Epic Environmental Pty Ltd
ABN: 54 169 57 92 75

Suite 5, Level 9
189 Kent Street
Sydney NSW 2000

1800 779 363
www.epicenvironmental.com.au

8 December 2022

Tim Doman
Project Manager - Environmental Remediation
ARTC
33 Newton Street
Broadmeadow NSW 2292
By email: TDoman@artc.com.au

Project name: Goulburn Wheat Yards - Contaminated Land Audit
Project number: SCL220020.01

Dear Tim

Subject: IAA#1 Review of Existing Environmental Reports and Plans

1 INTRODUCTION

1.1 Audit details

Mr Brad May, a NSW EPA accredited Contaminated Site Auditor (auditor) under the Contaminated Land Management Act 1997 (CLM Act) (Accreditation Number 1603) and an employee of Epic Environmental Pty Ltd (Epic) was commissioned by the Australian Rail Track Corporation (ARTC) on 31 October 2022 to carry out a site contamination audit (site audit) in relation to the site known as the Goulburn Wheat Yards, located off Sloane Street, Goulburn NSW 2580 (herein known as the site). Site identification details are presented in **Section 2**.

The purpose of the site audit, including the preparation of this interim audit advice (IAA), is for the independent review of existing environmental assessments listed in **Section 1.3**, as well as a future remedial options assessment (ROA) and remedial action plan (RAP). The ultimate outcome of the audit will be a site audit report (SAR) and site audit statement (SAS) at the completion of remedial and validation works confirming site suitability for commercial/ industrial use. Epic understands that while the site has been notified to the NSW EPA, it is not currently regulated under the Contaminated Land Management Act 1997 (CLM Act) and therefore at this stage the audit is a non-statutory audit.

The auditor notes that ARTC are currently engaging consultant(s) to carry out the following works:

- X-ray fluorescence (XRF) survey of soils and air dust monitoring
- ROA and RAP

A review of the above outputs by the Auditor will be provided in a future IAA.

The limitations to the site audit are detailed in **Section 1.6**.

1.2 Background

The site is legally described as part Lot 1 in DP 1185735 and part Lot 1 in DP 1187262 with an approximate site area of 76,903 m^2. The site boundary is shown in **Figure 1**, below, as well as on the site location and layout plan provided in the attached **Figure F1**.

The site is owned by TfNSW and is located at the southeast edge of Goulburn, immediately adjacent (to the west) to the ARTC Goulburn Roundhouse site. The site is comprised of five railway sidings, referred to in

previous reports as the 'No. 1 to No. 5 Up Sidings'. The site has a long history of rail related uses, which has included different tenants and associated land-uses.

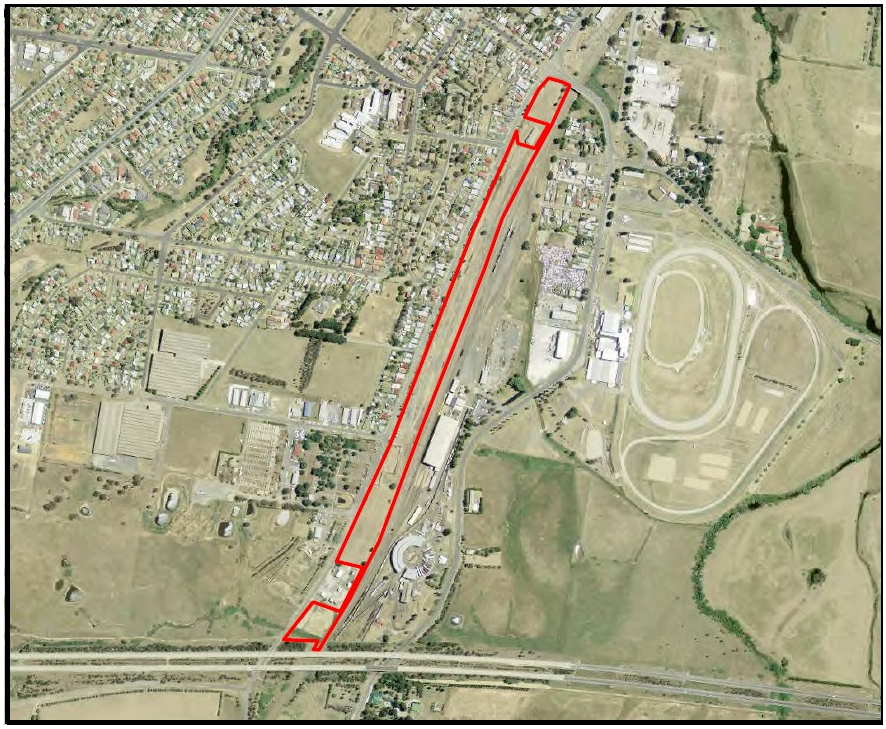


Figure 1. Goulburn Wheat Yards Site Boundary

The primary sources of contamination have included long history of railway yard use. The site is mostly unsealed, with the soil profile comprised of gravelly sandy clays/ sandy gravel fill materials to depths exceeding 0.5 metres below ground level (bgl). Fill material was observed as black sandy gravel with coal ash, particularly in areas near to the railway lines. Fill was underlain by natural orange/ brown sandy clay.

1.3 Scope of this IAA

Works carried out for preparation of this IAA have included:

- Site visit and walkover carried out by the auditor on November 15, 2022
- Review of the recent detailed site investigation reports covering the various sub-areas of the site including:
  - Phase 1 Environmental Contamination Assessment – SR47, Goulburn (CMPS&F Pty Ltd, 1996)
  - Demolition, Remediation and Site Validation – Goulburn Depot, Sloane Street, Goulburn NSW, (Parsons Brinckerhoff, November 2013
  - Preliminary Site Investigation and Detailed Site Investigation – Goulburn JS Hollingsworth and Sons (GHD Pty Ltd, 2021)
  - Supplementary Detailed Site Investigation – Goulburn JS Hollingsworth and Sons (GHD Pty Ltd, October 2021)
  - Detailed Site Investigation – Goulburn Wheat Yards, off Sloane Street, Goulburn NSW 2580, (Cavvanba Pty Ltd, October 2022)
- Preparation of this IAA, including the auditor's opinion regarding data gaps requiring further assessment for appropriate site characterisation to inform the ROA and RAP.

1.4 Guidelines made or approved by the EPA

This audit is being carried out under the NSW EPA Site Auditor Scheme in accordance with Part 4 of the Contaminated Land Management Act 1997 (CLM Act), including guidelines and requirements as described in the NSW EPA Guidelines for the NSW Site Auditor Scheme, 3rd edition (October 2017). Relevant legislation, guidelines and standards include:

- AS/NZS 5667.11 1998, Water Quality – Sampling – Guidance on Sampling of Groundwaters
- AS4482.1 2005, Guide to the investigation and sampling of sites with potentially contaminated soil – Part 1: Non-volatile and semi-volatile compounds
- AS4482.1 1999, Guide to the sampling and investigation of potentially contaminated soil – Part 2: Volatile substances
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG[1] 2018)
- HEPA[2] PFAS National Environmental Management Plan – Version 2.0, January 2020 (PFAS NEMP 2.0)
- National Health and Medical Research Council (NHMRC), Australian Drinking Water Guidelines (ADWG), updated March 2021 (NHMRC, 2011)
- NSW EPA Sampling design part 1 – application (August 2022)
- NSW EPA Sampling design part 2 – interpretation (August 2022)
- NSW EPA (2020) Consultants Reporting on Contaminated Land – Contaminated Land Guidelines
- NSW EPA (2020) Assessment and management of hazardous ground gases – Contaminated Land Guidelines
- NSW EPA (2017), Guidelines for the NSW Site Auditor Scheme, 3rd edition (Oct 2017)
- NSW EPA (2014) Waste Classification Guidelines – Part 1: Classifying waste
- State Environmental Planning Policy No 55—Remediation of Land (17 April 2020)
- NSW Environment, Climate Change and Water 2010, Vapour Intrusion: Technical Practice Note
- NSW EPA (2015) Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997
- NSW DEC 2007, Guidelines for the assessment and management of groundwater contamination
-
- The National Environment Protection (Assessment of Site Contamination) Measure 1999 (ASC NEPM), NEPC 1999, amended 2013.

1.5 Audit limitations

This audit relates only to those matters relevant to the Contaminated Land Management Act 1997, which describes that "The general object of this Act is to establish a process for investigating and (where appropriate) remediating land areas where contamination presents a significant risk of harm to human health or some other aspect of the environment". The SAS and SAR do not seek to provide an opinion regarding other aspects of the environment not related to site contamination, or to the suitability of the site in regard to:

- Landuse planning and legal use of the land; and/or
- The occupational health and safety legislation; and/or
- The suitability of any engineering design.

By definition, site auditing involves the review and critique of consultants' and contractors' work, including, amongst others, site histories, site surveys, subsurface investigations, chemical and physical analyses, and risk assessments and modelling. Accordingly, Epic relies on the experience, expertise and integrity of the relevant organisations. The information sources referenced have been used to determine site history and local subsurface conditions. While Epic has used reasonable care to avoid reliance on data and information that is

[1] ANZG: Australian and New Zealand Governments
[2] National Chemicals Working Group of the Heads of EPAs Australia and New Zealand

inaccurate or unsuitable, Epic is not able to verify the accuracy or completeness of all information and data made available.

Sampling and chemical analysis of environmental media are 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 and site history, not on sampling and analysis of all media at all locations for all potential contaminants.

Environmental sampling and laboratory analyses were undertaken as part of the investigations reviewed by Epic, as described herein. Ground conditions between sampling locations may vary, and this should be considered when extrapolating between sampling points. Except at each sampling point, the nature, extent, and concentration of contamination is inferred only. Furthermore, the test methods used to characterise the contamination at each sampling point are subject to limitations and provide only an approximation of the contaminant concentrations. 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 site audit are based on the available information at the time of the investigations.

As environmental sampling is based on achieving suitable sampling densities, rather than sampling all media at all locations, and analysis is based on-site histories and likely contaminants of concern, rather than analysis of all media at all locations for all potential contaminants, the absence of any identified hazardous or toxic materials at the site should not be interpreted as a warranty or guarantee that such materials do not exist at the site. Therefore, future work at the site which involves subsurface excavation should be conducted based on appropriate management plans. These should include, inter alia, environmental management plans, including unexpected findings protocols, hazardous building materials management plans, and occupational health and safety plans.

2 SITE DETAILS

Cavvanba (October 2022) reports that the site is located from railway chainage 225.6 km to 227.1 km (approx.) on the upside of the main south railway line. The site location and boundary are shown in **Figure F1**.

2.1 Site details

Site details are summarised in **Table 1.**

Table 1. Site Details

Site name:	**Goulburn Wheat Yards**
Address:	Off Sloane Street, Goulburn NSW 2580
Site owner:	Transport for NSW (TfNSW)
Site manager:	ARTC
Legal property description:	Part Lot 1 in DP 1185735 and part Lot 1 in DP 1187262
Site area:	76,903 m^2 (approx.)
Local government authority:	Goulburn – Mulwaree Council

Site name:	Goulburn Wheat Yards
Current land-use:	Commercial /Industrial – Railway yards
Zoning:	IN1 – General Industrial / RU1 – Primary Production

The site has been stratified for assessment purposes (Cavvanba, Oct 2022) into stratification sub areas that comprise the site as shown in attached **Figure F2**:

- AREA A: Former fuel depot
- AREA B: Former wheat yard sidings
- AREA C: Former stock yards
- AREA D: Access track
- AREA E: Former JS Hollingworth and Sons lease area
- AREA F: Former Caltex Depot

Detailed site plans including summary lead results (from Cavvanba 2022 for Areas A, B, C and D) are shown in the attached Figures 3a to 3d.

An operational Ampol (formerly Caltex) depot is also present at the southern end of the site, which does not form part of the audit area.

The site is bounded by:

- Chain link fence along Braidwood Road and the associated railway overpass in the north
- An agricultural fence and the Hume Highway overpass to the south
- Chain link and agricultural fence along Sloane Street to the west
- The refuge loop railway line (inclusive) to the east

It is noted that while the site forms part of the ARTC railyards and is accessible to railyards workers, no specific current land-use was observed on the site.

2.2 Adjacent land-uses

Based on site walkover and desktop review, adjacent land-uses are:

- NORTH: The Braidwood Road overpass, followed by the Goulburn ARTC Provisioning Centre, then residential areas (beyond Sloane Street) and the Goulburn commercial district.
- EAST: The main southern railway line followed by the Goulburn Railway Workshops and Goulburn Roundhouse. Further to the east is a residential area, car wreckers and associated commercial uses (automotive shops), dog track and Goulburn dressage club and associated facilities. Approximately 600m east of the site is the Mulwaree River.
- SOUTH: The Hume Highway overpass, followed by residential and rural properties.
- WEST: Sloane Street, followed by residential and commercial uses. Commercial properties/ warehouses are located along Finlay Road and the former Goulburn regional livestock saleyard is on the southern corner of Sloane Street and Finlay Road, which now appears vacant. A Delta Agribusiness depot is located on the southern corner of Sloane and Dossie Streets.

2.3 Site walkover observations

The auditor visited the site with ARTC representatives on 15 November 2022. A summary of relevant site walkover observations is presented in **Table 2.** Selected site photographs are provided in **Attachment A** to this letter report.

Table 2. Site walkover observations

Category	Observation
Current land use	Railyards, with no specific site use.
Boundary conditions	The site is bounded by the 'Refuge loop' rail line to the east and secured by chain-link and agricultural fencing to the west, chain-link fence along Braidwood Road to the north and agricultural fence and Hume Highway overpass to the south.
Site structures	No significant structures are present on the site. A large metal and timber building is present in the north of the site, however this appears to be largely outside the audit site boundary (see attached **Figure 3a**).
Surface covering	Site surface are largely unsealed, consisting of: • Exposed gravel, ballast and fill soils • Rock, rubble and debris • Sparse low vegetation and weeds • Localised areas of degraded bitumen and concrete • Footings of former structures Trees/ shrubs are present mainly along the western boundary of the site.
Stockpiled debris and wastes	Small to large gravel roadbase, ballast and waste stockpiles are present over the site. Rubbish, debris and wastes are present are also present on the site surface, generally consisting of drums, steel, timber, concrete, pallets and general rubbish. Bonded asbestos fragments were noted scattered over the site.
Waste disposal to ground or site filling	The site appears to have been cut and filled to provide flat topography for the rail corridor and siding. Further localised surface fill is apparent consisting of ballast/ gravels and fill soils.
Underground or above-ground fuel storage	No evidence of any existing above or below ground fuel storage infrastructure was observed.
Electrical transformers, substations or capacitors	No evidence of any electrical transformers or substations were noted on the site, however these are likely to have been present in the past.
Staining/odours and evidence of vegetation dieback/ stress	Large areas of the site contain evidence of vegetation dieback/ stress. Localised areas of staining were present, however no significant odours were noted.
Other observations	Stormwater infrastructure was noted on site, which receives stormwater from upgradient Sloane Street, which discharges via overland channels to an onsite earth stormwater channel, which flows to stormwater infrastructure on the rail corridor and rail yards to the east, ultimately discharging to the Mulwaree River, approximately 600m to the east. Some minor ponding of surface water was observed.
Photographs:	Attached: Plate 1 – Wheat yard siding looking north Plate 2 – Timber stockpile Area E Plate 3 – Waste and timber stockpiles Plate 4 – Wheat yard siding looking east Plate 5 – Wheat yard siding looking toward Ampol fuel depot (off site) Plate 6 – Wheat yard siding looking north, showing covered material stockpile Plate 7 – Wheat yard siding surface debris and fill Plate 8 – Wheat yard siding showing bonded asbestos fragments Plate 9 – Wheat yard siding looking north, showing cut and fill

Category	Observation
	Plate 10 – Stormwater infrastructure from Sloane Street Plate 11 – Stormwater flow channel from Sloane Street Plate 12 – Timber and metal building (off site) Plate 13 – Wheat yard siding looking south

3 PREVIOUS REPORTS

The following previous environmental assessment reports have been provided for this IAA:

A. Phase 1 Environmental Contamination Assessment – SR47, Goulburn (CMPS&F Pty Ltd, 1996)
B. Contamination Summary Report – JS Hollingsworth & Sons (Cavvanba, May 2019)
C. Preliminary Site Investigation – Goulburn Wheat Yard Sidings, Cavvanba Pty Ltd, June 2021
D. Stockpile Assessment – Off Sloane Street, Cavvanba Pty Ltd, September 2021
E. Preliminary Site Investigation and Detailed Site Investigation – Goulburn JS Hollingsworth and Sons (GHD Pty Ltd, 2021)
F. Supplementary Detailed Site Investigation – Goulburn JS Hollingsworth and Sons, GHD Pty Ltd, October 2021
G. Remediation Options Assessment – Goulburn JS Hollingsworth and Sons, GHD Pty Ltd, October 2021
H. Environmental Site Assessment – Goulburn Railway Yards, Cavvanba Pty Ltd, February 2022
I. Sampling and Analysis Quality Plan for Detailed Site Investigation, Cavvanba Pty Ltd, April 2022
J. Interim Environmental Management Plan - Goulburn Railway Yards, Cavvanba Pty Ltd, February 2022 (it is noted that this management plan applies to areas outside of the Goulburn Wheat Yards, but is intended to capture the entire operational railway yard)
K. Detailed Site Investigation, Goulburn Wheat Yard Sidings, Off Sloane Street, Goulburn NSW 2580, Cavvanba October 2022
L. Demolition, Remediation and Site Validation – Goulburn Depot, Sloane Street, Goulburn NSW, Parsons Brinckerhoff, November 2013

Summary review of the selected previous reports deemed to represent the site (i.e. reports A, E, F, K, L) is presented in **Section 3.1**.

3.1 Summary of previous reports

Table 3 presents a summary of the key reports, selected to represent the current characterisation of the component sub-site areas.

Table 3. Summary of previous reports

Document title:	**Phase 1 Environmental Contamination Assessment, SR47 Goulburn**
Date:	11 November 1996
Site:	Hollingsworth Pty Ltd 3200m^2 sub-lease area (Area E)
Prepared by:	CMPS&F Pty Ltd
Prepared for:	J S Hollingworth & Sons Pty Ltd
Key objectives:	
Phase 1 Environmental Contamination Assessment of the 0.32 ha Hollingsworth lease area undertaken to identify the issues associated with site contamination or other environmental matters, including requirements for Phase 2 Environmental Assessment	

Scope of work:

- Review of site description and background, site activities, adjacent land use and activities and historical site use
- Site inspection
- Consideration of other environmental issues, including wastewater, atmospheric emissions, chemicals inventory, waste management, transformers and sub-stations and asbestos
- Summary report and recommendations

QA/ QC Review

Not applicable

Key findings:

The report concluded:

- The site was being used as a storage facility for scrap metal and glass for recycling
- Oil staining was identified near a front-end loader at the rear of the site
- Compressed car bodies were stored on a narrow stretch of land between the site and the railway line
- Surface soils samples were collected and analysed at two locations, with one location reporting elevated concentrations of lead and zinc only.

Document title:	**Preliminary Site Investigation and Detailed Site Investigation**
Date:	May 2021
Site:	J S Hollingworth & Sons Pty Ltd 3200m^2 sub-lease area (Area E)
Prepared by:	GHD Pty Ltd
Prepared for:	ARTC

Key objectives:

- Undertake a DSI of soil and groundwater at the site to identify any contamination which poses human health or ecological exposure risks to the extent that requires management or remediation.
- Assess the need to undertake remediation and validation to make the site suitable for continued use for access and storage, and potentially ongoing railway activities.
- Meet regulatory obligations with respect to the duty to report to the NSW Environmental Protection Authority (EPA) under Section 60 of the Contaminated Land Act 1997 (CLM Act).

Scope of work:

- Preliminary desktop investigation and site walkover
- Sixteen sampling locations, including 7 boreholes (2.0m bgl), 4 surface bores (0.3m bgl) and 5 deep boreholes (7 -8m bgl) and conversion of 3 deep bores to groundwater monitoring wells
- Purge and sample groundwater monitoring wells
- Laboratory analysis of selected soil and groundwater samples for contaminants of potential concern
- Preparation of a PSI/ DSI report.

QA/ QC review:

QA/ QC data generated for this project were generally within acceptable limits, with some outliers identified. Overall, the data was considered overall sufficiently precise, accurate, representative, complete and comparable for the purposes of this investigation.

Key findings:

The report concluded:

- Based on aerial photographs review, the site was mostly vegetated before being cleared prior to 1953 and developed between 1967 and 1975
- Fill material was identified generally to 0.5m bgl, but up to 1.3m bgl consisting of consisting of Silty Sandy CLAY, low plasticity, brown or orange, often with gravel and foreign materials, including glass, plastic, concrete, tiles, metal, ballast
- Fill was underlain by natural soils to 5m bgl, then weathered bedrock to 6m bgl, then bedrock
- The following contamination was reported (summary):
- Various samples from the centre of the site reported heavy metal concentrations above ecological (copper, lead and zinc) and human health (lead) assessment criteria

The report recommended:

- The EPA should be notified of the site contamination in accordance with s.60 of the CLM Act
- The site should be kept secure and vacant until appropriate remediation is carried out
- ACM should be managed in accordance with Work Health Safety (WHS) regulations, including inspection and removal of visible asbestos, followed by clearance and validation
- The stained area on the northern portion of the site should be managed as part of ARTC or site specific environmental requirements which may include a surface scrape and removal of impacted soils. This may be carried out in conjunction with other remediation at the site.
- PCB and lead impacts in the vicinity of the former battery storage and former transformer storage areas require additional investigation for lateral delineation, confirmation that no offsite migration has occurred and to inform a remediation action plan.

Document title:	**Supplementary Detailed Site Investigation**
Date:	21 October 2021
Site:	J S Hollingworth & Sons Pty Ltd 3200m^2 sub-lease area (Area E)
Prepared by:	GHD Pty Ltd
Prepared for:	ARTC

Key objectives:

- Delineate areas of lead, polychlorinated biphenyl (PCB) and hydrocarbons in soil contamination as identified during the initial DSI and refine areas requiring remediation
- Provide sufficient data to delineate areas of contaminated soil (vertical and lateral delineation).
- Provide sufficient soil data for areas likely to be excavated, to calculate 95% upper confidence limit (average) (UCLav) concentrations for waste classification for offsite disposal
- Provide sufficient soil data for areas likely to be remain on-site following remediation to provide 95% confidence that remaining concentrations are below commercial/industrial criteria
- Assess whether soil contamination has migrated off-site.

Scope of work:

- Additional analysis of select soil samples collected during the DSI, including toxicity characteristic leaching procedure (TCLP) analysis
- Excavated test pits in 24 locations (including three outside the eastern site boundary) to a maximum depth of 1.5 metres below ground level (m bgl) and collected samples from the excavator bucket at depths of 0–0.1, 0.3–0.5, 0.8–1.0 and 1.2–1.5 m bgl
- Completed hand augers in two locations on the western boundary of the site to a maximum depth of 1 m bgl and collected soil samples at depths of 0.0–0.1, 0.3–0.5 and 0.8–1.0 m bgl
- Submitted all samples to a National Association of Testing Authorities (NATA) accredited laboratory.
- Selected samples for lead, PCBs, TRH and TCLP (lead) analysis.
- Implemented a Quality Assurance (QA) / Quality Control (QC) program during the works, including but not limited to following GHD standard Field Operating Procedures (SFOPs) and analysing intra and inter-laboratory duplicates, trip blanks and trip spikes
- Prepared a supplementary assessment factual report, outlining the estimated area requiring remediation, a statistical assessment of remediation and remaining areas and a preliminary waste classification for the remediation area.

QA/ QC review:

QA/ QC data generated for this project were generally within acceptable limits. Outliers in the data were identified, however considering sample heterogeneity in impacted fill material, the data was considered overall sufficiently precise, accurate, representative, complete and comparable for the purposes of this investigation.

Key findings:

The report concluded:

- All soil samples with exceedances of the adopted assessment criteria in this additional assessment were collected from fill material
- Lead impacts above human health and ecological assessment criteria were confirmed and delineated in surface soils in the centre of the site. Given the magnitude of the concentrations in some locations (>250% criteria), the contaminants are considered to pose an unacceptable risk to human health and would require remediation.
- PCB impacts above human health assessment criteria were confirmed and delineated on the eastern portion of the site. Given the magnitude of the concentrations in some locations (>250% criteria), the contaminants are considered to pose an unacceptable risk to human health and would require remediation.
- TRH impacts above ecological guidelines and/or management limits were also identified in two locations
- TRH impacts exceeding management limits may require remediation to avoid future restrictions to land use and to address aesthetic concerns (odours)
- The identified contamination has not migrated off-site
- There is sufficient data to identify the area requiring remediation
- Based on the lead concentrations in the proposed excavation area, the soil is classified as Restricted Solid Waste
- The PCB concentrations in the proposed excavation area exceeds the restricted solid waste criteria hence disposal of the soil will have to be carried out in accordance with the EPA's Polychlorinated Biphenyl (PCB) Chemical Control Order 1997
- Based on the concentrations of PCBs and lead exceeding human health criteria in surface soils at the site, the site is not considered suitable for commercial/industrial land use and remediation is required
- Consistent with the findings of the initial DSI, GHD considered to be a duty to notify contamination under Section 60 of the Contaminated Land Management Act 1997 on the basis of lead and PCB concentrations

- GHD recommended that the site should be kept secure and vacant until appropriate remediation is carried out and asbestos containing material should be managed in accordance with the relevant workplace health and safety regulations.

Document title:	**Detailed Site Investigation**
Date:	17 October 2022
Site:	Wheat yard sidings, stockyards, former fuel depot and access track sub-areas (Areas A, B, C and D)
Prepared by:	Cavvanba Consulting Pty Ltd
Prepared for:	ARTC

Key objectives:

- Supplement previous investigation data and further understand and delineate the extent of contamination associated with the data gaps previously identified
- Characterise the contamination present at the site to inform an appropriate assessment of potential risks to human health and/ or environment under the current land use scenario
- Provide further information to assist the NSW EPA in their decision making on whether the site requires regulation under the CLM Act.

Scope of work:

- Completion of a site walkover and visual inspection for key features within areas of environmental concern
- Installation of 12 boreholes to a maximum depth of 8 m using a combination of hand augering, and mechanical drilling
- Excavation of 73 test pits using an excavator to natural soils, or to maximum target depth of 2.0 m
- Use a photoionisation detector (PID) and portable x-ray fluorescence (XRF) analyser as a field screening tool
- Logging of the lithology at each soil bore / test pit and collection of soil samples for laboratory analysis at various depth intervals until termination.
- Conversion of six boreholes to groundwater monitoring wells.
- Development and purging of newly installed groundwater monitoring wells
- Gauging and sampling of all newly installed groundwater monitoring wells
- Submission of soil and groundwater samples to a National Association of Testing Authorities (NATA) accredited laboratory for analysis of potential contaminants of concern (PCOCs).
- Survey of newly installed groundwater monitoring wells to metres Australian Height Datum (AHD) and eastings and northings by a registered surveyor
- Preparation of a DSI report detailing the results of the investigation.

QA/ QC review:

Data usability assessment indicated that the data generated for the assessment was of sufficient reliability to support the conclusions made in the report.

Key findings:

In summary, key findings of the DSI were:

- The site is an operational railway with a long history of industrial activity going back to the early 1900s, including storage and/ or transfer of what, wool or livestock, bulk storage and transfer of fuels and as a siding for transfer of mineral concentrate from the former Woodlawn mine
- Soil profile consists of silty clayey gravel/ gravelly clay fill to between 1.2m and 1.8m bgl, underlain by natural light brown/ red mottled sandy clay and siltstone
- Fill in Area B (former wheat yard sidings) consisted of black sandy gravel with coal ash, particularly near to railway sidings and railway infrastructure
- Fragments of asbestos containing materials (ACM) were observed on soils at one location in Area A (former fuel depot) and three locations in Area B
- Lead concentrations exceeded the health investigation level of 1,500 mg/kg at one location in Area A (4,670 mg/kg) and at 23 locations in Area B (maximum concentration of 193,000 mg/kg)
- Apart from asbestos, soils were not found to be contaminated by any other PCoCs above health investigation levels and Area C (former stockyards) and Area D (access track) did not contain soils with any contamination exceeding health and ecological investigation levels or screening criteria
- Groundwater was not found to have been impacted by lead contamination
- The report concluded that there was an unacceptable risk to human health and the environment due to lead contamination in Area B, which requires remediation
- It was speculated that lead contamination in Area A was likely associated with lead based paints, which may require further investigation and delineation
- In Area B where lead contamination was recorded, co-contamination by arsenic, copper and/ or zinc indicated the source of contamination may be associated with metal ore concentrated historically placed in the area
- Areas C and D were considered suitable for on-going commercial/ industrial use

Document title:	**Demolition, Remediation and Site Validation – Goulburn Depot, Sloane Street, Goulburn NSW (22643)**
Date:	6 November 2013
Site:	Former Caltex Fuel Depot (Area F)
Prepared by:	Parsons Brinckerhoff
Prepared for:	Caltex Australia Petroleum Pty Ltd

Key objectives:

The stated objectives of the project reported in this document were to:

- Remove all infrastructure from the site
- Characterise and remediate residual hydrocarbon impacts to soil and groundwater across the site
- Validate the site as suitable for continued industrial/commercial land use.

Scope of work:

- Location, isolation, disconnection and abolition all services at the property boundary and provision of temporary fencing around the forecourt of the site
- Establishment of sediment and erosion control
- Removal and appropriate disposal of hazardous materials (including asbestos containing materials, synthetic mineral fibre and/or lead paint) in the building structures and infrastructure at the site
- Demolition of site buildings including two brick, metal, glass and wood buildings (10x9x5 m and 14x9x5 m)
- Demolition of one concrete and brick drum platform (7x9x1 m)

- Pump out and disposal of any residual fuel/water from aboveground storage tanks (AST)/underground storage tanks (USTs) and associated product lines
- Destruction and removal of ASTs, USTs, all associated fuel infrastructure including aboveground, underground and protruding pipework, unloading points, valves, etc., pipework, buildings and other infrastructure
- Removal of a surge tank and associated oil/water separator and holding tank
- Removal of a septic tank
- Confirmation test pitting in areas of previously identified impact yet to be vertically delineated
- Disposal off-site of building rubble, general rubbish, concrete rubble, pipework and tanks etc.
- Removal of contaminated soil from excavations, validation of all excavations and stockpiles
- Soil treatment via land-farming to minimise off-site disposal volumes
- Remediation via enhanced biodegradation of hydrocarbon impacted perched groundwater
- Backfilling and compaction (track rolling only) of all validated excavations
- Removal and reinstatement of existing internal front fence.

QA/ QC review:

QA/ QC data review indicated that the data generated for the validation assessment was sufficiently precise and accurate for the purpose of this project.

Key findings:

In summary, key findings of the report were:

- Site demolition and validation was completed by Enviropacific Service (EPS) under the supervision of Parsons Brinckerhoff as Principal Contractor
- Validation sampling across the site indicated that the residual impacts identified are not considered to pose a health risk to future site users and the site is considered to be suitable for the allowable land use (commercial/industrial)
- Groundwater remediation reduced dissolved phase hydrocarbon impacts in perched water across the site
- Parsons Brinckerhoff concluded that no impacts have migrated off-site and that no further investigation off-site is deemed necessary.

4 SITE HISTORY

4.1 Summary of site history

In summary from the available environmental reports, the whole site was agricultural land up to 1918. In 1918, a mouse plague occurred and two emergency wheat dumps were set up near the site and railway sidings were constructed for the transport of bagged wheat from Wagga Wagga to Goulburn. The site has been used since that time for storage and transport of livestock, wool and mineral ore concentrate.

Between the late 1960's to late 2000's the central-southern portion of the site (i.e Area E) operated as a scrap metal storage and recycling facility owned by JS Hollingsworth and Sons.

Two bulk fuel depots were located on the site. The northern most depot was present between 1944 to mid-1990s, when it was demolished. The owner and operator of the fuel dump is unknown and it is also unknown what remediation and validation activities were conducted when the fuel depot was decommissioned.

The southern-most fuel depot was formerly operated by Caltex Australian Petroleum. Site history included in Parsons Brinckerhoff (2013) indicates the site commenced operation in 1963 as a fuel depot and was operated by Golden Fleece until Caltex acquired the site in 1981. Storage depots previously on the site included 8 above-ground storage tanks, 4 underground storage tanks, a roofed store and 2 further USTs containing unknown product. Known products stored on the site included petrol, diesel, heating oil, kerosene and petroleum oil.

The report also refers to an asbestos septic tank being removed from the site, as well as asbestos pipework, gaskets and building materials.

In 2013 all remaining tanks and structures on the site were demolished and remediation and validation activities were completed.

4.2 Auditor's opinion

The following is noted regarding the adequacy of the site history presented in the reviewed reports:

- The source of information that the site commenced operation as railway sidings in 1918 is unknown (likely anecdotal).
- Historical aerial photograph review was conducted from 1944 to 2020, with review of aerial photographs from approximately each decade. Given aerial photograph review commences in 1944 (likely earliest available photograph), it provides no information regarding activities that may have occurred prior to 1944. The historical aerial photograph review provides corroborating evidence for use of the former fuel depot use in the north of the site, the JS Hollingsworth & Sons lease area and the Caltex fuel depot areas, as well as the removal of warehouses/ sheds associated with the former Wheat Yard Sidings. The aerial photograph review provides no information regarding the use of the site for storage and transport of mineral ore concentrate from the Woodlawn mine and it is assumed that this information is anecdotal.
- Cavvanba (October 2022) refers to a stockpile present on Area A, which had been previously assessed by Cavvanba (September 2021). Cavvanba indicates that the stockpile was generated from various works within the Goulburn railway yards carried out within potentially contaminated areas. The source of this information is anecdotal, from ARTC personnel.
- Robust information is available regarding storage depots and activities on the former Caltex fuel depot area[3], however limited information is available regarding storage depots and activities on the former northern fuel depot area.
- Regulatory records searches have been completed (Cavvanba June 2021) and are deemed to be adequate.

Overall, the site history review is considered sufficient as a basis for subsequent phases of assessment on the former Wheat Yard Sidings and former Caltex fuel depot areas. However, detailed historical information regarding storage depots and operations of the northern fuel depot area is absent.

5 CONTAMINANTS OF CONCERN

The Cavvanba (April 2022) SAQP, which was prepared to provide guidance for the most recent DSI (Cavvanba October 2022), lists the potential contaminants of concern (PCOCs) as:

- Total Recoverable Hydrocarbons (TRH) – associated with fuels, oils, grease, fill material, solvents and degreasers
- Benzene, toluene, ethyl-benzene, xylenes, naphthalene (BTEXN) – associated with fuels, fill material, solvents and degreasers
- Polycyclic aromatic hydrocarbons (PAHs) – associated with bitumen, tar, asphalt, fuel, oil, grease and ash
- Heavy metals (arsenic-As, cadmium-Cd, chromium-Cr, copper-Cu, lead-Pb, mercury-Hg, nickel-Ni, zinc-Zn) – associated with fuel storage, metal ore concentrate storage and distribution, coal/ ash and fil material and building materials
- Asbestos, in the form of free fibres and ACM – associated with pipework and construction materials, demolition activity, waste and fill material.

Cavvanba also identifies 'secondary' PCOCs as:

- Phenols – constituent of fuel and waste oil

[3] Separate environmental site assessment, remediation and validation reports prepared for Caltex

- Organochlorine and organophosphorous pesticides (OCP/ OPPs) – associated with pest and weed control
- Polychlorinated biphenyls (PCBs) – associated with historical dielectric and coolant fluids in electrical transformers and apparatus, as well as fill material. These compounds are of particular concern for the JS Hollingsworth lease area.

GHD (May 2021) and GHD (October 2021) identifies the following PCOCs for the JS Hollingsworth lease area (Area E):

- Heavy metals
- TRH, BTEX, PAHs and phenols
- OCP/ OPP and PCBs
- Asbestos
- Volatile organic compounds (VOCs)

Parsons Brinckerhoff (2013) is a validation report following demolition and remediation works at the former Caltex depot (Area F), which also contains a summary of previous environmental assessment conducted on this sub-area. This report identifies the following contaminants of concern:

- TRH, BTEX, PAHs and lead

5.1 Auditor's opinion

The auditor considers the PCOCs adopted by Cavvanba to be appropriate, with the following comments/ exceptions:

- The PFAS NEMP 2.0 (Appendix B, Table B1) lists onsite firefighting associated with fuel transport and storage as well as waste storage as activities potentially associated with per- and poly-fluoroalkyl substances (PFAS) contamination. Therefore, the auditor considers that PFAS should be considered an additional PCOC, particularly for the former fuel depots and JS Hollingsworth lease areas, until site sampling and analysis of soil and groundwater is able to exclude the presence of PFAS contamination on the site.
- There may have been other sources of asbestos on the site, apart from bonded ACM. Therefore, consideration of asbestos on the site should include ACM as well as asbestos fines (AF) and fibrous asbestos (FA), in accordance with the ASC NEPM
- Given that the former Caltex depot (Area F) commenced operation in 1963 and is likely to have had railway use prior to this time, assessment of this area PCOCs associated with railyards (i.e. heavy metals, OCP/ OPPs, PCBs and asbestos).

6 GEOLOGY AND HYDROGEOLOGY

Cavvanba (October 2022) describe the following geology and hydrogeology for the site:

- Soils on the site are described as Sodosols. According to previous environmental investigations conducted at the site, natural soils have been characterised as soft, high plasticity light brown sandy clays, with red / orange mottling, underlain by orange gravelly sand / gravelly clay and sandy clay to depths of approximately 10 m. These are typical of alluvial soils and are consistent with the described geology.
- Intrusive investigations identified the soil profile to generally comprise gravelly sandy clay/ sandy gravel fill material to depths of up to 1.4m bgl, underlain by natural orange to brown sandy clay. Fill material was observed to consist of black sandy gravel with inclusions of coal ash, particularly close to railway lines.
- According to the Goulburn 1:250,000 Geological Series Sheet 55-12 (Second Edition, 2013), the site is located underlain by Cainozoic Aged alluvium consisting of gravels and sands overlying Palaeozoic Aged Gundary beds consisting of sandstone, siltstone volcanic mudstone and lithic-quartz

sandstone. Siltstone bedrock was reported to be present from approximately 2.0 m to 8.0 m in the north-western portion of the site and 9 m to 12 m in the southern portion of the site.

- According to Combined Phase 1 and 2 Environmental Site Assessment -Caltex Goulburn Fuel Depot, Sloane Street, Goulburn NSW (Parsons Brinckerhoff Australia Pty Limited, 2011), shallow / perched groundwater was encountered at depths ranging from 2.5 m to 5 m within the gravelly clay and gravelly sand layers. However, regional groundwater was reported to be present within the underlying sandy clay and siltstone bedrock to depths of between 5.9 m and 8.3 m.
- Based on the surface topography, elevation and the adjacent surface water course, it is anticipated that regional groundwater generally flows to the east and north, consistent with the local topography towards Mulwarree River.

6.1 Auditor's opinion

The auditor considers that Cavvanba (October 2022) along with the previous environmental assessments prepared for the site, adequately describe soil stratigraphy, geology and hydrogeology, for remediation planning purposes.

7 EVALUATION OF SAMPLING AND ANALYSIS PLAN AND METHODOLOGY

7.1 Field investigation scope

The SAQP (Cavvanba, April 2022) describes the investigation strategy. The following is noted:

- The site was stratified into six sub-areas of concern (Areas A to F as listed in **Section 2.1**), however Area E and F (JS Hollingsworth lease area and former Caltex depot) were excluded from the Cavvanba (October 2022) DSI as it was considered that these areas had been previously appropriately characterised. The investigation scope for Areas E and F are discussed separately below.
- The intrusive investigation scope for Areas A to D was based on consideration of the preliminary Conceptual Site Model (CSM) and Data Quality Objectives (DQOs) and was supplementary to previous investigations. Generally, a stratified and systematic (grid) approach was applied to supplementary investigation, however Cavvanba states that investigation locations were positioned (i.e biased) 'to gain an appropriate degree of characterisation between existing infrastructure, such as railway lines, sidings, etc.'.
- The investigation scope for areas A to D is summarised in **Table 3**:

Table 4. Cavvanba (Oct. 2022) investigation scope

Area/ description	Approx Area	Existing locations	Required locations	Proposed locations	Actual locations
A- Former fuel depot	5,000 m^2	4	13	3 groundwater wells (gw), 8 test pits (tp)	3 gw, 8 tp
B- Wheat yard sidings	5.4 ha	53	60	3 gw, 50 tp, 2 boreholes (bh)	3 gw, 50 tp, 2 bh
C- Former stockyards	1.2 ha	3	25	15 tp	14 tp
D- Access track	3,200 m^2	0	7	4 tp	4 bh

- Sampling locations reported in Cavvanba (October 2022), as well as summary results, are shown on the attached Figures 3a to 3d

- Systematic sampling in each area was based on Table A of NSW EPA (1995)[4] 'Sampling Design Guidelines', which provides minimum sampling points required or site characterisation based on detecting circular hot spots using s systematic sampling pattern
- Areas C and D were deemed 'lower risk areas' and were assessed on 50% of density required by Table A of NSW EPA (1995)
- In Area A, two locations (1 tp and 1 mw) were located to target the former aboveground storage tank locations
- In Area A, one groundwater well was located upgradient of former fuel infrastructure and one well was located downgradient of former fuel infrastructure
- Cavvanba also used an XRF analyser to assist in targeting and delineating heavy metal contaminated soils as well as a photo-ionisation detector (PID) to target hydrocarbon contaminated soils in the field
- Cavvanba (October 2022) notes that surface water and stormwater 'appears to be controlled and directed to the stormwater infrastructure that is currently present at the site. The site receives stormwater from Sloane Street to the west of the site, which discharges overland to an earthen stormwater drainage channel on-site. It is understood that all stormwater would be directed to below ground stormwater infrastructure and discharge beneath the railway corridor to the east, eventually discharging to the Mulwaree River, located approximately 580 m from the site'. Given that stormwater may present a pathway for offsite migration of contamination, either as dissolved contamination or suspended sediments, the auditor notes that no assessment of contamination in stormwater or sediments has been carried out on the site.

GHD (May 2021) and GHD (October 2021) describe investigations carried out to date for Area E Hollingsworth lease area. The following is noted regarding the investigation approach:

- For the 3,200 m^2 area, a total of 42 investigation locations were completed, comprising:
  - 7 boreholes to maximum depth of 2m bgl (GHD May 2021)
  - 4 surface bores to depth of 0.3m bgl (GHD May 2021)
  - 5 deep boreholes to maximum depth of 7.7m bgl, three of which were converted to groundwater monitoring wells (GHD, May 2021)
  - 21 test pits to target depth of 1.5m bgl (GHD (October 2021), plus 3 test pits and 2 hand auger locations (1.0m bgl) carried out on the eastern and western site boundary, respectively.
- The GHD (May 2021) investigation targeted areas of environmental concern, including car battery storage, transformer storage oil-stained areas and remaining site areas
- The GHD (October 2021) investigation was supplementary to GHD (May 2021) generally providing systematic coverage over remaining areas of the site
- The 3 groundwater wells installed by GHD (May 2021) appear to be clustered in the southeast corner of the site and may not provide coverage of the entire site
- The total investigation density (42 locations) exceeded the minimum density specified by NSW EPA (1995) of 9 – 10 locations

Parsons Brinckerhoff (PB, 2013) includes the validation assessment of the former Caltex depot area (Area F), which was carried out generally in accordance with the (now superseded) NSW EPA (1994) 'Guidelines for Assessing Service Station Sites and NSW EPA (1995) 'Sampling Design Guidelines'. The validation assessment included samples targeting former infrastructure, sampling of remediated contaminated soil stockpiles. Figures 6 and 7 from PB (2013) showing soils and stockpile sampling locations are included as **Attachment B** to this letter.

Groundwater was assessed by PB during their 2011 Phase 1 and 2 Environmental Site Assessment, which found:

[4] Now superseded by NSW EPA (August 2022), Sampling design part 1 – application and Sampling design part 2 – interpretation.

- Shallow perched water inflow was encountered at depths ranging from 2.5 to 5.0m bgl within gravelly clay and gravelly sand layers
- Deeper regional groundwater aquifer was encountered at depths ranging from 7.5 to 10.0 m bgl within the medium to high plasticity sandy clay layer, extending to depth within the underlying siltstone bedrock
- Elevated concentrations of TRH and BTEX compounds, exceeding site assessment criteria, were recorded in perched water from locations in the vicinity of and to the east and southeast of the AST farm and concentrations of TRH and BTEX compounds were recorded below the site assessment criteria in perched water samples collected south of the AST farm
- PB (2013) reports that shallow groundwater remediation activities included inception trenching and dosing groundwater with Oxygen Release Compound (ORC)
- Following remediation, groundwater assessment was carried out using 7 existing preserved groundwater monitoring wells – MW1, MW2, MW3, MW5, MW6, MW7 and MW8. Groundwater monitoring well locations are shown on Figure 5 from PB (2013), included in **Attachment B**
- As well as groundwater sampling, representative surface water samples were obtained along the adjacent creek from locations upgradient and downgradient of the site to confirm impacts have not migrated off-site.

7.2 Analytical plan

For the Cavvanba (October 2022) DSI, the following is noted:

- The analytical schedule carried out was generally consistent with the SAQP (Cavvanba April 2022), with selected samples analysed for the contaminants of concern:
  - Metals at frequency of approximately 2 samples per investigation location (159 samples)
  - TRH/ BTEXN and PAHs at 0.5 – 1 sample per location (55 samples)
  - OCP/ OPP and PCBs at 0.25 – 0.5 samples per location (25 samples)
- No samples were analysed for asbestos in soils, however 8 asbestos determinations in fragments were carried out
- No samples (soil or groundwater) were analysed for PFAS chemicals, which may be considered a PCOC for Area A

For GHD (May 2021) and GHD (October 2021) assessment of Area E, the following is noted:

- The analytical schedule applied in GHD (May 2021) was broad, including 1 to 2 samples per borehole analysed for TRH/ BTEX and 0.5 to 1 sample analysed for remaining contaminants of concern
- The analytical schedule applied in GHD (October 2021) supplemented GHD (May 2021), concentrating on delineation of lead and PCB impact with up to 3 samples per investigation location analysed for these analytes
- While soils samples were collected for asbestos analysis, samples were analysed for presence/ absence of asbestos only and no AF/ FA analysis was undertaken for comparison with ASC NEPM criteria.

For PB (2013) assessment of Area F, the following is noted:

- Appropriate soil and groundwater sample quantities were analysed for TRH/ BTEX, PAHs and lead, generally in accordance with the NSW EPA (1994) 'Guidelines for Assessing Service Station Sites
- Only 1 sample was submitted for asbestos analysis during the validation program (from beneath the former asbestos septic tank), which was analysed for presence/ absence of asbestos. Given the prevalence of asbestos sources on this site (i.e. pipework, gaskets, building materials, fill as well as railway sources), asbestos assessment for this site does not preclude that widespread asbestos contamination may remain.

7.3 Auditor's opinion

Area A (former fuel depot) is considered to be adequately characterised for soil and groundwater, except for the following:

- There appears to be a data gap in the northeast corner of this area with regard to soil and groundwater, noting that TPA01 is a stockpile sample and that there are no groundwater monitoring wells in this area which is likely directly downgradient of former petroleum storage infrastructure
- As PFAS chemicals are a PCOC for this area, sampling of soils and groundwater should be carried out for PFAS to establish whether PFAS are at concentrations that present a risk to human health or the environment
- An assessment for asbestos in soils as asbestos fines (AF) and fibrous asbestos (FA) should be carried out and assessed in accordance with the ASC NEPM and to inform appropriate asbestos remediation and management.

Areas B, C & D (former wheat yards, stockyards and access track) are considered to be adequately characterised for soil and groundwater, except:

- An assessment for asbestos in soils as AF/ FA should be carried out and assessed in accordance with the ASC NEPM and to inform appropriate asbestos remediation and management.

Area E (former JS Hollingworth and Sons lease area), is considered to be adequately characterised for soil and groundwater, except:

- There appears to be a data gap for groundwater in the northeast corner of this area, which may be considered downgradient of former contamination source areas
- An assessment for asbestos in soils as asbestos fines (AF) and fibrous asbestos (FA) should be carried out and assessed in accordance with the ASC NEPM and to inform appropriate asbestos remediation and management.

Area F (former Caltex depot) is considered to be adequately characterised for soil and groundwater, except:

- As PFAS chemicals are a PCOC for this area, sampling of soils and groundwater should be carried out for PFAS to establish whether PFAS are at concentrations that present a risk to human health or the environment
- An assessment for asbestos in soils as asbestos fines (AF) and fibrous asbestos (FA) should be carried out on a systematic basis over this area and assessed in accordance with the ASC NEPM and to inform appropriate asbestos remediation and management
- Validation assessment on the site has targeted former fuel infrastructure but has not addressed PCOCs or areas of environmental concern associated with possible railyard use of this area prior to 1963. The auditor recommends supplementary assessment of this area be carried out to address this data gap.
- It is not clear from PB (2013) whether the deeper aquifer on the former Caltex fuel depot site has been assessed/ validated following remediation activities in 2013. Further, only 1 round of groundwater sampling was carried out on the site following remediation in 2013. The auditor considers that a further round of groundwater assessment is warranted on the site, assessing both deep and shallow groundwater.

Surface water flows and formal stormwater channels on the whole site may present offsite migration pathway for contamination, either as dissolved contamination or suspended sediments, potentially impacting the Mulwaree River or residential areas to the east. The auditor recommends that sampling and analysis of surface waters as well as sediments in the stormwater system be carried out for the contaminants of concern, to update the conceptual site model and inform remediation approaches and site management.

8 SITE ASSESSMENT CRITERIA

8.1 Soil assessment criteria

Cavvanba (October 2022), GHD (May 2021 and October 2021) and PB (2013) adopted human health criteria for soils from the following sources:

- ASC NEPM Health Investigation Levels (HILs) for 'Commercial/ Industrial' land-use (HIL-D)
- ASC NEPM Health Screening Levels (HSLs) for 'Commercial/ Industrial' land-use (HSL-D)
- ASC Management Limits (MLs) for petroleum hydrocarbons for commercial/ industrial use
- ASC NEPM asbestos criteria for ACM, FA and AF, however Cavvanba and GHD did not include sampling and analysis for AF and FA, as they assumed the source of ACM on site was only ACM and that asbestos fines impacts were trivial.

GHD (May 2021 and October 2021) also adopted:

- Soil direct contact HSLs for commercial industrial land-use and intrusive works from CRC Care Technical Report No. 10 – Health screening levels for petroleum hydrocarbons in soil and groundwater – Part 1: Technical Development Document and Part 2: Application Document (CRC Care, 2011), (Appendix A, Table 4)
- Soil HSLs for vapour intrusion for intrusive maintenance workers from CRC Care (2011), (Appendix A Table A3)

Cavvanba (October 2022) and GHD (May 2021 and October 2021) adopted environmental criteria for soils from the following sources:

- ASC NEPM Ecological Investigation levels (EILs) and Ecological Screening Levels (ESLs) for 'commercial-industrial' land-use

Cavvanba and GHD applied EILs for aged contamination, based on site specific soil characteristics (pH, cation exchange capacity and clay content). PB (2013) applied only generic EILs for lead and naphthalene only.

8.2 Groundwater assessment criteria

Cavvanba (October 2022) adopted groundwater assessment criteria from the following sources:

- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG 2018)
- National Health and Medical Research Council (NHMRC), Australian Drinking Water Guidelines (ADWG), updated March 2021 (NHMRC, 2011)
- Groundwater HSLs for vapour intrusion applicable to commercial/ industrial use (HSL-D) from CRC Care (2011) – Part 2: Application document, Appendix B, Table B2.

In applying ANZG 2018, Cavvanba have applied Tier 1 criteria for protection of drinking water as well as protection of freshwater environments, considering 95% level of species protection. The auditor also notes that the HSLs applied for petroleum levels in groundwater (CRC Care 2011) are protective of the dominant vapour exposure pathway and are equivalent to the levels for sand provided in Table 1A(4) of Schedule B1 of the ASC NEPM.

GHD (May 2021) adopted the following groundwater assessment criteria:

- ASC NEPM groundwater HSLs for vapour intrusion from Schedule B1, Table 1A(4)
- Groundwater HSLs for intrusive maintenance worker (shallow trench), from CRC Care (2011) – Part 2: Application document, Appendix B, Table B2
- Drinking water guidelines from NHMRC (2011) ADWGs and ASC NEPM Schedule B1, Table 1C
- Recreational criteria based on NHMRC (2011), ten times the ADWG health guidelines.

GHD (October 2021) did not include groundwater assessment.

PB (2013) adopted groundwater assessment criteria from the following source:

- Australian and New Zealand Environment Conservation Council (ANZECC,), Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC, 2000)
- Groundwater HSLs for vapour intrusion from ASC NEPM, Schedule B1, Table 1A(4)

In applying ANZECC 2000, PB have applied Tier 1 criteria for benzene, xylenes, naphthalene and lead for protection of freshwater environments, considering 95% level of species protection. PB also excluded the application of ADWGs, as there were no bores located downgradient of the site identified for drinking water use.

8.3 Auditor's opinion

The auditor considers that the soil and groundwater assessment criteria applied in the referenced assessments are generally appropriate, though the following should be considered:

- Sampling and analysis to allow comparison with ASC NEPM criteria for asbestos as ACM, AF and FA should be carried out
- The application of groundwater assessment criteria, needs to be primarily based on the approach described in the ASC NEPM (and supporting guidelines), with consistency in approach regarding environmental values of the aquifer with regard to drinking water and recreational use
- The use of groundwater for potential stock watering should be considered as an environmental value for protection of groundwater.

9 EVALUATION OF SOIL RESULTS

9.1 Field results

Cavvanba (October 2022) documented the key field observations for the former fuel depot (Area A), former what yards sidings (Area B), former stockyards (Area C) and access track (Area D), summarised as follows:

Area A – Former fuel depot

- The soil profile comprised of a silty clayey gravel / gravelly clay fill material to a maximum depth of 1.8 m (TPA01), underlain by natural light brown / red mottled sandy clay and siltstone
- The existing stockpile which was previously identified and assessed remained present in the northern portion (refer to Section 1.3.3). A smaller stockpile (approximately 1 m3) of soil and anthropogenic material (bricks, concrete and metal) was also identified in the western portion of the area.
- Anthropogenic material, including glass, asphalt, plastic, concrete, bricks, tiles and metal were observed in fill material at a number of locations within the area
- A piece of non-friable potential ACM was identified within fill material during boring at monitoring well location MW02, which was confirmed as chrysotile asbestos
- A slight petroleum hydrocarbon odour and/or staining was present in soil at the following locations:
  - TPA03 from a depth of 0.9 m – 1.0 m, with a PID reading of 0.0 ppm
  - TPA04 from a depth of 0.7 m – 0.8 m, with a PID reading of 0.0 ppm
  - MW01 from a depth of 5.0 m with a maximum PID field screening result of 5.6 parts per million (ppm) (isobutylene equivalent)
  - MW03 from a depth of 4.0 m with a maximum PID reading of 157.6 ppm.

Area B – Former wheat yard sidings

- The soil profile comprised of a silty clayey gravel / gravelly clay fill material to a maximum depth of 1.2 m, underlain by natural light brown / red mottled sandy clay. Fill material was observed to consist of black sandy gravel with evidence of coal ash, particularly within close proximity to the railway sidings and railway infrastructure

- A stockpile (less than 10 m^3) of soil and anthropogenic material (glass, plastic, bricks, tiles, concrete and metal) was identified in the central portion of the Area, adjacent to the former JS Hollingsworth & Sons site
- Anthropogenic material, including ash, glass, plastic, rubber, concrete, bricks, tiles and metal was also present within fill material at a number of locations across Area B
- A thin layer (approx. 10 mm) of green – stained soils was observed within TPB48 at a depth of 0.1 m
- There were no unusual odours identified and resultant PID readings at this location were 0.0 ppm
- Petroleum hydrocarbon odours or staining were not present on the surface or throughout any of the remaining test pit / borehole locations advanced within this area
- PID field screening results were not reported above 0.0 ppm within any of the soil samples collected and analysed
- Less than 10 fragments of non-friable potential ACM were observed on surface soils within Area B. All representative fragments collected and analysed returned a positive result for asbestos. ACM was identified at the following locations:
    - ACM02, within the vicinity of groundwater monitoring location MW04 in the northern portion of the area
    - ACM03, adjacent to the small building at the entrance to the site from Sloane Street
    - ACM04, adjacent to the filled area within the location of TPB34 in the central portion of the site

Area C – Former stockyards

- The soil profile generally comprised of a sandy silty clay fill and reworked natural soils to a maximum depth of 0.6 m (TPC13), underlain by natural light brown / red mottled sandy clay
- Evidence of anthropogenic material, being coal fragments were identified within fill material at one location only
- Unusual odours or staining were not present on the surface or throughout any of the test pit locations advanced within this area
- PID field screening results were not reported above 0.0 ppm within any of the soil samples collected and analysed
- There was no evidence of ACM in or on soils throughout this area, nor was there any evidence of construction or demolition waste (bricks, tiles, concrete, etc).

Area D – Access track

- The soil profile generally comprised of a sandy silty clay fill / reworked natural soil to a maximum depth of 0.3 m (BHD04), underlain by natural light brown / red mottled sandy clay.
- There were no unusual odours or staining present on the surface or throughout any of the borehole locations advanced within this area
- PID field screening results were not reported above 0.0 ppm within any of the soil samples collected and analysed
- There was no evidence of ACM in or on soils throughout this area, nor was there any evidence of construction or demolition waste (bricks, tiles, concrete, etc)

It is noted that all areas assessed by Cavvanba were generally unsealed.

Area E – Former JS Hollingsworth and Sons lease area

GHD (October 2021) documented field results and observations for the JS Hollingsworth and Sons lease area (Area E), summarised as follows:

- The soil profile was comprised of soil fill, generally to a depth of approximately 0.3 m bgl but up to 1.3 m bgl (TP02), consisting of silty sandy clay, low plasticity, brown or orange, often with gravel and some anthropogenic materials, including ceramic, brick, glass, plastic, concrete, tiles, metal, ballast and coal

- Soil fill was underlain by natural soil consisting of clay with sand and silt, low plasticity, grey/brown or yellow/orange, with some ironstone gravels in some areas
- No hydrocarbon odours and/or obvious visible staining was observed in soil excavated from all testpits or hand auger locations except for at 2 locations (TP09 at 0.8-1m and TP20 at 0.3-0.5 m, hydrocarbon odour and possible staining)

Area F – Former Caltex fuel depot

PB documented field results and observations for the former Caltex fuel depot (Area F), summarised as follows:

- The Parsons Brinckerhoff (2011) Phase 1 and 2 ESA works indicated that the subsurface comprised clayey sandy gravel/gravelly sand fill and topsoil up to 0.7 m thick across the majority of the areas of the site investigated
- The fill and topsoil materials were generally underlain by silty/sandy clay and gravelly sand/gravelly clay layers, extending to a depth of between 7.5 to 10.0 mBGL and overlying a sandy clay layer to the maximum depth of investigation
- Siltstone bedrock was also encountered at two locations to the maximum depth of investigation (12.0m bgl in both).

9.2 Analytical results

Summary results for lead from Cavvanba (2022) covering Areas A, B, C and D are shown on the attached Figures 3a to 3d.

Analytical results reported by Cavvanba (October 2022), GHD (May and October 2021) and PB (2013) are summarised as follows:

Area A – Former fuel depot

- Lead concentrations were reported to exceed the health investigation level of 1,500 mg/kg within surface soils at one location, with a reported concentration of 4,670 mg/kg
- All remaining potential contaminants of concern in soil in Area A were reported below the adopted health-based assessment criteria
- Fragments of non-friable ACM material was identified in soil at one location

Area B – Former wheat yard sidings

- Lead was reported to exceed the health investigation level at 23 locations advanced within Area B, with a maximum reported concentration of 193,000 mg/kg
- Lead exceedances were identified to be widespread across the central and eastern portion of Area B, with the highest concentrations being reported within and around the existing railway siding infrastructure
- Benzo(a)pyrene also exceeded health investigation level (HIL-D) at one location in Area B (reported in Cavvanba 2021)
- Arsenic, copper, lead, nickel, zinc and benzo(a)pyrene also exceeded environmental investigation levels, with copper, nickel and zinc appearing to be co-located with lead exceedances
- Asbestos was confirmed within bonded ACM fragments collected from the surface at 3 locations.

Area C – Former stockyards

- Concentrations of potential contaminants of concern in soil within Area C were reported below the adopted human health and ecological screening criteria in all samples collected and analysed.
- Cavvanba concluded that Area C was considered suitable for ongoing commercial/industrial use in line with the current zoning.

Area D – Access track

- Concentrations of potential contaminants of concern in soil within Area D were reported below the adopted human health and ecological screening criteria in all samples collected and analysed.

- Cavvanba concluded that Area D is considered suitable for ongoing commercial/industrial use in line with the current zoning.

Area E – Former JS Hollingsworth and Sons lease area

GHD (October 2021), reported the following soil results:

- Lead contamination in soils above human health and ecological assessment criteria were confirmed and delineated in surface soils in the centre of the site. Given the magnitude of the concentrations in some locations (>250% criteria), the contaminants are considered to pose an unacceptable risk to human health and would require remediation.
- PCB contamination above human health assessment criteria were confirmed and delineated on the eastern portion of the site. Given the magnitude of the concentrations in some locations (>250% criteria), the contaminants are considered to pose an unacceptable risk to human health and would require remediation.
- TRH impacts above ecological guidelines and/or management limits were also identified in two locations. However, given the limited ecological amenity at the site and the lack of buildings and services, GHD considered unlikely that these impacts will pose an unacceptable risk to the environment or property. TRH impacts exceeding management limits may require remediation to avoid future restrictions to land use and to address aesthetic concerns (odours).
- The identified contamination has not migrated off-site

Area F – Former Caltex fuel depot

PB (2013) carried out validation sampling and analysis following removal of fuel depot infrastructure and results were all below applicable HIL and HSL criteria.

Concentrations of the analytes tested were also below respective EIL and ESL screening levels, except for TRH ($>C_{10}$-C_{16}) and TRH ($>C_{16}$-C_{34}) at two locations to the west of the site between the former UST farm containing Depot 17 and Depot 18 and beneath the former AST farm to a maximum depth of 2m bgl. PB concluded that TRH concentrations did not represent a risk to vegetation on Area F, considering potential land-uses and also lack of vegetative stress both on or surrounding the site.

9.3 Auditor's opinion

- Field conditions described by Cavvanba, GHD and PB, were sufficient as a basis for assessment of the site and accord with the auditor's observations during site walkover
- Field and laboratory assessment has identified contaminants of concern for further risk assessment, remediation or management to include:
  - Lead, benzo (a) pyrene and asbestos in Areas A, B and E
  - Arsenic, copper, lead, nickel, zinc and benzo(a)pyrene, exceeding environmental investigation levels in Area B
  - PCB and TRH in Area E
- Cavvanba's conclusion that Area C and D are considered suitable for on-going commercial/ industrial use is subject to supplementary sampling and analysis to establish the presence (if any), concentration and distribution of asbestos in AF and FA forms in these areas.
- While PB concluded that Area F had been validated following removal of petroleum storage infrastructure and remediation of soils, further assessment is required of potential contamination impacts from railway land uses and current groundwater characterisation, as discussed in this IAA

10 EVALUATION OF GROUNDWATER RESULTS

10.1 Field results

Key observations made by Cavvanba during the groundwater assessment were:

- Groundwater was identified at depths ranging from 4.0 m to 5.5 m in siltstone within Area A, and within silty clays across Area B
- Standing water levels for groundwater ranged from 3.755m below top of casing (bTOC) to 5.710m bTOC
- Groundwater purged during sampling at all monitoring wells was observed to vary from clear to slightly cloudy
- Petroleum hydrocarbon odours and sheens were reported during sampling of monitoring wells MW01 and MW03, within and down-gradient of the former aboveground storage tanks identified within Area A
- Indications of LNAPL was not observed within any monitoring wells during the gauging and sampling event undertaken

10.2 Analytical results

The following groundwater results were reported by Cavvanba (October 2022), relating to areas A, B, C and D:

- Benzene in excess of ADWG criteria was recorded in monitoring wells MW01 and MW03, within Area A – Former Fuel Depot, with a maximum reported concentration of 138 µg/L
- Naphthalene and phenanthrene in excess of the 95% freshwater species protection level in monitoring well MW03, and phenanthrene in MW01
- Chromium, lead and/or zinc in excess of the 95% freshwater species protection level in monitoring wells MW01, MW05 and/or MW06

GHD (May 2021) reported:

- Groundwater in GW4 contained nickel concentrations greater than drinking water criteria
- TRH concentrations (>C10 fractions) were also elevated in GW4, indicating some potential impact from soil contamination at this location
- Groundwater in the shallow well at GW9S appears to have relatively minor heavy metal impacts, with copper, lead and zinc above ecological guidelines and lead above drinking water guidelines. Naphthalene concentrations in duplicate sample WQC03 were also above ecological guidelines.
- GHD considered that there are no registered bores within 500 m of the site so the groundwater is considered unlikely to be extracted for drinking purposes and the nearest natural water body, Mulwarree Ponds, is located approximately 800 m to the east. Therefore the impacts detected in groundwater at the site are not expected to negatively impact human health or ecological receptors.

PB (2013) reported no concentrations of the assessed PCOCs exceeding the adopted groundwater assessment criteria. However metals or other contaminants related to former railway use were not assessed.

10.3 Auditor's opinion

The auditor considers that:

- Groundwater conditions over the site have generally been adequately assessed and described in the reports, except:
- Groundwater assessment carried out in the former Caltex depot site (Area F) may not represent current groundwater conditions and should be expanded to include analytes related to potential former railway related uses
- Current groundwater monitoring data for the existing Ampol fuel depot (offsite) should be reviewed for potential groundwater impacts, that may migrate onto the subject site.

11 EVALUATION OF CONCEPTUAL SITE MODEL

Cavvanba (October, 2022) provides the summary conceptual site model (CSM) as shown in **Table 4**, which can be considered applicable to all site areas:

Table 5. Cavvanba (October 2022) CSM summary

Source	Pathway	Receptors
Lead and BaP (Cavvanba 2021) in soil – fill material	Dermal contact, ingestion and/or dust inhalation	• onsite occupants in a commercial/industrial land use scenario. • onsite intrusive maintenance workers.
	Surface water runoff (including movement of soil / sediment via runoff)	• Offsite occupants of neighbouring properties. • Recreational users, and flora and fauna within the Mulwaree River.
	Movement of soils via relocation, disposal or dust migration	• Offsite occupants of neighbouring properties.
TRH in soil (TRH C6 – C10) (Cavvanba 2021)	Indoor inhalation of vapour from contaminated soils	future occupants in a commercial/industrial land use scenario.
Asbestos in or on soil	Inhalation of fibres	• onsite occupants in a commercial/industrial land use scenario. • onsite intrusive maintenance workers.

11.1 Auditor's opinion and data gap assessment

The auditor considers that the CSM as presented by Cavvanba (October 2022) generally represents the source-pathway-receptor linkages on the site for on-going commercial/ industrial use, however the CSM should consider the following aspects:

- Potential asbestos fibre exposure to offsite commercial workers and nearby residents
- Offsite migration of site contaminants as either dissolved or suspended contamination in stormwater channels, to nearby residents and the Mulwaree river
- Potential groundwater impacts considering recreational use of the Mulwaree River or livestock watering.

The above CSM aspects support data gap assessment requirements, as discussed elsewhere in this IAA. The auditor considers that an updated and consistent CSM should be applied for all areas of the site.

12 COMPLIANCE WITH REGULATORY GUIDELINES AND DIRECTIONS

12.1 General

In conducting this audit review, the auditor has applied guidelines made or approved by the NSW EPA under Section 105 of the CLM Act. Investigations have been generally conducted in accordance with the NSW EPA (2020): Consultants Reporting on Contaminated Land – Contaminated Land Guidelines.

12.2 Duty to report

The auditor understands that the site has been notified to the NSW EPA and that the site is currently under assessment by the EPA for regulation in accordance with the CLM Act.

12.3 Conflict of interest

The auditor has considered the potential for conflicts of interest in accordance with the requirements of Section 3.2.3 of EPA (2017): Guidelines for the NSW Site Auditor Scheme (3rd Edition). The auditor considers there ae no conflicts of interest, given that:

- The auditor is not related to a person by whom any part of the land is owned or occupied
- The auditor does not have any pecuniary interest in any part of the land or any activity carried out on any part of the land

13 AUDIT FINDINGS

The auditor considers that further specific assessment is required before the site may be considered adequately characterised to inform development of appropriate remediation options, environmental management and remedial action plans. Specific requirements identified following this review are summarised in **Table 5**.

Table 6. Main audit findings

No.	Discussion	Recommendation
1	Information available regarding history and prior use of the former northern fuel depot (Area A) and the former Caltex fuel depot (Area F), is limited. Further, insufficient information is available regarding location, size and type of storage depots, previously located on the northern fuel depot.	Auditor recommends that further research may be undertaken to supplement site history in Areas A and F. This may include accessing rail or Council records as well as any available historical aerial photographs prior to the 1950s.
2	The PFAS NEMP 2.0 (Appendix B, Table B1) lists onsite firefighting associated with fuel transport and storage and waste storage as activities potentially associated with per- and poly-fluoroalkyl substances (PFAS) contamination. PFAS has not previously been assessed for the former northern fuel depot, former Caltex fuel depot and JS Hollingsworth lease area.	PFAS is to be assessed an additional PCOC, for the former fuel depots and JS Hollingsworth lease areas.
3	There may have been other historical sources of asbestos on the site, other than bonded ACM. Asbestos fibres (including AF and FA) have not previously been assessed over the site.	Assessment is required on all sub-areas of the site, to assess for the potential for significant quantities of AF and FA to be associated with surface soils, particularly in areas close to railway lines. Should significant AF or FA be identified, this should be taken into account in remediation and management approaches for the site, including air monitoring and licensing requirements for friable asbestos removal.
4	It is noted that previous assessment of the former Caltex depot sub-area (Area F) has not included contaminants potentially associated with railway use (i.e. heavy metals, OCP/ OPPs, PCBs and asbestos). Given that the	Soil and groundwater assessment meeting NSW EPA guidelines is to be carried out for the former Caltex depot sub-area (Area F) for railway related contaminants. This should

No.	Discussion	Recommendation
	former Caltex depot (Area F) commenced operation in 1963, this area is likely to have had railway use prior to this time and may be affected by railway use related contaminants	include groundwater assessment of the shallow and deep aquifers.
5	Available groundwater monitoring data for the current operating (offsite) Ampol fuel depot is >10 years old, and may not be representative of current groundwater conditions. It is noted that this site is immediately upgradient of most of the site, including former what yards sidings and stock yard.	Current groundwater monitoring reports for the Ampol fuel depot are to be accessed and provided to the auditor for review. If current reports cannot be accessed, consideration should be given to installation of groundwater monitoring wells to be located on the site at downgradient locations near the boundary of the Ampol fuel depot, with groundwater assessment using these wells.
6	The following data gaps with respect to groundwater assessment have been identified: • Northeast corner of the former fuel depot area (Area A) • Northeast corner of the JS Hollingsworth and Sons lease area.	Both of these areas are to be assessed with new groundwater wells and groundwater assessment. Two wells in each of these areas should be considered, targeting both the shallow and deep aquifers.
7	Surface water flows and formal stormwater channels on the whole site may present offsite migration pathway for contamination, either as dissolved contamination or suspended sediments, potentially impacting the Mulwaree River or residential areas to the east.	Sampling and analysis of surface waters and sediments in the stormwater system be carried out for the contaminants of concern, to update the conceptual site model and inform remediation approaches and site management.
8	Current CSMs describing source-pathway-receptor relationships at the site are presented in Cavvanba (Oct, 2022), GHD (2021) and PB (2013), rely on different data sets and are of varying detail and approach.	It is recommended that following adequate site characterisation as described above, a unified /integrated CSM be prepared for the site audit area as abasis for future remediation planning and management. It is envisaged that this can be included in the RAP document to be prepared for the site.

13.1 Site specific risk assessment

The auditor recommends that development of management and remediation approaches on the site would benefit from human health and environmental risk assessment (HHERA), to establish site specific risk criteria applicable to the site. HHERA would be carried out predominantly for lead and PCBs as the main confirmed contaminants of concern for the site. It is suggested that this work be carried out for inclusion in the remediation and environmental management planning documentation development to be carried out by consultant(s).

HHERA would involve a detailed review of updated environmental data (following full site characterisation) also including lead bio-accessibility testing, to determine key issues for the HHERA. The following scope of work would be required by a specialist HHERA practitioner:

- Confirmation of issues and data gaps to be considered in the HHERA
- Quantification of exposure, based on updated CSM listing all source – pathway – receptor relationships
- Assessment of toxicity and quantification of risk, including bio-availability testing
- Development of site-specific risk-based criteria – to apply in development of ROA and RAP, so that a targeted remediation approach can be developed for the site based on site specific health and environmental risk
- Documentation/ reporting.

It is considered that the above process would deliver significant savings in remediation scope and timing, benefiting ARTC and the land owner (TfNSW).

Yours sincerely

Gary Bagwell
Principal Environmental Engineer

gbagwell@epicenvironmental.com.au

Brad May
Managing Director / Principal Engineer / NSW & Qld Contaminated Land Auditor

bmay@epicenvironmental.com.au

Attachments:

FIGURES:

Figure F1: Site location and boundary

Figure F2: Site stratification sub-areas

Figure F3a to F3d: Sample locations and summary results (Cavvanba, October 2022)

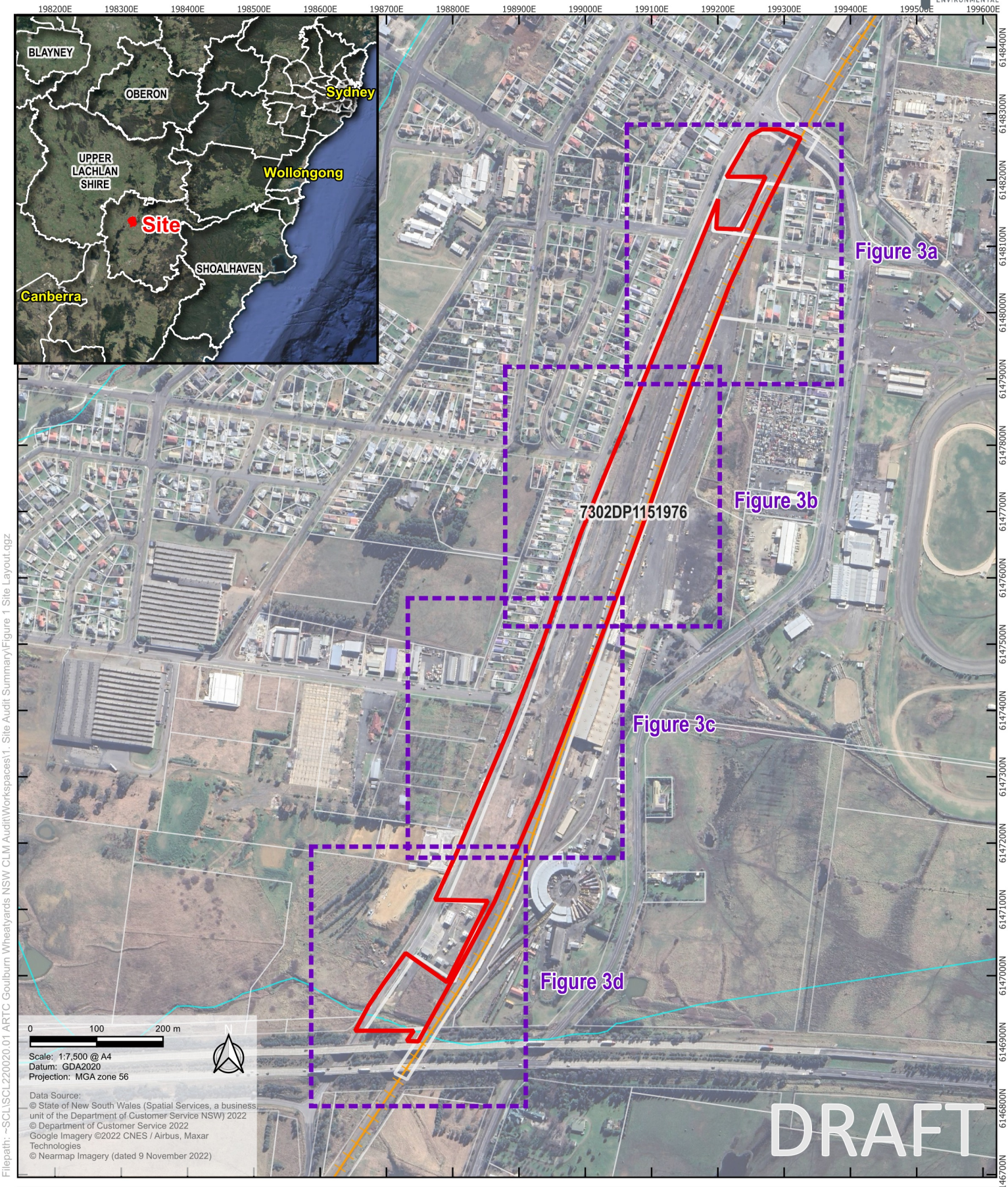
ATTACHMENT A:

Plates

ATTACHMENT B:

Figures 6 and 7 from Parsons Brinckerhoff (2013).

FIGURES



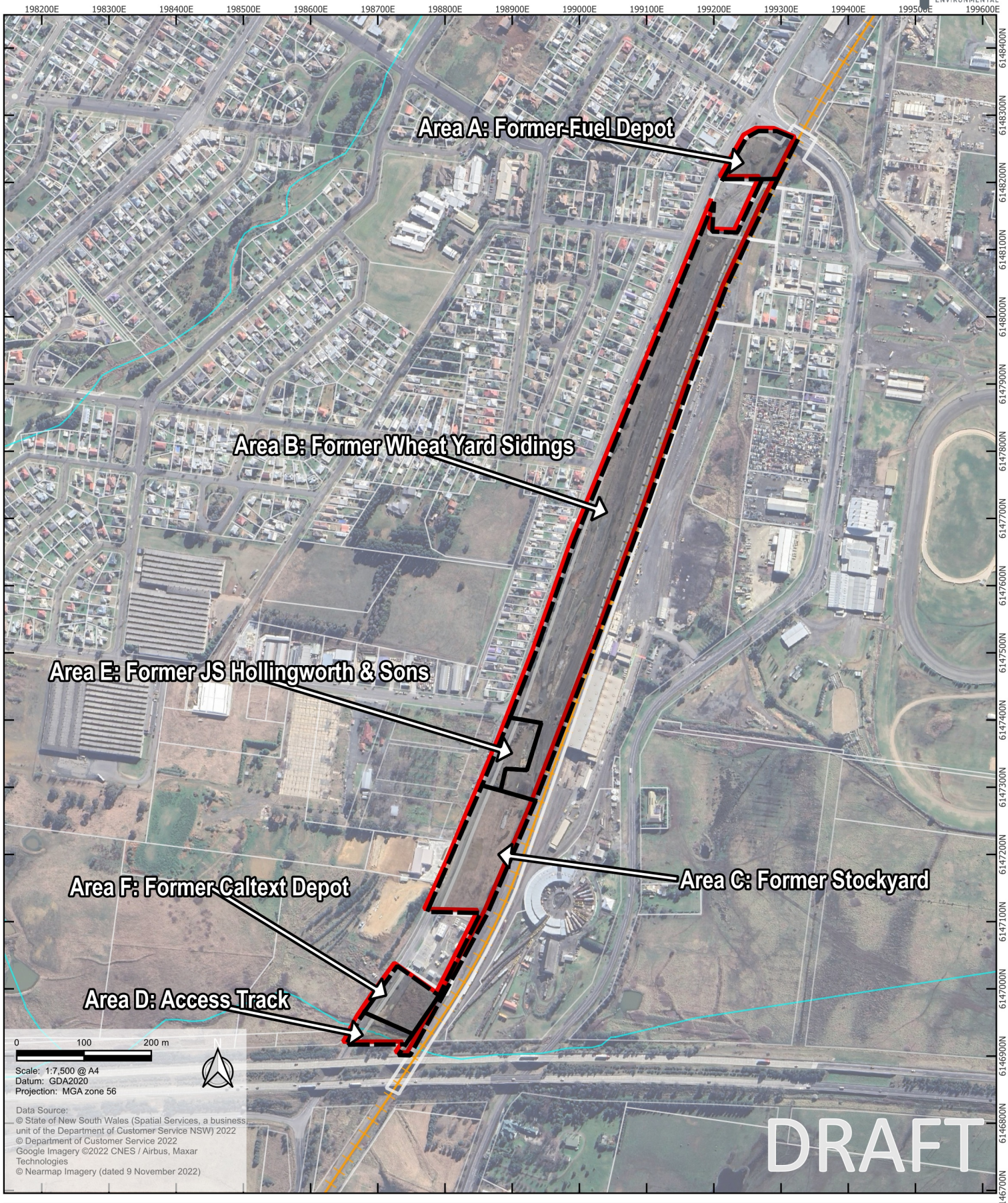
Filepath: ~SCL\SCL220020.01 ARTC Goulburn Wheatyards NSW CLM Audit\Workspaces\1. Site Audit Summary\Figure 1 Site Layout.qgz

Legend

- Site boundary
- Lot boundary
- Railways
- Watercourses

Australian Rail Track Corporation
Via Sloane St, Goulburn NSW 2580
Site Audit Summary

Figure F1
Site Location



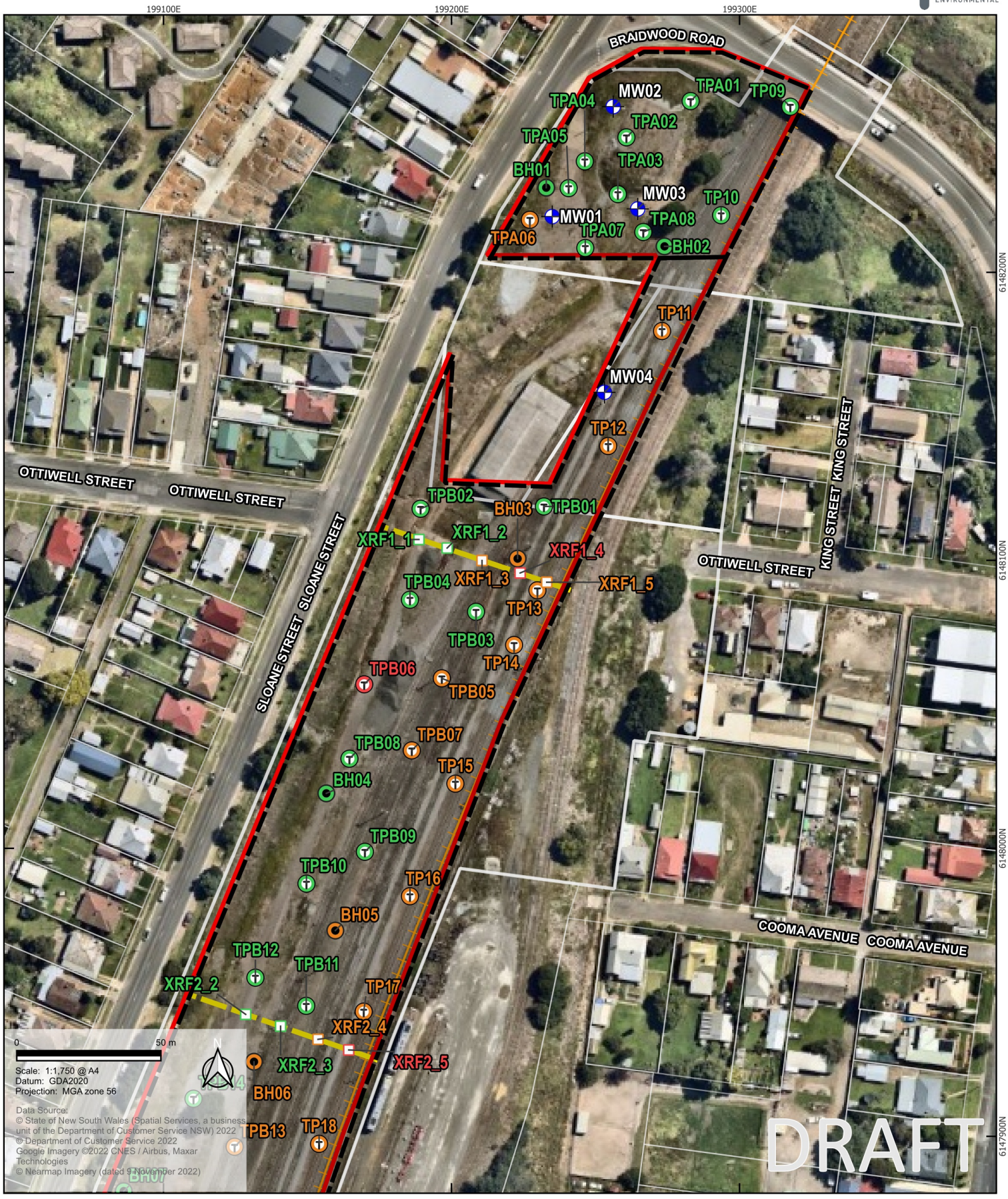
Filepath: ~SCL\SCL220020.01 ARTC Goulburn Wheatyards NSW CLM Audit\Workspaces\1. Site Audit Summary\Figure 1 Site Layout.qgz

Legend

- Site boundary
- Site areas
- Lot boundary
- Railways
- Watercourses

Australian Rail Track Corporation
Via Sloane St, Goulburn NSW 2580
Site Audit Summary

Figure F2
Site Areas



Filepath: ~SCL\SCL220020.01 ARTC Goulburn Wheatyards NSW CLM Audit\Workspaces\1. Site Audit Summary\Figure 1 Site Layout.qgz

Legend

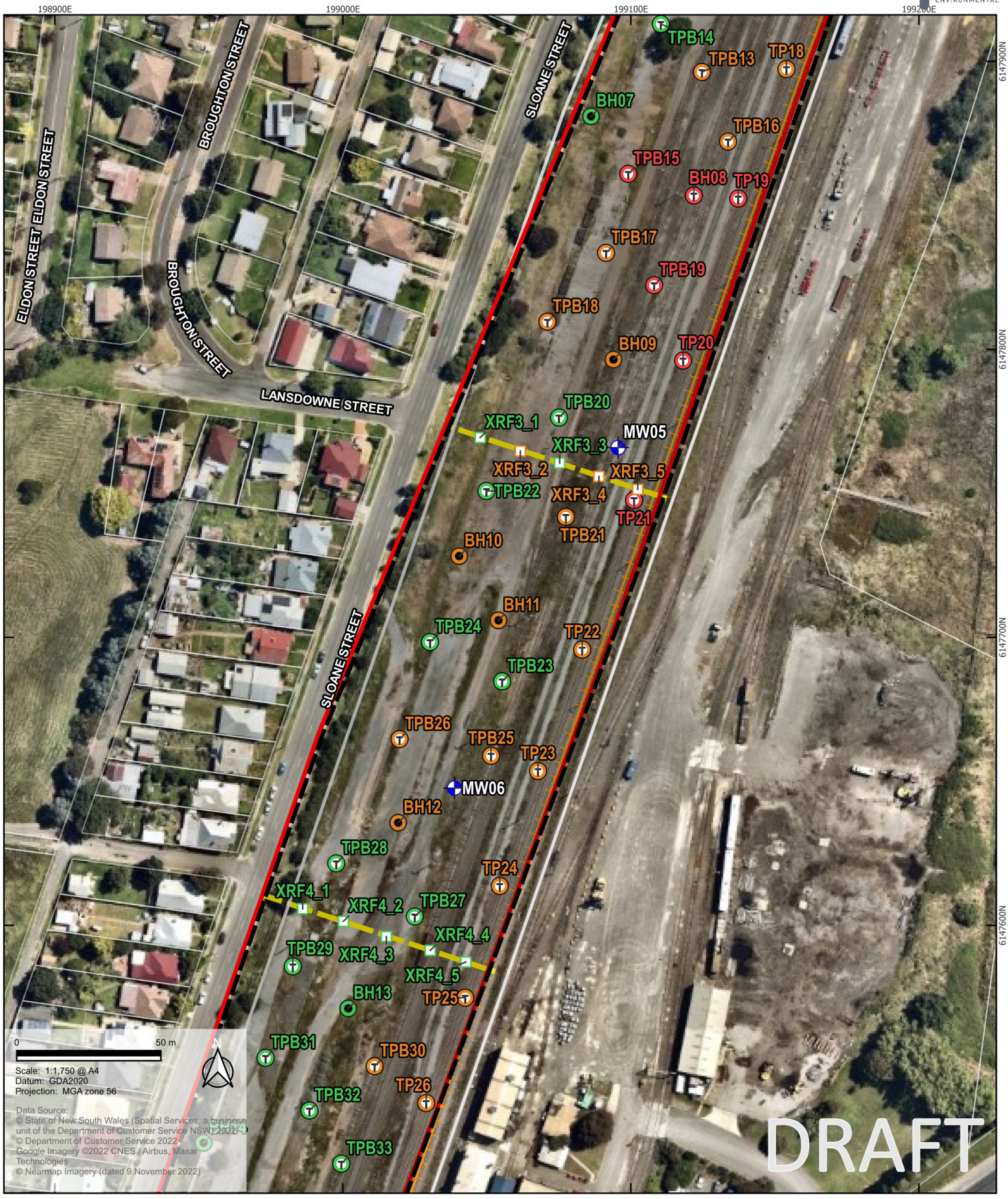
- Site boundary
- Site area
- Lot boundary
- Railways
- Watercourses
- XRF Transect
- Soil borehole
- Test pit
- Hand auger
- Groundwater monitoring well
- Radiological

Sample Lead Concentration

- <1,500mg/kg
- 1,500 - 10,000mg/kg
- >10,000mg/kg

Australian Rail Track Corporation
Via Sloane St, Goulburn NSW 2580
Site Audit Summary

Figure F3a
Site Location



Filepath: ~SCL\SCL220020.01 ARTC Goulburn Wheatyards NSW CLM Audit\Workspaces\1. Site Audit Summary\Figure 1 Site Layout.qgz

Legend

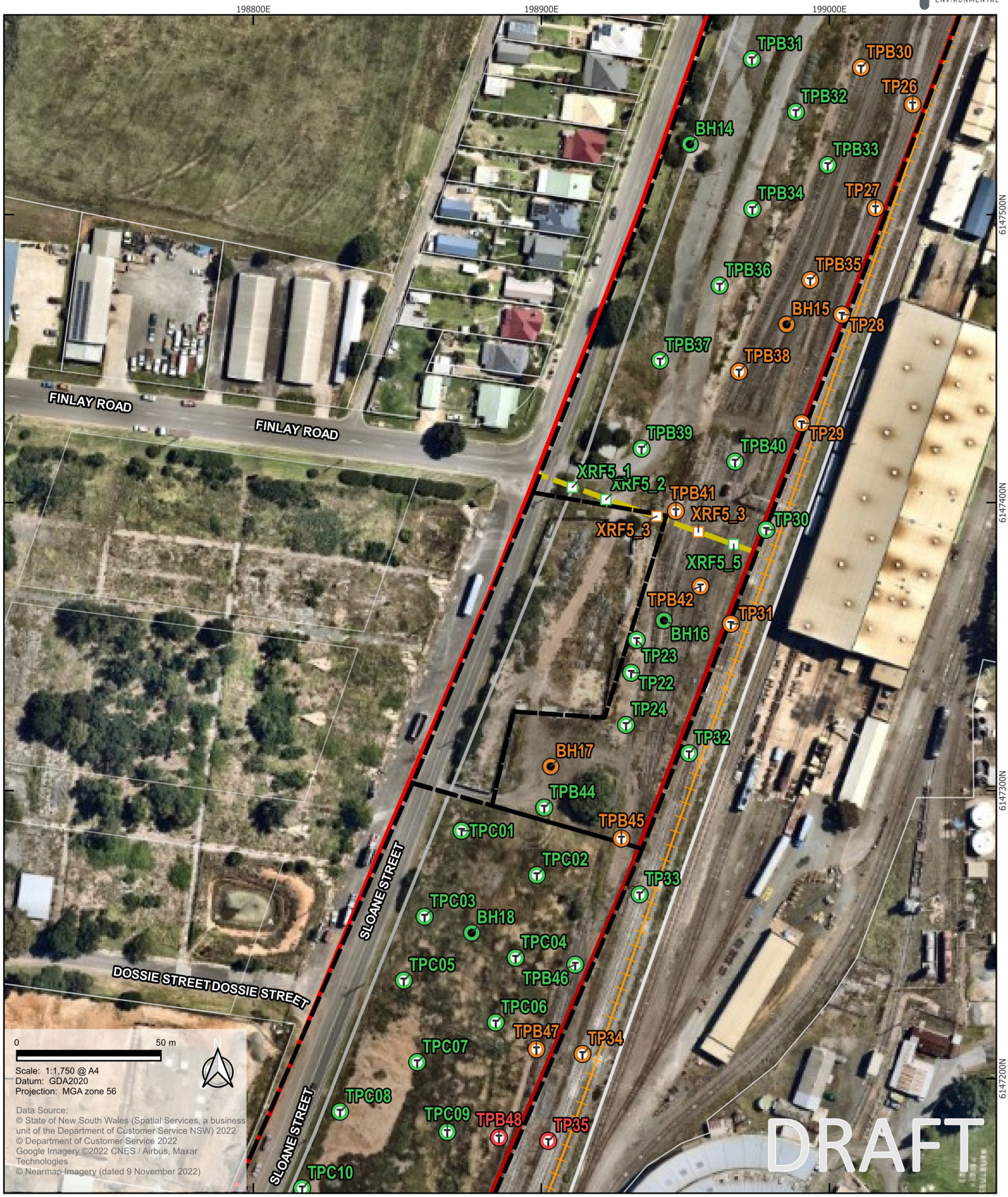
- Site boundary
- Site areas
- Lot boundary
- Railways
- Watercourses
- XRF Transect
- Soil borehole
- Test pit
- Hand auger
- Groundwater monitoring well
- Radiological

Sample Lead Concentration

- <1,500mg/kg
- 1,500 - 10,000mg/kg
- >10,000mg/kg

Australian Rail Track Corporation
Via Sloane St, Goulburn NSW 2580
Site Audit Summary

Figure F3b
Site Location



Filepath: ~SCL\SCL220020.01 ARTC Goulburn Wheatyards NSW CLM Audit\Workspaces\1. Site Audit Summary\Figure 1 Site Layout.qgz

Legend

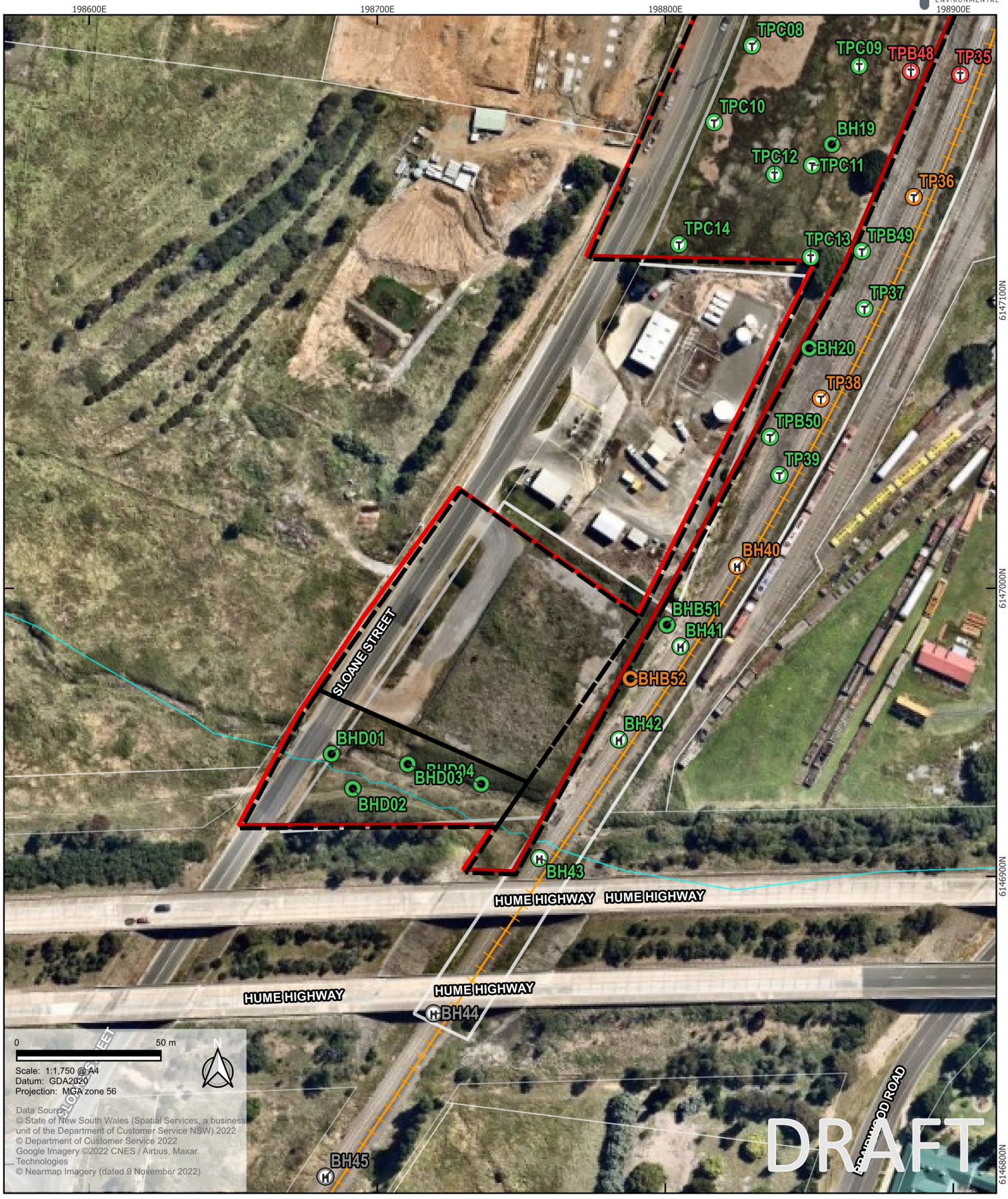
- Site boundary
- Site areas
- Lot boundary
- Railways
- Watercourses
- XRF Transect
- Soil borehole
- Test pit
- Hand auger
- Groundwater monitoring well
- Radiological

Sample Lead Concentration

- <1,500mg/kg
- 1,500 - 10,000mg/kg
- >10,000mg/kg

Australian Rail Track Corporation
Via Sloane St, Goulburn NSW 2580
Site Audit Summary

Figure F3c
Site Location



Filepath: ~SCL\SCL220020.01 ARTC Goulburn Wheatyards NSW CLM Audit\Workspaces\1. Site Audit Summary\Figure 1 Site Layout.qgz

Legend

- Site boundary
- Site areas
- Lot boundary
- Railways
- Watercourses
- XRF Transect
- Soil borehole
- Test pit
- Hand auger
- Groundwater monitoring well
- Radiological

Sample Lead Concentration

- <1,500mg/kg
- 1,500 - 10,000mg/kg
- >10,000mg/kg

Australian Rail Track Corporation
Via Sloane St, Goulburn NSW 2580
Site Audit Summary

Figure F3d
Site Location

Epic Environmental Pty Ltd
ABN: 54 169 57 92 75

Suite 5, Level 9
189 Kent Street
Sydney NSW 2000

1800 779 363
www.epicenvironmental.com.au

ATTACHMENT A: PLATES

Plate 1. Wheat yard siding looking north

Plate 2. Timber stockpile Area E

Epic Environmental Pty Ltd
ABN: 54 169 57 92 75

Suite 5, Level 9
189 Kent Street
Sydney NSW 2000

1800 779 363
www.epicenvironmental.com.au

Plate 3. Waste and timber stockpiles

Plate 4. Wheat yard siding looking east

Epic Environmental Pty Ltd
ABN: 54 169 57 92 75

Suite 5, Level 9
189 Kent Street
Sydney NSW 2000

1800 779 363
www.epicenvironmental.com.au

Plate 5. Wheat yard siding looking toward Ampol fuel depot

Plate 6. Wheat yard siding looking north, with covered material stockpile

Epic Environmental Pty Ltd
ABN: 54 169 57 92 75

Suite 5, Level 9
189 Kent Street
Sydney NSW 2000

1800 779 363
www.epicenvironmental.com.au

Plate 7. Wheat yard siding surface debris and fill

Plate 8. Wheat yard siding bonded asbestos fragments

Epic Environmental Pty Ltd
ABN: 54 169 57 92 75

Suite 5, Level 9
189 Kent Street
Sydney NSW 2000

1800 779 363
www.epicenvironmental.com.au

Plate 9. Wheat yard siding looking north, showing cut and fill

Plate 10. Stormwater infrastructure from Sloane Street

Epic Environmental Pty Ltd
ABN: 54 169 57 92 75

Suite 5, Level 9
189 Kent Street
Sydney NSW 2000

1800 779 363
www.epicenvironmental.com.au

Plate 11. Stormwater flow channel from Sloane Street

Plate 12. Timber and metal building (off site)

Epic Environmental Pty Ltd
ABN: 54 169 57 92 75

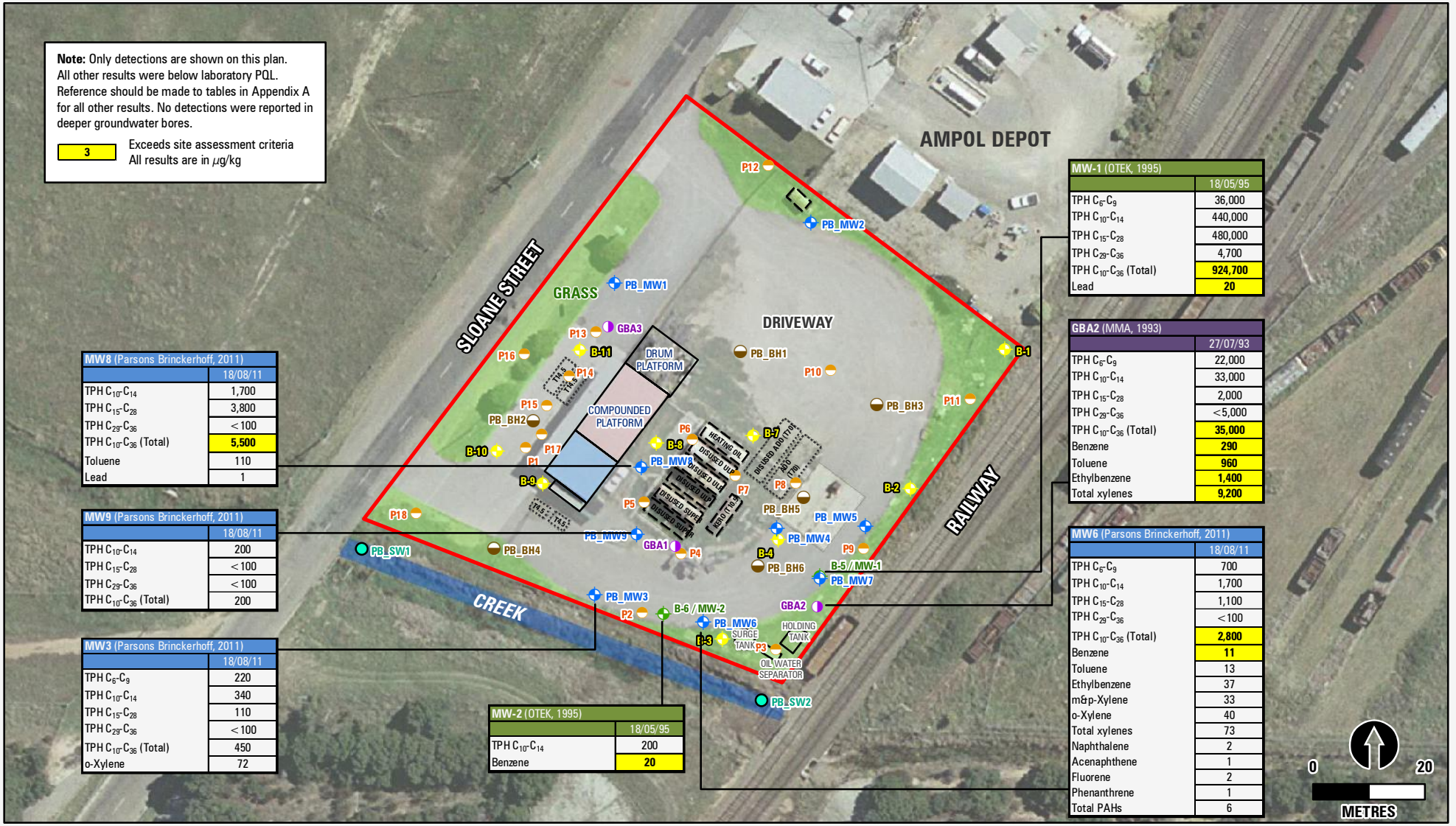
Suite 5, Level 9
189 Kent Street
Sydney NSW 2000

1800 779 363
www.epicenvironmental.com.au

Plate 13. Wheat yard siding looking south

PARSONS BRINCKERHOFF

DEMOLITION, REMEDIATION AND VALIDATION
Caltex Australia Petroleum Pty Ltd



MW8 (Parsons Brinckerhoff, 2011)

	18/08/11
TPH C_{10}-C_{14}	1,700
TPH C_{15}-C_{28}	3,800
TPH C_{29}-C_{36}	<100
TPH C_{10}-C_{36} (Total)	**5,500**
Toluene	110
Lead	1

MW9 (Parsons Brinckerhoff, 2011)

	18/08/11
TPH C_{10}-C_{14}	200
TPH C_{15}-C_{28}	<100
TPH C_{29}-C_{36}	<100
TPH C_{10}-C_{36} (Total)	200

MW3 (Parsons Brinckerhoff, 2011)

	18/08/11
TPH C_6-C_9	220
TPH C_{10}-C_{14}	340
TPH C_{15}-C_{28}	110
TPH C_{29}-C_{36}	<100
TPH C_{10}-C_{36} (Total)	450
o-Xylene	72

MW-2 (OTEK, 1995)

	18/05/95
TPH C_{10}-C_{14}	200
Benzene	**20**

MW-1 (OTEK, 1995)

	18/05/95
TPH C_6-C_9	36,000
TPH C_{10}-C_{14}	440,000
TPH C_{15}-C_{28}	480,000
TPH C_{29}-C_{36}	4,700
TPH C_{10}-C_{36} (Total)	**924,700**
Lead	**20**

GBA2 (MMA, 1993)

	27/07/93
TPH C_6-C_9	22,000
TPH C_{10}-C_{14}	33,000
TPH C_{15}-C_{28}	2,000
TPH C_{29}-C_{36}	<5,000
TPH C_{10}-C_{36} (Total)	**35,000**
Benzene	**290**
Toluene	**960**
Ethylbenzene	**1,400**
Total xylenes	**9,200**

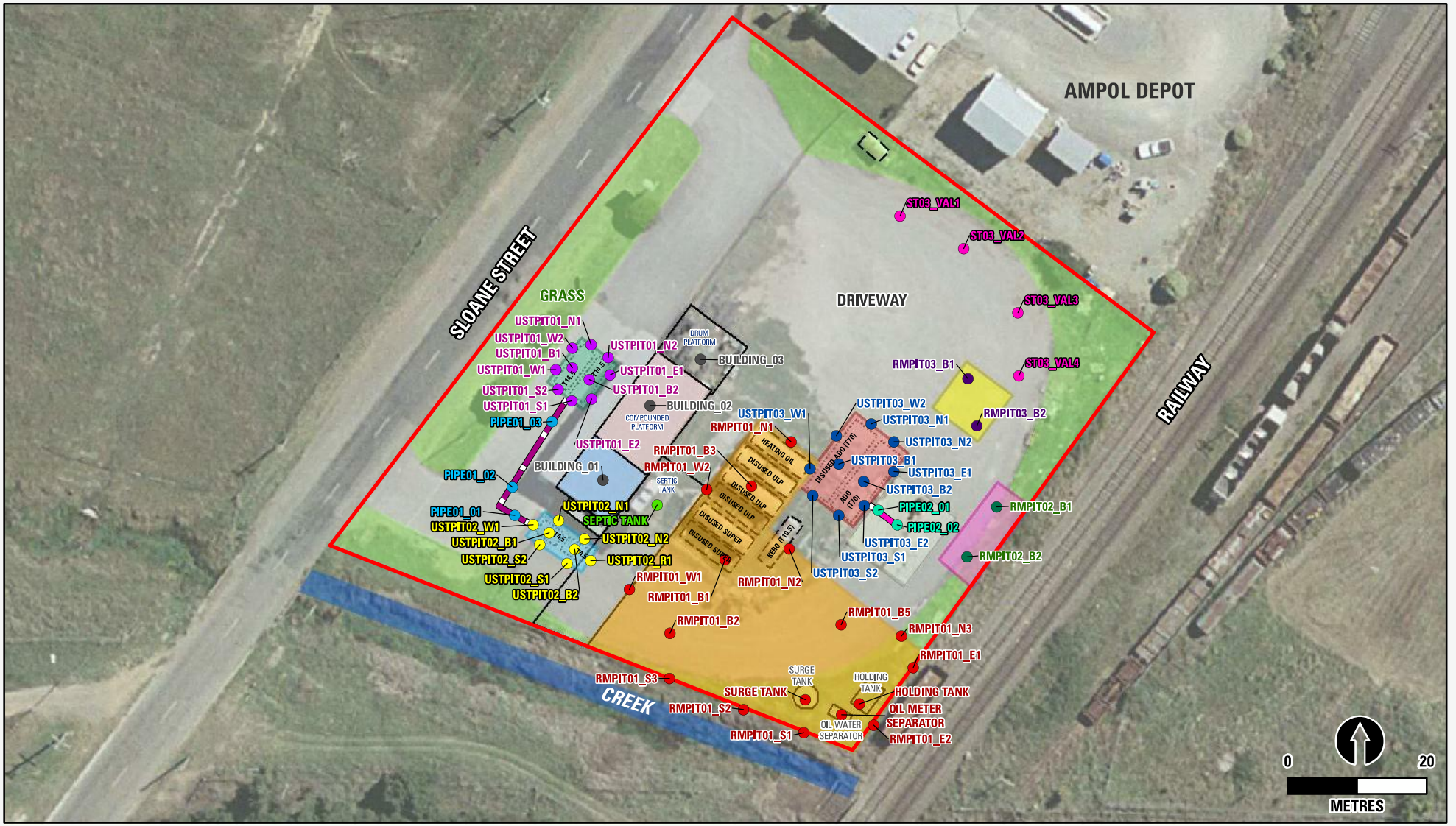
MW6 (Parsons Brinckerhoff, 2011)

	18/08/11
TPH C_6-C_9	700
TPH C_{10}-C_{14}	1,700
TPH C_{15}-C_{28}	1,100
TPH C_{29}-C_{36}	<100
TPH C_{10}-C_{36} (Total)	**2,800**
Benzene	**11**
Toluene	13
Ethylbenzene	37
m&p-Xylene	33
o-Xylene	40
Total xylenes	73
Naphthalene	2
Acenaphthene	1
Fluorene	2
Phenanthrene	1
Total PAHs	6

Study area
Above ground storage tank (AST)
Underground storage tank (UST)
PB monitoring well
PB borehole
PB surface water sample
Previous soil bore
Previous soil bore / monitoring well location
Previous auger hole
Previous soil vapour probe sites

Figure 5 Historical perched seepage water exceedences
Caltex fuel depot, Goulburn (Site # 22643)
Sloane Street, Goulburn, NSW

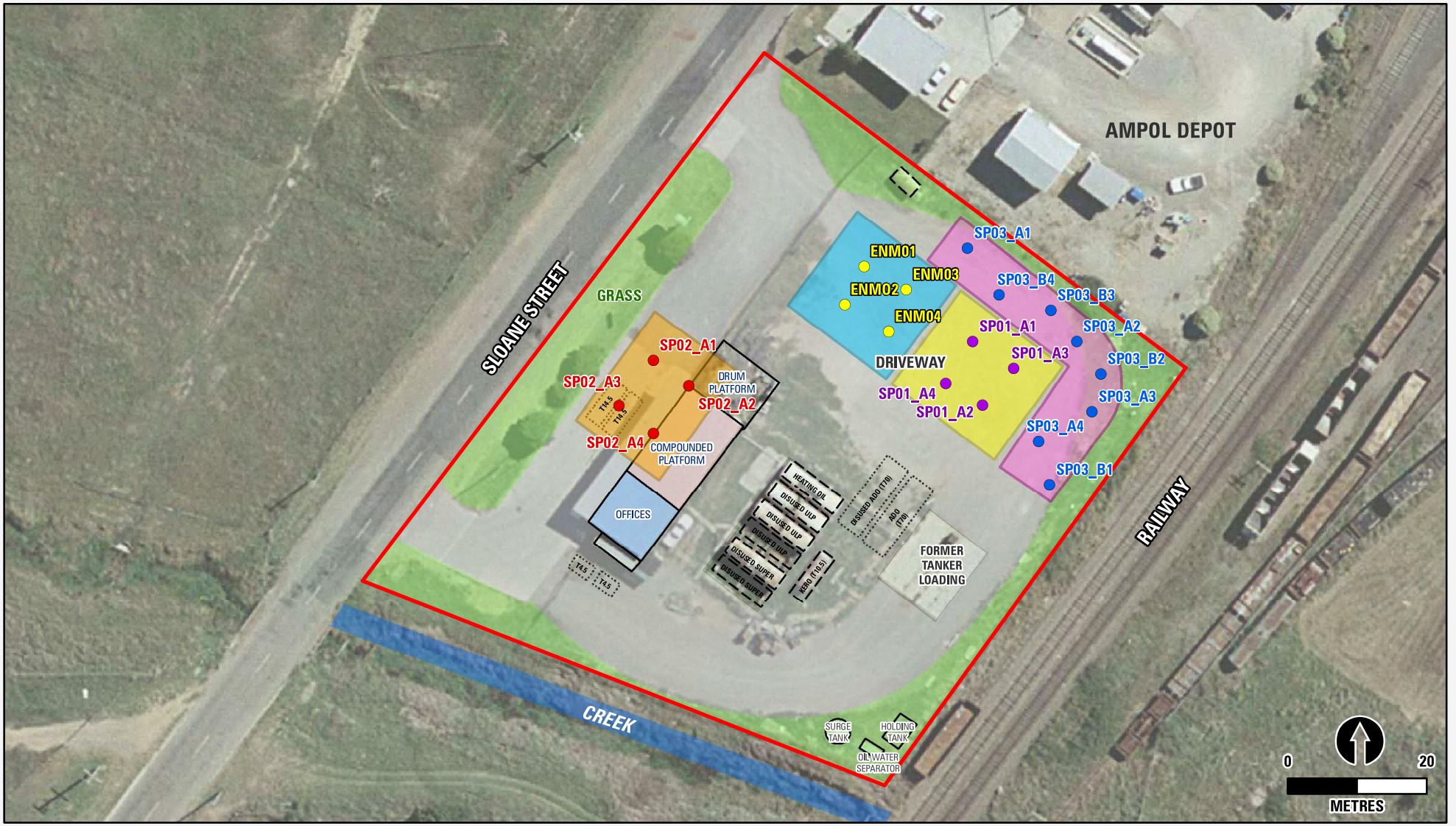
\\Apsydfil03\prn\C\Caltex_Aus_Petroleum\2193214AC\M_NSW_MRE_Goulburn_Remediation\10_GIS\Projects\Maps\2193214A_GIS_F007_A1.mxd // CasenasM // 19/07/2013



RMPIT01 · RMPIT02 · RMPIT03 · USTPIT01 · USTPIT02 · USTPIT03 · PIPE02 · PIPE01 · ST03 · Building · Septic tank · Pipeline trench 01 · Pipeline trence 02 · Study area · Above ground storage tank (AST) · Underground storage tank (UST) · RMPIT01 · RMPIT02 · RMPIT03 · USTPIT01 · USTPIT02 · USTPIT03

Figure 6 Remediation and sample locations
Caltex fuel depot, Goulburn (Site # 22643)
Sloane Street, Goulburn, NSW

\\Apsyelfil03\proj\C\Caltex_Aus_Petroleum\2193214AC1M_NSW_MRE_Goulburn_Remediati\10_GIS\Projects\Maps\2162544A_GIS_F008_A2.mxd // CasenasM // 9/08/2013



\\Apsyvfil03\proj\C\Caltex_Aus_Petroleum\219321 4AC\LM_NSW_MRE_Goulburn_Remediation\10_GIS\Projects\Maps\21625 44A_GIS_F009_A1.mxd // CasenasM // 19/07/2013

Study area
Above ground storage tank (AST)
Underground storage tank (UST)

SP01
SP02
SP03
ENM

SP01
SP02
SP03
ENM

Figure 7 Stockpile areas and sampling locations
Caltex fuel depot, Goulburn (Site # 22643)
Sloane Street, Goulburn, NSW