

23 August 2022

Joanne McLoughlin
Project Manager – Land Management
Network & Assets
Regional and Outer Metropolitan
Transport for NSW
Via email: joanne.mcloughlin@transport.nsw.gov.au

**L02 Interim Audit Advice (0503-2303-02) – Tarago Rail Corridor – Interim (Pre Remediation)
Monitoring Requirements**

Dear Joanne,

1. Introduction and Background

Andrew Lau of JBS&G Australia Pty Ltd (JBS&G), was engaged on the 16 April 2020 by Transport for NSW (TfNSW, the client) to conduct a site audit at land that falls within the Goulburn – Bombala rail corridor at 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 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 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).

2. Documents Reviewed

The following documents were reviewed/referred to as part of preparation of this Interim Audit Advice (IAA):

- 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 (Ramboll 2020a)
- Tarago Lead Management Action Plan, Ramboll, 31 July 2020 (Ramboll 2020b)
- Letter re: Advice of risks to Human Health and the Environment: Boyd Street and publicly accessible areas, Tarago NSW En Risks, 23 April 2021 (EnRisks 2021)
- Tarago Rail Corridor and Tarago Area Detailed Site Investigation Addendum, Ramboll, 12 February 2021 (Ramboll 2021a)
- April 2021 Surface Water Monitoring, Tarago NSW, Ramboll, June 2021 (Ramboll 2021b)
- Tarago Air Quality Monitoring Report, May 2021, Ramboll, 6 July 2021 (Ramboll 2021c)
- Tarago Rail Corridor, Remediation Action Plan, Ramboll, September 2021 (Ramboll 2021d)
- Site Audit Report (0503-2006) Tarago Rail Corridor, Tarago NSW, 29th October 2021, JBS&G Australia Pty Ltd and the associated SAS, dated 4 January 2021 (SAS 0503-2006-R) (JBS&G 2021)

3. Objective of this Interim Advice

The objective of this interim advice is to review the monitoring undertaken to date at the site and provide audit opinions on the need, if any, for further interim monitoring prior to remediation works being undertaken at the site.

4. Tarago Lead Management Action Plan

A Lead Management Action Plan was prepared for the site and the list below describes some of the management activities and measures to be conducted (Ramboll 2020b):

- Areas of contamination to be demarcated as exclusion zones by signage or similar. These areas are not to be utilised as thoroughfares;
- A polymer sealant has been applied to the lead impacted areas onsite and should be visually inspected on a routine basis. Polymer should be re-applied to areas where disturbance is observed;
- Contaminated sediments downstream of rail culverts will be removed within site boundaries under a specific remediation program that includes validation sampling;
- Sediment traps will be installed and maintained in/or adjacent to each rail formation culvert onsite. Sediment traps shall be inspected monthly and after rainfall events (>10mm) in a 24 hour period;
- Excavation within contaminated areas of the site shall only occur if completed in accordance with particular procedures described in the LMP;
- Controls for the existing stockpile shall be implemented in accordance with procedures described in the LMP; and

- Airborne dust and surface water monitoring are to be conducted to verify that activities were satisfactory.

5. Dust Monitoring Undertaken

In accordance with the requirements of the Lead Management Action Plan (Ramboll 2020b) air quality monitoring was undertaken to verify that the management measures implemented were effective. The air monitoring was undertaken over a period of 14 months up to May 2021.

5.1 Dust Monitoring Assessment Criteria

The consultant provided air quality criteria for lead, total suspended particulates (TSP), PM_{2.5} and PM₁₀ and deposited dust. The averaging period for each criterion was set as either annual or over a 24 hour period. Ramboll referenced four guidance documents as follows:

- *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); and
- National Environment Protection (Ambient Air Quality) Measure – as amended, Federal Register of Legislative Instruments F2016C00215, Department of the Environment, Canberra, DoE (2016).

5.2 Dust Monitoring Methods

The consultant provided monthly dust monitoring reports to the auditor for review for monitoring performed from April 2020 to May 2021, inclusive. The monitoring consisted of the following:

- Deposited dust and lead measured continuously throughout each month;
- Total suspended particulates (TSP) including lead contained within the TSP measured for a 24 hour period completed every one day in six days;
- Particulates less than 10 microns (µm) in aerodynamic diameter (PM₁₀) and less than 2.5 microns measured continuously throughout each month.

In addition, Ramboll presented rainfall and wind roses in each month's report.

Siting of sampling locations was completed with reference to the relevant Australian Standard (*AS/NZS 3580.1.1 Guide to siting air monitoring equipment*) and the auditor was satisfied that the locations were appropriate. These are summarised below.

Deposited Dust and Lead

- DDG1, Stewart St (approx. 140 m west of the site – southern portion);
- DDG2, Station Masters Cottage (immediately adjacent to the site and the closest off-site human health receptor);
- DDG3, Boyd St (40 m east of the site); and
- DDG4, Mulwaree St (200 m west of the site – northern portion).

5.3 Dust Monitoring Results

Deposited Dust and Lead

Table 5.1 summarises the results for deposited dust (insoluble solids) and lead for 14 monitoring events from April 2020 to May 2021 (Ramboll 2021c).

Table 5.1: Summary of Deposited Dust and Lead Monitoring Results

Location	Range of Results Insoluble Solids (g/m ² /month)	Average	Exceedances (4 g/m ² /month)	Range of Results Lead (µg)	Exceedances (0.5 g/m ² /month)
DDG1, Stewart St	0.5 – 3.0	1.5	0	<0.01 - <1	0
DDG2, Station Masters Cottage	0.2 – 4.3	1.5	1	<0.01 - <1	0
DDG3, Boyd St	0.2 – 8.8	2.2	1	<0.01 - <1	0
DDG4, Mulwaree St	0.2 – 1.5	0.8	0	<0.01 - <1	0

No lead was measured in the dust collected within the 14 months of monitoring at any of the dust gauges. Two monitoring events found exceedances for insoluble solids, but the average data indicated that the average for the entire monitoring period was less than criteria.

Total Suspended Particles (TSP) and Lead

The TSP sampler was located at the Station Master’s Cottage and Ramboll (2021c) noted that lead was detected in some of the TSP samples in the May 2021 sampling event, and the auditor noted that lead was routinely detected in TSP samples, but was less than criteria. Ramboll presented the results graphically for all months in the May Air Quality Report (2021c) and made the following conclusions:

- The lead concentration in TSP was less than annual average criterion; and
- The TSP concentration was less than the average annual criterion.

Ramboll stated the following:

“There was a low to moderate observable correlation between TSP and lead when considering the lowest 88% measured lead values. The outliers suggest local lead sources may have been disturbed during previous monitoring months. Decreasing lead concentrations with no corresponding decrease in TSP concentrations in more recent data suggests there is a lower fraction of lead in TSP in more recent data.”

Continuous PM₁₀ and PM_{2.5}

Ramboll presented the results of continuous measurements of PM₁₀ and PM_{2.5} at the Station Master’s Cottage. This data was then compared with the lead results collected in the TSP sampler. Ramboll found that there was no evident correlation between the smaller particulate size fractions and lead measured from total suspended particulates (TSP) during April 2020 to May 2021.

Summary

Ramboll concluded that data collected to date indicates that dust concentrations are below the air quality criteria at all locations monitored.

Recommendations

Ramboll found that after 12 months of air quality monitoring, the data was found to be consistently below assessment criteria protective of human health. Ramboll proposed ceasing the real time dust monitoring in July 2021.

6. Surface Water Monitoring

6.1 Surface Water Monitoring Assessment Criteria

The consultant (Ramboll 2020a) conducted an assessment of environmental values and adopted surface water 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); and
- 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 consultant 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.

The consultant (Ramboll 2021b) applied hardness correction factor for lead when considering protection of freshwater ecology, in line with procedures described ANZG 2018. EnRisks (2021) considered the risks posed by metals within surface waters passing through the site and towards the Mulwaree River.

6.2 Surface Water Monitoring Methods

Ramboll (2021a and 2021b) collected surface water and sediment results at locations at the rail corridor site and offsite towards the Mulwaree River to the east of the rail corridor site, as well as from the Mulwaree River. One location to the west of the rail corridor site was included in the program, which provided a background location. Sampling was performed during eight monitoring events from August 2019 to April 2021 and was generally performed after > 10 mm of rain on a quarterly basis.

Ramboll 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 prior to the sampling to high rainfall events immediately prior to the sampling.

6.3 Surface Water Monitoring Results

Ramboll (2020a, 2021a and 2021b) considered the results as two datasets, onsite & near site surface water locations and the Mulwaree River results. The sampling was conducted over eight monitoring events.

With regards the onsite and near site results, Ramboll reported that, with the exception of two detections (out of 41 samples), all lead results were less than the health-based screening criterion (recreational waters).

6.4 Risk Assessment for Surface Water 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 were low and acceptable.

6.5 Ramboll conclusions regarding Surface Water Monitoring

In the April Surface Water Monitoring report of 2021 (Ramboll, 2021b) Ramboll found that “Monitoring results indicate no evidence of offsite migration of contaminants in surface water that would represent an unacceptable human health risk, with no reported exceedances in the adopted human health criteria for the contaminants of concern in the April 2021 monitoring event.

“Similarly, monitoring results indicate no evidence of offsite migration of contaminants in surface water that would represent an unacceptable ecological risk. Concentrations of lead, copper and zinc observed in the Mulwaree River are consistent with background concentrations and do not indicate impacts from the Site.”

7. Audit Opinions

Based on a review of the information provided and subject to the limitations in **Attachment 1**, the following audit opinions are presented:

- The auditor accepts the site-specific criteria developed by EnRisks (2021), 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, namely that the risks posed by these media are low and acceptable.
- While lead has been reported in dust collected during monthly monitoring conducted for over a year, the reported concentrations have been lower than the adopted criteria. In the absence of activities in the rail corridor site disturbing the ground surface, the auditor is satisfied that ongoing dust monitoring prior to remedial activities is not required, if the other requirements of the Lead Management Action Plan (Ramboll 2020b) continue to be followed.
- The auditor notes that surface water monitoring was conducted at a number of upgradient, and downgradient locations as well as in the Mulwaree River during eight events between

August 2019 and April 2021. The conclusions reached by the consultant from the monitoring data were that risks posed to off-site human and ecological receptors was low and acceptable. The auditor concurs with these conclusions and, subject to ongoing implementation of the management measures in the Lead Management Action Plan (Ramboll 2020b), is satisfied that ongoing surface water monitoring is not required prior to the commencement of remedial activities at the site.

- In consideration of over 12 months of air and surface water monitoring and the conclusions made by Ramboll regarding ongoing monitoring, the auditor recommends that the Lead Management Action Plan (Ramboll 2020b) be updated with regards to these amended monitoring provisions, until remediation commences.

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

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



- Legend**
- Site boundary
 - Rail corridor
 - Rail corridor fence

A4
1:10,000

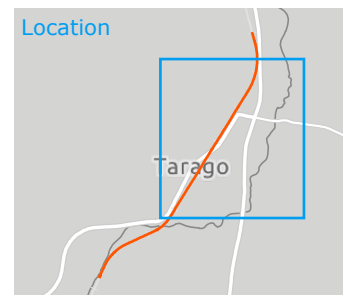
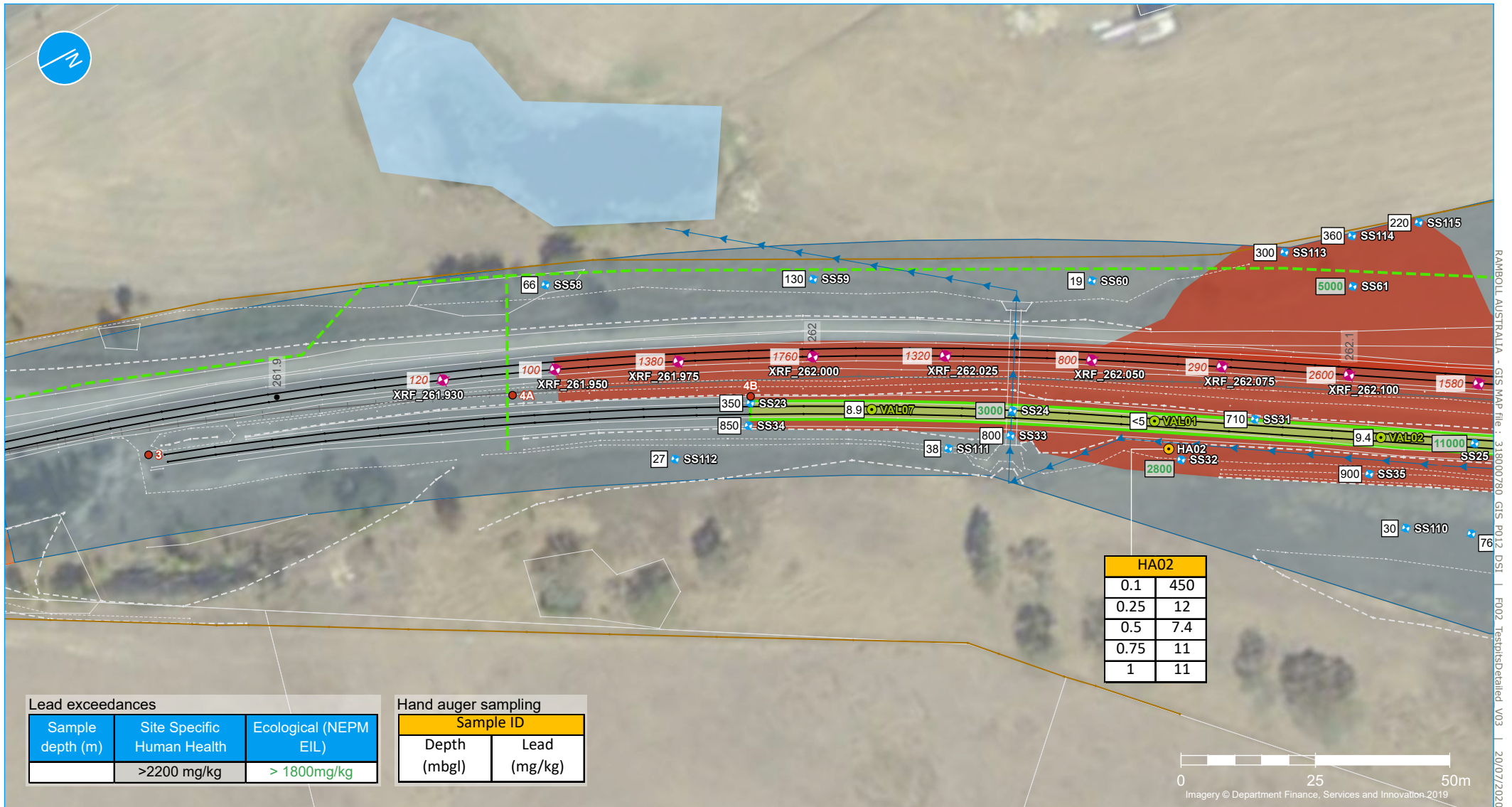
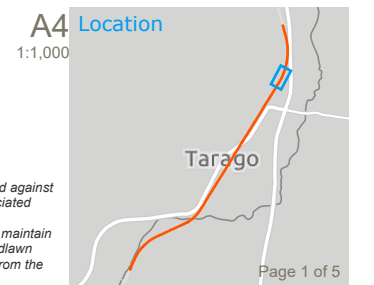


Figure 1 | Locality Plan



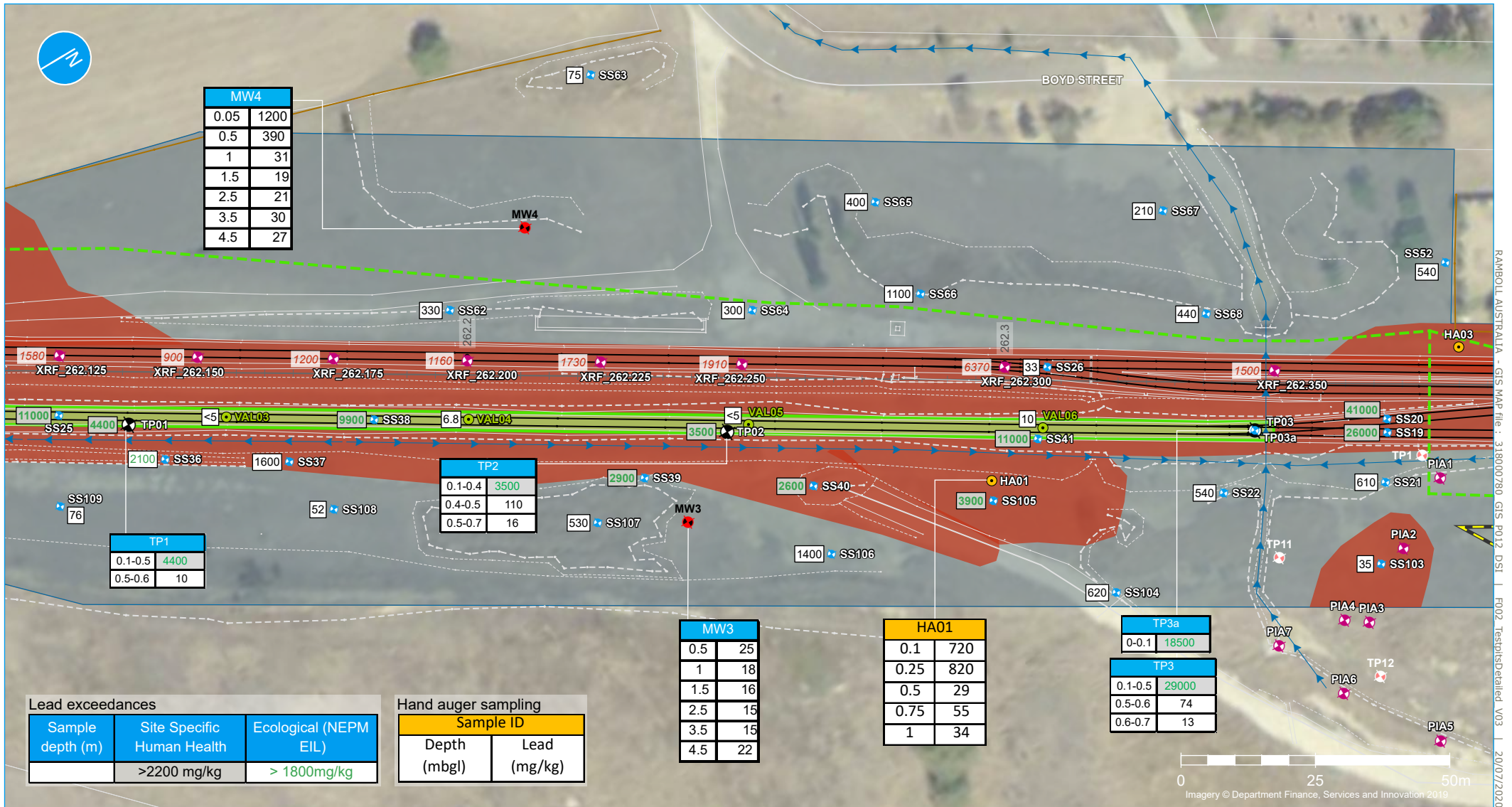
Legend

- 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
- 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.

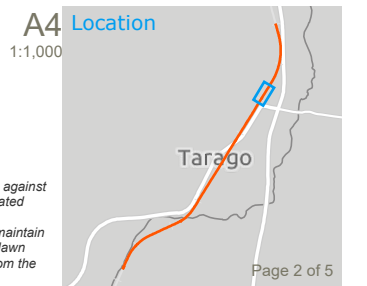
Figure 2a | Site Plan



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)
 - 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.

Figure 2b | Site Plan



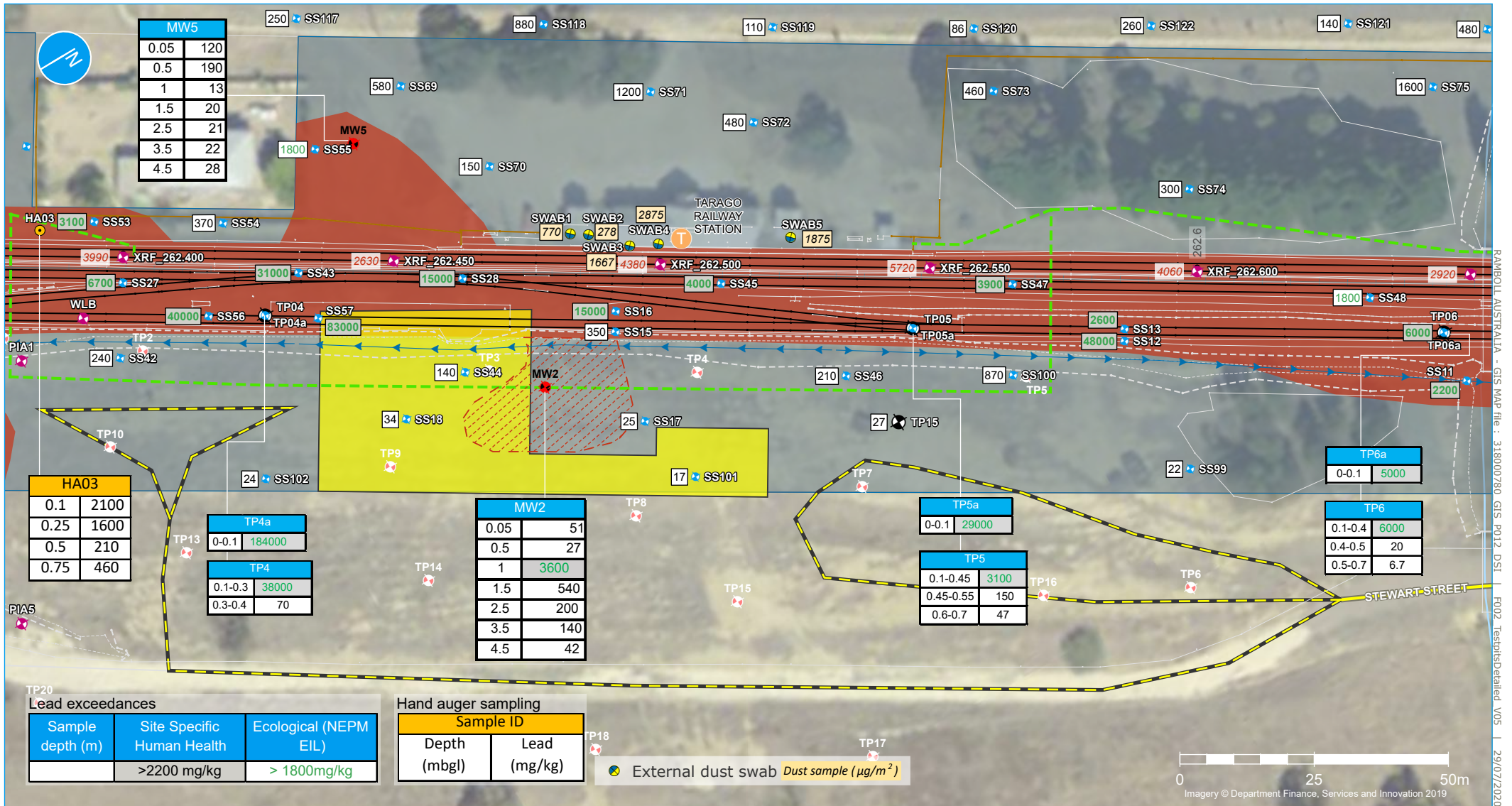
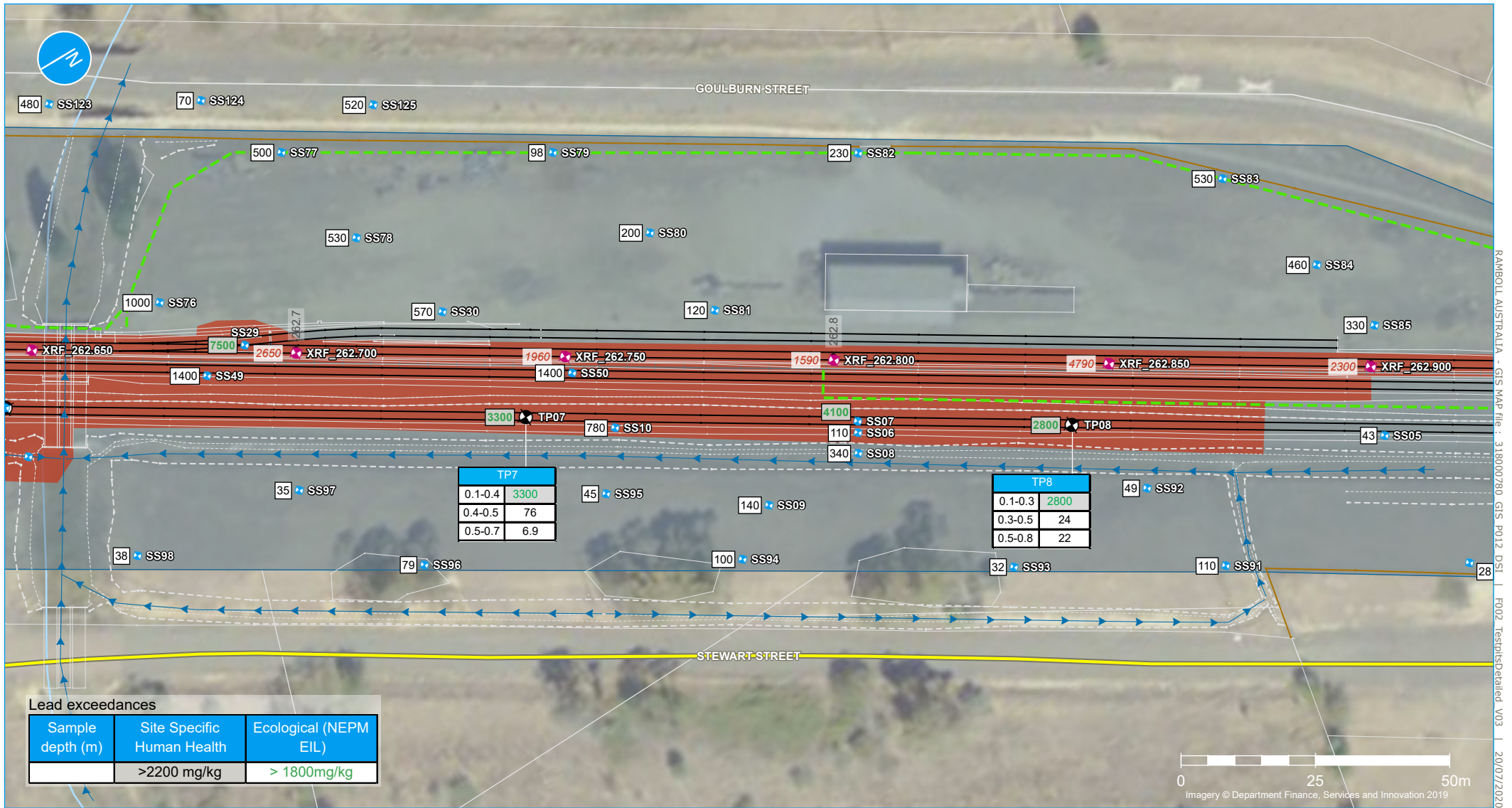


Figure 2c | Site Plan



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)
- 1200 Lead concentration for XRF sample (mg/kg)
- 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.

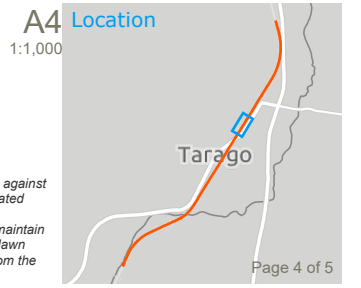
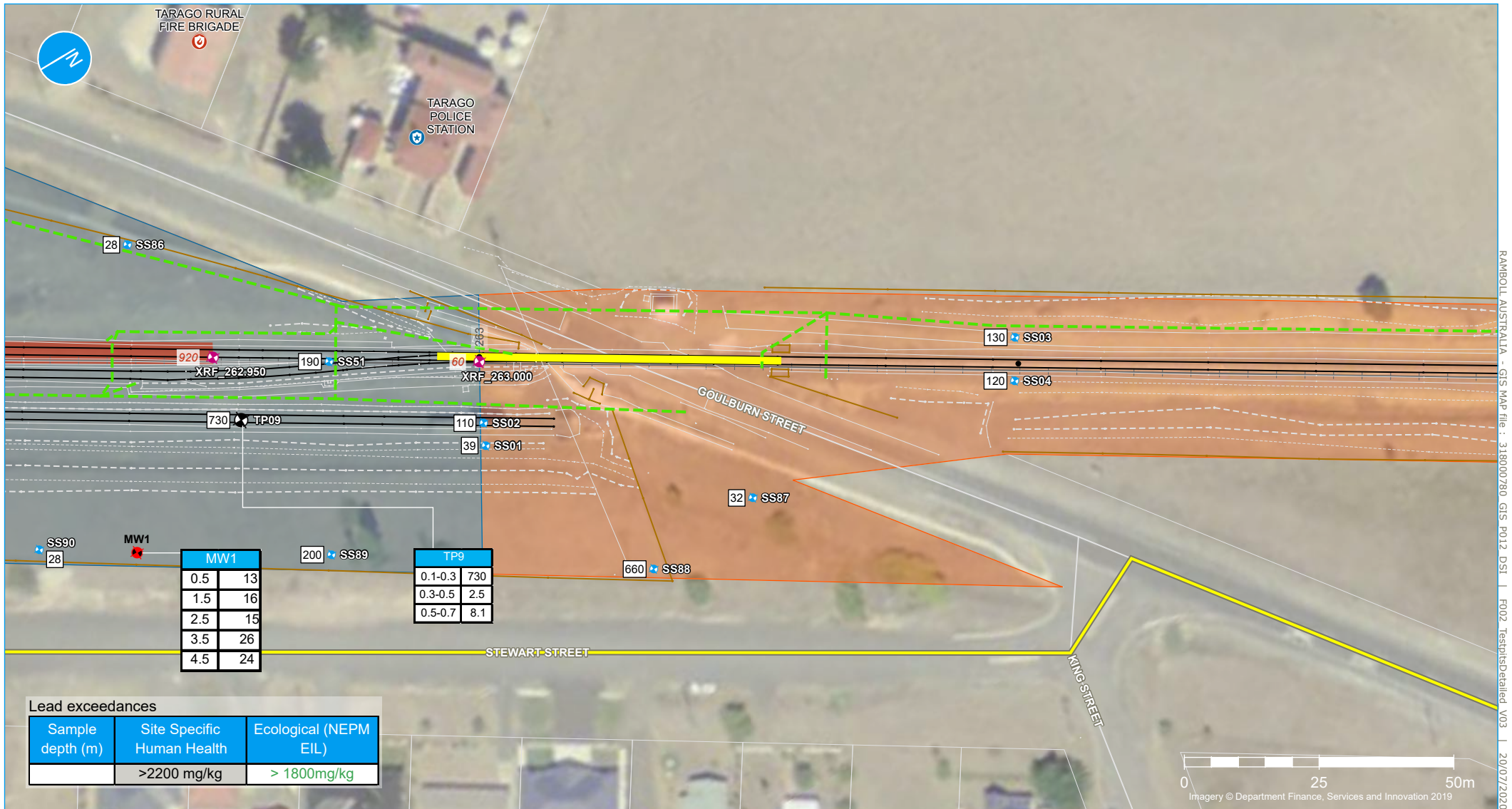


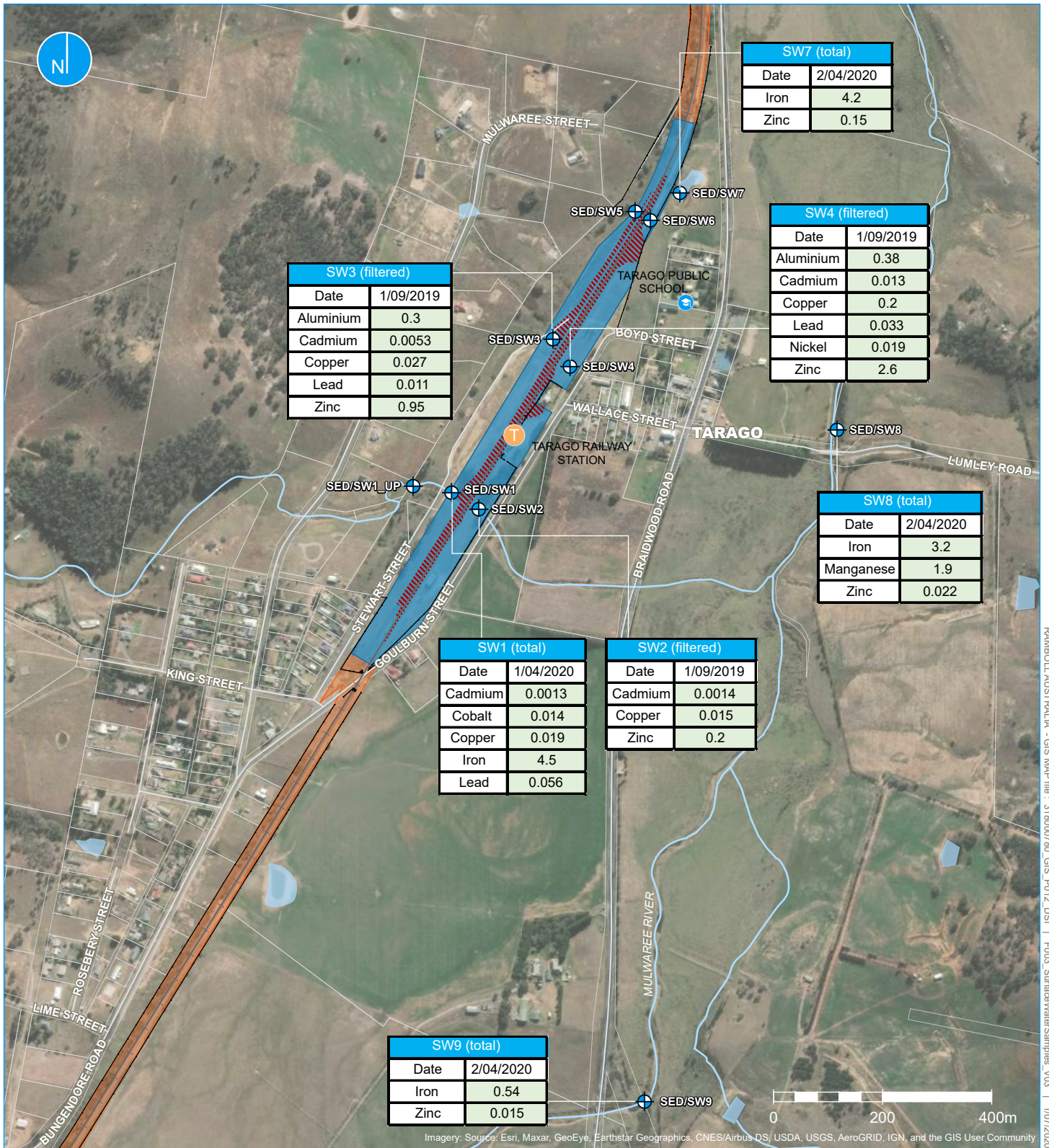
Figure 2d | Site Plan



RAMBOLL AUSTRALIA - GIS MAP file : 318000780_GIS_P012_DSI | F002_TestpitsDetailed_V03 | 20/07/2020

Figure 2e | Site Plan

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.



RAMBOLL AUSTRALIA - GIS MAP file : 318000780_GIS_P012_DSI | F003_SurfaceWaterSamples_V03 | 1/07/2020

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

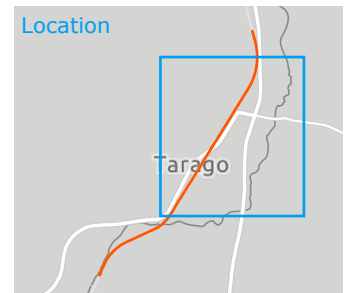


Figure 3 | Surface water and sediment sampling locations