(Mean, Sd) UCL	1323
97.5% Chebyshev(Mean, Sd) UCL	1658	99% Chebyshev(Mean, Sd) UCL	2318

Suggested UCL to Use

95% Adjusted Gamma UCL	1041		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Ramboll Environ Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

Attention: **Stephen Maxwell**

Report **772644-S**
Project name LEAD TRIAL
Project ID 318000780
Received Date Feb 08, 2021

Client Sample ID			**TP3A_BALA**	**TP3A_BALB**	**TP3A_BALC**	**TP5A_BALA**
Sample Matrix			**Rock**	**Rock**	**Rock**	**Rock**
Eurofins Sample No.			**S21-Fe16479**	**S21-Fe16480**	**S21-Fe16481**	**S21-Fe16482**
Date Sampled			**Feb 08, 2021**	**Feb 08, 2021**	**Feb 08, 2021**	**Feb 08, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	5	mg/kg	550	2800	2100	560
% Moisture	1	%	< 1	< 1	< 1	1.1

Client Sample ID			**TP5A_BALB**	**TP5A_BALC**	**TP6A_BALA**	**TP6A_BALB**
Sample Matrix			**Rock**	**Rock**	**Rock**	**Rock**
Eurofins Sample No.			**S21-Fe16483**	**S21-Fe16484**	**S21-Fe16485**	**S21-Fe16486**
Date Sampled			**Feb 08, 2021**	**Feb 08, 2021**	**Feb 08, 2021**	**Feb 08, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	5	mg/kg	420	390	1100	360
% Moisture	1	%	1.2	1.2	1.2	< 1

Sample History

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

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

Description	Testing Site	Extracted	Holding Time
Heavy Metals	Sydney	Feb 18, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
% Moisture	Sydney	Feb 09, 2021	14 Days
- Method: LTM-GEN-7080 Moisture			

eurofins | Environment Testing

ABN: 50 005 085 521 web: www.eurofins.com.au email: EnviroSales@eurofins.com

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NATA # 1261
Site # 1254 & 14271

Sydney
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Lane Cove West NSW 2066
Phone : +61 2 9900 8400
NATA # 1261 Site # 18217

Brisbane
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Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

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NATA # 1261
Site # 23736

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43 Detroit Drive
Rolleston, Christchurch 7675
Phone : 0800 856 450
IANZ # 1290

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: LEAD TRIAL
Project ID: 318000780

Order No.:
Report #: 772644
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Feb 8, 2021 2:15 PM
Due: Feb 15, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						HOLD	Lead	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
Mayfield Laboratory								
External Laboratory								
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**			
1	TP3A_BALA	Feb 08, 2021		Rock	S21-Fe16479		X	X
2	TP3A_BALB	Feb 08, 2021		Rock	S21-Fe16480		X	X
3	TP3A_BALC	Feb 08, 2021		Rock	S21-Fe16481		X	X
4	TP5A_BALA	Feb 08, 2021		Rock	S21-Fe16482		X	X
5	TP5A_BALB	Feb 08, 2021		Rock	S21-Fe16483		X	X
6	TP5A_BALC	Feb 08, 2021		Rock	S21-Fe16484		X	X
7	TP6A_BALA	Feb 08, 2021		Rock	S21-Fe16485		X	X
8	TP6A_BALB	Feb 08, 2021		Rock	S21-Fe16486		X	X
9	TP6A_BALC	Feb 08, 2021		Rock	S21-Fe16487	X		

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NSW 2060

Project Name: LEAD TRIAL
Project ID: 318000780

Order No.:
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Phone: 02 9954 8118
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Received: Feb 8, 2021 2:15 PM
Due: Feb 15, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail	HOLD	Lead	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271			
Sydney Laboratory - NATA Site # 18217	X	X	X
Brisbane Laboratory - NATA Site # 20794			
Perth Laboratory - NATA Site # 23736			
Mayfield Laboratory			
External Laboratory			
Test Counts	2	8	8

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

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

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

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

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

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

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

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

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

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

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

Results <10 times the LOR : No Limit

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

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

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

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

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

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Lab Sample ID	QA Source	Units	Result 1	Result 2	RPD	Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Heavy Metals									
Lead			mg/kg	< 5			5	Pass	
LCS - % Recovery									
Heavy Metals									
Lead			%	105			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Heavy Metals				Result 1					
Lead	S21-Fe35255	NCP	%	97			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S21-Fe31701	NCP	mg/kg	23	20	15	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S21-Fe16479	CP	%	< 1	< 1	<1	30%	Pass	

Comments

Sample Integrity

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

Authorised by:

Andrew Black	Analytical Services Manager
John Nguyen	Senior Analyst-Metal (NSW)

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

Measurement uncertainty of test data is available on request or please click here.

Ramboll Environ Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

NATA Accredited
Accreditation Number 1261
Site Number 18217

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

Attention: **Stephen Maxwell**

Report **778274-S**
Project name SOIL
Project ID 318000780-A
Received Date Mar 04, 2021

Client Sample ID			**SS202**	**SS203**
Sample Matrix			**Soil**	**Soil**
Eurofins Sample No.			**S21-Ma10625**	**S21-Ma10626**
Date Sampled			**Mar 02, 2021**	**Mar 02, 2021**
Test/Reference	LOR	Unit		
Heavy Metals				
Lead	5	mg/kg	350	28
% Moisture	1	%	5.9	< 1

Sample History

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

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

Description	Testing Site	Extracted	Holding Time
Heavy Metals	Sydney	Mar 07, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
% Moisture	Sydney	Mar 04, 2021	14 Days
- Method: LTM-GEN-7080 Moisture			

eurofins | Environment Testing

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Phone : 0800 856 450
IANZ # 1290

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
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NSW 2060

Project Name: SOIL
Project ID: 318000780-A

Order No.:
Report #: 778274
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Mar 4, 2021 12:18 PM
Due: Mar 11, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Lead	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271							
Sydney Laboratory - NATA Site # 18217						X	X
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 23736							
Mayfield Laboratory							
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	SS202	Mar 02, 2021		Soil	S21-Ma10625	X	X
2	SS203	Mar 02, 2021		Soil	S21-Ma10626	X	X
Test Counts						2	2

eurofins | Environment Testing

Internal Quality Control Review and Glossary

General

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6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
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****NOTE:** pH duplicates are reported as a range NOT as RPD

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mg/L: milligrams per litre

ug/L: micrograms per litre

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

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Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
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Results between 10-20 times the LOR : RPD must lie between 0-50%

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

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

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

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

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Lab Sample ID	QA Source	Units	Result 1	Result 2	RPD	Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Heavy Metals									
Lead			mg/kg	< 5			5	Pass	
LCS - % Recovery									
Heavy Metals									
Lead			%	102			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Heavy Metals				Result 1					
Lead	S21-Ma07313	NCP	%	105			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S21-Ma10593	NCP	%	15	14	9.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S21-Ma10626	CP	mg/kg	28	37	29	30%	Pass	

Comments

Sample Integrity

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

Authorised by:

Andrew Black	Analytical Services Manager
John Nguyen	Senior Analyst-Metal (NSW)

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

Measurement uncertainty of test data is available on request or please click here.

Ramboll Environ Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

Attention: **Stephen Maxwell**

Report **783811-L-V2**
Project name ADDITIONAL - TARAGO BALLAST SAMPLING
Project ID 31800780
Received Date Mar 29, 2021

Client Sample ID			**BAL_01 >26.5MM - 1**	**BAL_01 >26.5MM - 2**	**BAL_02 >26.5MM - 1**	**BAL_02 >26.5MM - 2**
Sample Matrix			**US Leachate**	**US Leachate**	**US Leachate**	**US Leachate**
Eurofins Sample No.			**S21-Ma53846**	**S21-Ma53847**	**S21-Ma53848**	**S21-Ma53849**
Date Sampled			**Mar 02, 2021**	**Mar 02, 2021**	**Mar 02, 2021**	**Mar 02, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	0.01	mg/L	0.68	1.4	0.36	0.45
USA Leaching Procedure						
Leachate Fluid[C01]		comment	1.0	1.0	1.0	1.0
pH (initial)	0.1	pH Units	4.5	4.6	5.2	5.3
pH (off)	0.1	pH Units	5.1	5.1	5.2	5.1
pH (USA HCl addition)	0.1	pH Units	1.7	1.7	1.7	1.7

Client Sample ID			**BAL_03 >26.5MM - 1**	**BAL_03 >26.5MM - 2**	**BAL_04 >26.5MM - 1**	**BAL_04 >26.5MM - 2**
Sample Matrix			**US Leachate**	**US Leachate**	**US Leachate**	**US Leachate**
Eurofins Sample No.			**S21-Ma53852**	**S21-Ma53853**	**S21-Ma53856**	**S21-Ma53857**
Date Sampled			**Mar 02, 2021**	**Mar 02, 2021**	**Mar 02, 2021**	**Mar 02, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	0.01	mg/L	4.7	2.6	2.6	1.8
USA Leaching Procedure						
Leachate Fluid[C01]		comment	1.0	1.0	1.0	1.0
pH (initial)	0.1	pH Units	5.3	5.1	5.2	5.2
pH (off)	0.1	pH Units	5.2	5.2	5.1	5.2
pH (USA HCl addition)	0.1	pH Units	1.7	1.6	1.7	1.6

Client Sample ID			**BAL_05 >26.5MM - 1**	**BAL_05 >26.5MM - 2**
Sample Matrix			**US Leachate**	**US Leachate**
Eurofins Sample No.			**S21-Ma53858**	**S21-Ma53859**
Date Sampled			**Mar 02, 2021**	**Mar 02, 2021**
Test/Reference	LOR	Unit		
Heavy Metals				
Lead	0.01	mg/L	0.17	0.20
USA Leaching Procedure				
Leachate Fluid[C01]		comment	1.0	1.0
pH (initial)	0.1	pH Units	5.6	5.5
pH (off)	0.1	pH Units	5.2	5.1
pH (USA HCl addition)	0.1	pH Units	1.7	1.7

Sample History

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

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

Description	Testing Site	Extracted	Holding Time
Heavy Metals	Sydney	Apr 01, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
USA Leaching Procedure	Sydney	Mar 31, 2021	14 Days
- Method: LTM-GEN-7010 Leaching Procedure for Soils & Solid Wastes			

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Company Name:	Ramboll Australia Pty Ltd	**Order No.:**	
Address:	Level 3/100 Pacific Highway North Sydney NSW 2060	**Report #:**	783811
		Phone:	02 9954 8118
		Fax:	02 9954 8150
Project Name:	ADDITIONAL - TARAGO BALLAST SAMPLING		
Project ID:	31800780		

Received:	Mar 29, 2021 1:38 PM
Due:	Apr 1, 2021
Priority:	3 Day
Contact Name:	Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						CANCELLED	Lead	USA Leaching Procedure	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271									
Sydney Laboratory - NATA Site # 18217						X	X	X	X
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
Mayfield Laboratory									
External Laboratory									
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**				
1	BAL_01 >26.5MM - 1	Mar 02, 2021		Soil	S21-Ma53832		X		X
2	BAL_01 >26.5MM - 2	Mar 02, 2021		Soil	S21-Ma53833		X		X
3	BAL_02 >26.5MM - 1	Mar 02, 2021		Soil	S21-Ma53834		X		X
4	BAL_02 >26.5MM - 2	Mar 02, 2021		Soil	S21-Ma53835		X		X
5	BAL_03 >37.5MM - 1	Mar 02, 2021		Soil	S21-Ma53836	X			
6	BAL_03	Mar 02, 2021		Soil	S21-Ma53837	X			

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Melbourne Laboratory - NATA Site # 1254 & 14271									
Sydney Laboratory - NATA Site # 18217						X	X	X	X
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
Mayfield Laboratory									
External Laboratory									
	>37.5MM - 2								
7	BAL_03 >26.5MM - 1	Mar 02, 2021		Soil	S21-Ma53838		X		X
8	BAL_03 >26.5MM - 2	Mar 02, 2021		Soil	S21-Ma53839		X		X
9	BAL_04 >37.5MM - 1	Mar 02, 2021		Soil	S21-Ma53840	X			
10	BAL_04 >37.5MM - 2	Mar 02, 2021		Soil	S21-Ma53841	X			
11	BAL_04 >26.5MM - 1	Mar 02, 2021		Soil	S21-Ma53842		X		X
12	BAL_04 >26.5MM - 2	Mar 02, 2021		Soil	S21-Ma53843		X		X

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Melbourne Laboratory - NATA Site # 1254 & 14271									
Sydney Laboratory - NATA Site # 18217						X	X	X	X
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
Mayfield Laboratory									
External Laboratory									
13	BAL_05 >26.5MM - 1	Mar 02, 2021		Soil	S21-Ma53844		X		X
14	BAL_05 >26.5MM - 2	Mar 02, 2021		Soil	S21-Ma53845		X		X
15	BAL_01 >26.5MM - 1	Mar 02, 2021		US Leachate	S21-Ma53846		X	X	
16	BAL_01 >26.5MM - 2	Mar 02, 2021		US Leachate	S21-Ma53847		X	X	
17	BAL_02 >26.5MM - 1	Mar 02, 2021		US Leachate	S21-Ma53848		X	X	
18	BAL_02 >26.5MM - 2	Mar 02, 2021		US Leachate	S21-Ma53849		X	X	
19	BAL_03	Mar 02, 2021		US Leachate	S21-Ma53850	X			

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Melbourne Laboratory - NATA Site # 1254 & 14271									
Sydney Laboratory - NATA Site # 18217						X	X	X	X
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
Mayfield Laboratory									
External Laboratory									
	>37.5MM - 1								
20	BAL_03 >37.5MM - 2	Mar 02, 2021		US Leachate	S21-Ma53851	X			
21	BAL_03 >26.5MM - 1	Mar 02, 2021		US Leachate	S21-Ma53852		X	X	
22	BAL_03 >26.5MM - 2	Mar 02, 2021		US Leachate	S21-Ma53853		X	X	
23	BAL_04 >37.5MM - 1	Mar 02, 2021		US Leachate	S21-Ma53854	X			
24	BAL_04 >37.5MM - 2	Mar 02, 2021		US Leachate	S21-Ma53855	X			
25	BAL_04 >26.5MM - 1	Mar 02, 2021		US Leachate	S21-Ma53856		X	X	

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Sample Detail						CANCELLED	Lead	USA Leaching Procedure	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271									
Sydney Laboratory - NATA Site # 18217						X	X	X	X
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
Mayfield Laboratory									
External Laboratory									
26	BAL_04 >26.5MM - 2	Mar 02, 2021		US Leachate	S21-Ma53857		X	X	
27	BAL_05 >26.5MM - 1	Mar 02, 2021		US Leachate	S21-Ma53858		X	X	
28	BAL_05 >26.5MM - 2	Mar 02, 2021		US Leachate	S21-Ma53859		X	X	
Test Counts						8	30	10	10

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

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

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

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

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

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

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

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

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

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

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

Results <10 times the LOR : No Limit

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

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

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

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

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

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Lab Sample ID	QA Source	Units	Result 1	Result 2	RPD	Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Heavy Metals									
Lead			mg/L	< 0.01			0.01	Pass	
LCS - % Recovery									
Heavy Metals									
Lead			%	88			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Heavy Metals				Result 1					
Lead	S21-Ma54310	NCP	%	79			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S21-Ma53846	CP	mg/L	0.68	0.89	27	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S21-Ma53859	CP	mg/L	0.20	0.19	6.0	30%	Pass	

Comments

V2- new version with all samples re-sieved and repeated as per client and internal request.

Sample Integrity

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

Qualifier Codes/Comments

Code	Description
C01	Leachate Fluid Key: 1 - pH 5.0; 2 - pH 2.9; 3 - pH 9.2; 4 - Reagent (DI) water; 5 - Client sample, 6 - other

Authorised by:

Andrew Black	Analytical Services Manager
John Nguyen	Senior Analyst-Metal (NSW)

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

Measurement uncertainty of test data is available on request or please click here.

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Attention: **Stephen Maxwell**

Report **783811-S-V2**
Project name ADDITIONAL - TARAGO BALLAST SAMPLING
Project ID 31800780
Received Date Mar 29, 2021

Client Sample ID			**BAL_01 >26.5MM - 1**	**BAL_01 >26.5MM - 2**	**BAL_02 >26.5MM - 1**	**BAL_02 >26.5MM - 2**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S21-Ma53832**	**S21-Ma53833**	**S21-Ma53834**	**S21-Ma53835**
Date Sampled			**Mar 02, 2021**	**Mar 02, 2021**	**Mar 02, 2021**	**Mar 02, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	5	mg/kg	620	130	18	42
% Moisture	1	%	2.5	1.8	3.5	4.1

Client Sample ID			**BAL_03 >26.5MM - 1**	**BAL_03 >26.5MM - 2**	**BAL_04 >26.5MM - 1**	**BAL_04 >26.5MM - 2**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S21-Ma53838**	**S21-Ma53839**	**S21-Ma53842**	**S21-Ma53843**
Date Sampled			**Mar 02, 2021**	**Mar 02, 2021**	**Mar 02, 2021**	**Mar 02, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	5	mg/kg	250	100	150	210
% Moisture	1	%	3.0	3.4	1.3	1.1

Client Sample ID			**BAL_05 >26.5MM - 1**	**BAL_05 >26.5MM - 2**
Sample Matrix			**Soil**	**Soil**
Eurofins Sample No.			**S21-Ma53844**	**S21-Ma53845**
Date Sampled			**Mar 02, 2021**	**Mar 02, 2021**
Test/Reference	LOR	Unit		
Heavy Metals				
Lead	5	mg/kg	13	22
% Moisture	1	%	< 1	< 1

Sample History

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

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

Description	Testing Site	Extracted	Holding Time
Heavy Metals	Sydney	Mar 31, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
% Moisture	Sydney	Mar 30, 2021	14 Days
- Method: LTM-GEN-7080 Moisture			

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Company Name:	Ramboll Australia Pty Ltd	**Order No.:**	
Address:	Level 3/100 Pacific Highway North Sydney NSW 2060	**Report #:**	783811
		Phone:	02 9954 8118
		Fax:	02 9954 8150
Project Name:	ADDITIONAL - TARAGO BALLAST SAMPLING		
Project ID:	31800780		

Received:	Mar 29, 2021 1:38 PM
Due:	Apr 1, 2021
Priority:	3 Day
Contact Name:	Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						CANCELLED	Lead	USA Leaching Procedure	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271									
Sydney Laboratory - NATA Site # 18217						X	X	X	X
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
Mayfield Laboratory									
External Laboratory									
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**				
1	BAL_01 >26.5MM - 1	Mar 02, 2021		Soil	S21-Ma53832		X		X
2	BAL_01 >26.5MM - 2	Mar 02, 2021		Soil	S21-Ma53833		X		X
3	BAL_02 >26.5MM - 1	Mar 02, 2021		Soil	S21-Ma53834		X		X
4	BAL_02 >26.5MM - 2	Mar 02, 2021		Soil	S21-Ma53835		X		X
5	BAL_03 >37.5MM - 1	Mar 02, 2021		Soil	S21-Ma53836	X			
6	BAL_03	Mar 02, 2021		Soil	S21-Ma53837	X			

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Sydney Laboratory - NATA Site # 18217						X	X	X	X
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
Mayfield Laboratory									
External Laboratory									
	>37.5MM - 2								
7	BAL_03 >26.5MM - 1	Mar 02, 2021		Soil	S21-Ma53838		X		X
8	BAL_03 >26.5MM - 2	Mar 02, 2021		Soil	S21-Ma53839		X		X
9	BAL_04 >37.5MM - 1	Mar 02, 2021		Soil	S21-Ma53840	X			
10	BAL_04 >37.5MM - 2	Mar 02, 2021		Soil	S21-Ma53841	X			
11	BAL_04 >26.5MM - 1	Mar 02, 2021		Soil	S21-Ma53842		X		X
12	BAL_04 >26.5MM - 2	Mar 02, 2021		Soil	S21-Ma53843		X		X

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Sydney Laboratory - NATA Site # 18217						X	X	X	X
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
Mayfield Laboratory									
External Laboratory									
13	BAL_05 >26.5MM - 1	Mar 02, 2021		Soil	S21-Ma53844		X		X
14	BAL_05 >26.5MM - 2	Mar 02, 2021		Soil	S21-Ma53845		X		X
15	BAL_01 >26.5MM - 1	Mar 02, 2021		US Leachate	S21-Ma53846		X	X	
16	BAL_01 >26.5MM - 2	Mar 02, 2021		US Leachate	S21-Ma53847		X	X	
17	BAL_02 >26.5MM - 1	Mar 02, 2021		US Leachate	S21-Ma53848		X	X	
18	BAL_02 >26.5MM - 2	Mar 02, 2021		US Leachate	S21-Ma53849		X	X	
19	BAL_03	Mar 02, 2021		US Leachate	S21-Ma53850	X			

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Sydney Laboratory - NATA Site # 18217						X	X	X	X
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
Mayfield Laboratory									
External Laboratory									
	>37.5MM - 1								
20	BAL_03 >37.5MM - 2	Mar 02, 2021		US Leachate	S21-Ma53851	X			
21	BAL_03 >26.5MM - 1	Mar 02, 2021		US Leachate	S21-Ma53852		X	X	
22	BAL_03 >26.5MM - 2	Mar 02, 2021		US Leachate	S21-Ma53853		X	X	
23	BAL_04 >37.5MM - 1	Mar 02, 2021		US Leachate	S21-Ma53854	X			
24	BAL_04 >37.5MM - 2	Mar 02, 2021		US Leachate	S21-Ma53855	X			
25	BAL_04 >26.5MM - 1	Mar 02, 2021		US Leachate	S21-Ma53856		X	X	

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Sydney Laboratory - NATA Site # 18217						X	X	X	X
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
Mayfield Laboratory									
External Laboratory									
26	BAL_04 >26.5MM - 2	Mar 02, 2021		US Leachate	S21-Ma53857		X	X	
27	BAL_05 >26.5MM - 1	Mar 02, 2021		US Leachate	S21-Ma53858		X	X	
28	BAL_05 >26.5MM - 2	Mar 02, 2021		US Leachate	S21-Ma53859		X	X	
Test Counts						8	30	10	10

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

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

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

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

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

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

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

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

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

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

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

Results <10 times the LOR : No Limit

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

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

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

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

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

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Lab Sample ID	QA Source	Units	Result 1	Result 2	RPD	Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Heavy Metals									
Lead			mg/kg	< 5			5	Pass	
LCS - % Recovery									
Heavy Metals									
Lead			%	114			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Heavy Metals				Result 1					
Lead	S21-Ma57786	NCP	%	100			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S21-Ma53832	CP	mg/kg	620	670	9.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S21-Ma53843	CP	%	1.1	1.2	6.0	30%	Pass	

Comments

V2- new version with all samples re-sieved and repeated as per client and internal request.

Sample Integrity

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

Authorised by:

Andrew Black	Analytical Services Manager
John Nguyen	Senior Analyst-Metal (NSW)

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

Measurement uncertainty of test data is available on request or please click here.

APPENDIX 6
95% UCL CALCULATIONS

UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.104-May-21 10:21:34 AM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Lead in Woodlawn Siding Ballast

General Statistics

Total Number of Observations	18	Number of Distinct Observations	18
		Number of Missing Observations	0
Minimum	13	Mean	546.4
Maximum	2800	Median	305
SD	755.5	Std. Error of Mean	178.1
Coefficient of Variation	1.383	Skewness	2.224

Normal GOF Test

Shapiro Wilk Test Statistic	0.69	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.897	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.295	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.202	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	856.2	95% Adjusted-CLT UCL (Chen-1995)	939
		95% Modified-t UCL (Johnson-1978)	871.7

Gamma GOF Test

A-D Test Statistic	0.292	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.785	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.137	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.213	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.672	k star (bias corrected MLE)	0.597
Theta hat (MLE)	812.8	Theta star (bias corrected MLE)	914.8
nu hat (MLE)	24.2	nu star (bias corrected)	21.5
MLE Mean (bias corrected)	546.4	MLE Sd (bias corrected)	707
		Approximate Chi Square Value (0.05)	11.97
Adjusted Level of Significance	0.0357	Adjusted Chi Square Value	11.29

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	981.9	95% Adjusted Gamma UCL (use when n<50)	1041

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.957	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.897	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.123	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.202	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.565	Mean of logged Data	5.399
Maximum of Logged Data	7.937	SD of logged Data	1.559

Assuming Lognormal Distribution

95% H-UCL	2835	90% Chebyshev (MVUE) UCL	1510
95% Chebyshev (MVUE) UCL	1897	97.5% Chebyshev (MVUE) UCL	2434
99% Chebyshev (MVUE) UCL	3488		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	839.3	95% Jackknife UCL	856.2
95% Standard Bootstrap UCL	822.1	95% Bootstrap-t UCL	1290
95% Hall's Bootstrap UCL	2256	95% Percentile Bootstrap UCL	830.8
95% BCA Bootstrap UCL	944.3		
90% Chebyshev(Mean, Sd) UCL	1081	95% Chebyshev(Mean, Sd) UCL	1323
97.5% Chebyshev(Mean, Sd) UCL	1658	99% Chebyshev(Mean, Sd) UCL	2318

Suggested UCL to Use

95% Adjusted Gamma UCL	1041		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

APPENDIX 7
REMEDIAL COST CALCULATIONS

Remedial Option Cost Estimates for Onsite Contamination

Option 1 - Return of ore impacted materials from the site to Woodlawn Mine

Description	Unit	Budget Rate	Estimated Qty	Estimated Total
Preliminaries and Management Plans	Item	$5,000	1	$5,000
Mobilisation and site establishment	Item	$10,000	1	$10,000
Project Management	Week	$6,500	6	$39,000
Excavation of impacted material to loading area	M3	$25	4,100	$102,500
Loading impacted material into truck and dogs and transport to mine (assumes tip only, handling of material at mine site excluded)	Tonne	$25	7,380	$184,500
Demobilisation	Item	$5,000	1	$5,000
Estimated Total				**$346,000**

Option 2 - Onsite containment

Description	Unit	Budget Rate	Estimated Qty	Estimated Total
Preliminaries and Management Plans	Item	$7,500	1	$7,500
Mobilisation and site establishment	Item	$20,000	1	$20,000
Project Management	Week	$6,500	10	$65,000
Excavate capping layer to stockpile (assume 6,000m2 x 0.5m thick)	M3	$25	3,000	$75,000
Excavate containment cell – spoil cart to stockpile within 100m – unsure of final destination of this	M3	$25	4,100	$102,500
Install HDPE and geofabric liner to containment cell	M2	$25	4,100	$102,500
Excavate impacted material, transport to containment cell, place and compact in cell	M3	$35	4,100	$143,500
Place capping layer from stockpile to cap containment cell	M3	$20	3,000	$60,000
Demobilisation	Item	$15,000	1	$15,000
Estimated Total				**$591,000**

Table 1: Remedial Option Cost Estimates for Onsite Contamination

Option 3 - Offsite treatment and disposal of ore impacted materials onsite

Description	Unit	Budget Rate	Estimated Qty	Estimated Total
Preliminaries and Management Plans	Item	$10,000	1	$10,000
Mobilisation and site establishment	Item	$25,000	1	$25,000
Project Management	Week	$6,500	12	$78,000
Bench-scale trial and obtain SIA	Item	$20,000	1	$20,000
Excavation of impacted material to loading area	M3	$25	4,100	$102,500
Loading impacted material into truck and dogs and transport to Local Landfill	Tonne	$25	7,380	$184,500
Screen material to remove ballast	Tonne	$15	7,380	$110,700
Return of ballast to site	M3	$25	2,050	$51,250
Immobilisation of impacted material following ballast removal	Tonne	$100	2,050	$205,000
Disposal of immobilised material as GSW at Hi Quality Minda Landfill	Tonne	$115	9,225	$1,060,875
Disposal of immobilised material as GSW at Veolia Woodlawn Landfill	Tonne	$225	9,225	$2,075,625
Demobilisation	Item	$20,000	1	$20,000
Estimated Total for disposal at Minda Landfill				**$1,867,825**
Estimated Total for disposal at Veolia Woodlawn				**$2,882,575**

APPENDIX 8
FINANCIAL ASSURANCE CALCULATIONS

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Lead Management
20-08-20

Table 1: Financial Assurance Assumptions

Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
q-factor	100.0%	97.1%	94.3%	91.5%	88.8%	86.3%	83.7%	81.3%	78.9%	76.6%	74.4%	72.2%	70.1%	68.1%	66.1%	64.2%	62.3%
Price escalation	100.0%	102.0%	104.0%	106.1%	108.2%	110.4%	112.6%	114.9%	117.2%	119.5%	121.9%	124.3%	126.8%	129.4%	131.9%	134.6%	137.3%
Investment	-1,233,000																
Ongoing Maintenance and Monitoring Requirements																	
Environmental Monitoring																	
Inspection and reporting		-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000
Periodic topsoil replacement											-40,000						
Recontainment																	
Security checks by third party																	
Maintenance																	
Administrator																	
Total (without price escalation)	**-1,233,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-45,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**
Total (with price escalation)	-1,233,000	-5,100	-5,202	-5,306	-5,412	-5,520	-5,631	-5,743	-5,858	-5,975	-54,855	-6,217	-6,341	-6,468	-6,597	-6,729	-6,864
NPV	**-1,233,000**	**-4,951**	**-4,903**	**-4,856**	**-4,809**	**-4,762**	**-4,716**	**-4,670**	**-4,625**	**-4,580**	**-40,817**	**-4,491**	**-4,448**	**-4,404**	**-4,362**	**-4,319**	**-4,277**
	-1,253,000																
Total NPV	**-1,793,937**																
NPV Risk realistic	-376,792																
NPV Risk worst	-305,589																
NPV Captial	-1,233,000																
NPV Monitoring and management	-541,418																

Note: the q-factor quantifies the effect of interest and inflation on future costs of long term environmental management and informs calculation of net present value required for financial assuranc

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Lead Management
20-08-20

Table 1: Financial Assurance Assumptions

17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
60.5%	58.7%	57.0%	55.4%	53.8%	52.2%	50.7%	49.2%	47.8%	46.4%	45.0%	43.7%	42.4%	41.2%	40.0%	38.8%	37.7%	36.6%	35.5%	34.5%	33.5%	32.5%
140.0%	142.8%	145.7%	148.6%	151.6%	154.6%	157.7%	160.8%	164.1%	167.3%	170.7%	174.1%	177.6%	181.1%	184.8%	188.5%	192.2%	196.1%	200.0%	204.0%	208.1%	212.2%
-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000
			-40,000										-40,000								
-5,000	**-5,000**	**-5,000**	**-45,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-45,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**
-7,001	-7,141	-7,284	-66,868	-7,578	-7,730	-7,884	-8,042	-8,203	-8,367	-8,534	-8,705	-8,879	-81,511	-9,238	-9,423	-9,611	-9,803	-9,999	-10,199	-10,403	-10,611
-4,236	**-4,195**	**-4,154**	**-37,023**	**-4,074**	**-4,034**	**-3,995**	**-3,956**	**-3,918**	**-3,880**	**-3,842**	**-3,805**	**-3,768**	**-33,582**	**-3,695**	**-3,659**	**-3,624**	**-3,588**	**-3,554**	**-3,519**	**-3,485**	**-3,451**

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Lead Management
20-08-20

Table 1: Financial Assurance Assumptions

39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
31.6%	30.7%	29.8%	28.9%	28.1%	27.2%	26.4%	25.7%	24.9%	24.2%	23.5%	22.8%	22.1%	21.5%	20.9%	20.3%	19.7%	19.1%	18.5%	18.0%	17.5%	17.0%
216.5%	220.8%	225.2%	229.7%	234.3%	239.0%	243.8%	248.7%	253.6%	258.7%	263.9%	269.2%	274.5%	280.0%	285.6%	291.3%	297.2%	303.1%	309.2%	315.4%	321.7%	328.1%
-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000
	-40,000										-40,000										-40,000
-5,000	**-45,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-45,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-45,000**
-10,824	-99,362	-11,261	-11,486	-11,716	-11,950	-12,189	-12,433	-12,682	-12,935	-13,194	-121,121	-13,727	-14,002	-14,282	-14,567	-14,859	-15,156	-15,459	-15,768	-16,083	-147,646
-3,418	**-30,460**	**-3,352**	**-3,319**	**-3,287**	**-3,255**	**-3,223**	**-3,192**	**-3,161**	**-3,130**	**-3,100**	**-27,629**	**-3,040**	**-3,011**	**-2,981**	**-2,952**	**-2,924**	**-2,895**	**-2,867**	**-2,839**	**-2,812**	**-25,060**

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Lead Management
20-08-20

Table 1: Financial Assurance Assumptions

RAMBOLL

61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82
16.5%	16.0%	15.5%	15.1%	14.6%	14.2%	13.8%	13.4%	13.0%	12.6%	12.3%	11.9%	11.6%	11.2%	10.9%	10.6%	10.3%	10.0%	9.7%	9.4%	9.1%	8.9%
334.7%	341.4%	348.2%	355.1%	362.3%	369.5%	376.9%	384.4%	392.1%	400.0%	408.0%	416.1%	424.4%	432.9%	441.6%	450.4%	459.4%	468.6%	478.0%	487.5%	497.3%	507.2%
-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000
									-40,000										-40,000		
-5,000	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-45,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-45,000**	**-5,000**	**-5,000**
-16,733	-17,068	-17,409	-17,757	-18,113	-18,475	-18,844	-19,221	-19,606	-179,980	-20,398	-20,806	-21,222	-21,646	-22,079	-22,521	-22,971	-23,431	-23,899	-219,395	-24,865	-25,362
-2,757	**-2,731**	**-2,704**	**-2,678**	**-2,652**	**-2,626**	**-2,601**	**-2,575**	**-2,550**	**-22,731**	**-2,501**	**-2,477**	**-2,453**	**-2,429**	**-2,405**	**-2,382**	**-2,359**	**-2,336**	**-2,313**	**-20,618**	**-2,269**	**-2,247**

Client: John Holland Rail
Job No: 318000780
Project Name: Tarago Lead Management
20-08-20

Table 1: Financial Assurance Assumptions

83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
8.6%	8.3%	8.1%	7.9%	7.6%	7.4%	7.2%	7.0%	6.8%	6.6%	6.4%	6.2%	6.0%	5.9%	5.7%	5.5%	5.4%	5.2%
517.4%	527.7%	538.3%	549.1%	560.0%	571.2%	582.7%	594.3%	606.2%	618.3%	630.7%	643.3%	656.2%	669.3%	682.7%	696.3%	710.3%	724.5%
-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000	-5000
							-40,000										-40,000
-5,000	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-45,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-5,000**	**-45,000**
-25,869	-26,387	-26,914	-27,453	-28,002	-28,562	-29,133	-267,441	-30,310	-30,916	-31,535	-32,165	-32,808	-33,465	-34,134	-34,817	-35,513	-326,009
-2,225	**-2,203**	**-2,182**	**-2,161**	**-2,140**	**-2,119**	**-2,098**	**-18,702**	**-2,058**	**-2,038**	**-2,018**	**-1,998**	**-1,979**	**-1,960**	**-1,941**	**-1,922**	**-1,903**	**-16,963**

APPENDIX 9
NOTIFICATION OF CATEGORY 2 REMEDIATION

ENVIRONMENT
& HEALTH

Goulburn-Mulwaree Council
Locked Bag 22
Goulburn NSW 2580
Attention: The General Manager

Date 6/05/2020

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Ref 318000780

TARAGO TRACK WORKS
NOTIFICATION OF CATEGORY 2 REMEDIATION WORKS

INTRODUCTION

Ramboll Australia Pty Ltd (Ramboll) was retained by John Holland Rail (JHR) on behalf of Transport for NSW (TfNSW) to prepare a Remedial Action Plan (RAP) for contamination identified along approximately one kilometre of the Goulburn – Bombala rail corridor at Tarago, NSW. This area is presented on **Figure 1**, **Appendix 1** and is here-in referred to as the site.

John Holland Rail (JHR) respectfully notify Goulburn Mulwaree Council of planned Category 2 remediation works, as defined by *State Environmental Planning Policy 55 – Remediation of Land* (SEPP 55) that will occur at the site.

REMEDIATION WORK

The preferred remedial strategy comprises offsite disposal of ballast fines from the Woodlawn Siding and adjacent surface soils. Offsite disposal will include excavation and transport of soils to a compound established at a licensed waste facility. Ballast will be mechanically screened for reuse onsite following successful validation. Ballast fines will be chemically immobilised for disposal as General Solid Waste in accordance with a NSW EPA Specific Immobilisation Approval.

Contaminated ballast will remain within operational rail formations and at depth around the footprint of the former Ore Concentrate Loadout Complex buildings. Remnant contamination will be managed under a long term environmental management plan (LTEMP).

Ramboll Australia Pty Ltd.
ACN 095 437 442
ABN 49 095 437 442

CATEGORY 2 REMEDIATION WORKS

This project is deemed to be Category 2 remediation work in accordance with SEPP 55. Category 2 remediation work is deemed remediation work that is not Category 1 remediation as described in Clause 9 of SEPP 55. The triggers for Category 1 remediation work are evaluated in **Table 1**.

Table 1: Evaluation of Category 1 Triggers

SEPP 55, Clause 9 Trigger	Evaluation
a) Designated development	The project is not designated development. Schedule 3 Clause 15 of the *Environmental Planning and Assessment Regulation 2000* describes conditions under which contaminated soil treatment works are deemed designated development. Of specific relevance to this project: • The volume of contaminated material falls below 30,000m3 (estimated at < 1000m3) The area of contaminated soil to be disturbed is less than 3 hectares (estimated at 2 hectares).
b) carried out or to be carried out on land declared to be a critical habitat, or	The project would not be carried out on land declared to be a critical habitat.
c) likely to have a significant effect on a critical habitat or a threatened species, population or ecological community, or	The site has been significantly disturbed by historical and ongoing rail related activities. It will not require disturbance of critical habitat or a threatened species, population or ecological community.
d) development for which another State environmental planning policy or a regional environmental plan requires development consent, or	No State Environmental Planning Policy or Regional Environmental Plan identifies the proposed remediation as an activity requiring development consent.
e) carried out or to be carried out in an area or zone to which any classifications to the following effect apply under an environmental planning instrument: (i) coastal protection, (ii) conservation or heritage conservation, (iii) habitat area, habitat protection area, habitat or wildlife corridor, (iv) environment protection, (v) escarpment, escarpment protection or escarpment preservation, (vi) floodway, (vii) littoral rainforest, (viii) nature reserve, (ix) scenic area or scenic protection, (x) wetland, or	The project is located on land zoned RU2 Rural Landscape under the *Goulburn Mulwaree Local Environmental Plan 2009*. No other environmental planning instrument prescribes the project site as one of the areas listed in point (e).

SEPP 55, Clause 9 Trigger	Evaluation
f) carried out or to be carried out on any land in a manner that does not comply with a policy made under the contaminated land planning guidelines by the council for any local government area in which the land is situated (or if the land is within the unincorporated area, the Western Lands Commissioner).	The *Goulburn Mulwaree Development Control Plan 2009* includes guidance that applies to Contaminated Land. The proposed remediation complies with the guidance.

The proposed remediation works do not trigger the criteria in clause 9 (a) – (f) as outlined in **Table 1**, and the proposed remediation works are not ancillary to any other current development requiring Development Consent. Based upon the above information and criteria the remediation works are deemed to be Category 2 works under SEPP 55.

It is anticipated that remediation of the activities associated the Tarago Siding Project would commence in late September/ early October 2019 and be completed XXX.

Yours sincerely

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APPENDIX 10
RAIL SLEEPER WASTE CLASSIFICATION

Intended for
John Holland Rail

Document type
Waste Classification Report

Date
26 March 2020

RAIL SLEEPER WASTE CLASSIFICATION TARAGO LOOP EXTENSION

RAMBOLL Bright ideas. Sustainable change.

RAIL SLEEPER WASTE CLASSIFICATION
TARAGO LOOP EXTENSION

Project name	**Tarago Loop Rail Sleeper Waste Classification**
Project no.	**318000780**
Recipient	**Wayne D'Souza**
Document type	**Report**
Version	**Draft**
Date	**26/03/2030**
Prepared by	**Lyon McLeod**
Checked by	**Fiona Robinson**
Approved by	**Stephen Maxwell**
Description	**The report presents a waste classification assessment for rail sleepers at the site of Tarago Loop Extension**
Ref	**318000780-T15-001**

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CONTENTS

APPENDICES

1. INTRODUCTION

Ramboll Australia Pty Ltd (Ramboll) was commissioned by John Holland Rail to complete a waste classification in accordance with the *NSW EPA Waste Classification Guidelines (2014).* The classification was required for railway sleepers removed as part of the Tarago Loop Extension. The objective of the waste classification was to classify the railway sleepers for off-site disposal from the site.

1.1 Scope of Works

The scope of works included the following tasks:

- Preparation of a site-specific Health and Safety Plan for the site works
- Collection of four samples from the rail sleepers by hand
- Laboratory analysis of four samples (including QA/QC) for potential contaminants of concern
- Evaluated quality control and quality assurance for the sampling program
- Comparison of laboratory results to relevant site and waste classification guidelines
- Preparation of this report.

2. FIELD INVESTIGATIONS AND OBSERVATIONS

2.1 Sample Collection

Field sampling of the railway sleepers was completed 18 March 2020 by an environmental engineer suitably experienced as a contaminated land consultant. At the time of fieldwork sleepers were stockpiled within the corridor and occupied approximately 50 m^3 as shown in **Photo 1**.

Sleepers were observed to be aged, moderately degraded and laden with dust that was stained green at some locations.

Photo 1 – Location of sleeper within the rail corridor

Four samples were selected for laboratory analysis to exceed the minimum sampling density for stockpiles of 3 per 75m^3 prescribed in the *National Environment Protection Measure (NEPC 2013)*. Samples from the railway sleepers were selected for testing based on visual assessment for staining or other signs of contamination and targeted areas with the potential for contamination.

Samples for laboratory testing were recovered from the rail sleepers using a hand held drill and a hand saw create drill shavings and saw dust. Samples comprised materials recovered from the surface of the sleeper and at depths of up to 2 cm below the surface of the sleeper.

A total of four primary samples were recovered, SLE01, SLE02, SLE03 and SLE04.

2.2 Quality Assurance/ Quality Control

Quality assurance and quality control completed for the project is included in **Table 1**.

Table 1 QA/QC Review

Element	Field and Laboratory QA/QC
Sampling	Samples were collected 18 March 2020 by an experienced Environmental Engineer from Ramboll using a cordless drill and hand saw. Samples were placed directly into laboratory-supplied soil jars using single use gloved hands.
Decontamination	All reusable sampling equipment was cleaned thoroughly between sampling points.
Sample Handling	Samples were collected into laboratory-supplied soil jars and stored in a cooler box chilled with ice.
Chain of Custody	Samples were sent to the laboratory under chain of custody conditions.
Field Quality Control Samples	One duplicate sample pair (SLE02/ D01_180320) was sent to the laboratory for analysis. Relative percentage differences (RPDs) were calculated. RPDs for Lead (70%), Copper (31.4%) and TCLP lead (129%) exceed the adopted RPD (30%) and is likely attributed to heterogeneity in the distribution of contaminants within the sampled material. For the waste classification assessment, the maximum recorded concentration of lead and TCLP lead was adopted to provide a conservative assessment. The NSW Waste Guidelines (EPA, 2014) do not provide a criterion for Copper.
Laboratories Used	The primary laboratory was Eurofins and laboratory reports are NATA stamped.
Laboratory Quality Control Samples	Eurofins completed quality control sampling, including analysis of method blanks, laboratory duplicates, laboratory control samples and matrix spikes. Results were within required parameters aside from an elevated relative percent difference (RPD) for duplicate results for moisture content, which is not considered to affect the usability of the data.
Laboratory Reports	Laboratory reports relevant to this waste classification are attached in **Appendix 2.**

Based on the field and laboratory quality assurance completed the data is considered to be reliable for the purpose of determining a waste classification.

3. WASTE CLASSIFICATION

Waste is classified in the *NSW EPA Waste Classification Guidelines (2014)* following a five step process which assess pre-classification followed by chemical classification of the waste. A review against each of the waste classification steps for the railway sleeper waste is outlined in **Table 2**. Once a waste's classification has been established under a particular pre-classification below, there is no need to go to the next classification. The waste has that classification and must be managed accordingly.

Table 2 Waste Classification

Waste Classification Steps	Assessment
Step 1: Is the waste special waste?	No, the waste does not meet the criteria of special waste.
Step 2: Is the waste liquid waste?	No, the waste comprises timber sleepers.
Step 3: Is the waste pre-classified?	Yes, the waste is preclassified as construction and demolition waste as being waste derived from 'the construction, replacement, repair or alteration of infrastructure development such as roads, tunnels, sewage, water, electricity, telecommunications and airports'. However, as the waste was suspected to be impacted by lead ore concentrate additional chemical waste classification was considered warranted.
Step 4: Does the waste possess hazardous characteristics?	No, the waste does not meet the characteristics of pre-classified hazardous waste.
Step 5: Determining a waste's classification using chemical assessment.	Chemical classification of the four timber samples is presented in the attached **Table A1** provided in **Appendix 1**. Based on the mean[1] total and leachable chemical concentrations present, the waste is classified as General Solid Waste.
Waste Classification	**General Solid Waste**

1. A mean rather than 95%UCLaverage sample concentration was adopted as n=4.

Based on the pre-classification and the supplementary sampling completed the railway sleepers are classified as general solid waste and can be disposed of to an off-site facility licenced to receive this waste type.

This assessment has not considered the suitability of the sleepers for reuse on the site. The railway sleepers are considered to be a waste material and cannot legally be reused off the site.

4. LIMITATIONS

This document is issued in confidence to John Holland Rail for the purposes of waste classification in accordance with NSW Waste Guidelines (EPA, 2014).

Whilst reasonable attempts have been made to ensure that the contents of this report are accurate and complete at the time of writing, Ramboll Australia Pty Ltd disclaims any responsibility for loss or damage that may be occasioned directly or indirectly through the use of, or reliance on, the contents of this report.

5. REFERENCES

NEPC 2013 *National Environment Protection (Assessment of Site Contamination) Measure 1999 amended 2013*

NSW Environment Protection Authority (EPA) 2014 *Waste Classification Guidelines, Part 1: Classifying waste*

APPENDIX 1
RESULTS SUMMARY TABLE

Table A1: Waste Classification Results

	CT1 - General Solid Waste[1]	CT2 - Restricted Solid Waste[1]	SCC1 - General Solid Waste[2]	SCC2 - Restricted Solid Waste[2]	TCLP1 - General Solid Waste[2]	TCLP2 - Restricted Solid Waste[2]							
Sample Type:									Primary	Primary	Primary	Primary	Duplicate
Sample number:									S20-Ma28575	S20-Ma28576	S20-Ma28577	S20-Ma28578	S20-Ma28579
Sample date:									18-Mar-20	18-Mar-20	18-Mar-20	18-Mar-20	18-Mar-20
Sample ID:									SLE01	SLE02	SLE03	SLE04	D01_180320
Project Name:									John Holland	John Holland	John Holland	John Holland	John Holland
Compound:													
Site:									Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop	Tarago Rail Loop
Sampling Method:									NA	NA	NA	NA	NA
Sample Description									Woodchips	Woodchips	Woodchips	Woodchips	Woodchips
Analyte grouping/Analyte							**Units**	**LOR**					
Total Metals													
Arsenic	**100**	**400**	**500**	**2000**			mg/kg	5	< 2	6.9	6.5	< 2	4.6
Cadmium	**20**	**80**	**100**	**400**			mg/kg	1	15	11	7.6	11	11
Chromium (VI)	**100**	**400**	**1900**	**7600**			mg/kg	2	< 5	11	14	< 5	< 5
Copper							mg/kg	5	140	430	1700	230	590
Lead	**100**	**400**	**1500**	**6000**			mg/kg	5	**240**	**1300**	**1300**	**560**	**2700**
Mercury	**4**	**16**	**50**	**200**			mg/kg	0.1	< 0.1	< 0.1	0.2	< 0.1	< 0.1
Nickel	**40**	**160**	**1050**	**4200**			mg/kg	2	< 5	11	11	5.7	< 5
Zinc							mg/kg	5	2800	1200	1300	1100	1300
Organophosphorus Pesticides (OP)													
Azinphos-methyl							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Bolstar							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chlorfenvinphos							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chlorpyrifos	**4**	**16**	**7.5**	**30**			mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chlorpyrifos-methyl							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Coumaphos							mg/kg	< 2	< 2	< 2	< 2	< 2	< 2
Demeton-O							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Demeton-S							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Diazinon							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dichlorvos							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dimethoate							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Disulfoton							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
EPN							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Ethion							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Ethoprop							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Ethyl parathion							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Fenitrothion							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Fensulfothion							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Fenthion							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Malathion							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Merphos							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Methyl parathion							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Mevinphos							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Monocrotophos							mg/kg	< 2	< 2	< 2	< 2	< 2	< 2
Naled							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Omethoate							mg/kg	< 2	< 2	< 2	< 2	< 2	< 2
Phorate							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Pirimiphos-methyl							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Pyrazophos							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Ronnel							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Terbufos							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Tetrachlorvinphos							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Tokuthion							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Trichloronate							mg/kg	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Polynuclear Aromatic Hydrocarbons													
Acenaphthene							mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene							mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene							mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene							mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	**0.8**	**3.2**	**10**	**23**			mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (lower bound) *							mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *							mg/kg	< 0.6	0.6	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *							mg/kg	< 0.7	1.2	1.2	1.2	1.2	1.2
Benzo(b&j)fluoranthene							mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene							mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene							mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene							mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene							mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene							mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene							mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene							mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene							mg/kg	< 0.6	1.7	1.1	0.5	< 0.5	< 0.5
Phenanthrene							mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene							mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Total PAH*	**200**	**800**	**200**	**800**			mg/kg	< 0.6	1.7	1.1	0.5	< 0.5	< 0.5
TRH - 1999 NEPM Fractions (after silica gel clean-up)													
TRH C10-C14 (after silica gel clean-up)							mg/kg	< 100	< 100	< 100	< 100	220	< 100
TRH C10-C36 (Total) (after silica gel clean-up)	**10000**	**40000**	**10000**	**40000**			mg/kg	< 250	1200	< 250	750	< 250	2110
TRH C15-C28 (after silica gel clean-up)							mg/kg	< 250	300	< 250	320	< 250	510
TRH C29-C36 (after silica gel clean-up)							mg/kg	< 250	900	< 250	430	< 250	1600
Total Recoverable Hydrocarbons - NEPM 2013 Fractions													
TRH >C10-C16 (after silica gel clean-up)							mg/kg	< 250	< 250	< 250	< 250	< 250	< 250
TRH >C16-C34 (after silica gel clean-up)							mg/kg	< 500	1100	< 500	650	< 500	1700
TRH >C34-C40 (after silica gel clean-up)							mg/kg	< 500	< 500	< 500	< 500	< 500	840
Metals TCLP													
Arsenic					**5**	**20**	mg/L	0.1	--	--	--	--	--
Cadmium					**1**	**4**	mg/L	0.05	--	--	--	--	--
Chromium (VI)					**5**	**20**	mg/L	0.1	--	--	--	--	--
Copper							mg/L	0.1	--	--	--	--	--
Lead					**5**	**20**	mg/L	0.1	0.14	0.9	0.97	0.79	4.2
Nickel					**2**	**8**	mg/L	0.1	--	--	--	--	--
Zinc							mg/L	0.1	--	--	--	--	--
Mercury							mg/L	0.001	--	--	--	--	--

Blank Cell indicates no criterion available
LOR = Limit of Reporting
NSW EPA Waste Classification Guidelines - Part 1: Classification of Waste
[1] Maximum values of specific contaminant concentration (SCC) for classification without TCLP
[2] Maximum values for leachable concentration and specific contaminant concentration when used together
[3] PFOS and PFHxS are to be summed for comparison against the TCLP and SCC values.
[4] Values are the same for general solid waste (putrescible) and general solid waste (non-putrescible).
PFOS/PFOA values adopted from Addendum to the Waste Classification Guidelines (2014) – Part 1: classifying waste, October 2016 (NSW EPA). Noting these values have been based on the enHealth TDI values
Blank cell indicates no screening criterion available
For Limit of Reporting (LOR) refer to laboratory certificates of analysis
--- Indicates sample not analysed
Concentration in **red** font and grey box exceed CT1 screening value
Concentration in **blue** font and grey box exceed CT2 screening value
Concentration in **orange** font and grey box exceed SCC1 or TCLP1 screening value
Concentration in **green** font and grey box exceed SCC2 or TCLP 2 screening value
Concentrations below the LOR noted as <value

Table A2: QA/QC Results

	Sample Type:	Primary	Duplicate	RPD
	Sample number:	S20-Ma28576	S20-Ma28579	
	Sample date:	18-Mar-20	18-Mar-20	
	Sample ID:	SLE02	D01_180320	
	Project Name:	John Holland	John Holland	
	Compound:			
	Site:	Tarago Rail Loop	Tarago Rail Loop	
	Sampling Method:	NA	NA	
	Sample Description	Woodchips	Woodchips	

Analyte grouping/Analyte	Units	LOR			
Total Metals					
Arsenic	mg/kg	5	6.9	4.6	40.0
Cadmium	mg/kg	1	11	11	0.0
Chromium (VI)	mg/kg	2	11	< 5	nc
Copper	mg/kg	5	430	590	**31.4**
Lead	mg/kg	5	1300	2700	**70.0**
Mercury	mg/kg	0.1	< 0.1	< 0.1	nc
Nickel	mg/kg	2	11	< 5	nc
Zinc	mg/kg	5	1200	1300	8.0
Organophosphorus Pesticides (OP)					
Azinphos-methyl	mg/kg	< 0.2	< 0.2	< 0.2	nc
Bolstar	mg/kg	< 0.2	< 0.2	< 0.2	nc
Chlorfenvinphos	mg/kg	< 0.2	< 0.2	< 0.2	nc
Chlorpyrifos	mg/kg	< 0.2	< 0.2	< 0.2	nc
Chlorpyrifos-methyl	mg/kg	< 0.2	< 0.2	< 0.2	nc
Coumaphos	mg/kg	< 2	< 2	< 2	nc
Demeton-O	mg/kg	< 0.2	< 0.2	< 0.2	nc
Demeton-S	mg/kg	< 0.2	< 0.2	< 0.2	nc
Diazinon	mg/kg	< 0.2	< 0.2	< 0.2	nc
Dichlorvos	mg/kg	< 0.2	< 0.2	< 0.2	nc
Dimethoate	mg/kg	< 0.2	< 0.2	< 0.2	nc
Disulfoton	mg/kg	< 0.2	< 0.2	< 0.2	nc
EPN	mg/kg	< 0.2	< 0.2	< 0.2	nc
Ethion	mg/kg	< 0.2	< 0.2	< 0.2	nc
Ethoprop	mg/kg	< 0.2	< 0.2	< 0.2	nc
Ethyl parathion	mg/kg	< 0.2	< 0.2	< 0.2	nc
Fenitrothion	mg/kg	< 0.2	< 0.2	< 0.2	nc
Fensulfothion	mg/kg	< 0.2	< 0.2	< 0.2	nc
Fenthion	mg/kg	< 0.2	< 0.2	< 0.2	nc
Malathion	mg/kg	< 0.2	< 0.2	< 0.2	nc
Merphos	mg/kg	< 0.2	< 0.2	< 0.2	nc
Methyl parathion	mg/kg	< 0.2	< 0.2	< 0.2	nc
Mevinphos	mg/kg	< 0.2	< 0.2	< 0.2	nc
Monocrotophos	mg/kg	< 2	< 2	< 2	nc
Naled	mg/kg	< 0.2	< 0.2	< 0.2	nc
Omethoate	mg/kg	< 2	< 2	< 2	nc
Phorate	mg/kg	< 0.2	< 0.2	< 0.2	nc
Pirimiphos-methyl	mg/kg	< 0.2	< 0.2	< 0.2	nc
Pyrazophos	mg/kg	< 0.2	< 0.2	< 0.2	nc
Ronnel	mg/kg	< 0.2	< 0.2	< 0.2	nc
Terbufos	mg/kg	< 0.2	< 0.2	< 0.2	nc
Tetrachlorvinphos	mg/kg	< 0.2	< 0.2	< 0.2	nc
Tokuthion	mg/kg	< 0.2	< 0.2	< 0.2	nc
Trichloronate	mg/kg	< 0.2	< 0.2	< 0.2	nc
Polynuclear Aromatic Hydrocarbons					
Acenaphthene	mg/kg	< 0.5	< 0.5	< 0.5	nc
Acenaphthylene	mg/kg	< 0.5	< 0.5	< 0.5	nc
Anthracene	mg/kg	< 0.5	< 0.5	< 0.5	nc
Benz(a)anthracene	mg/kg	< 0.5	< 0.5	< 0.5	nc
Benzo(a)pyrene	mg/kg	< 0.5	< 0.5	< 0.5	nc
Benzo(a)pyrene TEQ (lower bound) *	mg/kg	< 0.5	< 0.5	< 0.5	nc
Benzo(a)pyrene TEQ (medium bound) *	mg/kg	< 0.6	0.6	0.6	0.0
Benzo(a)pyrene TEQ (upper bound) *	mg/kg	< 0.7	1.2	1.2	0.0
Benzo(b&j)fluoranthene	mg/kg	< 0.5	< 0.5	< 0.5	nc
Benzo(g.h.i)perylene	mg/kg	< 0.5	< 0.5	< 0.5	nc
Benzo(k)fluoranthene	mg/kg	< 0.5	< 0.5	< 0.5	nc
Chrysene	mg/kg	< 0.5	< 0.5	< 0.5	nc
Dibenz(a.h)anthracene	mg/kg	< 0.5	< 0.5	< 0.5	nc
Fluoranthene	mg/kg	< 0.5	< 0.5	< 0.5	nc
Fluorene	mg/kg	< 0.5	< 0.5	< 0.5	nc
Indeno(1.2.3-cd)pyrene	mg/kg	< 0.5	< 0.5	< 0.5	nc
Naphthalene	mg/kg	< 0.6	1.1	< 0.5	nc
Phenanthrene	mg/kg	< 0.5	< 0.5	< 0.5	nc
Pyrene	mg/kg	< 0.5	< 0.5	< 0.5	nc
Total PAH*	mg/kg	< 0.6	1.1	< 0.5	nc
TRH - 1999 NEPM Fractions (after silica gel clean-up)					
TRH C10-C14 (after silica gel clean-up)	mg/kg	< 100	< 100	< 100	nc
TRH C10-C36 (Total) (after silica gel clean-up)	mg/kg	< 250	< 250	2110	nc
TRH C15-C28 (after silica gel clean-up)	mg/kg	< 250	< 250	510	nc
TRH C29-C36 (after silica gel clean-up)	mg/kg	< 250	< 250	1600	nc
Total Recoverable Hydrocarbons - NEPM 2013 Fractions					
TRH >C10-C16 (after silica gel clean-up)	mg/kg	< 250	< 250	< 250	nc
TRH >C16-C34 (after silica gel clean-up)	mg/kg	< 500	< 500	1700	nc
TRH >C34-C40 (after silica gel clean-up)	mg/kg	< 500	< 500	840	nc
Metals TCLP					
Arsenic	mg/L	0.1	--	--	--
Cadmium	mg/L	0.05	--	--	--
Chromium (VI)	mg/L	0.1	--	--	--
Copper	mg/L	0.1	--	--	--
Lead	mg/L	0.1	0.9	4.2	**129.4**
Nickel	mg/L	0.1	--	--	--
Zinc	mg/L	0.1	--	--	--
Mercury	mg/L	0.001	--	--	--

LOR = Limit of Reporting
<value = Less than the laboratory Limit of Reporting (LOR)
Bold shaded cells exceed RPD >30% and both samples have recorded concetrations >10 x LOR
Bold indicates when above the acceptance criteria for Trip Spikes/Blanks and Rinsates
nc = not calculated as one or more results are below the LOR.

APPENDIX 2
LABORATORY CERTIFICATES

CHAIN OF CUSTODY RECORD

ABN 50 005 085 521

☐ Sydney Laboratory
Unit F3 Bld.F, 16 Mars Rd, Lane Cove West, NSW 2066
02 9900 8400 EnviroSampleNSW@eurofins.com

☐ Brisbane Laboratory
Unit 1, 21 Smallwood Pl., Murarrie, QLD 4172
07 3902 4600 EnviroSampleQLD@eurofins.com

☐ Perth Laboratory
Unit 2, 91 Leach Highway, Kewdale WA 6105
08 9251 9600 EnviroSampleWA@eurofins.com

☐ Melbourne Laboratory
2 Kingston Town Close, Oakleigh, VIC 3166
03 8564 5000 EnviroSampleVic@eurofins.com

Company	Ramboll	Project №	318000780	Project Manager	Stephen Maxwell
Address	50 Glebe Road the Junction	Project Name		EDD Format (ESdat, EQuIS, Custom)	Excel and PDF
Contact Name	Stephen Maxwell				
Phone №					
Special Directions					
Purchase Order					
Quote ID №	180813RAMN_1				

Sampler(s)	JB
Handed over by	JB
Email for Invoice	smaxwell@ramboll.com asiapac-accounts@ramboll.com
Email for Results	smaxwell@ramboll.com jblackwell@ramboll.com

jblackwell@ramboll.com

Turnaround Time (TAT) Requirements (Default will be 5 days if not ticked)

☐ Overnight (9am)*
☐ 1 Day* ☐ 2 Day*
☑ 3 Day* ☐ 5 Day
* Surcharges apply
☐ Other ( )

Analyses (Note: Where metals are requested, please specify "Total" or "Filtered") SUITE code must be used to attract SUITE pricing.

№	Client Sample ID	Sampled Date/Time (dd/mm/yy hh:mm)	Matrix (Solid (S) Water (W))	TRH C10 - C40 (following silica gel cleanup)	PAH	M8 (As, Cd, Cr, Cu, Pb, Ni, Zn, Hg)	OPP	TCLP BaP and Pb	1L Plastic	250mL Plastic	125mL Plastic	200mL Amber Glass	40mL VOA vial	500mL PFAS Bottle	Jar (Glass or HDPE)	Other (Asbestos AS4964, WA Guidelines)	Sample Comments / Dangerous Goods Hazard Warning
1	SLE01	18/03/20	Timber	X	X	X	X	X									
2	SLE02	18/03/20	Timber	X	X	X	X	X									
3	SLE03	18/03/20	Timber	X	X	X	X	X									
4	SLE04	18/03/20	Timber	X	X	X	X	X									
5	D01_180320	18/03/20	Timber	X	X	X	X	X									
8																	
9																	
10																	
		Total Counts		5	5	5	5	5									

Method of Shipment	☐ Courier (#)	☐ Hand Delivered	☐ Postal	Name		Signature		Date	Time	Time
								___/___/___		___:___
Eurofins | mgt Laboratory Use Only	Received By	Suzanne Ford	SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature		Date	19/3/2020	Time	6:45PM	Temperature
	Received By		SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature		Date	___/___/___	Time	___:___	Report № 708717

Eurofins Environment Testing Australia Pty Ltd trading as Eurofins | mgt

eurofins | Environment Testing

Melbourne
6 Monterey Road
Dandenong South Vic 3175
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254 & 14271

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

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

Perth
2/91 Leach Highway
Kewdale WA 6105
Phone : +61 8 9251 9600
NATA # 1261 Site # 23736

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

Sample Receipt Advice

Company name:	**Ramboll Australia Pty Ltd**
Contact name:	Stephen Maxwell
Project ID:	318000780
COC number:	Not provided
Turn around time:	3 Day
Date/Time received:	Mar 19, 2020 6:45 AM
Eurofins reference:	**708717**

Sample information

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

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

☑ COC has been completed correctly.

☑ Attempt to chill was evident.

☑ Appropriately preserved sample containers have been used.

☑ All samples were received in good condition.

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

☑ Appropriate sample containers have been used.

☒ Split sample sent to requested external lab.

☒ Some samples have been subcontracted.

N/A Custody Seals intact (if used).

Contact notes

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

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

Results will be delivered electronically via e.mail to Stephen Maxwell - smaxwell@ramboll.com.

Note: A copy of these results will also be delivered to the general Ramboll Australia Pty Ltd email address.

Ramboll Environ Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

NATA Accredited
Accreditation Number 1261
Site Number 18217

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

Attention: **Stephen Maxwell**

Report **708717-S**
Project name
Project ID 318000780
Received Date Mar 19, 2020

Client Sample ID			**SLE01**	**SLE02**	**SLE03**	**SLE04**
Sample Matrix			**Woodchips**	**Woodchips**	**Woodchips**	**Woodchips**
Eurofins Sample No.			**S20-Ma28575**	**S20-Ma28576**	**S20-Ma28577**	**S20-Ma28578**
Date Sampled			**Mar 18, 2020**	**Mar 18, 2020**	**Mar 18, 2020**	**Mar 18, 2020**
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	1.7	1.1	0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	1.7	1.1	0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	91	89	89	95
p-Terphenyl-d14 (surr.)	1	%	88	85	85	92
Organophosphorus Pesticides						
Azinphos-methyl	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Bolstar	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Chlorfenvinphos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Chlorpyrifos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Chlorpyrifos-methyl	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Coumaphos	2	mg/kg	< 2	< 2	< 2	< 2
Demeton-S	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Demeton-O	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Diazinon	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Dichlorvos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Dimethoate	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Disulfoton	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2

Client Sample ID			SLE01	SLE02	SLE03	SLE04
Sample Matrix			Woodchips	Woodchips	Woodchips	Woodchips
Eurofins Sample No.			S20-Ma28575	S20-Ma28576	S20-Ma28577	S20-Ma28578
Date Sampled			Mar 18, 2020	Mar 18, 2020	Mar 18, 2020	Mar 18, 2020
Test/Reference	LOR	Unit				
Organophosphorus Pesticides						
EPN	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Ethion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Ethoprop	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Ethyl parathion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Fenitrothion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Fensulfothion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Fenthion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Malathion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Merphos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Methyl parathion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Mevinphos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Monocrotophos	2	mg/kg	< 2	< 2	< 2	< 2
Naled	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Omethoate	2	mg/kg	< 2	< 2	< 2	< 2
Phorate	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Pirimiphos-methyl	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Pyrazophos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Ronnel	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Terbufos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Tetrachlorvinphos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Tokuthion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Trichloronate	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Triphenylphosphate (surr.)	1	%	123	120	120	126
TRH - 2013 NEPM Fractions (after silica gel clean-up)						
TRH >C10-C16 (after silica gel clean-up)	50	mg/kg	< 250	< 250	< 250	< 250
TRH >C16-C34 (after silica gel clean-up)	100	mg/kg	1100	< 500	650	< 500
TRH >C34-C40 (after silica gel clean-up)	100	mg/kg	< 500	< 500	< 500	< 500
TRH - 1999 NEPM Fractions (after silica gel clean-up)						
TRH C10-C36 (Total) (after silica gel clean-up)	100	mg/kg	1200	< 250	750	< 250
TRH C10-C14 (after silica gel clean-up)	50	mg/kg	< 100	< 100	< 100	220
TRH C15-C28 (after silica gel clean-up)	100	mg/kg	300	< 250	320	< 250
TRH C29-C36 (after silica gel clean-up)	100	mg/kg	900	< 250	430	< 250
Heavy Metals						
Arsenic	2	mg/kg	< 2	6.9	6.5	< 2
Cadmium	0.4	mg/kg	15	11	7.6	11
Chromium	5	mg/kg	< 5	11	14	< 5
Copper	5	mg/kg	140	430	1700	230
Lead	5	mg/kg	240	1300	1300	560
Mercury	0.1	mg/kg	< 0.1	< 0.1	0.2	< 0.1
Nickel	5	mg/kg	< 5	11	11	5.7
Zinc	5	mg/kg	2800	1200	1300	1100

Client Sample ID			D01_180320
Sample Matrix			Woodchips
Eurofins Sample No.			S20-Ma28579
Date Sampled			Mar 18, 2020
Test/Reference	LOR	Unit	
Polycyclic Aromatic Hydrocarbons			
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2
Acenaphthene	0.5	mg/kg	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5
Anthracene	0.5	mg/kg	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5
Chrysene	0.5	mg/kg	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5
Fluorene	0.5	mg/kg	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5
Naphthalene	0.5	mg/kg	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5
Pyrene	0.5	mg/kg	< 0.5
Total PAH*	0.5	mg/kg	< 0.5
2-Fluorobiphenyl (surr.)	1	%	95
p-Terphenyl-d14 (surr.)	1	%	91
Organophosphorus Pesticides			
Azinphos-methyl	0.2	mg/kg	< 0.2
Bolstar	0.2	mg/kg	< 0.2
Chlorfenvinphos	0.2	mg/kg	< 0.2
Chlorpyrifos	0.2	mg/kg	< 0.2
Chlorpyrifos-methyl	0.2	mg/kg	< 0.2
Coumaphos	2	mg/kg	< 2
Demeton-S	0.2	mg/kg	< 0.2
Demeton-O	0.2	mg/kg	< 0.2
Diazinon	0.2	mg/kg	< 0.2
Dichlorvos	0.2	mg/kg	< 0.2
Dimethoate	0.2	mg/kg	< 0.2
Disulfoton	0.2	mg/kg	< 0.2
EPN	0.2	mg/kg	< 0.2
Ethion	0.2	mg/kg	< 0.2
Ethoprop	0.2	mg/kg	< 0.2
Ethyl parathion	0.2	mg/kg	< 0.2
Fenitrothion	0.2	mg/kg	< 0.2
Fensulfothion	0.2	mg/kg	< 0.2
Fenthion	0.2	mg/kg	< 0.2
Malathion	0.2	mg/kg	< 0.2
Merphos	0.2	mg/kg	< 0.2
Methyl parathion	0.2	mg/kg	< 0.2
Mevinphos	0.2	mg/kg	< 0.2
Monocrotophos	2	mg/kg	< 2
Naled	0.2	mg/kg	< 0.2
Omethoate	2	mg/kg	< 2

Client Sample ID			D01_180320
Sample Matrix			**Woodchips**
Eurofins Sample No.			**S20-Ma28579**
Date Sampled			**Mar 18, 2020**
Test/Reference	LOR	Unit	
Organophosphorus Pesticides			
Phorate	0.2	mg/kg	< 0.2
Pirimiphos-methyl	0.2	mg/kg	< 0.2
Pyrazophos	0.2	mg/kg	< 0.2
Ronnel	0.2	mg/kg	< 0.2
Terbufos	0.2	mg/kg	< 0.2
Tetrachlorvinphos	0.2	mg/kg	< 0.2
Tokuthion	0.2	mg/kg	< 0.2
Trichloronate	0.2	mg/kg	< 0.2
Triphenylphosphate (surr.)	1	%	131
TRH - 2013 NEPM Fractions (after silica gel clean-up)			
TRH >C10-C16 (after silica gel clean-up)	50	mg/kg	< 250
TRH >C16-C34 (after silica gel clean-up)	100	mg/kg	1700
TRH >C34-C40 (after silica gel clean-up)	100	mg/kg	840
TRH - 1999 NEPM Fractions (after silica gel clean-up)			
TRH C10-C36 (Total) (after silica gel clean-up)	100	mg/kg	2110
TRH C10-C14 (after silica gel clean-up)	50	mg/kg	< 100
TRH C15-C28 (after silica gel clean-up)	100	mg/kg	510
TRH C29-C36 (after silica gel clean-up)	100	mg/kg	1600
Heavy Metals			
Arsenic	2	mg/kg	4.6
Cadmium	0.4	mg/kg	11
Chromium	5	mg/kg	< 5
Copper	5	mg/kg	590
Lead	5	mg/kg	2700
Mercury	0.1	mg/kg	< 0.1
Nickel	5	mg/kg	< 5
Zinc	5	mg/kg	1300

Sample History

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

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

Description	Testing Site	Extracted	Holding Time
Polycyclic Aromatic Hydrocarbons	Sydney	Mar 20, 2020	14 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Organophosphorus Pesticides	Sydney	Mar 20, 2020	14 Days
- Method: LTM-ORG-2200 Organophosphorus Pesticides by GC-MS			
Metals M8	Sydney	Mar 20, 2020	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
TRH - 2013 NEPM Fractions (after silica gel clean-up)	Sydney	Mar 20, 2020	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			
TRH - 1999 NEPM Fractions (after silica gel clean-up)	Sydney	Mar 20, 2020	14 Days
- Method: LTM-ORG-2010 TRH C6-C40			

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IANZ # 1290

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name:
Project ID: 318000780

Order No.:
Report #: 708717
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Mar 19, 2020 6:45 AM
Due: Mar 24, 2020
Priority: 3 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Benzo(a)pyrene	Lead	Polycyclic Aromatic Hydrocarbons	Organophosphorus Pesticides	USA Leaching Procedure	Metals M8	TRH (after Silica Gel cleanup)
Melbourne Laboratory - NATA Site # 1254 & 14271												
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794												
Perth Laboratory - NATA Site # 23736												
External Laboratory												
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**							
1	SLE01	Mar 18, 2020		Woodchips	S20-Ma28575			X	X		X	X
2	SLE02	Mar 18, 2020		Woodchips	S20-Ma28576			X	X		X	X
3	SLE03	Mar 18, 2020		Woodchips	S20-Ma28577			X	X		X	X
4	SLE04	Mar 18, 2020		Woodchips	S20-Ma28578			X	X		X	X
5	D01_180320	Mar 18, 2020		Woodchips	S20-Ma28579			X	X		X	X
6	SLE01	Mar 18, 2020		US Leachate	S20-Ma28580	X	X			X		
7	SLE02	Mar 18, 2020		US Leachate	S20-Ma28581	X	X			X		
8	SLE03	Mar 18, 2020		US Leachate	S20-Ma28582	X	X			X		
9	SLE04	Mar 18, 2020		US Leachate	S20-Ma28583	X	X			X		
10	DO1_180320	Mar 18, 2020		US Leachate	S20-Ma28584	X	X			X		

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Eurofins Analytical Services Manager : Andrew Black

Sample Detail	Benzo(a)pyrene	Lead	Polycyclic Aromatic Hydrocarbons	Organophosphorus Pesticides	USA Leaching Procedure	Metals M8	TRH (after Silica Gel cleanup)
Melbourne Laboratory - NATA Site # 1254 & 14271							
Sydney Laboratory - NATA Site # 18217	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 23736							
Test Counts	5	5	5	5	5	5	5

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

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

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

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

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

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

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

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

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

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

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

Results <10 times the LOR : No Limit

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

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

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

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

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

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/kg	< 0.5			0.5	Pass	
Acenaphthylene	mg/kg	< 0.5			0.5	Pass	
Anthracene	mg/kg	< 0.5			0.5	Pass	
Benz(a)anthracene	mg/kg	< 0.5			0.5	Pass	
Benzo(a)pyrene	mg/kg	< 0.5			0.5	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Benzo(g.h.i)perylene	mg/kg	< 0.5			0.5	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Chrysene	mg/kg	< 0.5			0.5	Pass	
Dibenz(a.h)anthracene	mg/kg	< 0.5			0.5	Pass	
Fluoranthene	mg/kg	< 0.5			0.5	Pass	
Fluorene	mg/kg	< 0.5			0.5	Pass	
Indeno(1.2.3-cd)pyrene	mg/kg	< 0.5			0.5	Pass	
Naphthalene	mg/kg	< 0.5			0.5	Pass	
Phenanthrene	mg/kg	< 0.5			0.5	Pass	
Pyrene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Organophosphorus Pesticides							
Azinphos-methyl	mg/kg	< 0.2			0.2	Pass	
Bolstar	mg/kg	< 0.2			0.2	Pass	
Chlorfenvinphos	mg/kg	< 0.2			0.2	Pass	
Chlorpyrifos	mg/kg	< 0.2			0.2	Pass	
Chlorpyrifos-methyl	mg/kg	< 0.2			0.2	Pass	
Coumaphos	mg/kg	< 2			2	Pass	
Demeton-S	mg/kg	< 0.2			0.2	Pass	
Demeton-O	mg/kg	< 0.2			0.2	Pass	
Diazinon	mg/kg	< 0.2			0.2	Pass	
Dichlorvos	mg/kg	< 0.2			0.2	Pass	
Dimethoate	mg/kg	< 0.2			0.2	Pass	
Disulfoton	mg/kg	< 0.2			0.2	Pass	
EPN	mg/kg	< 0.2			0.2	Pass	
Ethion	mg/kg	< 0.2			0.2	Pass	
Ethoprop	mg/kg	< 0.2			0.2	Pass	
Ethyl parathion	mg/kg	< 0.2			0.2	Pass	
Fenitrothion	mg/kg	< 0.2			0.2	Pass	
Fensulfothion	mg/kg	< 0.2			0.2	Pass	
Fenthion	mg/kg	< 0.2			0.2	Pass	
Malathion	mg/kg	< 0.2			0.2	Pass	
Merphos	mg/kg	< 0.2			0.2	Pass	
Methyl parathion	mg/kg	< 0.2			0.2	Pass	
Mevinphos	mg/kg	< 0.2			0.2	Pass	
Monocrotophos	mg/kg	< 2			2	Pass	
Naled	mg/kg	< 0.2			0.2	Pass	
Omethoate	mg/kg	< 2			2	Pass	
Phorate	mg/kg	< 0.2			0.2	Pass	
Pirimiphos-methyl	mg/kg	< 0.2			0.2	Pass	
Pyrazophos	mg/kg	< 0.2			0.2	Pass	
Ronnel	mg/kg	< 0.2			0.2	Pass	
Terbufos	mg/kg	< 0.2			0.2	Pass	
Tetrachlorvinphos	mg/kg	< 0.2			0.2	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Tokuthion	mg/kg	< 0.2			0.2	Pass	
Trichloronate	mg/kg	< 0.2			0.2	Pass	
Method Blank							
TRH - 2013 NEPM Fractions (after silica gel clean-up)							
TRH >C10-C16 (after silica gel clean-up)	mg/kg	< 50			50	Pass	
TRH >C16-C34 (after silica gel clean-up)	mg/kg	< 100			100	Pass	
TRH >C34-C40 (after silica gel clean-up)	mg/kg	< 100			100	Pass	
Method Blank							
TRH - 1999 NEPM Fractions (after silica gel clean-up)							
TRH C10-C14 (after silica gel clean-up)	mg/kg	< 50			50	Pass	
TRH C15-C28 (after silica gel clean-up)	mg/kg	< 100			100	Pass	
TRH C29-C36 (after silica gel clean-up)	mg/kg	< 100			100	Pass	
Method Blank							
Heavy Metals							
Arsenic	mg/kg	< 2			2	Pass	
Cadmium	mg/kg	< 0.4			0.4	Pass	
Chromium	mg/kg	< 5			5	Pass	
Copper	mg/kg	< 5			5	Pass	
Lead	mg/kg	< 5			5	Pass	
Mercury	mg/kg	< 0.1			0.1	Pass	
Nickel	mg/kg	< 5			5	Pass	
Zinc	mg/kg	< 5			5	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	104			70-130	Pass	
Acenaphthylene	%	113			70-130	Pass	
Anthracene	%	107			70-130	Pass	
Benz(a)anthracene	%	108			70-130	Pass	
Benzo(a)pyrene	%	102			70-130	Pass	
Benzo(b&j)fluoranthene	%	98			70-130	Pass	
Benzo(g.h.i)perylene	%	101			70-130	Pass	
Benzo(k)fluoranthene	%	118			70-130	Pass	
Chrysene	%	103			70-130	Pass	
Dibenz(a.h)anthracene	%	95			70-130	Pass	
Fluoranthene	%	110			70-130	Pass	
Fluorene	%	102			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	92			70-130	Pass	
Naphthalene	%	109			70-130	Pass	
Phenanthrene	%	108			70-130	Pass	
Pyrene	%	110			70-130	Pass	
LCS - % Recovery							
Organophosphorus Pesticides							
Diazinon	%	104			70-130	Pass	
Dimethoate	%	101			70-130	Pass	
Ethion	%	109			70-130	Pass	
Fenitrothion	%	105			70-130	Pass	
Methyl parathion	%	97			70-130	Pass	
Mevinphos	%	116			70-130	Pass	
LCS - % Recovery							
TRH - 1999 NEPM Fractions (after silica gel clean-up)							
TRH C10-C14 (after silica gel clean-up)	%	126			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Arsenic	%	96			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Cadmium	%	99			70-130	Pass	
Chromium	%	96			70-130	Pass	
Copper	%	99			70-130	Pass	
Lead	%	100			70-130	Pass	
Mercury	%	93			70-130	Pass	
Nickel	%	99			70-130	Pass	
Zinc	%	96			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	S20-Ma24218	NCP	%	99			70-130	Pass	
Acenaphthylene	S20-Ma24218	NCP	%	121			70-130	Pass	
Anthracene	S20-Ma24218	NCP	%	109			70-130	Pass	
Benz(a)anthracene	S20-Ma24218	NCP	%	123			70-130	Pass	
Benzo(a)pyrene	S20-Ma24218	NCP	%	105			70-130	Pass	
Benzo(b&j)fluoranthene	S20-Ma24218	NCP	%	115			70-130	Pass	
Benzo(g.h.i)perylene	S20-Ma24218	NCP	%	109			70-130	Pass	
Benzo(k)fluoranthene	S20-Ma24218	NCP	%	107			70-130	Pass	
Chrysene	S20-Ma24218	NCP	%	107			70-130	Pass	
Dibenz(a.h)anthracene	S20-Ma24218	NCP	%	109			70-130	Pass	
Fluoranthene	S20-Ma24218	NCP	%	119			70-130	Pass	
Fluorene	S20-Ma24218	NCP	%	107			70-130	Pass	
Indeno(1.2.3-cd)pyrene	S20-Ma24218	NCP	%	104			70-130	Pass	
Naphthalene	S20-Ma24218	NCP	%	111			70-130	Pass	
Phenanthrene	S20-Ma24218	NCP	%	113			70-130	Pass	
Pyrene	S20-Ma24218	NCP	%	117			70-130	Pass	
Spike - % Recovery									
Organophosphorus Pesticides				Result 1					
Diazinon	S20-Ma24218	NCP	%	100			70-130	Pass	
Ethion	S20-Ma24218	NCP	%	128			70-130	Pass	
Fenitrothion	S20-Ma24218	NCP	%	127			70-130	Pass	
Methyl parathion	S20-Ma24218	NCP	%	114			70-130	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S20-Ma25156	NCP	%	86			70-130	Pass	
Cadmium	S20-Ma25156	NCP	%	95			70-130	Pass	
Chromium	S20-Ma25156	NCP	%	87			70-130	Pass	
Copper	S20-Ma25156	NCP	%	90			70-130	Pass	
Lead	S20-Ma25156	NCP	%	95			70-130	Pass	
Mercury	S20-Ma25156	NCP	%	97			70-130	Pass	
Nickel	S20-Ma25156	NCP	%	85			70-130	Pass	
Zinc	S20-Ma25156	NCP	%	92			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	S20-Ma26439	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	S20-Ma26439	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	S20-Ma26439	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	S20-Ma26439	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	S20-Ma26439	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	S20-Ma26439	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	S20-Ma26439	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	S20-Ma26439	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Chrysene	S20-Ma26439	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	S20-Ma26439	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	S20-Ma26439	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	S20-Ma26439	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	S20-Ma26439	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	S20-Ma26439	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	S20-Ma26439	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	S20-Ma26439	NCP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Organophosphorus Pesticides				Result 1	Result 2	RPD			
Azinphos-methyl	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Bolstar	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorfenvinphos	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorpyrifos	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorpyrifos-methyl	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Coumaphos	S20-Ma24217	NCP	mg/kg	< 2	< 2	<1	30%	Pass	
Demeton-S	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Demeton-O	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Diazinon	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Dichlorvos	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Dimethoate	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Disulfoton	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
EPN	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethion	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethoprop	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethyl parathion	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fenitrothion	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fensulfothion	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fenthion	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Malathion	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Merphos	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Methyl parathion	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Mevinphos	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Monocrotophos	S20-Ma24217	NCP	mg/kg	< 2	< 2	<1	30%	Pass	
Naled	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Omethoate	S20-Ma24217	NCP	mg/kg	< 2	< 2	<1	30%	Pass	
Phorate	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Pirimiphos-methyl	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Pyrazophos	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ronnel	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Terbufos	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Tetrachlorvinphos	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Tokuthion	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Trichloronate	S20-Ma24217	NCP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S20-Ma25147	NCP	mg/kg	4.3	4.7	9.0	30%	Pass	
Cadmium	S20-Ma25147	NCP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	S20-Ma25147	NCP	mg/kg	12	11	8.0	30%	Pass	
Copper	S20-Ma25147	NCP	mg/kg	20	18	11	30%	Pass	
Lead	S20-Ma25147	NCP	mg/kg	64	42	40	30%	Fail	Q15
Mercury	S20-Ma25147	NCP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	

Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Nickel	S20-Ma25147	NCP	mg/kg	11	11	1.0	30%	Pass	
Zinc	S20-Ma25147	NCP	mg/kg	140	120	17	30%	Pass	

Comments

Sample Integrity

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

Qualifier Codes/Comments

Code	Description
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
Q15	The RPD reported passes Eurofins Environment Testing's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised By

Andrew Black	Analytical Services Manager
Andrew Sullivan	Senior Analyst-Organic (NSW)
Gabriele Cordero	Senior Analyst-Metal (NSW)

Glenn Jackson
General Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

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

Measurement uncertainty of test data is available on request or please click here.

Ramboll Environ Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

Attention: **Stephen Maxwell**

Report **708717-L**
Project name
Project ID 318000780
Received Date Mar 19, 2020

Client Sample ID			**SLE01**	**SLE02**	**SLE03**	**SLE04**
Sample Matrix			**US Leachate**	**US Leachate**	**US Leachate**	**US Leachate**
Eurofins Sample No.			**S20-Ma28580**	**S20-Ma28581**	**S20-Ma28582**	**S20-Ma28583**
Date Sampled			**Mar 18, 2020**	**Mar 18, 2020**	**Mar 18, 2020**	**Mar 18, 2020**
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene	0.001	mg/L	< 0.001	< 0.001	< 0.001	< 0.001
Heavy Metals						
Lead	0.01	mg/L	0.14	0.90	0.97	0.79
USA Leaching Procedure						
Leachate Fluid[C01]		comment	1.0	1.0	1.0	1.0
pH (initial)	0.1	pH Units	4.0	4.2	3.9	4.2
pH (off)	0.1	pH Units	4.8	4.9	4.8	4.9
pH (USA HCl addition)	0.1	pH Units	2.0	2.0	1.7	1.8

Client Sample ID			**DO1_180320**
Sample Matrix			**US Leachate**
Eurofins Sample No.			**S20-Ma28584**
Date Sampled			**Mar 18, 2020**
Test/Reference	LOR	Unit	
Polycyclic Aromatic Hydrocarbons			
Benzo(a)pyrene	0.001	mg/L	< 0.001
Heavy Metals			
Lead	0.01	mg/L	4.2
USA Leaching Procedure			
Leachate Fluid[C01]		comment	1.0
pH (initial)	0.1	pH Units	4.0
pH (off)	0.1	pH Units	4.9
pH (USA HCl addition)	0.1	pH Units	2.0

Sample History

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

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

Description	Testing Site	Extracted	Holding Time
Polycyclic Aromatic Hydrocarbons	Sydney	Mar 20, 2020	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Heavy Metals	Sydney	Mar 23, 2020	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
USA Leaching Procedure	Sydney	Mar 20, 2020	14 Days
- Method: LTM-GEN-7010 Leaching Procedure for Soils & Solid Wastes			

eurofins | Environment Testing

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NATA # 1261 Site # 18217

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NATA # 1261 Site # 20794

Perth
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Kewdale WA 6105
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NATA # 1261
Site # 23736

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IANZ # 1290

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name:
Project ID: 318000780

Order No.:
Report #: 708717
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Mar 19, 2020 6:45 AM
Due: Mar 24, 2020
Priority: 3 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Benzo(a)pyrene	Lead	Polycyclic Aromatic Hydrocarbons	Organophosphorus Pesticides	USA Leaching Procedure	Metals M8	TRH (after Silica Gel cleanup)
Melbourne Laboratory - NATA Site # 1254 & 14271												
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794												
Perth Laboratory - NATA Site # 23736												
External Laboratory												
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**							
1	SLE01	Mar 18, 2020		Woodchips	S20-Ma28575			X	X		X	X
2	SLE02	Mar 18, 2020		Woodchips	S20-Ma28576			X	X		X	X
3	SLE03	Mar 18, 2020		Woodchips	S20-Ma28577			X	X		X	X
4	SLE04	Mar 18, 2020		Woodchips	S20-Ma28578			X	X		X	X
5	D01_180320	Mar 18, 2020		Woodchips	S20-Ma28579			X	X		X	X
6	SLE01	Mar 18, 2020		US Leachate	S20-Ma28580	X	X			X		
7	SLE02	Mar 18, 2020		US Leachate	S20-Ma28581	X	X			X		
8	SLE03	Mar 18, 2020		US Leachate	S20-Ma28582	X	X			X		
9	SLE04	Mar 18, 2020		US Leachate	S20-Ma28583	X	X			X		
10	DO1_180320	Mar 18, 2020		US Leachate	S20-Ma28584	X	X			X		

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Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name:
Project ID: 318000780

Order No.:
Report #: 708717
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Mar 19, 2020 6:45 AM
Due: Mar 24, 2020
Priority: 3 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail	Benzo(a)pyrene	Lead	Polycyclic Aromatic Hydrocarbons	Organophosphorus Pesticides	USA Leaching Procedure	Metals M8	TRH (after Silica Gel cleanup)
Melbourne Laboratory - NATA Site # 1254 & 14271							
Sydney Laboratory - NATA Site # 18217	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 23736							
Test Counts	5	5	5	5	5	5	5

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

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

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

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

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

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

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

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

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

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

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

Results <10 times the LOR : No Limit

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

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

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

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

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

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Benzo(a)pyrene	mg/L	< 0.001			0.001	Pass	
Method Blank							
Heavy Metals							
Lead	mg/L	< 0.01			0.01	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Benzo(a)pyrene	%	86			70-130	Pass	
LCS - % Recovery							
Heavy Metals							
Lead	%	99			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Heavy Metals				Result 1					
Lead	S20-Ma32658	NCP	%	94			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1	Result 2	RPD	Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Benzo(a)pyrene	S20-Ma31473	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S20-Ma32654	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	

Comments

Sample Integrity

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

Qualifier Codes/Comments

Code	Description
C01	Leachate Fluid Key: 1 - pH 5.0; 2 - pH 2.9; 3 - pH 9.2; 4 - Reagent (DI) water; 5 - Client sample, 6 - other

Authorised By

Andrew Black	Analytical Services Manager
Andrew Sullivan	Senior Analyst-Organic (NSW)
Gabriele Cordero	Senior Analyst-Metal (NSW)

Glenn Jackson
General Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

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

Measurement uncertainty of test data is available on request or please click here.

APPENDIX 11
MATERIAL TRACKING TEMPLATE

Client: John Holland Rail

Project Name: Tarago Rail Corridor Lead Management

31-07-20

Material Tracking Summary

Material Source	Vehicle Registration	Tranpsort Company	Waste Type	Waste Classification	Time Excavated	Date Excavated	Destination	Weighbridge Time	Weighbridge Date	Docket #	Net Weight (t)

Notes

Material source and destination (if onsite) should be defined with reference to a 10 x 10m site grid refernce such that the insitu contaminant characterisation can inform waste management.

This material tracking summary will be miantained digitally.

APPENDIX 12
TREATABILITY TRIAL AND SPECIFIC IMMOBILISATION APPLICATION

RAMBOLL

ENVIRONMENT
& HEALTH

21 June 2021

Waste Operations NSW EPA

NSW EPA

PO Box A290

SYDNEY SOUTH NSW 1232

via email: envsolclr.requests@epa.nsw.gov.au

Dear EPA

RE: Specific Immobilisation Approval Application - Lead Impacted Material

Ramboll
Level 3, 100 Pacific Highway
PO Box 560
North Sydney NSW 2060

T +61 2 9954 8100

www.ramboll.com

Ref 318000780

Waste ~~Generator/~~[1]Owner: Transport for NSW

Applicant: Ramboll Australia Pty Ltd

Site Location: Tarago Rail Yard, Tarago NSW

Contaminants of Concern: Lead

INTRODUCTION

John Holland Rail Pty Ltd engaged Ramboll to undertake lead stabilisation trials on lead impacted material located at the Tarago Rail Yard, Tarago NSW. A Site Locality Plan is shown in **Appendix 1**.

This letter provides supporting information required for an Application for Specific Immobilisation Approval (SIA). The following sections are numbered according to sections set out in Section B (Waste and Proposed Treatment/Immobilisation Mechanism) of an Application for a SIA.

[1] The generator will be the custodian of the Country Regional Network; scheduled to transition from John Holland Rail to UGL.

1. AVOIDANCE, REUSE, RECYCLING OR REPROCESSING

Avoidance: The impacted material cannot be avoided as contamination of the affected area has already occurred and the Site is required to be suitable for the proposed continued use.

Abbreviations

Abbreviation	Description
CoC	Chain of Custody
CoPC	Contaminant of Potential Concern
CT	Contaminant Threshold
GSW	General Solid Waste
ha	hectare
km	kilometre
L	litre
LOR	limit of reporting
m	metre
mg/kg	milligrams per kilogram
mg/L	milligrams per litre
MAP	Monoammonium phosphate (reagent)
MEP	Multiple Extraction Procedure (in accordance with US EPA Method 1320, 1986)
MgO	Magnesium oxide (reagent)
NATA	National Association of Testing Authorities
NEPM	National Environment Protection (Assessment of Contamination) Measure (amended 2013)
Pb	Chemical symbol for lead
pH	measure of acidity, hydrogen ion activity
QA/QC	Quality Assurance and Quality Control
RPD	Relative Percentage Difference
RSW	Restricted Solid Waste
SCC	Specific Contaminant Concentration
t	tonne
TCLP	Toxicity Characteristic Leaching Procedure (in accordance with US EPA Method 1311, 1992)
UCL	Upper Confidence Limit
XRF	X-ray fluorescence spectrometer

Reuse: The material is impacted with total lead levels that exceed the site-specific criterion for lead (2200 mg/kg) and criteria relevant to potential offsite reuse as defined under general Resource Recovery Exemptions prepared by the NSW EPA. Therefore, no reuse applications of the impacted material have been identified.

Recycling: The material contains limited calorific value, which precludes its recycling. No recycling options for material containing elevated lead concentrations can be identified.

Reprocessing: The material is co-contaminated with soil, and no technology or market exists for its incorporation into an alternative process or as a product.

2. QUANTITY OF WASTE REQUIRING TREATMENT AND/OR DISPOSAL & ESTIMATED TIME TO COMPLETE TREATMENT AND/OR DISPOSAL

Based on assessment of the horizontal and vertical distribution of contamination at the site the volume of material requiring remediation has been estimated at 4200 m^3. This includes an estimated 100 m^3 of railway sleepers, 2100 m^3 of soil adjacent the rail formation and 2000 m^3 of fouled ballast in the Woodlawn Siding (historically used to load ore concentrates for rail transport). Assessment of ballast pieces identified concentrations of lead below site criteria and so mechanical screening to remove the ballast for onsite reuse is proposed as a precursor to chemical immobilisation. The total volume of material for chemical immobilisation is estimated at 3100 m^3. Applying a volume to weight ratio of 1:1.8 this equates to an estimated 5580 t.

The time estimated for treatment works of the excavated and stockpiled waste is approximately 6 weeks, which includes allowance for receipt of conformance results and off-site disposal of the treated waste.

3. FORM OF THE WASTE

The waste material, comprising a combination of railway sleepers, soil and fouled ballast, currently sits onsite, partly in stockpile and partly in situ. This material will be excavated, stockpiled and screened (<20 mm) prior to treatment.

4. BACKGROUND INFORMATION ABOUT THE WASTE

The waste material comprises a combination of railway sleepers, soil adjacent the rail formation and fouled ballast in the Woodlawn Siding, which was historically used to load ore concentrates for rail transport. Contamination of these materials has occurred from this ore loading activity. Assessment of ballast pieces identified concentrations of lead below the site-specific criterion, therefore mechanical screening to remove the ballast for onsite reuse is proposed as a precursor to chemical immobilisation.

5. CHEMICAL COMPOSITION AND PHYSICAL/CHEMICAL NATURE OF THE UNTREATED WASTE

The waste includes silty-sandy-gravelly ballast fines and clayey surficial soils from the adjacent area. The chemical composition of the in situ impacted material was characterised by Ramboll (2020). Relevant data for the waste material are summarised in **Table 1**, which shows that the concentrations reported for lead would classify the waste as hazardous. All other contaminants of potential concern (CoPCs) are below the General Solid Waste (GSW) criteria (**Table 1**). Copies of the NATA accredited Certificates of Analysis are included in **Appendix 2**.

Total lead concentrations were measured in the field using a field-portable X-ray fluorescence spectrometer (XRF). Collected samples were analysed for total and leachable (TCLP) lead concentrations. A review of the analytical data shows that the maximum total and leachable lead concentrations were 184,000 mg/kg and 32 mg/L, respectively.

Ramboll collected four bulk samples (4 x 20 kg), TP3A, TP4A, TP5A and TP6A, of the impacted material on 16 September 2019. The laboratory results for total lead in the bulk samples are summarised below. Copies of the NATA accredited Certificates of Analysis are included in **Appendix 2**.

- TP3A: 18,500 mg/kg lead (Pb)
- TP4A: 184,000 mg/kg lead (Pb)
- TP5A: 29,000 mg/kg lead (Pb)
- TP6A: 5000 mg/kg lead (Pb)

Based on these results, two samples (TP3A and TP5A) were selected for use as bulk samples for the treatment trials. Based on the laboratory results summarised in **Table 1** for samples (n = 44) collected from the site in 2019, with an average total lead concentration of 4687 mg/kg and maximum total lead concentration of 38,000 mg/kg, TP3A was considered to best represent the upper range of expected total lead concentrations in the waste (once excavated and stockpiled), and TP5A represents a more 'worst-case' scenario, included as a contingency. Bulk sample TP6A was considered to provide insufficient contingency if higher total lead concentrations are reported in the excavated material, and the total lead concentration in sample TP4A was considered to be well beyond the expected concentration range in the excavated material.

Table 1: Summary of analytical results for representative onsite soil samples

Analyte	Unit	CT1 - General Solid Waste*	CT2 - Restricted Solid Waste*	TCLP1 (mg/L)	Count	Mean	Std Dev	Min	Max	95% UCL
Antimony	mg/kg	---	---	---	22	19.5	13.1	5	55	---
Arsenic	mg/kg	100	400	NA	33	68.3	57.4	4.9	190	91.9
Beryllium	mg/kg	---	---	---	22	1.0	0.0	1	1	---
Boron	mg/kg	---	---	---	22	5.0	0.0	5	5	---
Cadmium	mg/kg	20	80	NA	58	39.9	93.3	0.7	440	**93.3**
Cadmium	mg/kg	100*	400*	---	58	39.9	93.3	0.7	440	93.3
Cadmium TCLP	mg/L	---	---	1	12	0.5	0.3	0.19	1.2	0.70
Chromium(VI)	mg/kg	100	400	NA	33	39.7	36.4	2.5	130	53.2
Cobalt	mg/kg	---	---	---	22	9.1	6.6	2.5	30	---
Copper	mg/kg	---	---	---	33	989	938	20	4100	---
Lead	mg/kg	100	400	NA	44	**4687**	**6312**	52	**38000**	---
Manganese	mg/kg	---	---	---	22	510	270	70	1100	---
Mercury	mg/kg	4	16	NA	33	0.5	0.6	0.05	2.9	---
Molybdenum	mg/kg	100	400	NA	22	6.9	4.3	2.5	20	---
Nickel	mg/kg	40	160	NA	33	22.1	23.3	2.5	85	30.9
Selenium	mg/kg	20	80	NA	22	11.8	8.0	1	27	14.8
Tin	mg/kg	---	---	---	22	65.0	88.3	5	400	---
Vanadium	mg/kg	---	---	---	22	62.0	16.6	30	93	---
Zinc	mg/kg	---	---	---	33	1589.7	2360.8	130	12000	---

*Cadmium also assessed against SCC1/SCC2/TCLP1 criteria in Table 2 of NSW Waste Classification Guidelines (2014)

NA = not assessed

The selected bulk samples, TP3A and TP5A, were homogenised and screened (<20 mm) and analysed for total (SCC) and leachable (TCLP) lead, which are summarised in **Table 2**. Copies of the NATA accredited laboratory Certificates of Analysis are included in **Appendix 2**.

Table 2: Total and leachable (TCLP) lead results in the untreated bulk samples used for the treatment trials.

Sample ID	Total (SCC) Pb mg/kg	TCLP pH 5.0 Pb mg/L	TCLP Leachate Initial pH	TCLP Leachate Final pH
General solid criteria	**1500**	**5**	--	--
Restricted solid criteria	**6000**	**20**	--	--
TP3A_A_SCR	16,000	14	2.9	5
TP3A_B_SCR	15,000	28	3.1	5
TP3A_C_SCR	19,000	10	3.1	5
TP3A_D_SCR	10,000	35	3.3	5
Mean	**15,000**	**22**	**3.1**	**5**
TP5A_A_SCR	39,000	190	7.1	5
TP5A_B_SCR	35,000	180	4.3	5
TP5A_C_SCR	37,000	190	4.3	5
TP5A_D_SCR	19,000	140	5.3	5.1
Mean	**32,500**	**175**	**5.0**	**5**

Analytical results for bulk samples TP3A and TP5A (**Table 2**, **Appendix 2**) used in the treatability trials show the mean total lead concentrations were 15,000 and 32,500 mg/kg, respectively, and the mean leachable (TCLP) lead concentrations were 22 and 175 mg/L, respectively. These lead concentrations would result in both materials being classified as Hazardous Waste in accordance with the NSW Waste Classification Guidelines (2014).

6. CHEMICAL CONTAMINANTS OF CONCERN

The contaminant for which specific immobilisation approval is sought is lead.

7. PROPOSED TREATMENT METHOD OR PROCESS

To address the lead contamination in the waste material, it is proposed to use the chemical immobilisation reagent magnesium oxide (MgO), based on the treatability trial results presented in **Section 9**. Other reagents, such as a phosphate-based reagent (for example, monoammonium phosphate, MAP), were shown to be not required (**Section 9**).

The proposed treatment method will involve initial homogenisation of the waste with sufficient water to produce a moist, spadeable mixture that would have sufficient moisture to facilitate formation of insoluble lead hydroxide compounds upon addition of MgO to ensure adequate pH adjustment (discussed further in **Section 8**). The waste will be thoroughly mixed with the appropriate amount of reagent using a high shear mixer for waste treatment projects in accordance with NSW EPA Immobilisation Technical Note 1 - *Process Equipment for Treatment of Contaminated Soil and Sludge*

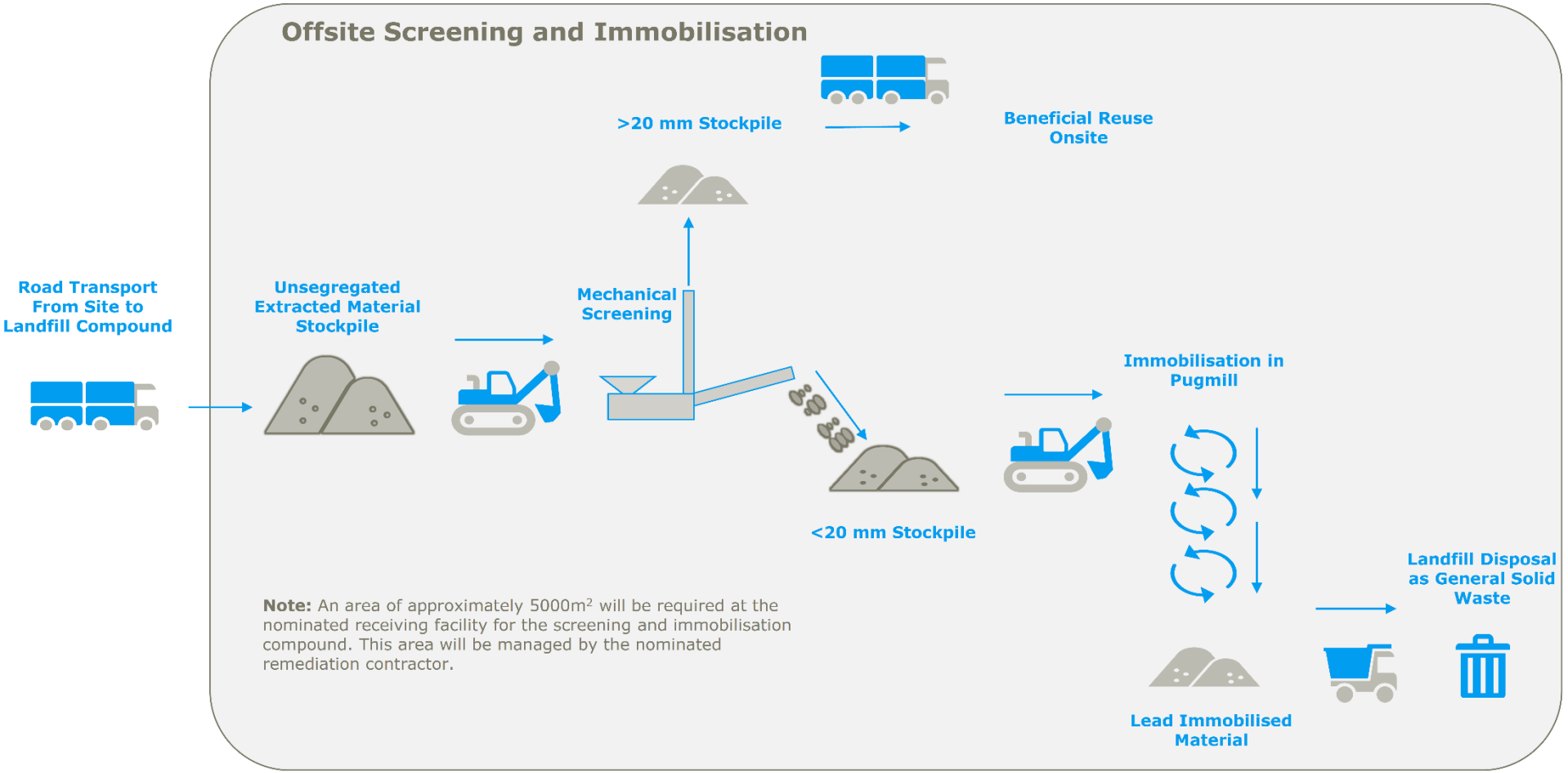
Waste. The resulting treated waste will be stockpiled in a holding bay to cure, awaiting laboratory validation before off-site disposal.

The proposed remedial methodology comprises the following key steps:

- Acquire necessary approvals for the selected remedial option including:
  - A SIA for lead in waste streams not suitable for disposal as GSW
  - Amendment to development consent conditions and Environmental Protection Licence (EPL) for the nominated receiving facility
- Remove remnant rails for recycling and sleeper for disposal as GSW. A waste classification for sleepers is presented in the Tarago Rail Corridor Remedial Action Plan (Ramboll 2021)
- Establish a work zone at the nominated receiving facility for temporary storage, mechanical screening and immobilisation of material excavated from the Woodlawn Siding and adjacent soils
- Excavate and transport materials from the Woodlawn Siding and adjacent soils to the receiving facility at the work zone. Materials will be excavated until lead concentrations at the remnant site surface (as measured by field-portable-XRF) are lower than the site assessment criteria (2200 mg/kg) and confirmed by laboratory analysis
- Mechanically screen materials excavated from the Woodlawn Siding and adjacent soils into <20 mm and >20 mm fractions[2]
- Validate suitability of >20 mm fraction for beneficial reuse onsite
- Immobilise the <20 mm fraction in accordance with the SIA (following EPA approval of the SIA).
- Validate successful immobilisation
- Dispose of lead immobilised materials as GSW at the nominated facility.

A process diagram for screening and immobilisation is presented in **Figure 1.**

Figure 1: Screening and Immobilisation Process Diagram



8. SCIENTIFIC EVIDENCE/JUSTIFICATION

The proposed remediation methodology involves chemical immobilisation of leachable lead to form insoluble lead hydroxide minerals. The process will use MgO to buffer the soil pH. Soil pH and pH buffering capacity are important to the long term success of the stabilisation process for soils in order to prevent lead remobilising with time. Chemical immobilisation of lead is generally a preferable treatment to cement stabilisation as the latter relies on maintaining physical solidification, and the pH is unlikely to be in the optimal target range.

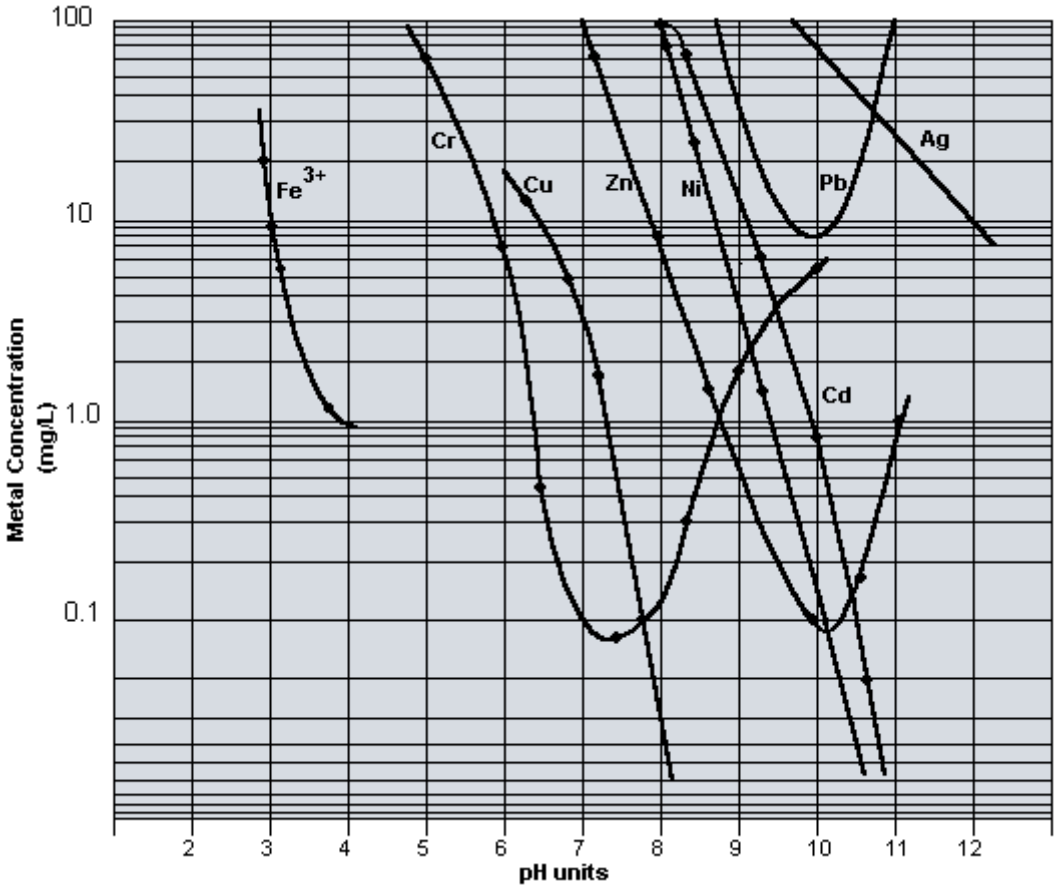
Chemical immobilisation of heavy metals in soil and solid wastes depends on factors such as solid-solution equilibrium, or the solubility product (Ksp) of the solid phase. The leaching of metals is highly pH dependent, and the solubility of several heavy metal hydroxides, such as lead, are minimal within pH range 9 - 11, and preferably pH 9.4 to 10.2 (Smith, 1996). **Figure 2** shows metal hydroxide solubility curves (theoretical), indicating the solubility of the common heavy metal ions and their respective solubility versus pH. Several metals, including lead, are amphoteric, being soluble at both alkaline and acid conditions. The use of dolomitic limes containing MgO have been shown to act as a buffering agent within the pH 9 - 10 range, minimising heavy metal solubility and avoiding the redissolution that can occur by using lime reagents only, due to highly alkaline conditions (Smith, 1996; García et al., 2004).

A wide range of remediation projects completed across Australia have previously demonstrated addition of MgO (typically at 5 to 10% additive ratio) can successfully immobilise hazardous soil and waste highly contaminated with a range of heavy metals, including lead. Soil or waste materials treated with MgO are typically buffered at ~ pH 10, corresponding to the minimum solubility for a range of metal hydroxides, including lead (**Figure 2**), hence demonstrating good long-term stability with regards to immobilisation of metals by maintaining the pH of the waste composition within the target range over which their solubility is minimised.

Whilst phosphate containing materials such as phosphorus fertilisers have also been used effectively to precipitate lead as either pyromorphite, plumbogummite or other lead bearing minerals (Aide et al., 2008; Nolan and Lunsmann, 2013), it has previously been demonstrated by Ramboll in a number of treatability trials that MgO alone can effectively immobilise lead and has demonstrated long term stability via the USEPA Multiple Extraction Procedure (MEP) Test Method 1320.

Addition of water during the mixing of waste and MgO is recommended to facilitate the chemical immobilisation and minimise the generation of dust.

Figure 2: Metal hydroxide solubility curves (theoretical).



9. TREATABILITY

Ramboll conducted the bench-scale treatability trial on 17 February 2021 using representative contaminated bulk samples, TP3A and TP5A, which were each pre-screened to <20 mm maximum particle size and homogenised. The soil samples were silty-sandy-gravelly soils, and were reddish brown in colour (TP3A, **Figure 3**) or light brown in colour (TP5A, **Figure 4**). The bulk samples were analysed for untreated total and leachable (TCLP) lead concentrations (**Table 2**).

For each treatment, sub-samples (600 g) of the homogenised bulk material were weighed into a mixing vessel followed by the appropriate amount(s) of reagents (**Table 3**), with sufficient water to moisten the soil, and thoroughly mixed using a hand-trowel. Hand mixing was considered the most effective method for mixing the amounts of material used for the treatments in this trial and has been previously demonstrated on a range of soil treatment projects to replicate full-scale treatment.

Figure 3. Homogenised bulk sample TP3A used in the lead immobilisation trials.

Figure 4. Homogenised bulk sample TP5A used in the lead immobilisation trials.

Treatments were conducted using MgO and/or MAP over a range of additive ratios (**Table 3**) based on Ramboll's previous experience with treatability trials for lead impacted soils. For all treated samples, the waste and reagent mixes were hydrated sufficiently (close to maximum water holding capacity) to facilitate formation of the stable lead compounds.

All treated samples were cured for at least 24 hours prior to post-treatment analysis of total (SCC) and leachable (TCLP) lead. All chemical analyses were conducted by Eurofins laboratory in Sydney, a NATA accredited laboratory and conducted the testing in accordance with quality assurance protocols. Results for the treatment trial are summarised below in **Table 3**. Copies of the laboratory Certificates of Analysis are included in **Appendix 2**.

Table 3: Total (SCC) and leachable (TCLP) lead (Pb) concentrations in the treated waste (MAP = monoammonium phosphate; MgO = magnesium oxide).

Sample ID	Reagents		Total (SCC) Pb mg/kg	TCLP pH 5.0 Pb mg/L[1]	%Reduction	TCLP Leachate Initial pH	TCLP Leachate Final pH
	%MAP	%MgO					
General solid criteria	**--**	**--**	**1500**	**5**	--	--	--
Restricted solid criteria	**--**	**--**	**6000**	**20**	--	--	--
Untreated Samples							
TP3A_A_SCR	--	--	16,000	14	--	2.9	5
TP3A_B_SCR	--	--	15,000	28	--	3.1	5
TP3A_C_SCR	--	--	19,000	10	--	3.1	5
TP3A_D_SCR	--	--	10,000	35	--	3.3	5
Mean	--	--	**15,000**	**22**	--	**3.1**	**5**
TP5A_A_SCR	--	--	39,000	190	--	7.1	5
TP5A_B_SCR	--	--	35,000	180	--	4.3	5
TP5A_C_SCR	--	--	37,000	190	--	4.3	5
TP5A_D_SCR	--	--	19,000	140	--	5.3	5.1
Mean	--	--	**32,500**	**175**	--	**5.0**	**5**
Treated Samples							
TP3A_TR01-1	--	5%	8,200	<0.01	>99.9	9.2	9.0
TP3A_TR01-2	--	5%	--	<0.01	>99.9	9.3	9.0
Mean				**<0.01**	**>99.9**	**9.2**	**9.0**
TP3A_TR02-1	--	10%	9,600	<0.01	>99.9	9.5	9.2
TP3A_TR02-2	--	10%	--	<0.01	>99.9	9.5	9.3
Mean				**<0.01**	**>99.9**	**9.5**	**9.3**
TP3A_TR03-1	2%	5%	18,000	0.01	99.9	9.7	8.8
TP3A_TR03-2	2%	5%	--	0.03	99.9	9.7	9.2
Mean				**0.02**	**99.9**	**9.7**	**9.0**
TP3A_TR04-1	3%	5%	9,500	<0.01	>99.9	8.8	8.5
TP3A_TR04-2	3%	5%	--	0.04	99.8	8.9	8.3
Mean				**0.03**	**99.9**	**8.9**	**8.4**

Sample ID	Reagents		Total (SCC) Pb mg/kg	TCLP pH 5.0 Pb mg/L[1]	%Reduction	TCLP Leachate Initial pH	TCLP Leachate Final pH
	%MAP	%MgO					
TP3A_TR05-1	2%	10%	9,900	<0.01	>99.9	9.6	9.3
TP3A_TR05-2	2%	10%	--	0.04	99.8	9.6	9.3
Mean				**0.03**	**99.9**	**9.6**	**9.3**
TP3A_TR06-1	3%	10%	9,100	0.03	99.9	9.6	8.9
TP3A_TR06-2	3%	10%	--	0.01	99.9	9.5	9.0
Mean				**0.02**	**99.9**	**9.6**	**9.0**
TP5A_TR01-1	--	5%	17,000	0.19	99.9	9.7	9.2
TP5A_TR01-2	--	5%	--	<0.01	>99.9	9.8	9.0
Mean				**0.10**	**99.9**	**9.8**	**9.1**
TP5A_TR02-1	--	10%	15,000	0.05	>99.9	9.7	9.2
TP5A_TR02-2	--	10%	--	0.02	>99.9	9.7	9.2
Mean				**0.04**	**>99.9**	**9.7**	**9.2**
TP5A_TR03-1	2%	5%	18,000	0.03	>99.9	9.7	8.7
TP5A_TR03-2	2%	5%	--	0.03	>99.9	10	8.7
Mean				**0.03**	**>99.9**	**9.9**	**8.7**
TP5A_TR04-1	3%	5%	20,000	0.05	>99.9	9.9	9.2
TP5A_TR04-2	3%	5%	--	<0.01	>99.9	9.4	9.0
Mean				**0.03**	**>99.9**	**9.7**	**9.1**
TP5A_TR05-1	2%	10%	10,000	<0.01	>99.9	9.8	9.1
TP5A_TR05-2	2%	10%	--	0.01	>99.9	9.8	9.4
Mean				**0.01**	**>99.9**	**9.8**	**9.3**
TP5A_TR06-1	3%	10%	13,000	0.05	>99.9	9.9	9.4
TP5A_TR06-2	3%	10%	--	0.02	>99.9	9.8	9.3
Mean				**0.04**	**>99.9**	**9.9**	**9.4**
TP5A_TR07-1	4%	15%	12,000	0.08	>99.9	9.6	9.4
TP5A_TR07-2	4%	15%	--	0.05	>99.9	9.6	9.3
Mean				**0.07**	**>99.9**	**9.6**	**9.4**

[1]For calculation of mean results, the LOR was used if one of the duplicate results reported as <LOR

Results for the treated samples in **Table 3** demonstrate that each of the treatments successfully reduced the leachable lead to concentrations well below the GSW criterion of 5 mg/L lead (Pb) for both bulk samples, TP3A and TP5A.

In order to provide evidence of the long term stability of the treated waste, four of the treated samples, TP3A-TR01-1 (5% MgO), TP3A-TR03-1 (2% MAP, 5% MgO), TP5A-TR01-1 (5% MgO) and TP5A-TR03-1 (2% MAP, 5% MgO), were selected for MEP analysis (lead), based on the

minimum amount of reagent required to successfully treat both bulk samples, which are presented in **Table 4**. These results show:

- All four MEP results remained relatively stable over the 10 sequential extractions and were well below the GSW criterion of 5 mg/L Pb.
- The final pH of the leachate also remained relatively stable, with the leachate pH at Day 10 ranging from 9.1 to 9.8, close to the minimum point of solubility for lead.
- There appeared to be little difference in the results for TR01 (5% MgO) vs TR03 (2% MAP, 5% MgO) for both bulk samples, indicating MAP is not required to achieve long term stability of the treated waste.
- Whilst there was some variability across the 10 MEP extractions for each sample, these results are similar to previous MEP results reported for lead immobilised wastes and is likely related to the low concentrations detected and/or heterogeneity of lead in the sample, where the amount of lead exposed to leachate during each test may vary.
- There was one anomalously higher leachate result of 1 mg/L for TP5A_TR01-1 on Day 9 (however results on Day 8 and Day 10 were below the LOR of 0.01 mg/L), hence it is likely this result was an anomaly, however it is still five times below the GSW criterion for lead.

Based on the treatment trial results presented in **Table 3** and **Table 4**, it is proposed to use **5% MgO** to chemically immobilise the leachable lead in the waste material from the Site. Addition of MAP did not provide any substantial improvement to either the short term (TCLP) or long term (MEP) treatment results. It is preferable to minimise the amount of reagent used in the full-scale treatment process from a sustainability perspective (without compromising the outcome), as well as to minimise unnecessary bulking of the treated waste.

10. ABILITY TO REPRODUCE THE PROCESSES, AND QUALITY ASSURANCE

The remediation contractor undertaking the waste treatment shall have an Environmental Management System with third party accreditation to ISO14001 and work under the framework of an integrated Management Plan for the remediation works. As part of this plan, Work Procedures, Inspection and Test Plans and Inspection and Test Reports will be developed for specific tasks such as the proposed on-site treatment works.

The Work Procedure and Inspection and Test Plan will cover aspects such as:

- Materials tracking and batch formation
- Sampling procedures (composite sampling) and results reporting including accept/reject criteria
- Analytical testing to be undertaken by NATA accredited testing bodies.

Sampling of the treated stockpiled waste will take place at a rate of 1 sample per 25 m^3 of waste for analytical testing. Samples will be dispatched to a NATA accredited laboratory for TCLP and SCC analysis. Conformance of the waste material will be based on an accept/reject procedure determined by calculation of 95% UCL for chemical contaminants.

This remediation project is subject to audit, and a full Validation Sampling, Analysis and Quality Plan (VSAQP) will be developed and signed off by the auditor. The project implementation will also be overseen by the auditor.

TP3A_TR01-1	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10
Leachate Fluid	4	4	4	4	4	4	4	4	4	4
pH (initial)	9.4	8.7	8.8	9.3	8.8	9	9.1	9.7	9.7	9.2
pH (Leachate fluid)	6.8	5.1	6.8	6.8	6.8	6.8	6.2	6.2	6.2	6.2
pH (off)	9.6	9.2	9.5	9.5	9.3	9.3	9.8	9.3	9.3	9.1
Lead (mg/L)	<0.001	0.001	0.003	0.002	<0.001	0.002	<0.001	<0.001	0.004	0.017
TP3A_TR03-1	**Day 1**	**Day 2**	**Day 3**	**Day 4**	**Day 5**	**Day 6**	**Day 7**	**Day 8**	**Day 9**	**Day 10**
Leachate Fluid	4	4	4	4	4	4	4	4	4	4
pH (initial)	9.1	8.7	8.9	9.3	9	9.4	9	9.7	9.7	9.3
pH (Leachate fluid)	6.8	5.1	6.8	6.8	6.8	6.8	6.2	6.2	6.2	6.2
pH (off)	9.5	9.3	9.5	9.4	9.6	9.5	9.5	9.4	9.4	9.4
Lead (mg/L)	0.12	0.001	0.004	0.13	0.001	0.002	<0.001	0.013	0.015	0.003
TP5A_TR01-1	**Day 1**	**Day 2**	**Day 3**	**Day 4**	**Day 5**	**Day 6**	**Day 7**	**Day 8**	**Day 9**	**Day 10**
Leachate Fluid	4	4	4	4	4	4	4	4	4	4
pH (initial)	9.6	9.1	9.5	9.8	9.6	9.9	9.6	9.9	9.8	9.8
pH (Leachate fluid)	6.8	5.1	6.8	6.8	6.8	6.8	6.2	6.2	6.2	6.2
pH (off)	10	9.6	9.5	9.8	9.8	9.7	9.9	9.7	9.7	9.8
Lead (mg/L)	0.002	<0.001	0.017	0.075	0.004	0.003	0.058	<0.001	1	<0.001
TP5A_TR03-1	**Day 1**	**Day 2**	**Day 3**	**Day 4**	**Day 5**	**Day 6**	**Day 7**	**Day 8**	**Day 9**	**Day 10**
Leachate Fluid	4	4	4	4	4	4	4	4	4	4
pH (initial)	9.4	8.9	9.3	9.7	9.4	9.9	9.5	10	9.9	9.7
pH (Leachate fluid)	6.8	5.1	6.8	6.8	6.8	6.8	6.2	6.2	6.2	6.2
pH (off)	10	9.7	9.7	9.8	9.8	9.8	10	9.8	9.8	9.8
Lead (mg/L)	<0.001	0.036	0.031	0.053	0.047	0.042	<0.001	0.016	0.017	0.001

11. PROPOSED DISPOSAL LOCATION

It is proposed the treated and validated material will be disposed to a local landfill (to be confirmed) once the amendment to development consent conditions and EPL for the nominated receiving facility are approved.

Please contact the undersigned if you have any questions.

Yours sincerely,

Dr Annette Nolan, PhD (Chem)

Lead Consultant

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12. REFERENCES

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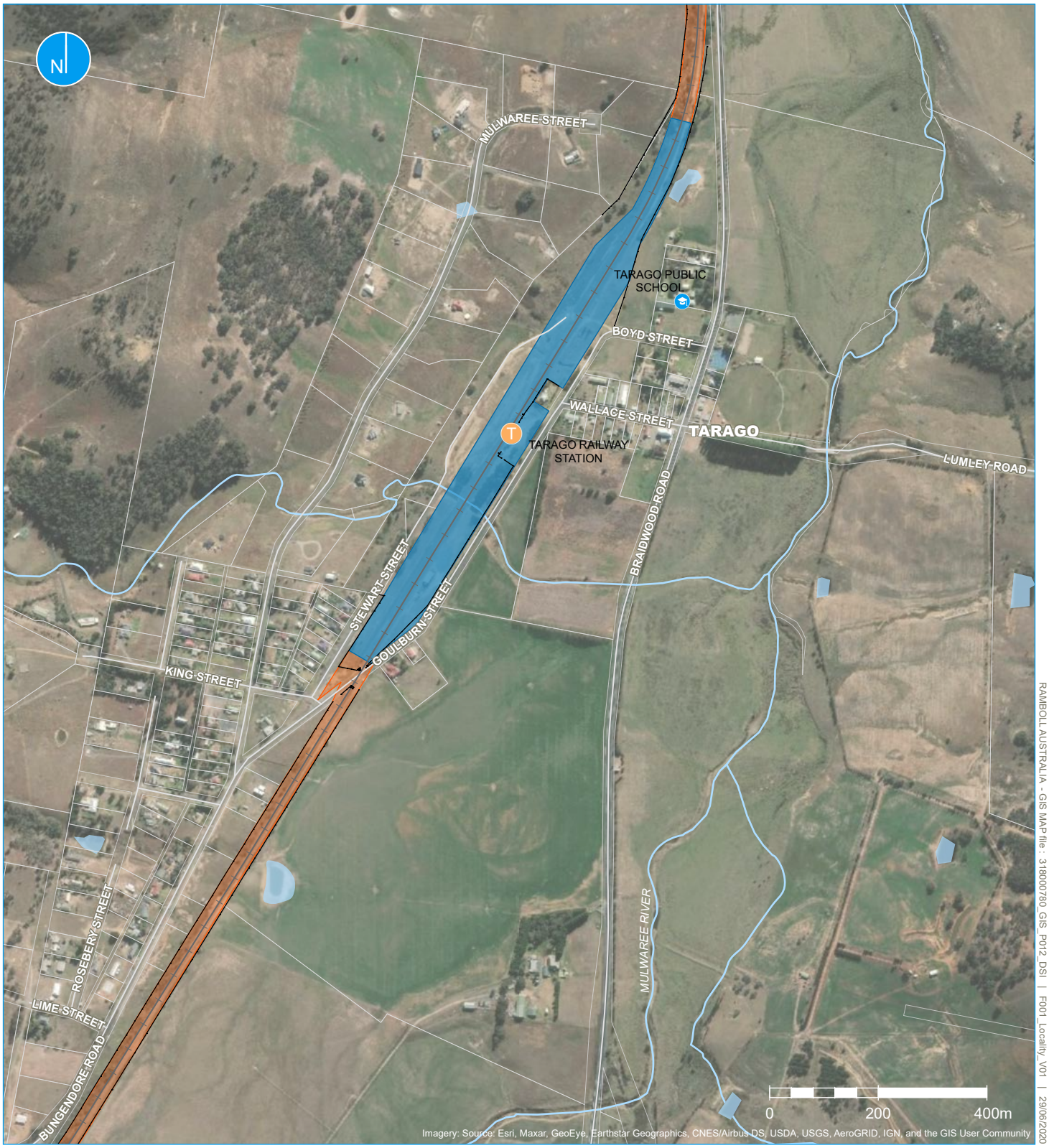
APPENDIX 1
SITE LAYOUT PLAN



RAMBOLL AUSTRALIA - GIS MAP file : 318000780_GIS_P012_DSI | F001_Locality_V01 | 29/06/2020

Legend

- Site boundary
- Rail corridor
- Rail corridor fence

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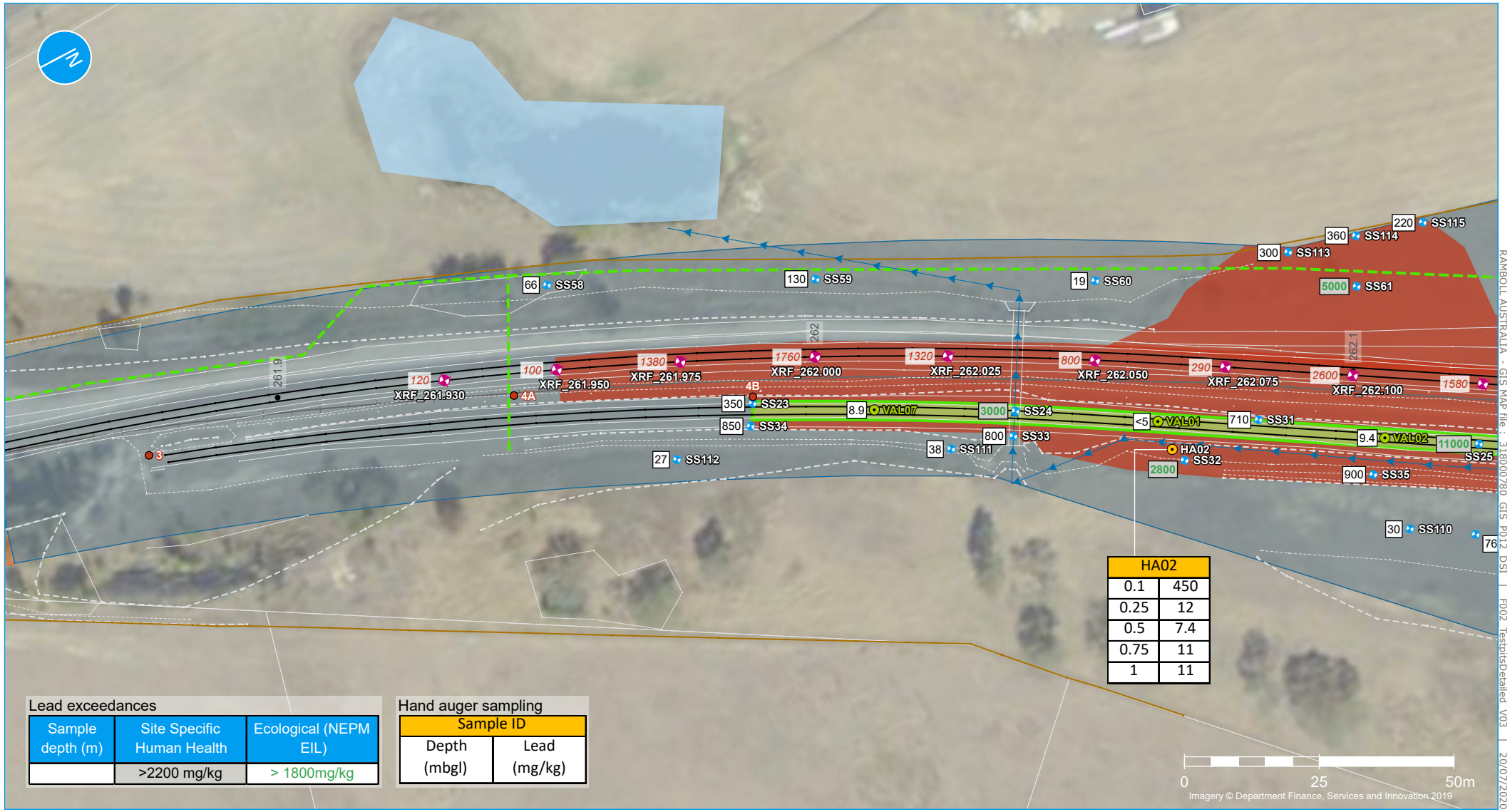
Figure 1 | Locality Plan



HA02

0.1	450
0.25	12
0.5	7.4
0.75	11
1	11

Lead exceedances

Sample depth (m)	Site Specific Human Health	Ecological (NEPM EIL)
	>2200 mg/kg	> 1800mg/kg

Hand auger sampling

Sample ID	
Depth (mbgl)	Lead (mg/kg)

Legend

- Site boundary
- Rail corridor fence
- 0.1km chainage point
- Signal trench (approximate)
- Surface water flow (indicative)

Survey lines

- Rail track
- Top of bank
- Bottom of bank
- Other elements

- X-Ray fluorescence sampling (Ramboll 2019, 2020)
- Previous sampling location (McMahon)
- Shallow soil (Ramboll 2019)
- Hand auger (Ramboll 2019)
- 1200 Lead concentration for XRF sample (mg/kg)
- Validation sample (Ramboll 2019)

- Lead impacted area
- Area of excavation during loop extension (no further excavation proposed)

Note: X-Ray fluorescence sampling results were conservatively assessed against a management threshold of 1200 mg/kg Pb to mitigate uncertainty associated with these.
Data relating to impacts on private properties has not been presented to maintain privacy for affected parties. Data for TP1 – TP9 and TP15 from the Woodlawn siding is presented in Appendix 3, Table H2 – H3. Data for TP1 – TP20 from the Loadout Complex Footprint is presented in Appendix 3, Table 7.

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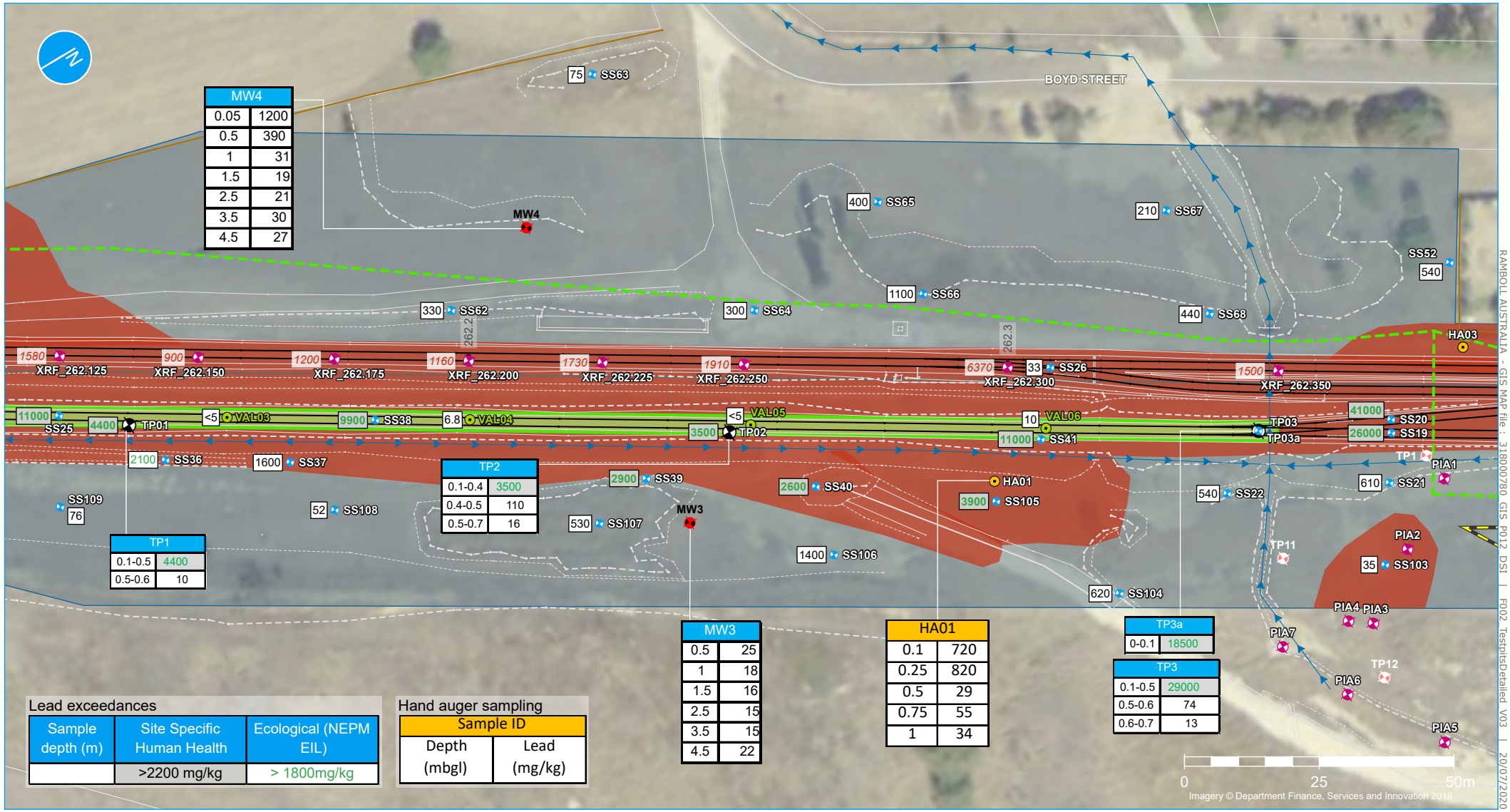
Figure 2a | Site Plan



Lead exceedances

Sample depth (m)	Site Specific Human Health	Ecological (NEPM EIL)
	>2200 mg/kg	> 1800mg/kg

Hand auger sampling

Sample ID	
Depth (mbgl)	Lead (mg/kg)

Legend

- Site boundary
- Rail corridor fence
- 0.1km chainage point
- Signal trench (approximate)
- Surface water flow (indicative)

Survey lines

- Rail track
- Top of bank
- Bottom of bank
- Other elements

- X-Ray fluorescence sampling (Ramboll 2019, 2020)
- Shallow soil (Ramboll 2019)
- Test pit (Ramboll 2019)
- Hand auger (Ramboll 2019)
- 1200 Lead concentration for XRF sample (mg/kg)
- Validation sample (Ramboll 2019)
- Groundwater monitoring location
- Test pit (loadout complex)

- Lead impacted area
- Area of excavation during loop extension (no further excavation proposed)
- Former loadout road (approximate)

Note: X-Ray fluorescence sampling results were conservatively assessed against a management threshold of 1200 mg/kg Pb to mitigate uncertainty associated with these.
Data relating to impacts on private properties has not been presented to maintain privacy for affected parties. Data for TP1 – TP9 and TP15 from the Woodlawn siding is presented in Appendix 3, Table H2 – H3. Data for TP1 – TP20 from the Loadout Complex Footprint is presented in Appendix 3, Table 7.

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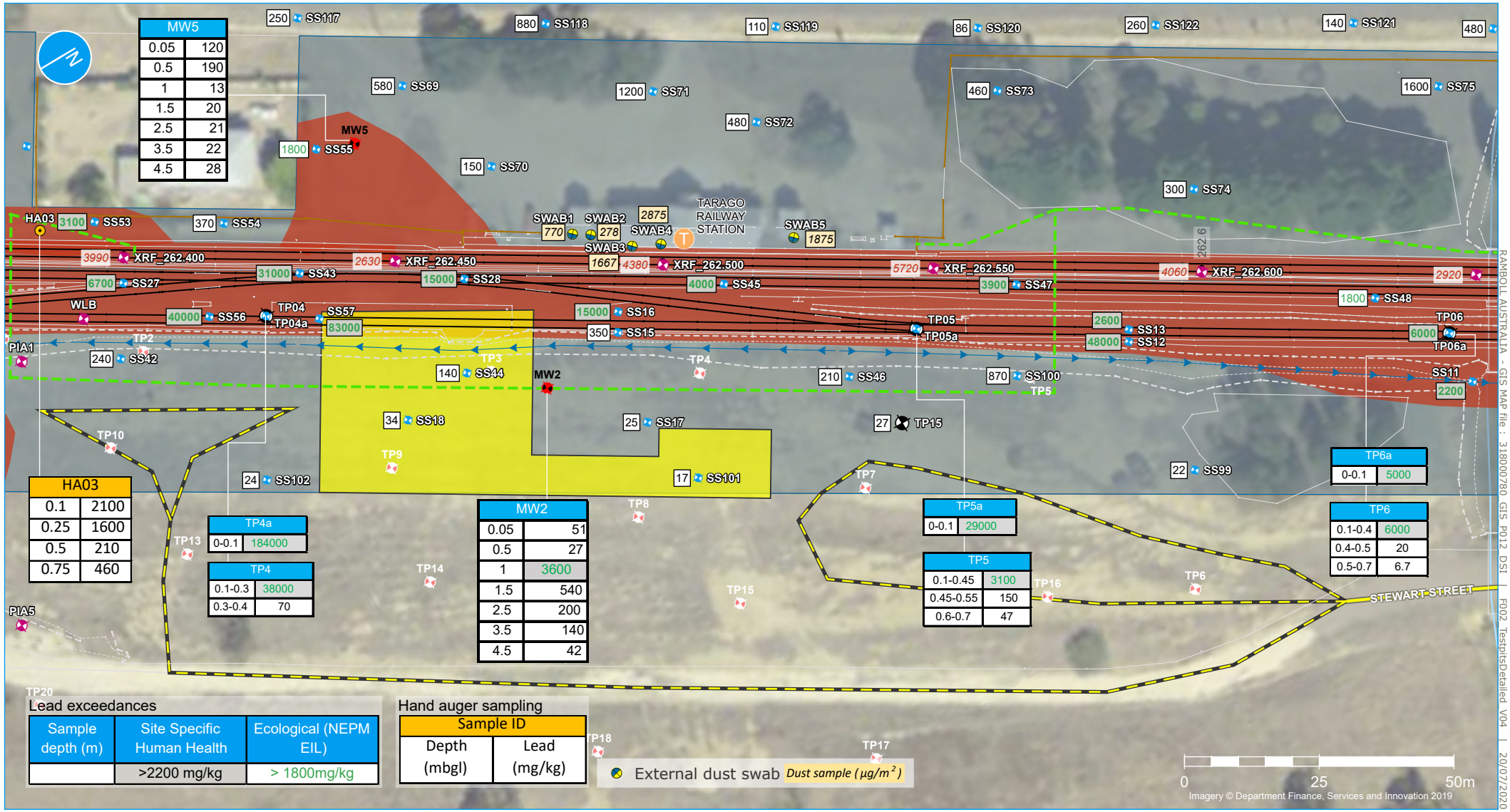
Location

Figure 2b | Site Plan



RAMBOLL AUSTRALIA - GIS MAP file : 318000780 GIS P012 DSI | F002 TestpitsDetailed V04 | 20/07/2020

Legend

- Site boundary
- Rail corridor fence
- 0.1km chainage point
- Signal trench (approximate)
- Surface water flow (indicative)

Survey lines

- Rail track
- Top of bank
- Bottom of bank
- Other elements

- X-Ray fluorescence sampling (Ramboll 2019, 2020)
- Shallow soil (Ramboll 2019)
- Test pit (Ramboll 2019)
- Hand auger (Ramboll 2019)
- 1200 Lead concentration for XRF sample (mg/kg)
- Groundwater monitoring location
- Test pit (loadout complex)

- Lead impacted area
- Former loadout road (approximate)
- Loadout complex footprint
- Haul route

Note: X-Ray fluorescence sampling results were conservatively assessed against a management threshold of 1200 mg/kg Pb to mitigate uncertainty associated with these.
Data relating to impacts on private properties has not been presented to maintain privacy for affected parties. Data for TP1 – TP9 and TP15 from the Woodlawn siding is presented in Appendix 3, Table H2 – H3. Data for TP1 – TP20 from the Loadout Complex Footprint is presented in Appendix 3, Table 7.

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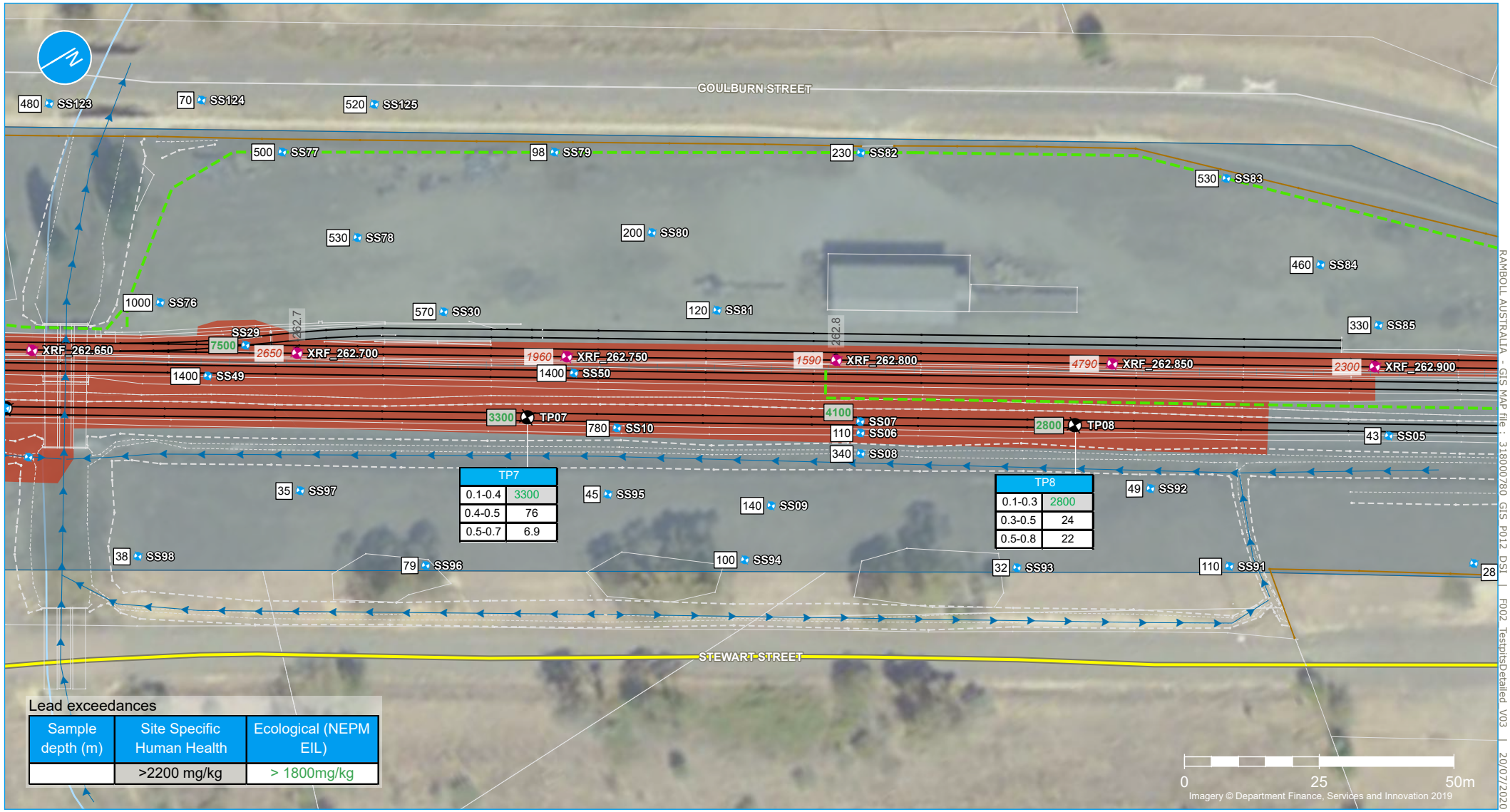
Location

Figure 2c | Site Plan



RAMBOLL AUSTRALIA - GIS MAP file : 318000780 GIS P012 DSI | F002 TestpitsDetailed V03 | 20/07/2020

Legend

- Site boundary
- Rail corridor fence
- 0.1km chainage point
- Signal trench (approximate)
- Surface water flow (indicative)

Survey lines

- Rail track
- Top of bank
- Bottom of bank
- Other elements

- X-Ray fluorescence sampling (Ramboll 2019, 2020)
- Shallow soil (Ramboll 2019)
- Test pit (Ramboll 2019)
- 1200 Lead concentration for XRF sample (mg/kg)

- Lead impacted area
- Haul route

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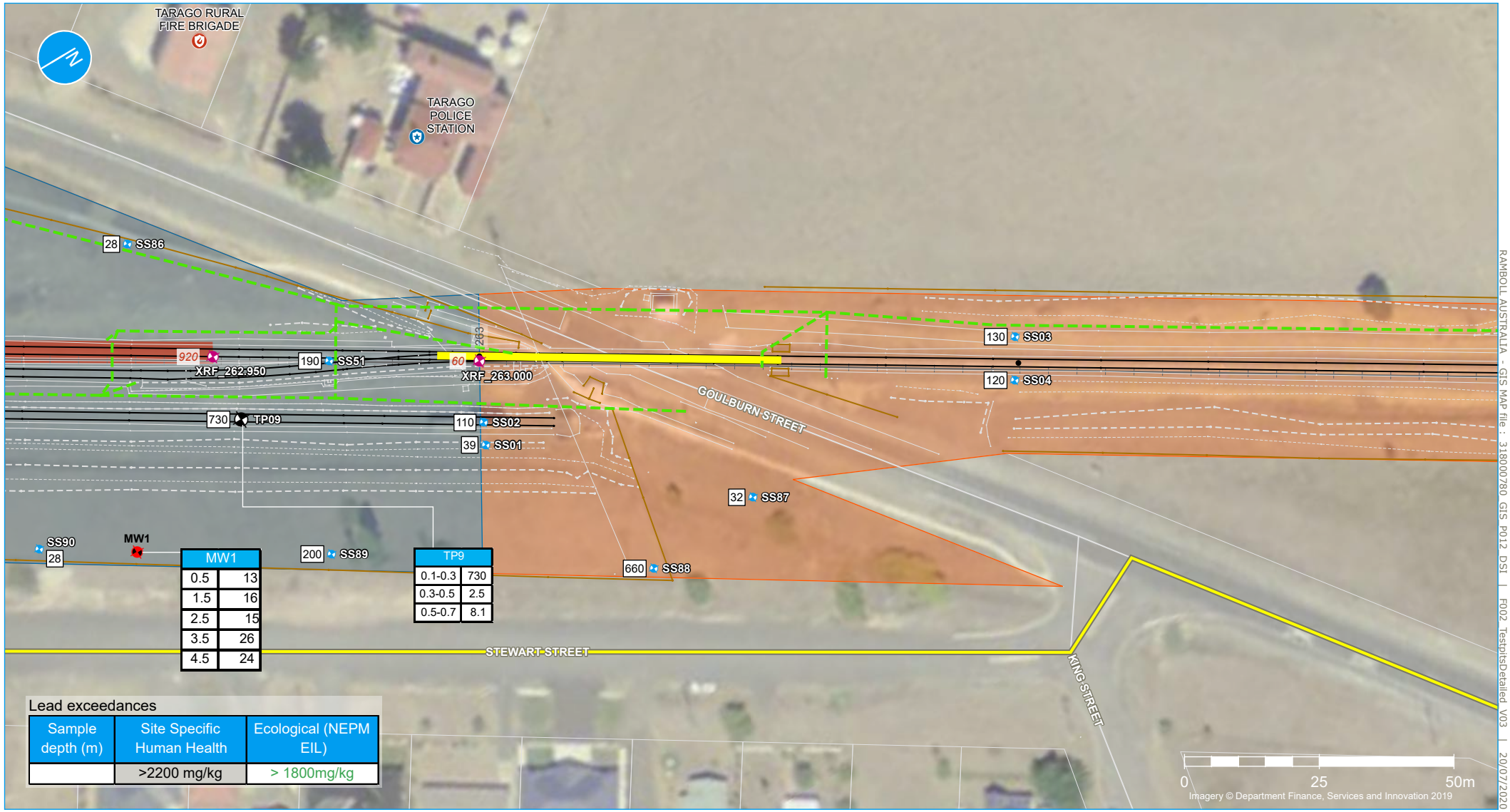
Location

Note: X-Ray fluorescence sampling results were conservatively assessed against a management threshold of 1200 mg/kg Pb to mitigate uncertainty associated with these.
Data relating to impacts on private properties has not been presented to maintain privacy for affected parties. Data for TP1 – TP9 and TP15 from the Woodlawn siding is presented in Appendix 3, Table H2 – H3. Data for TP1 – TP20 from the Loadout Complex Footprint is presented in Appendix 3, Table 7.

Figure 2d | Site Plan



RAMBOLL AUSTRALIA - GIS MAP file : 318000780 GIS P012 DSI | F002 TestpitsDetailed V03 | 20/07/2020

Legend

- Site boundary
- Rail corridor fence
- 0.1km chainage point
- Goulburn Street level crossing
- Signal trench (approximate)
- Surface water flow (indicative)

Survey lines

- Rail track
- Top of bank
- Bottom of bank
- Other elements

- X-Ray fluorescence sampling (Ramboll 2019, 2020)
- Shallow soil (Ramboll 2019)
- Test pit (Ramboll 2019)
- 1200 Lead concentration for XRF sample (mg/kg)
- Groundwater monitoring location

- Lead impacted area
- Haul route

Note: X-Ray fluorescence sampling results were conservatively assessed against a management threshold of 1200 mg/kg Pb to mitigate uncertainty associated with these.
Data relating to impacts on private properties has not been presented to maintain privacy for affected parties. Data for TP1 – TP9 and TP15 from the Woodlawn siding is presented in Appendix 3, Table H2 – H3. Data for TP1 – TP20 from the Loadout Complex Footprint is presented in Appendix 3, Table 7.

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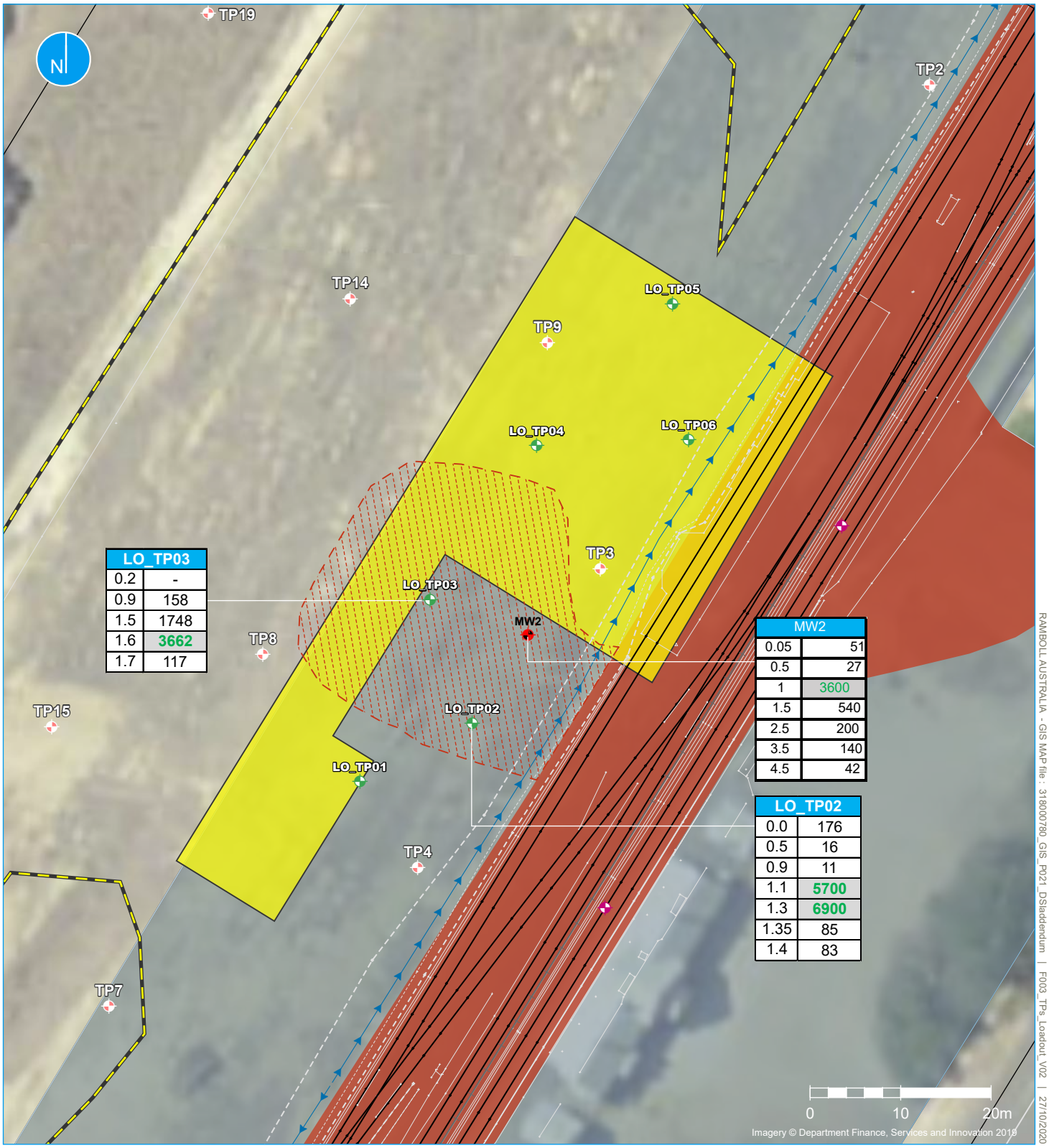
Figure 2e | Site Plan



RAMBOLL AUSTRALIA - GIS MAP file - 318000780_GIS_P021_DSaddendum | F003_TPs_Loadout_V02 | 27/10/2020

A4
1:600

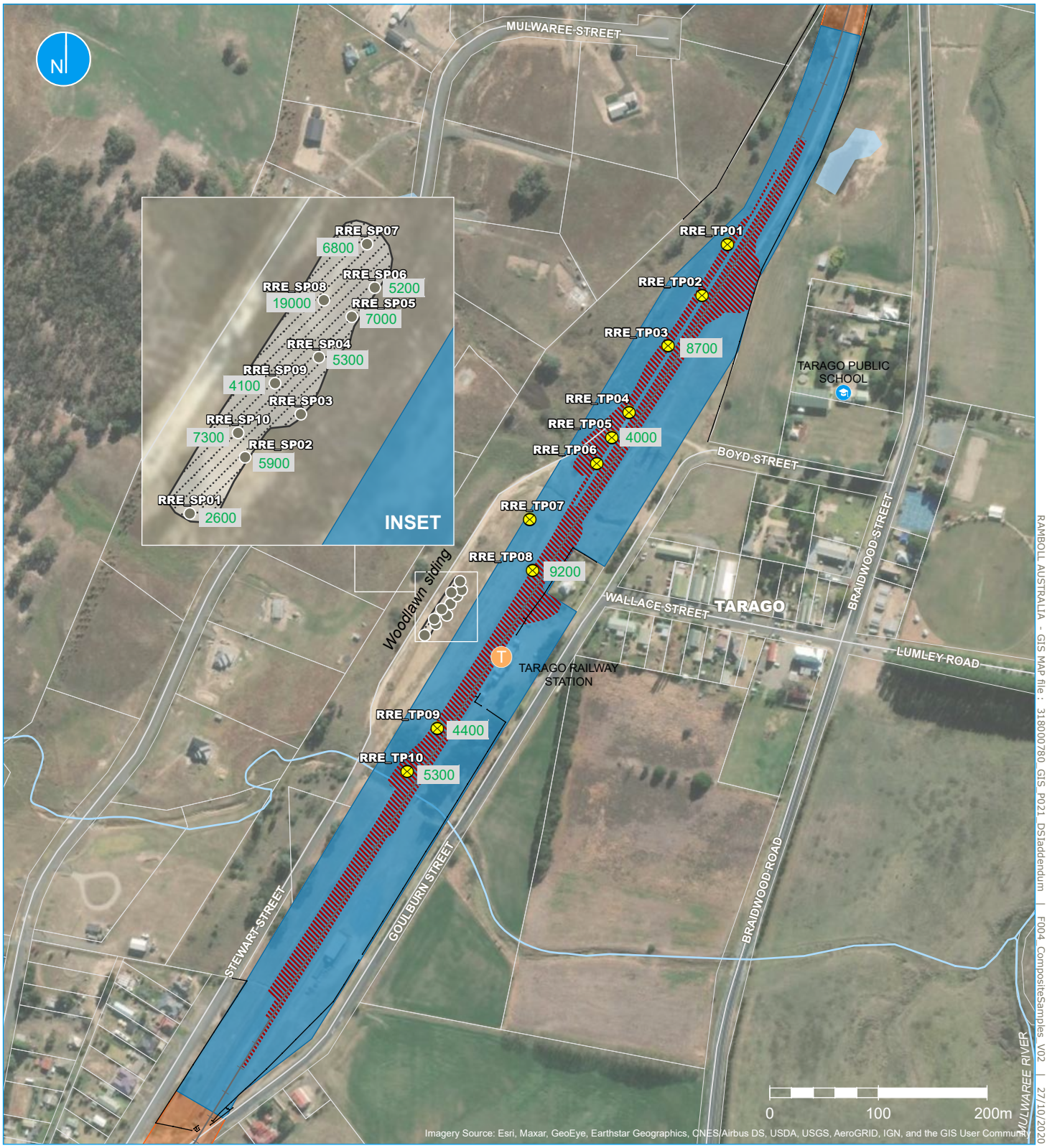
Legend

- Former loadout complex building footprint
- Former loadout road (approximate)
- Site boundary
- Surface water flow (indicative)
- Lead impacted area
- Indicative lead impacted area
- Loadout complex testpit (March 2020)
- Loadout complex testpit (August 2020)
- Groundwater monitoring location

Lead exceedance criteria

Sample depth (m)	Site Specific Human Health	EIL Commercial/Ind. (NEPM 2013)
	>2200 mg/kg	>1800 mg/kg

Figure 3 | Loadout complex sampling locations



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Legend

- Site boundary
- Rail corridor
- Rail corridor fence
- Area of lead contamination within the rail corridor
- Stockpile (JHR)

Composite sampling (Ramboll 2020)

- Stockpile sample
- Test pit
- 400 Lead (mg/kg)

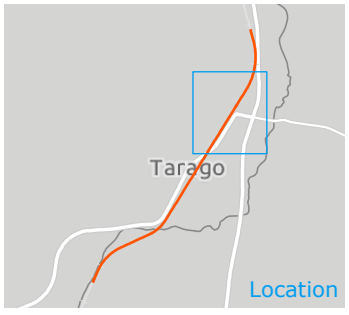

Figure 4 | Characterisation of Remediation Spoil

APPENDIX 2
LABORATORY CERTIFICATES OF ANALYSIS

Ramboll Environ Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

NATA Accredited
Accreditation Number 1261
Site Number 18217

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

Attention: **Stephen Maxwell**

Report **668047-S**
Project name
Project ID 318000780
Received Date Jul 26, 2019

Client Sample ID			**TP1 0.1-0.5**	**TP1 0.5-0.6**	**TP2 0.1-0.4**	**TP2 0.4-0.5**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S19-Jl39891**	**S19-Jl39892**	**S19-Jl39893**	**S19-Jl39894**
Date Sampled			**Jul 26, 2019**	**Jul 26, 2019**	**Jul 26, 2019**	**Jul 26, 2019**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	5	mg/kg	4400	10	3500	110
% Moisture	1	%	3.9	4.8	2.7	4.4

Client Sample ID			**TP2 0.5-0.7**	**TP3 0.1-0.5**	**TP3 0.5-0.6**	**TP3 0.6-0.7**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S19-Jl39895**	**S19-Jl39896**	**S19-Jl39897**	**S19-Jl39898**
Date Sampled			**Jul 26, 2019**	**Jul 26, 2019**	**Jul 26, 2019**	**Jul 26, 2019**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	5	mg/kg	16	29000	74	13
% Moisture	1	%	9.2	9.8	6.4	9.1

Client Sample ID			**TP4 0.1-0.3**	**TP4 0.3-0.4**	**TP5 0.1-0.45**	**TP5 0.45-0.55**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S19-Jl39899**	**S19-Jl39900**	**S19-Jl39901**	**S19-Jl39902**
Date Sampled			**Jul 26, 2019**	**Jul 26, 2019**	**Jul 26, 2019**	**Jul 26, 2019**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	5	mg/kg	38000	70	3100	150
% Moisture	1	%	4.2	8.4	5.6	5.4

Client Sample ID			TP5 0.6-0.7	TP6 0.1-0.4	TP6 0.4-0.5	TP6 0.5-0.7
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-JI39903	S19-JI39904	S19-JI39905	S19-JI39906
Date Sampled			Jul 26, 2019	Jul 26, 2019	Jul 26, 2019	Jul 26, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	5	mg/kg	47	6000	20	6.7
% Moisture	1	%	12	5.8	6.5	11

Client Sample ID			TP7 0.1-0.4	TP7 0.4-0.5	TP7 0.5-0.7	TP8 0.1-0.3
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-JI39907	S19-JI39908	S19-JI39909	S19-JI39910
Date Sampled			Jul 26, 2019	Jul 26, 2019	Jul 26, 2019	Jul 26, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	5	mg/kg	3300	76	6.9	2800
% Moisture	1	%	3.7	5.7	11	2.2

Client Sample ID			TP8 0.3-0.5	TP8 0.5-0.8	TP9 0.1-0.3	TP9 0.3-0.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-JI39911	S19-JI39912	S19-JI39913	S19-JI39914
Date Sampled			Jul 26, 2019	Jul 26, 2019	Jul 26, 2019	Jul 26, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	5	mg/kg	24	22	600	< 5
% Moisture	1	%	6.0	9.5	2.4	6.1

Client Sample ID			TP9 0.5-0.7	TP15 0.1	TP15 0.8	SS1 0.0-0.1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-JI39915	S19-JI39918	S19-JI39919	S19-JI39920
Date Sampled			Jul 26, 2019	Jul 26, 2019	Jul 26, 2019	Jul 26, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	5	mg/kg	8.1	27	26	39
% Moisture	1	%	10	6.1	12	4.6

Client Sample ID			SS2 0.0-0.1	SS3 0.0-0.1	SS4 0.0-0.1	SS5 0.0-0.1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-JI39921	S19-JI39922	S19-JI39923	S19-JI39924
Date Sampled			Jul 26, 2019	Jul 26, 2019	Jul 26, 2019	Jul 26, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	5	mg/kg	110	130	120	43
% Moisture	1	%	3.2	7.5	5.6	2.8

Client Sample ID			SS6 0.0-0.1	SS7 0.0-0.1	SS8 0.0-0.1	SS9 0.0-0.1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-JI39925	S19-JI39926	S19-JI39927	S19-JI39928
Date Sampled			Jul 26, 2019	Jul 26, 2019	Jul 26, 2019	Jul 26, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	5	mg/kg	110	4100	340	140
% Moisture	1	%	2.8	4.4	19	6.2

Client Sample ID			SS10 0.0-0.1	SS11 0.0-0.1	SS12 0.0-0.1	SS13 0.0-0.1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-JI39929	S19-JI39930	S19-JI39931	S19-JI39932
Date Sampled			Jul 26, 2019	Jul 26, 2019	Jul 26, 2019	Jul 26, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	5	mg/kg	780	2200	32000	2600
% Moisture	1	%	2.2	5.8	3.3	1.2

Client Sample ID			SS14 0.0-0.1	SS15 0.0-0.1	SS16 0.0-0.1	D02_260719
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-JI39933	S19-JI39934	S19-JI39935	S19-JI39936
Date Sampled			Jul 26, 2019	Jul 26, 2019	Jul 26, 2019	Jul 26, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	5	mg/kg	31	350	15000	280
% Moisture	1	%	6.8	4.7	1.9	5.0

Client Sample ID			D03_260719	SS17_0.0-0.1	SS18_0.0-0.1	SS19_0.0-0.1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-Jl39937	S19-Jl39997	S19-Jl39998	S19-Jl39999
Date Sampled			Jul 26, 2019	Jul 26, 2019	Jul 26, 2019	Jul 26, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	5	mg/kg	120	25	34	26000
% Moisture	1	%	5.5	3.2	4.8	2.4

Client Sample ID			SS20_0.0-0.1	SS21	SS22
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			S19-Jl40000	S19-Jl40001	S19-Jl40002
Date Sampled			Jul 26, 2019	Jul 26, 2019	Jul 26, 2019
Test/Reference	LOR	Unit			
Heavy Metals					
Lead	5	mg/kg	35000	610	540
% Moisture	1	%	3.6	2.2	3.4

Sample History

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

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

Description	Testing Site	Extracted	Holding Time
Heavy Metals	Sydney	Jul 29, 2019	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
% Moisture	Sydney	Jul 29, 2019	14 Days
- Method: LTM-GEN-7080 Moisture			

Company Name:	Ramboll Australia Pty Ltd	**Order No.:**		**Received:**	Jul 26, 2019 5:54 PM
Address:	Level 3/100 Pacific Highway North Sydney NSW 2060	**Report #:**	668047	**Due:**	Jul 29, 2019
		Phone:	02 9954 8118	**Priority:**	1 Day
		Fax:	02 9954 8150	**Contact Name:**	Stephen Maxwell
Project Name:					
Project ID:	318000780				

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						HOLD	Lead	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
External Laboratory								
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**			
1	TP1 0.1-0.5	Jul 26, 2019		Soil	S19-Jl39891		X	X
2	TP1 0.5-0.6	Jul 26, 2019		Soil	S19-Jl39892		X	X
3	TP2 0.1-0.4	Jul 26, 2019		Soil	S19-Jl39893		X	X
4	TP2 0.4-0.5	Jul 26, 2019		Soil	S19-Jl39894		X	X
5	TP2 0.5-0.7	Jul 26, 2019		Soil	S19-Jl39895		X	X
6	TP3 0.1-0.5	Jul 26, 2019		Soil	S19-Jl39896		X	X
7	TP3 0.5-0.6	Jul 26, 2019		Soil	S19-Jl39897		X	X
8	TP3 0.6-0.7	Jul 26, 2019		Soil	S19-Jl39898		X	X
9	TP4 0.1-0.3	Jul 26, 2019		Soil	S19-Jl39899		X	X

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Sample Detail						HOLD	Lead	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
10	TP4 0.3-0.4	Jul 26, 2019		Soil	S19-Jl39900		X	X
11	TP5 0.1-0.45	Jul 26, 2019		Soil	S19-Jl39901		X	X
12	TP5 0.45-0.55	Jul 26, 2019		Soil	S19-Jl39902		X	X
13	TP5 0.6-0.7	Jul 26, 2019		Soil	S19-Jl39903		X	X
14	TP6 0.1-0.4	Jul 26, 2019		Soil	S19-Jl39904		X	X
15	TP6 0.4-0.5	Jul 26, 2019		Soil	S19-Jl39905		X	X
16	TP6 0.5-0.7	Jul 26, 2019		Soil	S19-Jl39906		X	X
17	TP7 0.1-0.4	Jul 26, 2019		Soil	S19-Jl39907		X	X
18	TP7 0.4-0.5	Jul 26, 2019		Soil	S19-Jl39908		X	X
19	TP7 0.5-0.7	Jul 26, 2019		Soil	S19-Jl39909		X	X
20	TP8 0.1-0.3	Jul 26, 2019		Soil	S19-Jl39910		X	X
21	TP8 0.3-0.5	Jul 26, 2019		Soil	S19-Jl39911		X	X

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Sample Detail						HOLD	Lead	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
22	TP8 0.5-0.8	Jul 26, 2019		Soil	S19-Jl39912		X	X
23	TP9 0.1-0.3	Jul 26, 2019		Soil	S19-Jl39913		X	X
24	TP9 0.3-0.5	Jul 26, 2019		Soil	S19-Jl39914		X	X
25	TP9 0.5-0.7	Jul 26, 2019		Soil	S19-Jl39915		X	X
26	TP15 0.1	Jul 26, 2019		Soil	S19-Jl39918		X	X
27	TP15 0.8	Jul 26, 2019		Soil	S19-Jl39919		X	X
28	SS1 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39920		X	X
29	SS2 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39921		X	X
30	SS3 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39922		X	X
31	SS4 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39923		X	X
32	SS5 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39924		X	X
33	SS6 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39925		X	X

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Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
34	SS7 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39926		X	X
35	SS8 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39927		X	X
36	SS9 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39928		X	X
37	SS10 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39929		X	X
38	SS11 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39930		X	X
39	SS12 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39931		X	X
40	SS13 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39932		X	X
41	SS14 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39933		X	X
42	SS15 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39934		X	X
43	SS16 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39935		X	X
44	D02_260719	Jul 26, 2019		Soil	S19-Jl39936		X	X
45	D03_260719	Jul 26, 2019		Soil	S19-Jl39937		X	X

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Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
46	TP10_0.8-1.0	Jul 26, 2019		Soil	S19-Jl39990	X		
47	TP11_0.5-0.6	Jul 26, 2019		Soil	S19-Jl39991	X		
48	TP11_0.8-1.0	Jul 26, 2019		Soil	S19-Jl39992	X		
49	TP12_0.5	Jul 26, 2019		Soil	S19-Jl39993	X		
50	TP13_0.5-0.6	Jul 26, 2019		Soil	S19-Jl39994	X		
51	TP13_0.8-0.9	Jul 26, 2019		Soil	S19-Jl39995	X		
52	TP14_0.6-0.8	Jul 26, 2019		Soil	S19-Jl39996	X		
53	SS17_0.0-0.1	Jul 26, 2019		Soil	S19-Jl39997		X	X
54	SS18_0.0-0.1	Jul 26, 2019		Soil	S19-Jl39998		X	X
55	SS19_0.0-0.1	Jul 26, 2019		Soil	S19-Jl39999		X	X
56	SS20_0.0-0.1	Jul 26, 2019		Soil	S19-Jl40000		X	X
57	SS21	Jul 26, 2019		Soil	S19-Jl40001		X	X

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Sample Detail						HOLD	Lead	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
58	SS22	Jul 26, 2019		Soil	S19-Jl40002		X	X
59	D01_260719	Jul 26, 2019		Soil	S19-Jl40003	X		
Test Counts						8	51	51

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

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

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

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

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

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

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

Units

mg/kg: milligrams per kilogram
mg/L: milligrams per litre
ug/L: micrograms per litre
ppm: Parts per million
ppb: Parts per billion
%: Percentage
org/100mL: Organisms per 100 millilitres
NTU: Nephelometric Turbidity Units
MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

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

Results <10 times the LOR : No Limit

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

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

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

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

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

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Lab Sample ID	QA Source	Units	Result 1	Result 2	RPD	Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Heavy Metals									
Lead			mg/kg	< 5			5	Pass	
LCS - % Recovery									
Heavy Metals									
Lead			%	127			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Heavy Metals				Result 1					
Lead	S19-JI39895	CP	%	119			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S19-JI39894	CP	mg/kg	110	92	19	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S19-JI39896	CP	%	9.8	9.4	5.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S19-JI39904	CP	mg/kg	6000	6600	10	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S19-JI39906	CP	%	11	11	4.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S19-JI39914	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S19-JI39918	CP	%	6.1	5.5	10	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S19-JI39928	CP	%	6.2	5.2	17	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S19-JI39997	CP	%	3.2	3.8	17	30%	Pass	

Comments

Sample Integrity

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

Authorised By

Andrew Black	Analytical Services Manager
Gabriele Cordero	Senior Analyst-Metal (NSW)

Glenn Jackson
General Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

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

Measurement uncertainty of test data is available on request or please click here.

Environ
PO Box560
North Sydney
NSW 2060

Attention: **Stephen Maxwell**

Report **668047-S-V2**
Project name
Project ID 318000780
Received Date Jul 26, 2019

Client Sample ID			**TP1 0.1-0.5**	**TP1 0.5-0.6**	**TP2 0.1-0.4**	**TP2 0.4-0.5**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S19-Jl39891**	**S19-Jl39892**	**S19-Jl39893**	**S19-Jl39894**
Date Sampled			**Jul 26, 2019**	**Jul 26, 2019**	**Jul 26, 2019**	**Jul 26, 2019**
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	10	0.7	7	2.1
Lead	5	mg/kg	4400	10	3500	110
% Moisture	1	%	3.9	4.8	2.7	4.4

Client Sample ID			**TP2 0.5-0.7**	**TP3 0.1-0.5**	**TP3 0.5-0.6**	**TP3 0.6-0.7**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S19-Jl39895**	**S19-Jl39896**	**S19-Jl39897**	**S19-Jl39898**
Date Sampled			**Jul 26, 2019**	**Jul 26, 2019**	**Jul 26, 2019**	**Jul 26, 2019**
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	< 0.4	3.4	< 0.4	0.8
Lead	5	mg/kg	16	29000	74	13
% Moisture	1	%	9.2	9.8	6.4	9.1

Client Sample ID			**TP4 0.1-0.3**	**TP4 0.3-0.4**	**TP5 0.1-0.45**	**TP5 0.45-0.55**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S19-Jl39899**	**S19-Jl39900**	**S19-Jl39901**	**S19-Jl39902**
Date Sampled			**Jul 26, 2019**	**Jul 26, 2019**	**Jul 26, 2019**	**Jul 26, 2019**
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	0.8	2.9	-	1.4
Lead	5	mg/kg	38000	70	3100	150
% Moisture	1	%	4.2	8.4	5.6	5.4

Client Sample ID			TP5 0.6-0.7	TP6 0.1-0.4	TP6 0.4-0.5	TP6 0.5-0.7
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-JI39903	S19-JI39904	S19-JI39905	S19-JI39906
Date Sampled			Jul 26, 2019	Jul 26, 2019	Jul 26, 2019	Jul 26, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	1.8	3.5	0.7	0.7
Lead	5	mg/kg	47	6000	20	6.7
% Moisture	1	%	12	5.8	6.5	11

Client Sample ID			TP7 0.1-0.4	TP7 0.4-0.5	TP7 0.5-0.7	TP8 0.1-0.3
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-JI39907	S19-JI39908	S19-JI39909	S19-JI39910
Date Sampled			Jul 26, 2019	Jul 26, 2019	Jul 26, 2019	Jul 26, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	3.8	< 0.4	< 0.4	3.5
Lead	5	mg/kg	3300	76	6.9	2800
% Moisture	1	%	3.7	5.7	11	2.2

Client Sample ID			TP8 0.3-0.5	TP8 0.5-0.8	TP9 0.1-0.3	TP9 0.3-0.5
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-JI39911	S19-JI39912	S19-JI39913	S19-JI39914
Date Sampled			Jul 26, 2019	Jul 26, 2019	Jul 26, 2019	Jul 26, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	< 0.4	< 0.4	2.3	< 0.4
Lead	5	mg/kg	24	22	600	< 5
% Moisture	1	%	6.0	9.5	2.4	6.1

Client Sample ID			TP9 0.5-0.7	TP15 0.1	TP15 0.8	SS1 0.0-0.1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-JI39915	S19-JI39918	S19-JI39919	S19-JI39920
Date Sampled			Jul 26, 2019	Jul 26, 2019	Jul 26, 2019	Jul 26, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	< 0.4	< 0.4	< 0.4	0.5
Lead	5	mg/kg	8.1	27	26	39
% Moisture	1	%	10	6.1	12	4.6

Client Sample ID			SS2 0.0-0.1	SS3 0.0-0.1	SS4 0.0-0.1	SS5 0.0-0.1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-JI39921	S19-JI39922	S19-JI39923	S19-JI39924
Date Sampled			Jul 26, 2019	Jul 26, 2019	Jul 26, 2019	Jul 26, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	0.6	3.1	3.5	0.7
Lead	5	mg/kg	110	130	120	43
% Moisture	1	%	3.2	7.5	5.6	2.8

Client Sample ID			SS6 0.0-0.1	SS7 0.0-0.1	SS8 0.0-0.1	SS9 0.0-0.1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-JI39925	S19-JI39926	S19-JI39927	S19-JI39928
Date Sampled			Jul 26, 2019	Jul 26, 2019	Jul 26, 2019	Jul 26, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	0.4	18	2.7	1.5
Lead	5	mg/kg	110	4100	340	140
% Moisture	1	%	2.8	4.4	19	6.2

Client Sample ID			SS10 0.0-0.1	SS11 0.0-0.1	SS12 0.0-0.1	SS13 0.0-0.1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-JI39929	S19-JI39930	S19-JI39931	S19-JI39932
Date Sampled			Jul 26, 2019	Jul 26, 2019	Jul 26, 2019	Jul 26, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	0.8	3.4	-	14
Lead	5	mg/kg	780	2200	32000	2600
% Moisture	1	%	2.2	5.8	3.3	1.2

Client Sample ID			SS14 0.0-0.1	SS15 0.0-0.1	SS16 0.0-0.1	D02_260719
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-JI39933	S19-JI39934	S19-JI39935	S19-JI39936
Date Sampled			Jul 26, 2019	Jul 26, 2019	Jul 26, 2019	Jul 26, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	< 0.4	4.6	-	1.5
Lead	5	mg/kg	31	350	15000	280
% Moisture	1	%	6.8	4.7	1.9	5.0

Client Sample ID			D03_260719	SS17_0.0-0.1	SS18_0.0-0.1	SS19_0.0-0.1
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-JI39937	S19-JI39997	S19-JI39998	S19-JI39999
Date Sampled			Jul 26, 2019	Jul 26, 2019	Jul 26, 2019	Jul 26, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	1.1	-	-	-
Lead	5	mg/kg	120	25	34	26000
% Moisture	1	%	5.5	3.2	4.8	2.4

Client Sample ID			SS20_0.0-0.1	SS21	SS22
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			S19-JI40000	S19-JI40001	S19-JI40002
Date Sampled			Jul 26, 2019	Jul 26, 2019	Jul 26, 2019
Test/Reference	LOR	Unit			
Heavy Metals					
Lead	5	mg/kg	35000	610	540
% Moisture	1	%	3.6	2.2	3.4

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

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

Description	Testing Site	Extracted	Holding Time
Heavy Metals	Sydney	May 26, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
% Moisture	Sydney	Jul 29, 2019	14 Days
- Method: LTM-GEN-7080 Moisture			

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NATA # 1261
Site # 23736

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name:
Project ID: 318000780

Order No.:
Report #: 668047
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jul 26, 2019 5:54 PM
Due: Jul 29, 2019
Priority: 1 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						HOLD	Lead	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
External Laboratory								
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**			
1	TP1 0.1-0.5	Jul 26, 2019		Soil	S19-Jl39891		X	X
2	TP1 0.5-0.6	Jul 26, 2019		Soil	S19-Jl39892		X	X
3	TP2 0.1-0.4	Jul 26, 2019		Soil	S19-Jl39893		X	X
4	TP2 0.4-0.5	Jul 26, 2019		Soil	S19-Jl39894		X	X
5	TP2 0.5-0.7	Jul 26, 2019		Soil	S19-Jl39895		X	X
6	TP3 0.1-0.5	Jul 26, 2019		Soil	S19-Jl39896		X	X
7	TP3 0.5-0.6	Jul 26, 2019		Soil	S19-Jl39897		X	X
8	TP3 0.6-0.7	Jul 26, 2019		Soil	S19-Jl39898		X	X
9	TP4 0.1-0.3	Jul 26, 2019		Soil	S19-Jl39899		X	X

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Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
10	TP4 0.3-0.4	Jul 26, 2019		Soil	S19-Jl39900		X	X
11	TP5 0.1-0.45	Jul 26, 2019		Soil	S19-Jl39901		X	X
12	TP5 0.45-0.55	Jul 26, 2019		Soil	S19-Jl39902		X	X
13	TP5 0.6-0.7	Jul 26, 2019		Soil	S19-Jl39903		X	X
14	TP6 0.1-0.4	Jul 26, 2019		Soil	S19-Jl39904		X	X
15	TP6 0.4-0.5	Jul 26, 2019		Soil	S19-Jl39905		X	X
16	TP6 0.5-0.7	Jul 26, 2019		Soil	S19-Jl39906		X	X
17	TP7 0.1-0.4	Jul 26, 2019		Soil	S19-Jl39907		X	X
18	TP7 0.4-0.5	Jul 26, 2019		Soil	S19-Jl39908		X	X
19	TP7 0.5-0.7	Jul 26, 2019		Soil	S19-Jl39909		X	X
20	TP8 0.1-0.3	Jul 26, 2019		Soil	S19-Jl39910		X	X
21	TP8 0.3-0.5	Jul 26, 2019		Soil	S19-Jl39911		X	X

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Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
22	TP8 0.5-0.8	Jul 26, 2019		Soil	S19-Jl39912		X	X
23	TP9 0.1-0.3	Jul 26, 2019		Soil	S19-Jl39913		X	X
24	TP9 0.3-0.5	Jul 26, 2019		Soil	S19-Jl39914		X	X
25	TP9 0.5-0.7	Jul 26, 2019		Soil	S19-Jl39915		X	X
26	TP15 0.1	Jul 26, 2019		Soil	S19-Jl39918		X	X
27	TP15 0.8	Jul 26, 2019		Soil	S19-Jl39919		X	X
28	SS1 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39920		X	X
29	SS2 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39921		X	X
30	SS3 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39922		X	X
31	SS4 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39923		X	X
32	SS5 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39924		X	X
33	SS6 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39925		X	X

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Sample Detail						HOLD	Lead	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
34	SS7 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39926		X	X
35	SS8 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39927		X	X
36	SS9 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39928		X	X
37	SS10 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39929		X	X
38	SS11 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39930		X	X
39	SS12 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39931		X	X
40	SS13 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39932		X	X
41	SS14 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39933		X	X
42	SS15 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39934		X	X
43	SS16 0.0-0.1	Jul 26, 2019		Soil	S19-Jl39935		X	X
44	D02_260719	Jul 26, 2019		Soil	S19-Jl39936		X	X
45	D03_260719	Jul 26, 2019		Soil	S19-Jl39937		X	X

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Sample Detail						HOLD	Lead	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
46	TP10_0.8-1.0	Jul 26, 2019		Soil	S19-Jl39990	X		
47	TP11_0.5-0.6	Jul 26, 2019		Soil	S19-Jl39991	X		
48	TP11_0.8-1.0	Jul 26, 2019		Soil	S19-Jl39992	X		
49	TP12_0.5	Jul 26, 2019		Soil	S19-Jl39993	X		
50	TP13_0.5-0.6	Jul 26, 2019		Soil	S19-Jl39994	X		
51	TP13_0.8-0.9	Jul 26, 2019		Soil	S19-Jl39995	X		
52	TP14_0.6-0.8	Jul 26, 2019		Soil	S19-Jl39996	X		
53	SS17_0.0-0.1	Jul 26, 2019		Soil	S19-Jl39997		X	X
54	SS18_0.0-0.1	Jul 26, 2019		Soil	S19-Jl39998		X	X
55	SS19_0.0-0.1	Jul 26, 2019		Soil	S19-Jl39999		X	X
56	SS20_0.0-0.1	Jul 26, 2019		Soil	S19-Jl40000		X	X
57	SS21	Jul 26, 2019		Soil	S19-Jl40001		X	X

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Sample Detail						HOLD	Lead	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
58	SS22	Jul 26, 2019		Soil	S19-Jl40002		X	X
59	D01_260719	Jul 26, 2019		Soil	S19-Jl40003	X		
Test Counts						8	51	51

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Quality Control Results

Test	Lab Sample ID	QA Source	Units	Result 1	Result 2	RPD	Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Heavy Metals									
Cadmium			mg/kg	< 0.4			0.4	Pass	
Lead			mg/kg	< 5			5	Pass	
LCS - % Recovery									
Heavy Metals									
Cadmium			%	119			80-120	Pass	
Lead			%	127			80-120	Fail	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Heavy Metals				Result 1					
Cadmium	S19-JI39895	CP	%	124			75-125	Pass	
Lead	S19-JI39895	CP	%	119			75-125	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Cadmium	S19-JI39905	CP	%	131			75-125	Fail	
Spike - % Recovery									
Heavy Metals				Result 1					
Cadmium	S19-JI39927	CP	%	123			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S19-JI39894	CP	mg/kg	110	92	19	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S19-JI39896	CP	%	9.8	9.4	5.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S19-JI39904	CP	mg/kg	6000	6600	10	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S19-JI39906	CP	%	11	11	4.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S19-JI39914	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S19-JI39918	CP	%	6.1	5.5	10	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S19-JI39928	CP	%	6.2	5.2	17	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S19-JI39997	CP	%	3.2	3.8	17	30%	Pass	

Comments

V2- new version to import Cd results as per client request.

1. The results in this report supersede any previously corresponded results.
2. All Soil Results are reported on a dry basis.
3. Samples are analysed on an as received basis.

ABBREVIATIONS

mg/kg : milligrams per kilograms, mg/L : milligrams per litre, ppm : parts per million,
LOR : Limit of Reporting
RPD : Relative Percent Difference
CRM : Certified Reference Material
LCS : Laboratory Control Sample

Sample Integrity

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

Authorised by:

Andrew Black Analytical Services Manager

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

Measurement uncertainty of test data is available on request or please click here.

Ramboll Environ Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

NATA Accredited
Accreditation Number 1261
Site Number 18217

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

Attention: **Stephen Maxwell**

Report **670968-S**
Project name
Project ID 318000780
Received Date Aug 13, 2019

Client Sample ID			**SS23**	**SS24**	**SS25**	**SS26**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S19-Au17274**	**S19-Au17275**	**S19-Au17276**	**S19-Au17277**
Date Sampled			**Aug 12, 2019**	**Aug 12, 2019**	**Aug 12, 2019**	**Aug 12, 2019**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	5	mg/kg	350	3000	11000	33
% Moisture	1	%	1.7	3.3	4.9	2.7

Client Sample ID			**SS27**	**SS28**	**SS29**	**SS30**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S19-Au17278**	**S19-Au17279**	**S19-Au17280**	**S19-Au17281**
Date Sampled			**Aug 12, 2019**	**Aug 12, 2019**	**Aug 12, 2019**	**Aug 12, 2019**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	5	mg/kg	6700	12000	3700	470
% Moisture	1	%	6.7	5.7	3.9	3.5

Client Sample ID			**D01_120819**	**D02_120819**
Sample Matrix			**Soil**	**Soil**
Eurofins Sample No.			**S19-Au17282**	**S19-Au17283**
Date Sampled			**Aug 12, 2019**	**Aug 12, 2019**
Test/Reference	LOR	Unit		
Heavy Metals				
Lead	5	mg/kg	13000	570
% Moisture	1	%	6.1	4.4

Sample History

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

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

Description	Testing Site	Extracted	Holding Time
Heavy Metals	Sydney	Aug 13, 2019	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
% Moisture	Sydney	Aug 13, 2019	14 Days
- Method: LTM-GEN-7080 Moisture			

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Site # 1254 & 14271

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NATA # 1261 Site # 18217

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NATA # 1261 Site # 20794

Perth
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Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name:
Project ID: 318000780

Order No.:
Report #: 670968
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Aug 14, 2019 9:43 AM
Due: Aug 15, 2019
Priority: 1 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Alena Bounkeua

Sample Detail						Aluminium (filtered)	Barium (filtered)	Beryllium (filtered)	Cobalt (filtered)	Conductivity (at 25°C)	Iron (filtered)	Lead	Manganese (filtered)	pH (at 25°C)	Total Dissolved Solids Dried at 180°C ± 2°C	Total Suspended Solids Dried at 103–105°C	Turbidity	Moisture Set	Eurofins | mgt Suite B6 (filtered metals)	BTEXN and Volatile TRH	Eurofins | mgt Suite B19D: Total N, TKN, NOx, NO2, NO3, Total P
Melbourne Laboratory - NATA Site # 1254 & 14271																					X
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794																					
Perth Laboratory - NATA Site # 23736																					
External Laboratory																					
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**																
1	S03 UP	Aug 13, 2019		Water	S19-Au17273	X	X	X	X	X	X		X	X	X	X	X		X		X
2	SS23	Aug 12, 2019		Soil	S19-Au17274							X						X			
3	SS24	Aug 12, 2019		Soil	S19-Au17275							X						X			
4	SS25	Aug 12, 2019		Soil	S19-Au17276							X						X			
5	SS26	Aug 12, 2019		Soil	S19-Au17277							X						X			
6	SS27	Aug 12, 2019		Soil	S19-Au17278							X						X			
7	SS28	Aug 12, 2019		Soil	S19-Au17279							X						X			
8	SS29	Aug 12, 2019		Soil	S19-Au17280							X						X			
9	SS30	Aug 12, 2019		Soil	S19-Au17281							X						X			

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Eurofins Analytical Services Manager : Alena Bounkeua

Sample Detail						Aluminium (filtered)	Barium (filtered)	Beryllium (filtered)	Cobalt (filtered)	Conductivity (at 25°C)	Iron (filtered)	Lead	Manganese (filtered)	pH (at 25°C)	Total Dissolved Solids Dried at 180°C ± 2°C	Total Suspended Solids Dried at 103–105°C	Turbidity	Moisture Set	Eurofins | mgt Suite B6 (filtered metals)	BTEXN and Volatile TRH	Eurofins | mgt Suite B19D: Total N, TKN, NOx, NO2, NO3, Total P
Melbourne Laboratory - NATA Site # 1254 & 14271																					X
Sydney Laboratory - NATA Site # 18217						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Brisbane Laboratory - NATA Site # 20794																					
Perth Laboratory - NATA Site # 23736																					
10	D01_120819	Aug 12, 2019		Soil	S19-Au17282							X						X			
11	D02_120819	Aug 12, 2019		Soil	S19-Au17283							X						X			
12	D01_130819	Aug 12, 2019		Water	S19-Au17284	X	X	X	X	X	X		X	X	X	X	X		X		X
13	SPIKE	Aug 12, 2019		Water	S19-Au17285															X	
14	BLANK	Aug 12, 2019		Water	S19-Au17286															X	
Test Counts						2	2	2	2	2	2	10	2	2	2	2	2	10	2	2	2

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

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

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

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

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

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

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

Units

mg/kg: milligrams per kilogram
mg/L: milligrams per litre
ug/L: micrograms per litre
ppm: Parts per million
ppb: Parts per billion
%: Percentage
org/100mL: Organisms per 100 millilitres
NTU: Nephelometric Turbidity Units
MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

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

Results <10 times the LOR : No Limit

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

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

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

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

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

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Lab Sample ID	QA Source	Units	Result 1	Result 2	RPD	Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Heavy Metals									
Lead			mg/kg	< 5			5	Pass	
LCS - % Recovery									
Heavy Metals									
Lead			%	104			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Heavy Metals				Result 1					
Lead	S19-Au11644	NCP	%	102			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S19-Au17274	CP	mg/kg	350	380	6.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S19-Au17274	CP	%	1.7	1.2	35	30%	Fail	Q15

Comments

Sample Integrity

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

Qualifier Codes/Comments

Code	Description
Q15	The RPD reported passes Eurofins | mgt's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised By

Alena Bounkeua	Analytical Services Manager
Gabriele Cordero	Senior Analyst-Metal (NSW)

Glenn Jackson
General Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

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

Measurement uncertainty of test data is available on request or please click here.

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Accreditation Number 1261
Site Number 18217

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The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Attention: **Stephen Maxwell**

Report **673583-S**
Project name 318000780
Received Date Aug 27, 2019

Client Sample ID			**SS30**	**SS31**	**SS32**	**SS33**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S19-Au39075**	**S19-Au39076**	**S19-Au39077**	**S19-Au39078**
Date Sampled			**Aug 27, 2019**	**Aug 27, 2019**	**Aug 27, 2019**	**Aug 27, 2019**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	5	mg/kg	2100	710	2400	800
% Moisture	1	%	2.4	1.5	2.2	3.8

Client Sample ID			**SS34**	**SS35**	**SS37**	**SS38**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S19-Au39079**	**S19-Au39080**	**S19-Au39082**	**S19-Au39083**
Date Sampled			**Aug 27, 2019**	**Aug 27, 2019**	**Aug 27, 2019**	**Aug 27, 2019**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	5	mg/kg	850	900	1600	9900
% Moisture	1	%	1.7	2.4	1.8	1.8

Client Sample ID			**SS39**	**SS40**	**SS41**	**SS42**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S19-Au39084**	**S19-Au39085**	**S19-Au39086**	**S19-Au39087**
Date Sampled			**Aug 27, 2019**	**Aug 27, 2019**	**Aug 27, 2019**	**Aug 27, 2019**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	5	mg/kg	2900	2600	11000	240
% Moisture	1	%	1.2	2.3	3.0	4.8

Client Sample ID			SS43	SS44	SS45	SS46
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-Au39088	S19-Au39089	S19-Au39090	S19-Au39091
Date Sampled			Aug 27, 2019	Aug 27, 2019	Aug 27, 2019	Aug 27, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	5	mg/kg	31000	140	4000	210
% Moisture	1	%	7.5	8.7	6.1	9.6

Client Sample ID			SS47	SS48	SS49	SS50
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-Au39092	S19-Au39093	S19-Au39094	S19-Au39095
Date Sampled			Aug 27, 2019	Aug 27, 2019	Aug 27, 2019	Aug 27, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	5	mg/kg	3900	1800	1400	1400
% Moisture	1	%	7.4	6.9	5.9	7.3

Client Sample ID			SS51	D01_270819	D02_270819
Sample Matrix			Soil	Soil	Soil
Eurofins Sample No.			S19-Au39096	S19-Au39097	S19-Au39098
Date Sampled			Aug 27, 2019	Aug 27, 2019	Aug 27, 2019
Test/Reference	LOR	Unit			
Heavy Metals					
Lead	5	mg/kg	190	2800	230
% Moisture	1	%	3.0	2.6	4.8

Sample History

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

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

Description	Testing Site	Extracted	Holding Time
Heavy Metals	Sydney	Aug 27, 2019	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
% Moisture	Sydney	Aug 27, 2019	14 Days
- Method: LTM-GEN-7080 Moisture			

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Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

Company Name:	Ramboll Australia Pty Ltd	**Order No.:**		**Received:**	Aug 27, 2019 5:45 PM
Address:	Level 3/100 Pacific Highway North Sydney NSW 2060	**Report #:**	673583	**Due:**	Aug 28, 2019
		Phone:	02 9954 8118	**Priority:**	1 Day
		Fax:	02 9954 8150	**Contact Name:**	Stephen Maxwell
Project Name:	318000780				

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						CANCELLED	Lead	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
External Laboratory								
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**			
1	SS30	Aug 27, 2019		Soil	S19-Au39075		X	X
2	SS31	Aug 27, 2019		Soil	S19-Au39076		X	X
3	SS32	Aug 27, 2019		Soil	S19-Au39077		X	X
4	SS33	Aug 27, 2019		Soil	S19-Au39078		X	X
5	SS34	Aug 27, 2019		Soil	S19-Au39079		X	X
6	SS35	Aug 27, 2019		Soil	S19-Au39080		X	X
7	SS36	Aug 27, 2019		Soil	S19-Au39081	X		
8	SS37	Aug 27, 2019		Soil	S19-Au39082		X	X
9	SS38	Aug 27, 2019		Soil	S19-Au39083		X	X
10	SS39	Aug 27, 2019		Soil	S19-Au39084		X	X

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Project Name: 318000780

Order No.:
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Received: Aug 27, 2019 5:45 PM
Due: Aug 28, 2019
Priority: 1 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						CANCELLED	Lead	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
11	SS40	Aug 27, 2019		Soil	S19-Au39085		X	X
12	SS41	Aug 27, 2019		Soil	S19-Au39086		X	X
13	SS42	Aug 27, 2019		Soil	S19-Au39087		X	X
14	SS43	Aug 27, 2019		Soil	S19-Au39088		X	X
15	SS44	Aug 27, 2019		Soil	S19-Au39089		X	X
16	SS45	Aug 27, 2019		Soil	S19-Au39090		X	X
17	SS46	Aug 27, 2019		Soil	S19-Au39091		X	X
18	SS47	Aug 27, 2019		Soil	S19-Au39092		X	X
19	SS48	Aug 27, 2019		Soil	S19-Au39093		X	X
20	SS49	Aug 27, 2019		Soil	S19-Au39094		X	X
21	SS50	Aug 27, 2019		Soil	S19-Au39095		X	X
22	SS51	Aug 27, 2019		Soil	S19-Au39096		X	X
23	D01_270819	Aug 27, 2019		Soil	S19-Au39097		X	X

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Perth
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Company Name:	Ramboll Australia Pty Ltd	**Order No.:**	
Address:	Level 3/100 Pacific Highway North Sydney NSW 2060	**Report #:** **Phone:** **Fax:**	673583 02 9954 8118 02 9954 8150
Project Name:	318000780		

Received:	Aug 27, 2019 5:45 PM
Due:	Aug 28, 2019
Priority:	1 Day
Contact Name:	Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						CANCELLED	Lead	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
24	D02_270819	Aug 27, 2019		Soil	S19-Au39098		X	X
Test Counts						1	23	23

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

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

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

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

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

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

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

Units

mg/kg: milligrams per kilogram
mg/L: milligrams per litre
ug/L: micrograms per litre
ppm: Parts per million
ppb: Parts per billion
%: Percentage
org/100mL: Organisms per 100 millilitres
NTU: Nephelometric Turbidity Units
MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

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

Results <10 times the LOR : No Limit

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

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

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

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

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

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Lab Sample ID	QA Source	Units	Result 1	Result 2	RPD	Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Heavy Metals									
Lead			mg/kg	< 5			5	Pass	
LCS - % Recovery									
Heavy Metals									
Lead			%	128			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Heavy Metals				Result 1					
Lead	S19-Au30488	NCP	%	120			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S19-Au39083	CP	mg/kg	9900	9500	4.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S19-Au39084	CP	%	1.2	1.6	27	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S19-Au39094	CP	mg/kg	1400	1300	4.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S19-Au39094	CP	%	5.9	6.7	13	30%	Pass	

Comments

Sample Integrity

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

Authorised By

Andrew Black	Analytical Services Manager
Gabriele Cordero	Senior Analyst-Metal (NSW)

Glenn Jackson
General Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

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

Measurement uncertainty of test data is available on request or please click here.

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NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection and proficiency testing scheme providers reports.

Attention: **Stephen Maxwell**

Report **694957-S-V3**
Project name 318000780
Received Date Dec 20, 2019

Client Sample ID			**HA01_0.1**	**HA01_0.25**	**HA01_0.5**	**HA01_0.75**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S19-De30523**	**S19-De30524**	**S19-De30525**	**S19-De30526**
Date Sampled			**Dec 18, 2019**	**Dec 18, 2019**	**Dec 18, 2019**	**Dec 18, 2019**
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	4.2	1.9	0.6	2
Lead	5	mg/kg	720	820	29	55
% Moisture	1	%	2.2	7.0	18	17

Client Sample ID			**HA01_1.0**	**HA02_0.1**	**HA02_0.25**	**HA02_0.5**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S19-De30527**	**S19-De30528**	**S19-De30529**	**S19-De30530**
Date Sampled			**Dec 18, 2019**	**Dec 18, 2019**	**Dec 18, 2019**	**Dec 18, 2019**
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	< 0.4	12	1	< 0.4
Lead	5	mg/kg	34	450	12	7.4
% Moisture	1	%	15	2.3	13	10

Client Sample ID			**HA02_0.75**	**HA02_1.0**	**HA03_0.1**	**HA03_0.25**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S19-De30531**	**S19-De30532**	**S19-De30533**	**S19-De30534**
Date Sampled			**Dec 18, 2019**	**Dec 18, 2019**	**Dec 18, 2019**	**Dec 18, 2019**
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	< 0.4	< 0.4	2.5	0.5
Lead	5	mg/kg	11	11	2100	1600
% Moisture	1	%	14	13	4.2	8.0

Client Sample ID			HA03_0.5	HA03_0.75	SS113	SS114
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-De30535	S19-De30536	S19-De30537	S19-De30538
Date Sampled			Dec 18, 2019	Dec 18, 2019	Dec 19, 2019	Dec 19, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	0.4	0.8	3.8	1.8
Lead	5	mg/kg	210	460	300	360
% Moisture	1	%	11	12	3.5	2.2

Client Sample ID			SS115	SS116	SS117	SS118
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-De30539	S19-De30540	S19-De30541	S19-De30542
Date Sampled			Dec 19, 2019	Dec 19, 2019	Dec 19, 2019	Dec 19, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	0.9	2.4	2.7	8.7
Copper	5	mg/kg	-	-	50	310
Lead	5	mg/kg	220	250	250	880
Zinc	5	mg/kg	-	-	540	1300
% Moisture	1	%	3.4	< 1	3.1	2.3

Client Sample ID			SS119	SS120	SS121	SS122
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-De30543	S19-De30544	S19-De30545	S19-De30546
Date Sampled			Dec 19, 2019	Dec 19, 2019	Dec 19, 2019	Dec 19, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	0.8	0.7	1.2	2.7
Copper	5	mg/kg	21	20	40	59
Lead	5	mg/kg	110	86	140	260
Zinc	5	mg/kg	160	150	260	530
% Moisture	1	%	3.4	3.0	1.1	2.3

Client Sample ID			SS123	SS124	SS125	SS126
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-De30547	S19-De30548	S19-De30549	S19-De30550
Date Sampled			Dec 19, 2019	Dec 19, 2019	Dec 19, 2019	Dec 19, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	3.3	0.7	5	1
Copper	5	mg/kg	81	32	110	-
Lead	5	mg/kg	480	70	520	110
Zinc	5	mg/kg	700	180	850	-
% Moisture	1	%	1.2	3.9	2.6	2.4

Client Sample ID			SS127	SS128	SS129	SS130
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-De30551	S19-De30552	S19-De30553	S19-De30554
Date Sampled			Dec 19, 2019	Dec 19, 2019	Dec 19, 2019	Dec 19, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	1	< 0.4	< 0.4	0.6
Lead	5	mg/kg	89	39	61	190
% Moisture	1	%	3.6	2.5	3.2	1.1

Client Sample ID			SS131	SS132	SS133	SS134
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-De30555	S19-De30556	S19-De30557	S19-De30558
Date Sampled			Dec 19, 2019	Dec 19, 2019	Dec 19, 2019	Dec 19, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	0.6	< 0.4	< 0.4	< 0.4
Lead	5	mg/kg	240	17	46	42
% Moisture	1	%	1.3	< 1	< 1	1.0

Client Sample ID			SS135	SS136	SS137	SS138
Sample Matrix			Soil	Soil	Soil	Soil
Eurofins Sample No.			S19-De30559	S19-De30560	S19-De30561	S19-De30562
Date Sampled			Dec 19, 2019	Dec 19, 2019	Dec 19, 2019	Dec 19, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	< 0.4	3.8	2.7	1.8
Lead	5	mg/kg	59	1200	1100	210
% Moisture	1	%	3.2	2.1	< 1	1.1

Client Sample ID			SS139	SS140	SS141	PAINT1
Sample Matrix			Soil	Soil	Soil	Paint
Eurofins Sample No.			S19-De30563	S19-De30564	S19-De30565	S19-De30587
Date Sampled			Dec 19, 2019	Dec 19, 2019	Dec 19, 2019	Dec 19, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	9.5	7.4	3.9	-
Lead	5	mg/kg	800	660	390	-
% Moisture	1	%	1.1	1.6	1.5	-
Lead (% w/w)	0.01	%	-	-	-	0.09

Client Sample ID			PAINT2	PAINT3	PAINT4	PAINT5
Sample Matrix			Paint	Paint	Paint	Paint
Eurofins Sample No.			S19-De30588	S19-De30589	S19-De30590	S19-De30591
Date Sampled			Dec 19, 2019	Dec 19, 2019	Dec 19, 2019	Dec 19, 2019
Test/Reference	LOR	Unit				
Lead (% w/w)	0.01	%	0.25	1.8	0.29	0.03

Client Sample ID			PAINT6	PAINT7	PAINT8	D01_191219
Sample Matrix			Paint	Paint	Paint	Soil
Eurofins Sample No.			S19-De30592	S19-De30593	S19-De30594	S19-De30595
Date Sampled			Dec 19, 2019	Dec 19, 2019	Dec 19, 2019	Dec 19, 2019
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	-	-	-	2.2
Lead	5	mg/kg	-	-	-	320
% Moisture	1	%	-	-	-	3.5
Lead (% w/w)	0.01	%	0.07	16	15	-

Client Sample ID			D02_191219	D03_191219
Sample Matrix			Soil	Soil
Eurofins Sample No.			S19-De30596	S19-De30597
Date Sampled			Dec 19, 2019	Dec 19, 2019
Test/Reference	LOR	Unit		
Heavy Metals				
Cadmium	0.4	mg/kg	0.7	3.2
Lead	5	mg/kg	98	1100
% Moisture	1	%	2.6	2.6

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

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

Description	Testing Site	Extracted	Holding Time
Heavy Metals	Sydney	May 26, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
- Method: LTM-MET-3030 Metals in Soils by ICP-OES			
Lead (% w/w)	Sydney	Dec 23, 2019	6 Months
- Method: LTM-MET-3040 Metals in Waters Soils & Sediments by ICP-MS			
% Moisture	Melbourne	Dec 20, 2019	14 Days
- Method: LTM-GEN-7080 Moisture			

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Company Name: Ramboll Australia Pty Ltd
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Project Name: 318000780

Order No.:
Report #: 694957
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Dec 20, 2019 11:00 AM
Due: Dec 31, 2019
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Lead	Lead	Lead (% w/w)	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271						X			X
Sydney Laboratory - NATA Site # 18217							X	X	
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
External Laboratory									
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**				
1	HA01_0.1	Dec 18, 2019		Soil	S19-De30523	X			X
2	HA01_0.25	Dec 18, 2019		Soil	S19-De30524	X			X
3	HA01_0.5	Dec 18, 2019		Soil	S19-De30525	X			X
4	HA01_0.75	Dec 18, 2019		Soil	S19-De30526	X			X
5	HA01_1.0	Dec 18, 2019		Soil	S19-De30527	X			X
6	HA02_0.1	Dec 18, 2019		Soil	S19-De30528	X			X
7	HA02_0.25	Dec 18, 2019		Soil	S19-De30529	X			X
8	HA02_0.5	Dec 18, 2019		Soil	S19-De30530	X			X
9	HA02_0.75	Dec 18, 2019		Soil	S19-De30531	X			X
10	HA02_1.0	Dec 18, 2019		Soil	S19-De30532	X			X
11	HA03_0.1	Dec 18, 2019		Soil	S19-De30533	X			X

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Company Name: Ramboll Australia Pty Ltd
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Project Name: 318000780

Order No.:
Report #: 694957
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Dec 20, 2019 11:00 AM
Due: Dec 31, 2019
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Lead	Lead	Lead (% w/w)	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271						X			X
Sydney Laboratory - NATA Site # 18217							X	X	
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
12	HA03_0.25	Dec 18, 2019		Soil	S19-De30534	X			X
13	HA03_0.5	Dec 18, 2019		Soil	S19-De30535	X			X
14	HA03_0.75	Dec 18, 2019		Soil	S19-De30536	X			X
15	SS113	Dec 19, 2019		Soil	S19-De30537	X			X
16	SS114	Dec 19, 2019		Soil	S19-De30538	X			X
17	SS115	Dec 19, 2019		Soil	S19-De30539	X			X
18	SS116	Dec 19, 2019		Soil	S19-De30540	X			X
19	SS117	Dec 19, 2019		Soil	S19-De30541	X			X
20	SS118	Dec 19, 2019		Soil	S19-De30542	X			X
21	SS119	Dec 19, 2019		Soil	S19-De30543	X			X
22	SS120	Dec 19, 2019		Soil	S19-De30544	X			X
23	SS121	Dec 19, 2019		Soil	S19-De30545	X			X
24	SS122	Dec 19, 2019		Soil	S19-De30546	X			X

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Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: 318000780

Order No.:
Report #: 694957
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Dec 20, 2019 11:00 AM
Due: Dec 31, 2019
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Lead	Lead	Lead (% w/w)	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271						X			X
Sydney Laboratory - NATA Site # 18217							X	X	
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
25	SS123	Dec 19, 2019		Soil	S19-De30547	X			X
26	SS124	Dec 19, 2019		Soil	S19-De30548	X			X
27	SS125	Dec 19, 2019		Soil	S19-De30549	X			X
28	SS126	Dec 19, 2019		Soil	S19-De30550	X			X
29	SS127	Dec 19, 2019		Soil	S19-De30551	X			X
30	SS128	Dec 19, 2019		Soil	S19-De30552	X			X
31	SS129	Dec 19, 2019		Soil	S19-De30553	X			X
32	SS130	Dec 19, 2019		Soil	S19-De30554	X			X
33	SS131	Dec 19, 2019		Soil	S19-De30555	X			X
34	SS132	Dec 19, 2019		Soil	S19-De30556	X			X
35	SS133	Dec 19, 2019		Soil	S19-De30557	X			X
36	SS134	Dec 19, 2019		Soil	S19-De30558	X			X
37	SS135	Dec 19, 2019		Soil	S19-De30559	X			X

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Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: 318000780

Order No.:
Report #: 694957
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Dec 20, 2019 11:00 AM
Due: Dec 31, 2019
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Lead	Lead	Lead (% w/w)	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271						X			X
Sydney Laboratory - NATA Site # 18217							X	X	
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
38	SS136	Dec 19, 2019		Soil	S19-De30560	X			X
39	SS137	Dec 19, 2019		Soil	S19-De30561	X			X
40	SS138	Dec 19, 2019		Soil	S19-De30562	X			X
41	SS139	Dec 19, 2019		Soil	S19-De30563	X			X
42	SS140	Dec 19, 2019		Soil	S19-De30564	X			X
43	SS141	Dec 19, 2019		Soil	S19-De30565	X			X
44	SWAB1	Dec 19, 2019		Wipes	S19-De30566		X		
45	SWAB2	Dec 19, 2019		Wipes	S19-De30567		X		
46	SWAB3	Dec 19, 2019		Wipes	S19-De30568		X		
47	SWAB4	Dec 19, 2019		Wipes	S19-De30569		X		
48	SWAB5	Dec 19, 2019		Wipes	S19-De30570		X		
49	SWAB6	Dec 19, 2019		Wipes	S19-De30571		X		
50	SWAB7	Dec 19, 2019		Wipes	S19-De30572		X		

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Sample Detail						Lead	Lead	Lead (% w/w)	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271						X			X
Sydney Laboratory - NATA Site # 18217							X	X	
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
51	SWAB8	Dec 19, 2019		Wipes	S19-De30573		X		
52	SWAB9	Dec 19, 2019		Wipes	S19-De30574		X		
53	SWAB10	Dec 19, 2019		Wipes	S19-De30575		X		
54	SWAB11	Dec 19, 2019		Wipes	S19-De30576		X		
55	SWAB12	Dec 19, 2019		Wipes	S19-De30577		X		
56	SWAB13	Dec 19, 2019		Wipes	S19-De30578		X		
57	SWAB14	Dec 19, 2019		Wipes	S19-De30579		X		
58	SWAB15	Dec 19, 2019		Wipes	S19-De30580		X		
59	SWAB16	Dec 19, 2019		Wipes	S19-De30581		X		
60	SWAB17	Dec 19, 2019		Wipes	S19-De30582		X		
61	SWAB18	Dec 19, 2019		Wipes	S19-De30583		X		
62	SWAB19	Dec 19, 2019		Wipes	S19-De30584		X		
63	SWAB20	Dec 19, 2019		Wipes	S19-De30585		X		

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Received: Dec 20, 2019 11:00 AM
Due: Dec 31, 2019
Priority: 5 Day
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Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Lead	Lead	Lead (% w/w)	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271						X			X
Sydney Laboratory - NATA Site # 18217							X	X	
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
64	SWAB21	Dec 19, 2019		Wipes	S19-De30586		X		
65	PAINT1	Dec 19, 2019		Paint	S19-De30587			X	
66	PAINT2	Dec 19, 2019		Paint	S19-De30588			X	
67	PAINT3	Dec 19, 2019		Paint	S19-De30589			X	
68	PAINT4	Dec 19, 2019		Paint	S19-De30590			X	
69	PAINT5	Dec 19, 2019		Paint	S19-De30591			X	
70	PAINT6	Dec 19, 2019		Paint	S19-De30592			X	
71	PAINT7	Dec 19, 2019		Paint	S19-De30593			X	
72	PAINT8	Dec 19, 2019		Paint	S19-De30594			X	
73	D01_191219	Dec 19, 2019		Soil	S19-De30595	X			X
74	D02_191219	Dec 19, 2019		Soil	S19-De30596	X			X
75	D03_191219	Dec 19, 2019		Soil	S19-De30597	X			X
76	QA1	Dec 19, 2019		Wipes	S19-De30598		X		

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Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Lead	Lead	Lead (% w/w)	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271						X			X
Sydney Laboratory - NATA Site # 18217							X	X	
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
77	QA2	Dec 19, 2019		Wipes	S19-De30599		X		
Test Counts						69	69	8	46

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Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Heavy Metals							
Cadmium	mg/kg	< 0.4			0.4	Pass	
Copper	mg/kg	< 5			5	Pass	
Lead	mg/kg	< 5			5	Pass	
Zinc	mg/kg	< 5			5	Pass	
LCS - % Recovery							
Heavy Metals							
Cadmium	%	109			80-120	Pass	
Copper	%	114			80-120	Pass	
Lead	%	117			80-120	Pass	
Zinc	%	112			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Heavy Metals				Result 1					
Cadmium	S19-De30524	CP	%	105			75-125	Pass	
Copper	S19-De30524	CP	%	66			75-125	Fail	
Zinc	S19-De30524	CP	%	42			75-125	Fail	
Spike - % Recovery									
Heavy Metals				Result 1					
Cadmium	S19-De30534	CP	%	104			75-125	Pass	
Copper	S19-De30534	CP	%	129			75-125	Fail	
Zinc	S19-De30534	CP	%	127			75-125	Fail	
Spike - % Recovery									
Heavy Metals				Result 1					
Cadmium	S19-De30544	CP	%	106			75-125	Pass	
Copper	S19-De30544	CP	%	199			75-125	Fail	
Lead	S19-De30544	CP	%	91			75-125	Pass	
Zinc	S19-De30544	CP	%	105			75-125	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Cadmium	S19-De30554	CP	%	119			75-125	Pass	
Copper	S19-De30554	CP	%	116			75-125	Pass	
Zinc	S19-De30554	CP	%	262			75-125	Fail	Q08
Spike - % Recovery									
Heavy Metals				Result 1					
Cadmium	S19-De30564	CP	%	86			75-125	Pass	
Copper	S19-De30564	CP	%	70			75-125	Fail	Q08

Test	Lab Sample ID	QA Source	Units	Result 1	Result 2	RPD	Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Copper	S19-De30523	CP	mg/kg	260	180	37	30%	Fail	
Lead	S19-De30523	CP	mg/kg	720	650	11	30%	Pass	
Zinc	S19-De30523	CP	mg/kg	420	390	7.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Copper	S19-De30524	CP	mg/kg	150	150	<1	30%	Pass	
Lead	S19-De30524	CP	mg/kg	820	830	1.0	30%	Pass	
Zinc	S19-De30524	CP	mg/kg	300	300	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S19-De30530	CP	%	10	10	2.0	30%	Pass	

Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Copper	S19-De30533	CP	mg/kg	420	380	9.0	30%	Pass	
Lead	S19-De30533	CP	mg/kg	2100	1900	5.0	30%	Pass	
Zinc	S19-De30533	CP	mg/kg	360	400	11	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Copper	S19-De30534	CP	mg/kg	230	230	1.0	30%	Pass	
Lead	S19-De30534	CP	mg/kg	1600	1600	1.0	30%	Pass	
Zinc	S19-De30534	CP	mg/kg	180	180	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S19-De30540	CP	%	< 1	< 1	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S19-De30543	CP	mg/kg	110	97	10	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S19-De30544	CP	mg/kg	86	86	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S19-De30550	CP	%	2.4	2.5	3.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Copper	S19-De30553	CP	mg/kg	17	17	1.0	30%	Pass	
Lead	S19-De30553	CP	mg/kg	61	64	6.0	30%	Pass	
Zinc	S19-De30553	CP	mg/kg	190	200	6.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Copper	S19-De30554	CP	mg/kg	32	32	1.0	30%	Pass	
Lead	S19-De30554	CP	mg/kg	190	190	1.0	30%	Pass	
Zinc	S19-De30554	CP	mg/kg	280	280	1.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S19-De30560	CP	%	2.1	1.9	11	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Copper	S19-De30563	CP	mg/kg	200	200	<1	30%	Pass	
Lead	S19-De30563	CP	mg/kg	800	790	2.0	30%	Pass	
Zinc	S19-De30563	CP	mg/kg	1100	1100	4.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Copper	S19-De30564	CP	mg/kg	130	140	3.0	30%	Pass	
Lead	S19-De30564	CP	mg/kg	660	670	2.0	30%	Pass	
Zinc	S19-De30564	CP	mg/kg	1500	1500	2.0	30%	Pass	

Comments

V3- new version to import Cd as per client request on soil samples.

1. The results in this report supersede any previously corresponded results.
2. All Soil Results are reported on a dry basis.
3. Samples are analysed on an as received basis.

ABBREVIATIONS

mg/kg : milligrams per kilograms, mg/L : milligrams per litre, ppm : parts per million,

LOR : Limit of Reporting

RPD : Relative Percent Difference

CRM : Certified Reference Material

LCS : Laboratory Control Sample

Sample Integrity

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

Qualifier Codes/Comments

Code	Description
Q08	The matrix spike recovery is outside of the recommended acceptance criteria. An acceptable recovery was obtained for the laboratory control sample indicating a sample matrix interference
Q15	The RPD reported passes mgt-LabMark's Acceptance Criteria as stipulated in AS-POL-002. Refer to Glossary Page of this report for further details

Authorised by:

Andrew Black Analytical Services Manager

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

Measurement uncertainty of test data is available on request or please click here.

Ramboll Environ Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

Attention: **Stephen Maxwell**

Report **772644-S**
Project name LEAD TRIAL
Project ID 318000780
Received Date Feb 08, 2021

Client Sample ID			**TP3A_BALA**	**TP3A_BALB**	**TP3A_BALC**	**TP5A_BALA**
Sample Matrix			**Rock**	**Rock**	**Rock**	**Rock**
Eurofins Sample No.			**S21-Fe16479**	**S21-Fe16480**	**S21-Fe16481**	**S21-Fe16482**
Date Sampled			**Feb 08, 2021**	**Feb 08, 2021**	**Feb 08, 2021**	**Feb 08, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	5	mg/kg	550	2800	2100	560
% Moisture	1	%	< 1	< 1	< 1	1.1

Client Sample ID			**TP5A_BALB**	**TP5A_BALC**	**TP6A_BALA**	**TP6A_BALB**
Sample Matrix			**Rock**	**Rock**	**Rock**	**Rock**
Eurofins Sample No.			**S21-Fe16483**	**S21-Fe16484**	**S21-Fe16485**	**S21-Fe16486**
Date Sampled			**Feb 08, 2021**	**Feb 08, 2021**	**Feb 08, 2021**	**Feb 08, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	5	mg/kg	420	390	1100	360
% Moisture	1	%	1.2	1.2	1.2	< 1

Sample History

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

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

Description	Testing Site	Extracted	Holding Time
Heavy Metals	Sydney	Feb 18, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
% Moisture	Sydney	Feb 09, 2021	14 Days
- Method: LTM-GEN-7080 Moisture			

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Company Name: Ramboll Australia Pty Ltd
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Project Name: LEAD TRIAL
Project ID: 318000780

Order No.:
Report #: 772644
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Feb 8, 2021 2:15 PM
Due: Feb 15, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						HOLD	Lead	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
Mayfield Laboratory								
External Laboratory								
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**			
1	TP3A_BALA	Feb 08, 2021		Rock	S21-Fe16479		X	X
2	TP3A_BALB	Feb 08, 2021		Rock	S21-Fe16480		X	X
3	TP3A_BALC	Feb 08, 2021		Rock	S21-Fe16481		X	X
4	TP5A_BALA	Feb 08, 2021		Rock	S21-Fe16482		X	X
5	TP5A_BALB	Feb 08, 2021		Rock	S21-Fe16483		X	X
6	TP5A_BALC	Feb 08, 2021		Rock	S21-Fe16484		X	X
7	TP6A_BALA	Feb 08, 2021		Rock	S21-Fe16485		X	X
8	TP6A_BALB	Feb 08, 2021		Rock	S21-Fe16486		X	X
9	TP6A_BALC	Feb 08, 2021		Rock	S21-Fe16487	X		

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Sample Detail	HOLD	Lead	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271			
Sydney Laboratory - NATA Site # 18217	X	X	X
Brisbane Laboratory - NATA Site # 20794			
Perth Laboratory - NATA Site # 23736			
Mayfield Laboratory			
External Laboratory			
Test Counts	2	8	8

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

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

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

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

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

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

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

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

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

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

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

Results <10 times the LOR : No Limit

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

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

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

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

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

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Lab Sample ID	QA Source	Units	Result 1	Result 2	RPD	Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Heavy Metals									
Lead			mg/kg	< 5			5	Pass	
LCS - % Recovery									
Heavy Metals									
Lead			%	105			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Heavy Metals				Result 1					
Lead	S21-Fe35255	NCP	%	97			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S21-Fe31701	NCP	mg/kg	23	20	15	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S21-Fe16479	CP	%	< 1	< 1	<1	30%	Pass	

Comments

Sample Integrity

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

Authorised by:

Andrew Black	Analytical Services Manager
John Nguyen	Senior Analyst-Metal (NSW)

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

Measurement uncertainty of test data is available on request or please click here.

Ramboll Environ Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

Attention: **Stephen Maxwell**

Report **772646-L**
Project name TREATABLILITY TRIAL
Project ID 318000780
Received Date Feb 08, 2021

Client Sample ID			**TP3A_A_SCR**	**TP3A_B_SCR**	**TP3A_C_SCR**	**TP5A_A_SCR**
Sample Matrix			**US Leachate**	**US Leachate**	**US Leachate**	**US Leachate**
Eurofins Sample No.			**S21-Fe16506**	**S21-Fe16507**	**S21-Fe16508**	**S21-Fe16509**
Date Sampled			**Feb 08, 2021**	**Feb 08, 2021**	**Feb 08, 2021**	**Feb 08, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	0.01	mg/L	14	28	10	190
USA Leaching Procedure						
Leachate Fluid[C01]		comment	1.0	1.0	1.0	1.0
pH (initial)	0.1	pH Units	2.9	3.1	3.1	7.1
pH (off)	0.1	pH Units	5.0	5.0	5.0	5.0
pH (USA HCl addition)	0.1	pH Units	1.5	1.6	1.6	1.9

Client Sample ID			**TP5A_B_SCR**	**TP5A_C_SCR**
Sample Matrix			**US Leachate**	**US Leachate**
Eurofins Sample No.			**S21-Fe16510**	**S21-Fe16511**
Date Sampled			**Feb 08, 2021**	**Feb 08, 2021**
Test/Reference	LOR	Unit		
Heavy Metals				
Lead	0.01	mg/L	180	190
USA Leaching Procedure				
Leachate Fluid[C01]		comment	1.0	1.0
pH (initial)	0.1	pH Units	4.3	4.3
pH (off)	0.1	pH Units	5.0	5.0
pH (USA HCl addition)	0.1	pH Units	1.7	2.0

Sample History

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

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

Description	Testing Site	Extracted	Holding Time
Heavy Metals	Sydney	Feb 15, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
USA Leaching Procedure	Sydney	Feb 10, 2021	14 Days
- Method: LTM-GEN-7010 Leaching Procedure for Soils & Solid Wastes			

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Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: TREATABLILITY TRIAL
Project ID: 318000780

Order No.:
Report #: 772646
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Feb 8, 2021 2:15 PM
Due: Feb 15, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Lead	USA Leaching Procedure	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
Mayfield Laboratory								
External Laboratory								
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**			
1	TP3A_A_SCR	Feb 08, 2021		Soil	S21-Fe16500	X		X
2	TP3A_B_SCR	Feb 08, 2021		Soil	S21-Fe16501	X		X
3	TP3A_C_SCR	Feb 08, 2021		Soil	S21-Fe16502	X		X
4	TP5A_A_SCR	Feb 08, 2021		Soil	S21-Fe16503	X		X
5	TP5A_B_SCR	Feb 08, 2021		Soil	S21-Fe16504	X		X
6	TP5A_C_SCR	Feb 08, 2021		Soil	S21-Fe16505	X		X
7	TP3A_A_SCR	Feb 08, 2021		US Leachate	S21-Fe16506	X	X	
8	TP3A_B_SCR	Feb 08, 2021		US Leachate	S21-Fe16507	X	X	
9	TP3A_C_SCR	Feb 08, 2021		US Leachate	S21-Fe16508	X	X	

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Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: TREATABLILITY TRIAL
Project ID: 318000780

Order No.:
Report #: 772646
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Feb 8, 2021 2:15 PM
Due: Feb 15, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Lead	USA Leaching Procedure	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
Mayfield Laboratory								
External Laboratory								
10	TP5A_A_SCR	Feb 08, 2021		US Leachate	S21-Fe16509	X	X	
11	TP5A_B_SCR	Feb 08, 2021		US Leachate	S21-Fe16510	X	X	
12	TP5A_C_SCR	Feb 08, 2021		US Leachate	S21-Fe16511	X	X	
Test Counts						12	6	6

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

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

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

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

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

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

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

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

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%: Percentage

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

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
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TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

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

Results <10 times the LOR : No Limit

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

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

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

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

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

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Lab Sample ID	QA Source	Units	Result 1	Result 2	RPD	Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Heavy Metals									
Lead			mg/L	< 0.01			0.01	Pass	
LCS - % Recovery									
Heavy Metals									
Lead			%	98			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Heavy Metals				Result 1					
Lead	S21-Fe23191	NCP	%	96			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S21-Fe24422	NCP	mg/L	0.23	0.24	5.0	30%	Pass	

Comments

Sample Integrity

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

Qualifier Codes/Comments

Code	Description
C01	Leachate Fluid Key: 1 - pH 5.0; 2 - pH 2.9; 3 - pH 9.2; 4 - Reagent (DI) water; 5 - Client sample, 6 - other

Authorised by:

Andrew Black	Analytical Services Manager
John Nguyen	Senior Analyst-Metal (NSW)

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

Measurement uncertainty of test data is available on request or please click here.

Ramboll Environ Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

Attention: **Stephen Maxwell**

Report **772646-S**
Project name TREATABLILITY TRIAL
Project ID 318000780
Received Date Feb 08, 2021

Client Sample ID			**TP3A_A_SCR**	**TP3A_B_SCR**	**TP3A_C_SCR**	**TP5A_A_SCR**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S21-Fe16500**	**S21-Fe16501**	**S21-Fe16502**	**S21-Fe16503**
Date Sampled			**Feb 08, 2021**	**Feb 08, 2021**	**Feb 08, 2021**	**Feb 08, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	5	mg/kg	16000	15000	19000	39000
% Moisture	1	%	8.0	8.4	8.5	2.6

Client Sample ID			**TP5A_B_SCR**	**TP5A_C_SCR**
Sample Matrix			**Soil**	**Soil**
Eurofins Sample No.			**S21-Fe16504**	**S21-Fe16505**
Date Sampled			**Feb 08, 2021**	**Feb 08, 2021**
Test/Reference	LOR	Unit		
Heavy Metals				
Lead	5	mg/kg	35000	37000
% Moisture	1	%	2.6	4.0

Sample History

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

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

Description	Testing Site	Extracted	Holding Time
Heavy Metals	Sydney	Feb 10, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
% Moisture	Sydney	Feb 09, 2021	14 Days
- Method: LTM-GEN-7080 Moisture			

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Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
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Project Name: TREATABLILITY TRIAL
Project ID: 318000780

Order No.:
Report #: 772646
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Feb 8, 2021 2:15 PM
Due: Feb 15, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Lead	USA Leaching Procedure	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
Mayfield Laboratory								
External Laboratory								
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**			
1	TP3A_A_SCR	Feb 08, 2021		Soil	S21-Fe16500	X		X
2	TP3A_B_SCR	Feb 08, 2021		Soil	S21-Fe16501	X		X
3	TP3A_C_SCR	Feb 08, 2021		Soil	S21-Fe16502	X		X
4	TP5A_A_SCR	Feb 08, 2021		Soil	S21-Fe16503	X		X
5	TP5A_B_SCR	Feb 08, 2021		Soil	S21-Fe16504	X		X
6	TP5A_C_SCR	Feb 08, 2021		Soil	S21-Fe16505	X		X
7	TP3A_A_SCR	Feb 08, 2021		US Leachate	S21-Fe16506	X	X	
8	TP3A_B_SCR	Feb 08, 2021		US Leachate	S21-Fe16507	X	X	
9	TP3A_C_SCR	Feb 08, 2021		US Leachate	S21-Fe16508	X	X	

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

Perth
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Kewdale WA 6105
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

Newcastle
4/52 Industrial Drive
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New Zealand

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Penrose, Auckland 1061
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Christchurch
43 Detroit Drive
Rolleston, Christchurch 7675
Phone : 0800 856 450
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Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: TREATABLILITY TRIAL
Project ID: 318000780

Order No.:
Report #: 772646
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Feb 8, 2021 2:15 PM
Due: Feb 15, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Lead	USA Leaching Procedure	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
Mayfield Laboratory								
External Laboratory								
10	TP5A_A_SCR	Feb 08, 2021		US Leachate	S21-Fe16509	X	X	
11	TP5A_B_SCR	Feb 08, 2021		US Leachate	S21-Fe16510	X	X	
12	TP5A_C_SCR	Feb 08, 2021		US Leachate	S21-Fe16511	X	X	
Test Counts						12	6	6

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Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

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

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

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

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

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

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

Units

mg/kg: milligrams per kilogram
mg/L: milligrams per litre
ug/L: micrograms per litre
ppm: Parts per million
ppb: Parts per billion
%: Percentage
org/100mL: Organisms per 100 millilitres
NTU: Nephelometric Turbidity Units
MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

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

Results <10 times the LOR : No Limit

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

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

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

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

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

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Heavy Metals							
Lead	mg/kg	< 5			5	Pass	
LCS - % Recovery							
Heavy Metals							
Lead	%	109			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S21-Fe16501	CP	%	8.4	8.6	3.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S21-Fe16504	CP	mg/kg	35000	37000	6.0	30%	Pass	

Comments

Sample Integrity

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

Authorised by:

Andrew Black	Analytical Services Manager
John Nguyen	Senior Analyst-Metal (NSW)

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

Measurement uncertainty of test data is available on request or please click here.

Ramboll Environ Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

Attention: **Stephen Maxwell**

Report **774893-L**
Project name TREATABILITY TRIAL
Project ID 318000780
Received Date Feb 17, 2021

Client Sample ID			**TP3A_D_SCR**	**TP3A_TR01-1**	**TP3A_TR01-2**	**TP3A_TR02-1**
Sample Matrix			**US Leachate**	**US Leachate**	**US Leachate**	**US Leachate**
Eurofins Sample No.			**S21-Fe36599**	**S21-Fe36600**	**S21-Fe36601**	**S21-Fe36602**
Date Sampled			**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	0.01	mg/L	35	< 0.01	< 0.01	< 0.01
USA Leaching Procedure						
Leachate Fluid[C01]		comment	1.0	1.0	1.0	1.0
pH (initial)	0.1	pH Units	3.3	9.2	9.3	9.5
pH (off)	0.1	pH Units	5.0	9.0	9.0	9.2
pH (USA HCl addition)	0.1	pH Units	1.8	1.9	1.9	2.0

Client Sample ID			**TP3A_TR02-2**	**TP3A_TR03-1**	**TP3A_TR03-2**	**TP3A_TR04-1**
Sample Matrix			**US Leachate**	**US Leachate**	**US Leachate**	**US Leachate**
Eurofins Sample No.			**S21-Fe36603**	**S21-Fe36604**	**S21-Fe36605**	**S21-Fe36606**
Date Sampled			**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	0.01	mg/L	< 0.01	0.01	0.03	< 0.01
USA Leaching Procedure						
Leachate Fluid[C01]		comment	1.0	1.0	1.0	1.0
pH (initial)	0.1	pH Units	9.5	9.7	9.7	8.8
pH (off)	0.1	pH Units	9.3	8.8	9.2	8.5
pH (USA HCl addition)	0.1	pH Units	1.9	2.0	2.0	1.9

Client Sample ID			**TP3A_TR04-2**	**TP3A_TR05-1**	**TP3A_TR05-2**	**TP3A_TR06-1**
Sample Matrix			**US Leachate**	**US Leachate**	**US Leachate**	**US Leachate**
Eurofins Sample No.			**S21-Fe36607**	**S21-Fe36608**	**S21-Fe36609**	**S21-Fe36610**
Date Sampled			**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	0.01	mg/L	0.04	< 0.01	0.04	0.03
USA Leaching Procedure						
Leachate Fluid[C01]		comment	1.0	1.0	1.0	1.0
pH (initial)	0.1	pH Units	8.9	9.6	9.6	9.6
pH (off)	0.1	pH Units	8.3	9.3	9.3	8.9
pH (USA HCl addition)	0.1	pH Units	1.9	1.9	1.8	1.9

Client Sample ID			TP3A_TR06-2	TP5A_D_SCR	TP5A_TR01-1	TP5A_TR01-2
Sample Matrix			US Leachate	US Leachate	US Leachate	US Leachate
Eurofins Sample No.			S21-Fe36611	S21-Fe36612	S21-Fe36613	S21-Fe36614
Date Sampled			Feb 17, 2021	Feb 17, 2021	Feb 17, 2021	Feb 17, 2021
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	0.01	mg/L	0.01	140	0.19	< 0.01
USA Leaching Procedure						
Leachate Fluid[C01]		comment	1.0	1.0	1.0	1.0
pH (initial)	0.1	pH Units	9.5	5.3	9.7	9.8
pH (off)	0.1	pH Units	9.0	5.1	9.2	9.0
pH (USA HCl addition)	0.1	pH Units	1.9	1.9	2.0	1.9

Client Sample ID			TP5A_TR02-1	TP5A_TR02-2	TP5A_TR03-1	TP5A_TR03-2
Sample Matrix			US Leachate	US Leachate	US Leachate	US Leachate
Eurofins Sample No.			S21-Fe36615	S21-Fe36616	S21-Fe36617	S21-Fe36618
Date Sampled			Feb 17, 2021	Feb 17, 2021	Feb 17, 2021	Feb 17, 2021
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	0.01	mg/L	0.05	0.02	0.03	0.03
USA Leaching Procedure						
Leachate Fluid[C01]		comment	1.0	1.0	1.0	1.0
pH (initial)	0.1	pH Units	9.7	9.7	9.7	10.0
pH (off)	0.1	pH Units	9.2	9.2	8.7	8.7
pH (USA HCl addition)	0.1	pH Units	2.0	1.9	1.9	2.0

Client Sample ID			TP5A_TR04-1	TP5A_TR04-2	TP5A_TR05-1	TP5A_TR05-2
Sample Matrix			US Leachate	US Leachate	US Leachate	US Leachate
Eurofins Sample No.			S21-Fe36619	S21-Fe36620	S21-Fe36621	S21-Fe36622
Date Sampled			Feb 17, 2021	Feb 17, 2021	Feb 17, 2021	Feb 17, 2021
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	0.01	mg/L	0.05	< 0.01	< 0.01	0.01
USA Leaching Procedure						
Leachate Fluid[C01]		comment	1.0	1.0	1.0	1.0
pH (initial)	0.1	pH Units	9.9	9.4	9.8	9.8
pH (off)	0.1	pH Units	9.2	9.0	9.1	9.4
pH (USA HCl addition)	0.1	pH Units	1.9	1.8	1.9	1.9

Client Sample ID			TP5A_TR06-1	TP5A_TR06-2	TP5A_TR07-1	TP5A_TR07-2
Sample Matrix			US Leachate	US Leachate	US Leachate	US Leachate
Eurofins Sample No.			S21-Fe36623	S21-Fe36624	S21-Fe36625	S21-Fe36626
Date Sampled			Feb 17, 2021	Feb 17, 2021	Feb 17, 2021	Feb 17, 2021
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	0.01	mg/L	0.05	0.02	0.08	0.05
USA Leaching Procedure						
Leachate Fluid[C01]		comment	1.0	1.0	1.0	1.0
pH (initial)	0.1	pH Units	9.9	9.8	9.6	9.6
pH (off)	0.1	pH Units	9.4	9.3	9.4	9.3
pH (USA HCl addition)	0.1	pH Units	1.9	1.9	1.8	2.0

Sample History

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

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

Description	Testing Site	Extracted	Holding Time
Heavy Metals	Sydney	Feb 23, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
USA Leaching Procedure	Sydney	Feb 20, 2021	14 Days
- Method: LTM-GEN-7010 Leaching Procedure for Soils & Solid Wastes			

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Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
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NSW 2060

Project Name: TREATABILITY TRIAL
Project ID: 318000780

Order No.:
Report #: 774893
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Feb 17, 2021 3:00 PM
Due: Feb 24, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Lead	pH (1:5 Aqueous extract at 25°C as rec.)	USA Leaching Procedure	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271									
Sydney Laboratory - NATA Site # 18217						X	X	X	X
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
Mayfield Laboratory									
External Laboratory									
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**				
1	TP3A_D_SCR	Feb 17, 2021		Soil	S21-Fe36583	X	X		X
2	TP3A_TR01-1	Feb 17, 2021		Soil	S21-Fe36584	X			X
3	TP3A_TR02-1	Feb 17, 2021		Soil	S21-Fe36585	X			X
4	TP3A_TR03-1	Feb 17, 2021		Soil	S21-Fe36586	X			X
5	TP3A_TR04-1	Feb 17, 2021		Soil	S21-Fe36587	X			X
6	TP3A_TR05-1	Feb 17, 2021		Soil	S21-Fe36588	X			X
7	TP3A_TR06-1	Feb 17, 2021		Soil	S21-Fe36589	X			X
8	TP5A_D_SCR	Feb 17, 2021		Soil	S21-Fe36590	X	X		X
9	TP5A_TR01-1	Feb 17, 2021		Soil	S21-Fe36591	X			X

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Sydney Laboratory - NATA Site # 18217						X	X	X	X
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
Mayfield Laboratory									
External Laboratory									
10	TP5A_TR02-1	Feb 17, 2021		Soil	S21-Fe36592	X			X
11	TP5A_TR03-1	Feb 17, 2021		Soil	S21-Fe36593	X			X
12	TP5A_TR04-1	Feb 17, 2021		Soil	S21-Fe36594	X			X
13	TP5A_TR05-1	Feb 17, 2021		Soil	S21-Fe36595	X			X
14	TP5A_TR06-1	Feb 17, 2021		Soil	S21-Fe36596	X			X
15	TP5A_TR07-1	Feb 17, 2021		Soil	S21-Fe36597	X			X
16	TP3A_D_SCR	Feb 17, 2021		US Leachate	S21-Fe36599	X		X	
17	TP3A_TR01-1	Feb 17, 2021		US Leachate	S21-Fe36600	X		X	
18	TP3A_TR01-2	Feb 17, 2021		US Leachate	S21-Fe36601	X		X	
19	TP3A_TR02-1	Feb 17, 2021		US Leachate	S21-Fe36602	X		X	
20	TP3A_TR02-2	Feb 17, 2021		US Leachate	S21-Fe36603	X		X	

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Sample Detail						Lead	pH (1:5 Aqueous extract at 25°C as rec.)	USA Leaching Procedure	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271									
Sydney Laboratory - NATA Site # 18217						X	X	X	X
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
Mayfield Laboratory									
External Laboratory									
21	TP3A_TR03-1	Feb 17, 2021		US Leachate	S21-Fe36604	X		X	
22	TP3A_TR03-2	Feb 17, 2021		US Leachate	S21-Fe36605	X		X	
23	TP3A_TR04-1	Feb 17, 2021		US Leachate	S21-Fe36606	X		X	
24	TP3A_TR04-2	Feb 17, 2021		US Leachate	S21-Fe36607	X		X	
25	TP3A_TR05-1	Feb 17, 2021		US Leachate	S21-Fe36608	X		X	
26	TP3A_TR05-2	Feb 17, 2021		US Leachate	S21-Fe36609	X		X	
27	TP3A_TR06-1	Feb 17, 2021		US Leachate	S21-Fe36610	X		X	
28	TP3A_TR06-2	Feb 17, 2021		US Leachate	S21-Fe36611	X		X	
29	TP5A_D_SCR	Feb 17, 2021		US Leachate	S21-Fe36612	X		X	
30	TP5A_TR01-1	Feb 17, 2021		US Leachate	S21-Fe36613	X		X	
31	TP5A_TR01-2	Feb 17, 2021		US Leachate	S21-Fe36614	X		X	

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Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: TREATABILITY TRIAL
Project ID: 318000780

Order No.:
Report #: 774893
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Feb 17, 2021 3:00 PM
Due: Feb 24, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Lead	pH (1:5 Aqueous extract at 25°C as rec.)	USA Leaching Procedure	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271									
Sydney Laboratory - NATA Site # 18217						X	X	X	X
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
Mayfield Laboratory									
External Laboratory									
32	TP5A_TR02-1	Feb 17, 2021		US Leachate	S21-Fe36615	X		X	
33	TP5A_TR02-2	Feb 17, 2021		US Leachate	S21-Fe36616	X		X	
34	TP5A_TR03-1	Feb 17, 2021		US Leachate	S21-Fe36617	X		X	
35	TP5A_TR03-2	Feb 17, 2021		US Leachate	S21-Fe36618	X		X	
36	TP5A_TR04-1	Feb 17, 2021		US Leachate	S21-Fe36619	X		X	
37	TP5A_TR04-2	Feb 17, 2021		US Leachate	S21-Fe36620	X		X	
38	TP5A_TR05-1	Feb 17, 2021		US Leachate	S21-Fe36621	X		X	
39	TP5A_TR05-2	Feb 17, 2021		US Leachate	S21-Fe36622	X		X	
40	TP5A_TR06-1	Feb 17, 2021		US Leachate	S21-Fe36623	X		X	
41	TP5A_TR06-2	Feb 17, 2021		US Leachate	S21-Fe36624	X		X	
42	TP5A_TR07-1	Feb 17, 2021		US Leachate	S21-Fe36625	X		X	

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Sydney Laboratory - NATA Site # 18217						X	X	X	X
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
Mayfield Laboratory									
External Laboratory									
43	TP5A_TR07-2	Feb 17, 2021		US Leachate	S21-Fe36626	X		X	
Test Counts						43	2	28	15

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

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

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

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

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

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

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

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

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

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

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

Results <10 times the LOR : No Limit

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

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

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

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

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

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Lab Sample ID	QA Source	Units	Result 1	Result 2	RPD	Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Heavy Metals									
Lead			mg/L	< 0.01			0.01	Pass	
LCS - % Recovery									
Heavy Metals									
Lead			%	93			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Heavy Metals				Result 1					
Lead	S21-Fe36618	CP	%	82			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S21-Fe36599	CP	mg/L	35	35	1.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S21-Fe36609	CP	mg/L	0.04	0.04	3.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S21-Fe36619	CP	mg/L	0.05	0.03	42	30%	Fail	Q15

Comments

Sample Integrity

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

Qualifier Codes/Comments

Code	Description
C01	Leachate Fluid Key: 1 - pH 5.0; 2 - pH 2.9; 3 - pH 9.2; 4 - Reagent (DI) water; 5 - Client sample, 6 - other
Q15	The RPD reported passes Eurofins Environment Testing's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised by:

Andrew Black	Analytical Services Manager
John Nguyen	Senior Analyst-Metal (NSW)

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

Measurement uncertainty of test data is available on request or please click here.

Ramboll Environ Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

NATA Accredited
Accreditation Number 1261
Site Number 18217

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

Attention: **Stephen Maxwell**

Report **774893-S**
Project name TREATABILITY TRIAL
Project ID 318000780
Received Date Feb 17, 2021

Client Sample ID			**TP3A_D_SCR**	**TP3A_TR01-1**	**TP3A_TR02-1**	**TP3A_TR03-1**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S21-Fe36583**	**S21-Fe36584**	**S21-Fe36585**	**S21-Fe36586**
Date Sampled			**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**
Test/Reference	LOR	Unit				
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	2.8	-	-	-
% Moisture	1	%	7.8	15	16	13
Heavy Metals						
Lead	5	mg/kg	10000	8200	9600	18000

Client Sample ID			**TP3A_TR04-1**	**TP3A_TR05-1**	**TP3A_TR06-1**	**TP5A_D_SCR**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S21-Fe36587**	**S21-Fe36588**	**S21-Fe36589**	**S21-Fe36590**
Date Sampled			**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**
Test/Reference	LOR	Unit				
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	-	-	-	4.2
% Moisture	1	%	13	14	12	2.4
Heavy Metals						
Lead	5	mg/kg	9500	9900	9100	19000

Client Sample ID			**TP5A_TR01-1**	**TP5A_TR02-1**	**TP5A_TR03-1**	**TP5A_TR04-1**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S21-Fe36591**	**S21-Fe36592**	**S21-Fe36593**	**S21-Fe36594**
Date Sampled			**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**
Test/Reference	LOR	Unit				
% Moisture	1	%	17	13	20	18
Heavy Metals						
Lead	5	mg/kg	17000	15000	18000	20000

Client Sample ID			TP5A_TR05-1	TP5A_TR06-1	TP5A_TR07-1
Sample Matrix			**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S21-Fe36595**	**S21-Fe36596**	**S21-Fe36597**
Date Sampled			**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**
Test/Reference	LOR	Unit			
% Moisture	1	%	13	16	15
Heavy Metals					
Lead	5	mg/kg	10000	13000	12000

Sample History

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

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

Description	Testing Site	Extracted	Holding Time
pH (1:5 Aqueous extract at 25°C as rec.)	Sydney	Feb 20, 2021	7 Days
- Method: LTM-GEN-7090 pH in soil by ISE			
Heavy Metals	Sydney	Feb 22, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
% Moisture	Sydney	Feb 18, 2021	14 Days
- Method: LTM-GEN-7080 Moisture			

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Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
Mayfield Laboratory									
External Laboratory									
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**				
1	TP3A_D_SCR	Feb 17, 2021		Soil	S21-Fe36583	X	X		X
2	TP3A_TR01-1	Feb 17, 2021		Soil	S21-Fe36584	X			X
3	TP3A_TR02-1	Feb 17, 2021		Soil	S21-Fe36585	X			X
4	TP3A_TR03-1	Feb 17, 2021		Soil	S21-Fe36586	X			X
5	TP3A_TR04-1	Feb 17, 2021		Soil	S21-Fe36587	X			X
6	TP3A_TR05-1	Feb 17, 2021		Soil	S21-Fe36588	X			X
7	TP3A_TR06-1	Feb 17, 2021		Soil	S21-Fe36589	X			X
8	TP5A_D_SCR	Feb 17, 2021		Soil	S21-Fe36590	X	X		X
9	TP5A_TR01-1	Feb 17, 2021		Soil	S21-Fe36591	X			X

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Mayfield Laboratory									
External Laboratory									
10	TP5A_TR02-1	Feb 17, 2021		Soil	S21-Fe36592	X			X
11	TP5A_TR03-1	Feb 17, 2021		Soil	S21-Fe36593	X			X
12	TP5A_TR04-1	Feb 17, 2021		Soil	S21-Fe36594	X			X
13	TP5A_TR05-1	Feb 17, 2021		Soil	S21-Fe36595	X			X
14	TP5A_TR06-1	Feb 17, 2021		Soil	S21-Fe36596	X			X
15	TP5A_TR07-1	Feb 17, 2021		Soil	S21-Fe36597	X			X
16	TP3A_D_SCR	Feb 17, 2021		US Leachate	S21-Fe36599	X		X	
17	TP3A_TR01-1	Feb 17, 2021		US Leachate	S21-Fe36600	X		X	
18	TP3A_TR01-2	Feb 17, 2021		US Leachate	S21-Fe36601	X		X	
19	TP3A_TR02-1	Feb 17, 2021		US Leachate	S21-Fe36602	X		X	
20	TP3A_TR02-2	Feb 17, 2021		US Leachate	S21-Fe36603	X		X	

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21	TP3A_TR03-1	Feb 17, 2021		US Leachate	S21-Fe36604	X		X	
22	TP3A_TR03-2	Feb 17, 2021		US Leachate	S21-Fe36605	X		X	
23	TP3A_TR04-1	Feb 17, 2021		US Leachate	S21-Fe36606	X		X	
24	TP3A_TR04-2	Feb 17, 2021		US Leachate	S21-Fe36607	X		X	
25	TP3A_TR05-1	Feb 17, 2021		US Leachate	S21-Fe36608	X		X	
26	TP3A_TR05-2	Feb 17, 2021		US Leachate	S21-Fe36609	X		X	
27	TP3A_TR06-1	Feb 17, 2021		US Leachate	S21-Fe36610	X		X	
28	TP3A_TR06-2	Feb 17, 2021		US Leachate	S21-Fe36611	X		X	
29	TP5A_D_SCR	Feb 17, 2021		US Leachate	S21-Fe36612	X		X	
30	TP5A_TR01-1	Feb 17, 2021		US Leachate	S21-Fe36613	X		X	
31	TP5A_TR01-2	Feb 17, 2021		US Leachate	S21-Fe36614	X		X	

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Melbourne Laboratory - NATA Site # 1254 & 14271									
Sydney Laboratory - NATA Site # 18217						X	X	X	X
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
Mayfield Laboratory									
External Laboratory									
32	TP5A_TR02-1	Feb 17, 2021		US Leachate	S21-Fe36615	X		X	
33	TP5A_TR02-2	Feb 17, 2021		US Leachate	S21-Fe36616	X		X	
34	TP5A_TR03-1	Feb 17, 2021		US Leachate	S21-Fe36617	X		X	
35	TP5A_TR03-2	Feb 17, 2021		US Leachate	S21-Fe36618	X		X	
36	TP5A_TR04-1	Feb 17, 2021		US Leachate	S21-Fe36619	X		X	
37	TP5A_TR04-2	Feb 17, 2021		US Leachate	S21-Fe36620	X		X	
38	TP5A_TR05-1	Feb 17, 2021		US Leachate	S21-Fe36621	X		X	
39	TP5A_TR05-2	Feb 17, 2021		US Leachate	S21-Fe36622	X		X	
40	TP5A_TR06-1	Feb 17, 2021		US Leachate	S21-Fe36623	X		X	
41	TP5A_TR06-2	Feb 17, 2021		US Leachate	S21-Fe36624	X		X	
42	TP5A_TR07-1	Feb 17, 2021		US Leachate	S21-Fe36625	X		X	

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Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: TREATABILITY TRIAL
Project ID: 318000780

Order No.:
Report #: 774893
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Feb 17, 2021 3:00 PM
Due: Feb 24, 2021
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Lead	pH (1:5 Aqueous extract at 25°C as rec.)	USA Leaching Procedure	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271									
Sydney Laboratory - NATA Site # 18217						X	X	X	X
Brisbane Laboratory - NATA Site # 20794									
Perth Laboratory - NATA Site # 23736									
Mayfield Laboratory									
External Laboratory									
43	TP5A_TR07-2	Feb 17, 2021		US Leachate	S21-Fe36626	X		X	
Test Counts						43	2	28	15

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

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

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

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

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

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

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

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

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

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

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

Results <10 times the LOR : No Limit

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

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

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

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

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

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Lab Sample ID	QA Source	Units	Result 1	Result 2	RPD	Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Heavy Metals									
Lead			mg/kg	< 5			5	Pass	
LCS - % Recovery									
Heavy Metals									
Lead			%	92			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Heavy Metals				Result 1					
Lead	S21-Fe34686	NCP	%	94			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
				Result 1	Result 2	RPD			
pH (1:5 Aqueous extract at 25°C as rec.)	S21-Fe36583	CP	pH Units	2.8	2.8	Pass	30%	Pass	
% Moisture	S21-Fe36583	CP	%	7.8	8.1	3.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S21-Fe36583	CP	mg/kg	10000	9400	8.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	S21-Fe36593	CP	%	20	19	5.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S21-Fe36593	CP	mg/kg	18000	16000	9.0	30%	Pass	

Comments

Sample Integrity

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

Authorised by:

Andrew Black	Analytical Services Manager
Charl Du Preez	Senior Analyst-Inorganic (NSW)
John Nguyen	Senior Analyst-Metal (NSW)

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

Measurement uncertainty of test data is available on request or please click here.

Ramboll Environ Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

Attention: **Stephen Maxwell**

Report **777838-L**
Project name ADDITIONAL TREATABILITY TRIAL
Project ID 318000780
Received Date Mar 03, 2021

Client Sample ID			**TP3A_TR01-1 (DAY 1)**	**TP3A_TR01-1 (DAY 2)**	**0448224653**	**TP3A_TR01-1 (DAY 4)**
Sample Matrix			**Leachate - MEP**	**Leachate - MEP**	**Leachate - MEP**	**Leachate - MEP**
Eurofins Sample No.			**S21-Ma06656**	**S21-Ma06657**	**S21-Ma06658**	**S21-Ma06659**
Date Sampled			**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	0.001	mg/L	< 0.001	0.001	0.003	0.002
AUS Leaching Procedure						
Leachate Fluid[C01]		comment	4.0	4.0	4.0	4.0
pH (initial)	0.1	pH Units	9.4	8.7	8.8	9.3
pH (Leachate fluid)	0.1	pH Units	6.8	5.1	6.8	6.8
pH (off)	0.1	pH Units	9.6	9.2	9.5	9.5

Client Sample ID			**TP3A_TR01-1 (DAY 5)**	**TP3A_TR01-1 (DAY 6)**	**TP3A_TR01-1 (DAY 7)**	**TP3A_TR01-1 (DAY 8)**
Sample Matrix			**Leachate - MEP**	**Leachate - MEP**	**Leachate - MEP**	**Leachate - MEP**
Eurofins Sample No.			**S21-Ma06660**	**S21-Ma06661**	**S21-Ma06662**	**S21-Ma06663**
Date Sampled			**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	0.001	mg/L	< 0.001	0.002	< 0.001	< 0.001
AUS Leaching Procedure						
Leachate Fluid[C01]		comment	4.0	4.0	4.0	4.0
pH (initial)	0.1	pH Units	8.8	9.0	9.1	9.7
pH (Leachate fluid)	0.1	pH Units	6.8	6.8	6.2	6.2
pH (off)	0.1	pH Units	9.3	9.3	9.8	9.3

Client Sample ID			TP3A_TR01-1 (DAY 9)	TP3A_TR01-1 (DAY 10)	TP3A_TR03-1 (DAY 1)	TP3A_TR03-1 (DAY 2)
Sample Matrix			Leachate - MEP	Leachate - MEP	Leachate - MEP	Leachate - MEP
Eurofins Sample No.			S21-Ma06664	S21-Ma06665	S21-Ma06666	S21-Ma06667
Date Sampled			Feb 17, 2021	Feb 17, 2021	Feb 17, 2021	Feb 17, 2021
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	0.001	mg/L	0.004	0.017	0.12	0.001
AUS Leaching Procedure						
Leachate Fluid[C01]		comment	4.0	4.0	4.0	4.0
pH (initial)	0.1	pH Units	9.7	9.2	9.1	8.7
pH (Leachate fluid)	0.1	pH Units	6.2	6.2	6.8	5.1
pH (off)	0.1	pH Units	9.3	9.1	9.5	9.3

Client Sample ID			TP3A_TR03-1 (DAY 3)	TP3A_TR03-1 (DAY 4)	TP3A_TR03-1 (DAY 5)	TP3A_TR03-1 (DAY 6)
Sample Matrix			Leachate - MEP	Leachate - MEP	Leachate - MEP	Leachate - MEP
Eurofins Sample No.			S21-Ma06668	S21-Ma06669	S21-Ma06670	S21-Ma06671
Date Sampled			Feb 17, 2021	Feb 17, 2021	Feb 17, 2021	Feb 17, 2021
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	0.001	mg/L	0.004	0.13	0.001	0.002
AUS Leaching Procedure						
Leachate Fluid[C01]		comment	4.0	4.0	4.0	4.0
pH (initial)	0.1	pH Units	8.9	9.3	9.0	9.4
pH (Leachate fluid)	0.1	pH Units	6.8	6.8	6.8	6.8
pH (off)	0.1	pH Units	9.5	9.4	9.6	9.5

Client Sample ID			TP3A_TR03-1 (DAY 7)	TP3A_TR03-1 (DAY 8)	TP3A_TR03-1 (DAY 9)	TP3A_TR03-1 (DAY 10)
Sample Matrix			Leachate - MEP	Leachate - MEP	Leachate - MEP	Leachate - MEP
Eurofins Sample No.			S21-Ma06672	S21-Ma06673	S21-Ma06674	S21-Ma06675
Date Sampled			Feb 17, 2021	Feb 17, 2021	Feb 17, 2021	Feb 17, 2021
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	0.001	mg/L	< 0.001	0.013	0.015	0.003
AUS Leaching Procedure						
Leachate Fluid[C01]		comment	4.0	4.0	4.0	4.0
pH (initial)	0.1	pH Units	9.0	9.7	9.7	9.3
pH (Leachate fluid)	0.1	pH Units	6.2	6.2	6.2	6.2
pH (off)	0.1	pH Units	9.5	9.4	9.4	9.4

Sample History

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

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

Description	Testing Site	Extracted	Holding Time
Heavy Metals	Sydney	Mar 22, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
AUS Leaching Procedure	Sydney	Mar 19, 2021	7 Days
- Method: LTM-GEN-7010 Leaching Procedure for Soils & Solid Wastes			

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Company Name:	Ramboll Australia Pty Ltd	**Order No.:**	
Address:	Level 3/100 Pacific Highway North Sydney NSW 2060	**Report #:** **Phone:** **Fax:**	777838 02 9954 8118 02 9954 8150
Project Name:	ADDITIONAL TREATABILITY TRIAL		
Project ID:	318000780		

Received:	Mar 3, 2021 12:14 PM
Due:	Mar 17, 2021
Priority:	10 Day
Contact Name:	Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Lead	AUS Leaching Procedure
Melbourne Laboratory - NATA Site # 1254 & 14271							
Sydney Laboratory - NATA Site # 18217						X	X
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 23736							
Mayfield Laboratory							
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	TP3A_TR01-1 (DAY 1)	Feb 17, 2021		Leachate - MEP	S21-Ma06656	X	X
2	TP3A_TR01-1 (DAY 2)	Feb 17, 2021		Leachate - MEP	S21-Ma06657	X	X
3	TP3A_TR01-1 (DAY 3)	Feb 17, 2021		Leachate - MEP	S21-Ma06658	X	X
4	TP3A_TR01-1 (DAY 4)	Feb 17, 2021		Leachate - MEP	S21-Ma06659	X	X
5	TP3A_TR01-1 (DAY 5)	Feb 17, 2021		Leachate - MEP	S21-Ma06660	X	X
6	TP3A_TR01-1	Feb 17, 2021		Leachate -	S21-Ma06661	X	X

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Company Name: Ramboll Australia Pty Ltd
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Project Name: ADDITIONAL TREATABILITY TRIAL
Project ID: 318000780

Order No.:
Report #: 777838
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Mar 3, 2021 12:14 PM
Due: Mar 17, 2021
Priority: 10 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Lead	AUS Leaching Procedure
Melbourne Laboratory - NATA Site # 1254 & 14271							
Sydney Laboratory - NATA Site # 18217						X	X
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 23736							
Mayfield Laboratory							
External Laboratory							
	(DAY 6)			MEP			
7	TP3A_TR01-1 (DAY 7)	Feb 17, 2021		Leachate - MEP	S21-Ma06662	X	X
8	TP3A_TR01-1 (DAY 8)	Feb 17, 2021		Leachate - MEP	S21-Ma06663	X	X
9	TP3A_TR01-1 (DAY 9)	Feb 17, 2021		Leachate - MEP	S21-Ma06664	X	X
10	TP3A_TR01-1 (DAY 10)	Feb 17, 2021		Leachate - MEP	S21-Ma06665	X	X
11	TP3A_TR03-1 (DAY 1)	Feb 17, 2021		Leachate - MEP	S21-Ma06666	X	X
12	TP3A_TR03-1 (DAY 2)	Feb 17, 2021		Leachate - MEP	S21-Ma06667	X	X

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Company Name: Ramboll Australia Pty Ltd
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Project Name: ADDITIONAL TREATABILITY TRIAL
Project ID: 318000780

Order No.:
Report #: 777838
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Mar 3, 2021 12:14 PM
Due: Mar 17, 2021
Priority: 10 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Lead	AUS Leaching Procedure
Melbourne Laboratory - NATA Site # 1254 & 14271							
Sydney Laboratory - NATA Site # 18217						X	X
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 23736							
Mayfield Laboratory							
External Laboratory							
13	TP3A_TR03-1 (DAY 3)	Feb 17, 2021		Leachate - MEP	S21-Ma06668	X	X
14	TP3A_TR03-1 (DAY 4)	Feb 17, 2021		Leachate - MEP	S21-Ma06669	X	X
15	TP3A_TR03-1 (DAY 5)	Feb 17, 2021		Leachate - MEP	S21-Ma06670	X	X
16	TP3A_TR03-1 (DAY 6)	Feb 17, 2021		Leachate - MEP	S21-Ma06671	X	X
17	TP3A_TR03-1 (DAY 7)	Feb 17, 2021		Leachate - MEP	S21-Ma06672	X	X
18	TP3A_TR03-1 (DAY 8)	Feb 17, 2021		Leachate - MEP	S21-Ma06673	X	X
19	TP3A_TR03-1	Feb 17, 2021		Leachate -	S21-Ma06674	X	X

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North Sydney
NSW 2060

Project Name: ADDITIONAL TREATABILITY TRIAL
Project ID: 318000780

Order No.:
Report #: 777838
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Mar 3, 2021 12:14 PM
Due: Mar 17, 2021
Priority: 10 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Lead	AUS Leaching Procedure
Melbourne Laboratory - NATA Site # 1254 & 14271							
Sydney Laboratory - NATA Site # 18217						X	X
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 23736							
Mayfield Laboratory							
External Laboratory							
	(DAY 9)			MEP			
20	TP3A_TR03-1 (DAY 10)	Feb 17, 2021		Leachate - MEP	S21-Ma06675	X	X
Test Counts						20	20

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

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

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

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

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

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

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

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

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

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

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

Results <10 times the LOR : No Limit

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

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

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

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

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

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Lab Sample ID	QA Source	Units	Result 1	Result 2	RPD	Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Heavy Metals									
Lead			mg/L	< 0.001			0.001	Pass	
LCS - % Recovery									
Heavy Metals									
Lead			%	103			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Heavy Metals				Result 1					
Lead	S21-Ma06668	CP	%	122			75-125	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Lead	S21-Ma06670	CP	%	109			75-125	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Lead	S21-Ma06672	CP	%	96			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**	**Result 2**	**RPD**	**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S21-Ma06659	CP	mg/L	0.002	0.002	4.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S21-Ma06661	CP	mg/L	0.002	0.002	21	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S21-Ma06663	CP	mg/L	< 0.001	< 0.001	<1	30%	Pass	

Comments

Sample Integrity

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

Qualifier Codes/Comments

Code	Description
C01	Leachate Fluid Key: 1 - pH 5.0; 2 - pH 2.9; 3 - pH 9.2; 4 - Reagent (DI) water; 5 - Client sample, 6 - other

Authorised by:

Ryan Gilbert	Analytical Services Manager
John Nguyen	Senior Analyst-Metal (NSW)

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

Measurement uncertainty of test data is available on request or please click here.

Ramboll Environ Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

Attention: **Stephen Maxwell**

Report **777842-L**
Project name ADDITIONAL TREATABILITY TRIAL
Project ID 318000780
Received Date Mar 03, 2021

Client Sample ID			**TP5A_TR01-1 (DAY 1)**	**TP5A_TR01-1 (DAY 2)**	**TP5A_TR01-1 (DAY 3)**	**TP5A_TR01-1 (DAY 4)**
Sample Matrix			**Leachate - MEP**	**Leachate - MEP**	**Leachate - MEP**	**Leachate - MEP**
Eurofins Sample No.			**S21-Ma06676**	**S21-Ma06677**	**S21-Ma06678**	**S21-Ma06679**
Date Sampled			**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	0.001	mg/L	0.002	< 0.001	0.017	0.075
AUS Leaching Procedure						
Leachate Fluid[C01]		comment	4.0	4.0	4.0	4.0
pH (initial)	0.1	pH Units	9.6	9.1	9.5	9.8
pH (Leachate fluid)	0.1	pH Units	6.8	5.1	6.8	6.8
pH (off)	0.1	pH Units	10	9.6	9.5	9.8

Client Sample ID			**TP5A_TR01-1 (DAY 5)**	**TP5A_TR01-1 (DAY 6)**	**TP5A_TR01-1 (DAY 7)**	**TP5A_TR01-1 (DAY 8)**
Sample Matrix			**Leachate - MEP**	**Leachate - MEP**	**Leachate - MEP**	**Leachate - MEP**
Eurofins Sample No.			**S21-Ma06680**	**S21-Ma06681**	**S21-Ma06682**	**S21-Ma06683**
Date Sampled			**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	0.001	mg/L	0.004	0.003	0.058	< 0.001
AUS Leaching Procedure						
Leachate Fluid[C01]		comment	4.0	4.0	4.0	4.0
pH (initial)	0.1	pH Units	9.6	9.9	9.6	9.9
pH (Leachate fluid)	0.1	pH Units	6.8	6.8	6.2	6.2
pH (off)	0.1	pH Units	9.8	9.7	9.9	9.7

Client Sample ID			TP5A_TR01-1 (DAY 9)	TP5A_TR01-1 (DAY 10)	TP5A_TR03-1 (DAY 1)	TP5A_TR03-1 (DAY 2)
Sample Matrix			**Leachate - MEP**	**Leachate - MEP**	**Leachate - MEP**	**Leachate - MEP**
Eurofins Sample No.			**S21-Ma06684**	**S21-Ma06685**	**S21-Ma06686**	**S21-Ma06687**
Date Sampled			**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	0.001	mg/L	1.0	< 0.001	< 0.001	0.036
AUS Leaching Procedure						
Leachate Fluid[C01]		comment	4.0	4.0	4.0	4.0
pH (initial)	0.1	pH Units	9.8	9.8	9.4	8.9
pH (Leachate fluid)	0.1	pH Units	6.2	6.2	6.8	5.1
pH (off)	0.1	pH Units	9.7	9.8	10.0	9.7

Client Sample ID			TP5A_TR03-1 (DAY 3)	TP5A_TR03-1 (DAY 4)	TP5A_TR03-1 (DAY 5)	TP5A_TR03-1 (DAY 6)
Sample Matrix			**Leachate - MEP**	**Leachate - MEP**	**Leachate - MEP**	**Leachate - MEP**
Eurofins Sample No.			**S21-Ma06688**	**S21-Ma06689**	**S21-Ma06690**	**S21-Ma06691**
Date Sampled			**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	0.001	mg/L	0.031	0.053	0.047	0.042
AUS Leaching Procedure						
Leachate Fluid[C01]		comment	4.0	4.0	4.0	4.0
pH (initial)	0.1	pH Units	9.3	9.7	9.4	9.9
pH (Leachate fluid)	0.1	pH Units	6.8	6.8	6.8	6.8
pH (off)	0.1	pH Units	9.7	9.8	9.8	9.8

Client Sample ID			TP5A_TR03-1 (DAY 7)	TP5A_TR03-1 (DAY 8)	TP5A_TR03-1 (DAY 9)	TP5A_TR03-1 (DAY 10)
Sample Matrix			**Leachate - MEP**	**Leachate - MEP**	**Leachate - MEP**	**Leachate - MEP**
Eurofins Sample No.			**S21-Ma06692**	**S21-Ma06693**	**S21-Ma06694**	**S21-Ma06695**
Date Sampled			**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**	**Feb 17, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	0.001	mg/L	< 0.001	0.016	0.017	0.001
AUS Leaching Procedure						
Leachate Fluid[C01]		comment	4.0	4.0	4.0	4.0
pH (initial)	0.1	pH Units	9.5	10.0	9.9	9.7
pH (Leachate fluid)	0.1	pH Units	6.2	6.2	6.2	6.2
pH (off)	0.1	pH Units	10.0	9.8	9.8	9.8

Sample History

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

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

Description	Testing Site	Extracted	Holding Time
Heavy Metals	Sydney	Mar 22, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
AUS Leaching Procedure	Sydney	Mar 19, 2021	7 Days
- Method: LTM-GEN-7010 Leaching Procedure for Soils & Solid Wastes			

eurofins | Environment Testing

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Company Name:	Ramboll Australia Pty Ltd	**Order No.:**	
Address:	Level 3/100 Pacific Highway North Sydney NSW 2060	**Report #:** **Phone:** **Fax:**	777842 02 9954 8118 02 9954 8150
Project Name:	ADDITIONAL TREATABILITY TRIAL		
Project ID:	318000780		

Received:	Mar 3, 2021 12:14 PM
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Priority:	10 Day
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Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Lead	AUS Leaching Procedure
Melbourne Laboratory - NATA Site # 1254 & 14271							
Sydney Laboratory - NATA Site # 18217						X	X
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 23736							
Mayfield Laboratory							
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	TP5A_TR01-1 (DAY 1)	Feb 17, 2021		Leachate - MEP	S21-Ma06676	X	X
2	TP5A_TR01-1 (DAY 2)	Feb 17, 2021		Leachate - MEP	S21-Ma06677	X	X
3	TP5A_TR01-1 (DAY 3)	Feb 17, 2021		Leachate - MEP	S21-Ma06678	X	X
4	TP5A_TR01-1 (DAY 4)	Feb 17, 2021		Leachate - MEP	S21-Ma06679	X	X
5	TP5A_TR01-1 (DAY 5)	Feb 17, 2021		Leachate - MEP	S21-Ma06680	X	X
6	TP5A_TR01-1	Feb 17, 2021		Leachate -	S21-Ma06681	X	X

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Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 23736							
Mayfield Laboratory							
External Laboratory							
	(DAY 6)			MEP			
7	TP5A_TR01-1 (DAY 7)	Feb 17, 2021		Leachate - MEP	S21-Ma06682	X	X
8	TP5A_TR01-1 (DAY 8)	Feb 17, 2021		Leachate - MEP	S21-Ma06683	X	X
9	TP5A_TR01-1 (DAY 9)	Feb 17, 2021		Leachate - MEP	S21-Ma06684	X	X
10	TP5A_TR01-1 (DAY 10)	Feb 17, 2021		Leachate - MEP	S21-Ma06685	X	X
11	TP5A_TR03-1 (DAY 1)	Feb 17, 2021		Leachate - MEP	S21-Ma06686	X	X
12	TP5A_TR03-1 (DAY 2)	Feb 17, 2021		Leachate - MEP	S21-Ma06687	X	X

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External Laboratory							
13	TP5A_TR03-1 (DAY 3)	Feb 17, 2021		Leachate - MEP	S21-Ma06688	X	X
14	TP5A_TR03-1 (DAY 4)	Feb 17, 2021		Leachate - MEP	S21-Ma06689	X	X
15	TP5A_TR03-1 (DAY 5)	Feb 17, 2021		Leachate - MEP	S21-Ma06690	X	X
16	TP5A_TR03-1 (DAY 6)	Feb 17, 2021		Leachate - MEP	S21-Ma06691	X	X
17	TP5A_TR03-1 (DAY 7)	Feb 17, 2021		Leachate - MEP	S21-Ma06692	X	X
18	TP5A_TR03-1 (DAY 8)	Feb 17, 2021		Leachate - MEP	S21-Ma06693	X	X
19	TP5A_TR03-1	Feb 17, 2021		Leachate -	S21-Ma06694	X	X

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Units

mg/kg: milligrams per kilogram | **mg/L:** milligrams per litre | **ug/L:** micrograms per litre

ppm: Parts per million | **ppb:** Parts per billion | **%:** Percentage

org/100mL: Organisms per 100 millilitres | **NTU:** Nephelometric Turbidity Units | **MPN/100mL:** Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

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

Results <10 times the LOR : No Limit

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

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

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

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

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

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Heavy Metals							
Lead	mg/L	< 0.001			0.001	Pass	
LCS - % Recovery							
Heavy Metals							
Lead	%	116			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Heavy Metals				Result 1					
Lead	S21-Ma06679	CP	%	84			75-125	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Lead	S21-Ma06687	CP	%	99			75-125	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Lead	S21-Ma06691	CP	%	89			75-125	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Lead	S21-Ma06693	CP	%	112			75-125	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Lead	S21-Ma06694	CP	%	92			75-125	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Lead	S21-Ma06695	CP	%	104			75-125	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1	Result 2	RPD	Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	S21-Ma06680	CP	mg/L	0.004	0.002	62	30%	Fail	Q15

Comments

Sample Integrity

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

Qualifier Codes/Comments

Code	Description
C01	Leachate Fluid Key: 1 - pH 5.0; 2 - pH 2.9; 3 - pH 9.2; 4 - Reagent (DI) water; 5 - Client sample, 6 - other
Q15	The RPD reported passes Eurofins Environment Testing's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised by:

Ryan Gilbert	Analytical Services Manager
John Nguyen	Senior Analyst-Metal (NSW)

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

Measurement uncertainty of test data is available on request or please click here.

Ramboll Environ Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

Attention: **Stephen Maxwell**

Report **799567-L**
Project name TARAGO CADMIUM ANALYSIS
Project ID 31800780
Received Date Jun 01, 2021

Client Sample ID			**TP3a_01**	**TP3a_02**	**TP3a_03**	**TP4a_01**
Sample Matrix			**US Leachate**	**US Leachate**	**US Leachate**	**US Leachate**
Eurofins Sample No.			**N21-Jn00956**	**N21-Jn00957**	**N21-Jn00958**	**N21-Jn00959**
Date Sampled			**Jun 01, 2021**	**Jun 01, 2021**	**Jun 01, 2021**	**Jun 01, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.005	mg/L	0.63	0.58	0.44	1.2
USA Leaching Procedure						
Leachate Fluid[C01]		comment	1.0	1.0	1.0	1.0
pH (initial)	0.1	pH Units	3.4	3.4	3.3	4.0
pH (off)	0.1	pH Units	4.9	4.9	4.9	4.8
pH (USA HCl addition)	0.1	pH Units	1.8	1.8	1.8	1.8

Client Sample ID			**TP4a_02**	**TP4a_03**	**TP5a_01**	**TP5a_02**
Sample Matrix			**US Leachate**	**US Leachate**	**US Leachate**	**US Leachate**
Eurofins Sample No.			**N21-Jn00960**	**N21-Jn00961**	**N21-Jn00962**	**N21-Jn00963**
Date Sampled			**Jun 01, 2021**	**Jun 01, 2021**	**Jun 01, 2021**	**Jun 01, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.005	mg/L	0.92	0.91	0.33	0.35
USA Leaching Procedure						
Leachate Fluid[C01]		comment	1.0	1.0	1.0	1.0
pH (initial)	0.1	pH Units	4.0	4.0	4.6	4.6
pH (off)	0.1	pH Units	4.9	4.9	5.0	5.0
pH (USA HCl addition)	0.1	pH Units	1.8	1.8	1.8	1.8

Client Sample ID			**TP5a_03**	**TP6a_01**	**TP6a_02**	**TP6a_03**
Sample Matrix			**US Leachate**	**US Leachate**	**US Leachate**	**US Leachate**
Eurofins Sample No.			**N21-Jn00964**	**N21-Jn00965**	**N21-Jn00966**	**N21-Jn00967**
Date Sampled			**Jun 01, 2021**	**Jun 01, 2021**	**Jun 01, 2021**	**Jun 01, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.005	mg/L	0.36	0.22	0.19	0.19
USA Leaching Procedure						
Leachate Fluid[C01]		comment	1.0	1.0	1.0	1.0
pH (initial)	0.1	pH Units	4.7	5.0	5.1	5.0
pH (off)	0.1	pH Units	5.0	5.0	5.0	5.0
pH (USA HCl addition)	0.1	pH Units	1.8	1.8	1.8	1.8

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

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

Description	Testing Site	Extracted	Holding Time
Heavy Metals	Sydney	Jun 03, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
USA Leaching Procedure	Sydney	Jun 02, 2021	14 Days
- Method: LTM-GEN-7010 Leaching Procedure for Soils & Solid Wastes			

eurofins | Environment Testing

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IANZ # 1290

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: TARAGO CADMIUM ANALYSIS
Project ID: 31800780

Order No.: 318000780
Report #: 799567
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 1, 2021 12:40 PM
Due: Jun 3, 2021
Priority: 2 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Cadmium	USA Leaching Procedure	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
Mayfield Laboratory - NATA Site # 25079								
External Laboratory								
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**			
1	TP3a_01	Jun 01, 2021		Soil	N21-Jn00912	X		X
2	TP3a_02	Jun 01, 2021		Soil	N21-Jn00913	X		X
3	TP3a_03	Jun 01, 2021		Soil	N21-Jn00914	X		X
4	TP4a_01	Jun 01, 2021		Soil	N21-Jn00915	X		X
5	TP4a_02	Jun 01, 2021		Soil	N21-Jn00916	X		X
6	TP4a_03	Jun 01, 2021		Soil	N21-Jn00917	X		X
7	TP5a_01	Jun 01, 2021		Soil	N21-Jn00918	X		X
8	TP5a_02	Jun 01, 2021		Soil	N21-Jn00919	X		X
9	TP5a_03	Jun 01, 2021		Soil	N21-Jn00920	X		X

Date Reported:Jun 03, 2021

eurofins | Environment Testing

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External Laboratory								
10	TP6a_01	Jun 01, 2021		Soil	N21-Jn00921	X		X
11	TP6a_02	Jun 01, 2021		Soil	N21-Jn00922	X		X
12	TP6a_03	Jun 01, 2021		Soil	N21-Jn00923	X		X
13	TP3a_01	Jun 01, 2021		US Leachate	N21-Jn00956	X	X	
14	TP3a_02	Jun 01, 2021		US Leachate	N21-Jn00957	X	X	
15	TP3a_03	Jun 01, 2021		US Leachate	N21-Jn00958	X	X	
16	TP4a_01	Jun 01, 2021		US Leachate	N21-Jn00959	X	X	
17	TP4a_02	Jun 01, 2021		US Leachate	N21-Jn00960	X	X	
18	TP4a_03	Jun 01, 2021		US Leachate	N21-Jn00961	X	X	
19	TP5a_01	Jun 01, 2021		US Leachate	N21-Jn00962	X	X	
20	TP5a_02	Jun 01, 2021		US Leachate	N21-Jn00963	X	X	

Date Reported:Jun 03, 2021

eurofins | Environment Testing

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Due: Jun 3, 2021
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Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

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Perth Laboratory - NATA Site # 23736								
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External Laboratory								
21	TP5a_03	Jun 01, 2021		US Leachate	N21-Jn00964	X	X	
22	TP6a_01	Jun 01, 2021		US Leachate	N21-Jn00965	X	X	
23	TP6a_02	Jun 01, 2021		US Leachate	N21-Jn00966	X	X	
24	TP6a_03	Jun 01, 2021		US Leachate	N21-Jn00967	X	X	
Test Counts						24	12	12

Date Reported:Jun 03, 2021

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

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

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

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

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

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

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

Units

mg/kg: milligrams per kilogram | **mg/L:** milligrams per litre | **ug/L:** micrograms per litre

ppm: Parts per million | **ppb:** Parts per billion | **%:** Percentage

org/100mL: Organisms per 100 millilitres | **NTU:** Nephelometric Turbidity Units | **MPN/100mL:** Most Probable Number of organisms per 100 millilitres

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CRM	Certified Reference Material - reported as percent recovery.
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Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
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SRA	Sample Receipt Advice
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RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

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

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

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

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

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

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Heavy Metals							
Cadmium	mg/L	< 0.005			0.005	Pass	
LCS - % Recovery							
Heavy Metals							
Cadmium	%	89			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Cadmium	N21-Jn00956	CP	mg/L	0.63	0.58	7.0	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Cadmium	N21-Jn00958	CP	mg/L	0.44	0.45	1.0	30%	Pass	

Comments

Sample Integrity

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

Qualifier Codes/Comments

Code	Description
C01	Leachate Fluid Key: 1 - pH 5.0; 2 - pH 2.9; 3 - pH 9.2; 4 - Reagent (DI) water; 5 - Client sample, 6 - other

Authorised by:

Andrew Black	Analytical Services Manager
John Nguyen	Senior Analyst-Metal (NSW)

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

Measurement uncertainty of test data is available on request or please click here.

Ramboll Environ Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

Attention: **Stephen Maxwell**

Report **799567-S**
Project name TARAGO CADMIUM ANALYSIS
Project ID 31800780
Received Date Jun 01, 2021

Client Sample ID			**TP3a_01**	**TP3a_02**	**TP3a_03**	**TP4a_01**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**N21-Jn00912**	**N21-Jn00913**	**N21-Jn00914**	**N21-Jn00915**
Date Sampled			**Jun 01, 2021**	**Jun 01, 2021**	**Jun 01, 2021**	**Jun 01, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	51	30	27	190
% Moisture	1	%	8.4	7.4	6.8	4.8

Client Sample ID			**TP4a_02**	**TP4a_03**	**TP5a_01**	**TP5a_02**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**N21-Jn00916**	**N21-Jn00917**	**N21-Jn00918**	**N21-Jn00919**
Date Sampled			**Jun 01, 2021**	**Jun 01, 2021**	**Jun 01, 2021**	**Jun 01, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	130	170	430	270
% Moisture	1	%	7.4	2.3	2.0	2.0

Client Sample ID			**TP5a_03**	**TP6a_01**	**TP6a_02**	**TP6a_03**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**N21-Jn00920**	**N21-Jn00921**	**N21-Jn00922**	**N21-Jn00923**
Date Sampled			**Jun 01, 2021**	**Jun 01, 2021**	**Jun 01, 2021**	**Jun 01, 2021**
Test/Reference	LOR	Unit				
Heavy Metals						
Cadmium	0.4	mg/kg	440	12	9.6	7.1
% Moisture	1	%	2.1	6.0	5.0	4.7

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

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

Description	Testing Site	Extracted	Holding Time
Heavy Metals	Sydney	Jun 02, 2021	180 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
% Moisture	Sydney	Jun 01, 2021	14 Days
- Method: LTM-GEN-7080 Moisture			

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Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: TARAGO CADMIUM ANALYSIS
Project ID: 31800780

Order No.: 318000780
Report #: 799567
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jun 1, 2021 12:40 PM
Due: Jun 3, 2021
Priority: 2 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Cadmium	USA Leaching Procedure	Moisture Set
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
Mayfield Laboratory - NATA Site # 25079								
External Laboratory								
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**			
1	TP3a_01	Jun 01, 2021		Soil	N21-Jn00912	X		X
2	TP3a_02	Jun 01, 2021		Soil	N21-Jn00913	X		X
3	TP3a_03	Jun 01, 2021		Soil	N21-Jn00914	X		X
4	TP4a_01	Jun 01, 2021		Soil	N21-Jn00915	X		X
5	TP4a_02	Jun 01, 2021		Soil	N21-Jn00916	X		X
6	TP4a_03	Jun 01, 2021		Soil	N21-Jn00917	X		X
7	TP5a_01	Jun 01, 2021		Soil	N21-Jn00918	X		X
8	TP5a_02	Jun 01, 2021		Soil	N21-Jn00919	X		X
9	TP5a_03	Jun 01, 2021		Soil	N21-Jn00920	X		X

Date Reported:Jun 03, 2021

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Perth Laboratory - NATA Site # 23736								
Mayfield Laboratory - NATA Site # 25079								
External Laboratory								
10	TP6a_01	Jun 01, 2021		Soil	N21-Jn00921	X		X
11	TP6a_02	Jun 01, 2021		Soil	N21-Jn00922	X		X
12	TP6a_03	Jun 01, 2021		Soil	N21-Jn00923	X		X
13	TP3a_01	Jun 01, 2021		US Leachate	N21-Jn00956	X	X	
14	TP3a_02	Jun 01, 2021		US Leachate	N21-Jn00957	X	X	
15	TP3a_03	Jun 01, 2021		US Leachate	N21-Jn00958	X	X	
16	TP4a_01	Jun 01, 2021		US Leachate	N21-Jn00959	X	X	
17	TP4a_02	Jun 01, 2021		US Leachate	N21-Jn00960	X	X	
18	TP4a_03	Jun 01, 2021		US Leachate	N21-Jn00961	X	X	
19	TP5a_01	Jun 01, 2021		US Leachate	N21-Jn00962	X	X	
20	TP5a_02	Jun 01, 2021		US Leachate	N21-Jn00963	X	X	

Date Reported:Jun 03, 2021

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Sydney Laboratory - NATA Site # 18217						X	X	X
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
Mayfield Laboratory - NATA Site # 25079								
External Laboratory								
21	TP5a_03	Jun 01, 2021		US Leachate	N21-Jn00964	X	X	
22	TP6a_01	Jun 01, 2021		US Leachate	N21-Jn00965	X	X	
23	TP6a_02	Jun 01, 2021		US Leachate	N21-Jn00966	X	X	
24	TP6a_03	Jun 01, 2021		US Leachate	N21-Jn00967	X	X	
Test Counts						24	12	12

Date Reported:Jun 03, 2021

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

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

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

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

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

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

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

Units

mg/kg: milligrams per kilogram
mg/L: milligrams per litre
ug/L: micrograms per litre
ppm: Parts per million
ppb: Parts per billion
%: Percentage
org/100mL: Organisms per 100 millilitres
NTU: Nephelometric Turbidity Units
MPN/100mL: Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

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

Results <10 times the LOR : No Limit

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

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

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

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

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

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Lab Sample ID	QA Source	Units	Result 1	Result 2	RPD	Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Heavy Metals									
Cadmium			mg/kg	< 0.4			0.4	Pass	
LCS - % Recovery									
Heavy Metals									
Cadmium			%	104			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Heavy Metals				Result 1					
Cadmium	S21-My61675	NCP	%	111			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Cadmium	S21-My61674	NCP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
% Moisture	N21-Jn00916	CP	%	7.4	6.4	15	30%	Pass	

Comments

Sample Integrity

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

Authorised by:

Andrew Black	Analytical Services Manager
John Nguyen	Senior Analyst-Metal (NSW)

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

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

Measurement uncertainty of test data is available on request or please click here.

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