Stockinbingal to Parkes

Supplementary Review of Environmental Factors:
Forbes Station and Yard

Inland Rail is a subsidiary of
Australian Rail Track Corporation

INLAND
RAIL

COVER IMAGE
An image of a rail line with a freight train sitting on the line.

ACKNOWLEDGEMENT OF COUNTRY

Inland Rail acknowledges the Traditional Custodians of the land on which we work and, pay our respect to their Elders past, present and emerging.

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SUPPLEMENTARY REVIEW OF ENVIRONMENTAL FACTORS (REF) CERTIFICATION

Certification by Suitably Qualified Person

This Supplementary Review of Environmental Factors (SREF) provides a true and fair review of the proposal in relation to its likely effects on the environment. It addresses, to the fullest extent, possible all matters affecting or likely to affect the environment as a result of the proposed activity and provides sufficient information to determine that the activity as described in this REF will not or is not likely to significantly affect the environment. Accordingly, an Environmental Impact Statement (EIS) and/or Species Impact Statement (SIS) is not required.

Name & Position Chris Standing—Environment and Sustainability Manager

Company Martinus

Signature **Date** 05/03/2024

Certification by ARTC Project Manager

The project is titled: Stockinbingal to Parkes —Supplementary Review of Environmental Factors: Forbes Station and Yard
Subject to approval, proposal commencement is anticipated to be:
I confirm that I have reviewed and accept the REF, including the scope of works as detailed, and will:

- construct and operate the project as described in the REF
- ensure all legislative requirements related to approvals, consultation and notification are fulfilled
- implement all listed environmental management measures
- seek advice from ARTC environment staff as required and report all non-conformances and incidents
- undertake audits and/or environmental site inspections
- appropriately communicate REF requirements to project personnel.

Name & Position Steve Smith—Construction Manager A2P

Signature Steve Smith (Mar 6, 2024 17:28 GMT+11) **Date** 06/03/2024

Certification by ARTC Environment Lead

I confirm that:

- I have reviewed the REF in accordance with legislative requirements and it meets the requirements of the REF Guidance Note (*ENV-FM-021*)
- the management measures listed in the REF are suitable to mitigate the impact of works
- the activity as described, is unlikely to significantly affect the environment.

Name & Position Dan Lumby—Environment Lead: Approvals

Signature Daniel Lumby **Date** 06/03/2024

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DEFINITIONS

Term	Definition
AHIMS	NSW Aboriginal Heritage Information Management System
ARTC	Australian Rail Track Corporation
BC Act	Biodiversity Conservation Act 2016 (NSW)
CIZ	Construction impact zone
CSSI	Critical State Significant Infrastructure
dB(A)	Decibels
DCCEEW	Department of Climate Change, Energy, the Environment and Water (Cwlth)
DECC	Former Department of Environment and Climate Change (NSW)
DPE	Department of Planning and Environment (NSW)
DREF	Determined Review of Environmental Factors
EIS	Environmental impact statement
EP&A Act	Environmental Planning and Assessment Act 1979 (NSW)
EP&A Regulation	Environmental Planning and Assessment Regulation 2021 (NSW)
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)
EPL	Environment Protection Licence (issued under the POEO Act)
ICNG	NSW Interim Construction Noise Guideline
MNES	Matters of national environmental significance under the EPBC Act
NCA	Noise catchment area
NHVR	National Heavy Vehicle Regulator
NML	Noise Management Level
NPT	ARTC Noise Prediction Tool
NPW Regulation	National Parks and Wildlife 2019 (NSW)
NSW	New South Wales
PCT	Plant Community Type
PFAS	Per- and polyfluoroalkyl substances
POEO Act	Protection of the Environment Act 1997 (NSW)
Proposal site	Area of the proposed works, including the existing utility, easement and immediate adjacent area.
RBL	Rating background levels
REF	Review of Environmental Factors
RMAR	Rail Maintenance Access Road
RRO	Resource Recovery Order
S2P	Stockinbingal to Parkes
SREF	Supplementary REF
TEC	Threatened Ecological Community, under the EPBC Act
TfNSW	Transport for New South Wales
TMP	Traffic Management Plan
TISEPP	State Environmental Planning Policy (Transport and Infrastructure) 2021 (NSW)

1. INTRODUCTION

1.1 Background

The Australian Government has committed to building a significant piece of national transport infrastructure by constructing a high-performance and direct interstate freight rail corridor between Melbourne and Brisbane, via central-west New South Wales (NSW) and Toowoomba in Queensland (QLD). Inland Rail is a major national project that will enhance Australia's existing national rail network and serve the interstate freight market. The Inland Rail route, which is about 1,600 kilometres (km) long, involves:

- using the existing interstate rail line through Victoria and southern NSW
- upgrading about 400 km of existing track, mainly in western NSW
- providing approximately 600 km of new track in northern NSW and south-east Queensland
- division of the Inland Rail route into 12 projects, 7 of which are in NSW.

Inland Rail will provide greater freight carrying capacity, as it is designed for double-stacked trains up to 1,800 m long, each of which will be able to carry the same volume of freight as 110 B-double trucks. Better infrastructure and an effective national freight operation are key to delivering efficient supply.

Across its rail network, ARTC is responsible for:

- selling access to train operators
- developing new business
- capital investment in the corridors
- managing the network
- rail infrastructure maintenance.

A Review of Environmental Factors (REF) assessment of the Stockinbingal to Parkes (S2P)—Horizontal Clearances was prepared for the project by WSP Australia, on behalf of ARTC, in November 2021. The REF identified a range of environmental, social and planning issues associated with the construction and operation of six enhancement sites along the rail corridor in the Stockinbingal to Parkes (S2P) section of the Inland Rail (the proposal), and proposed measures to mitigate and manage those potential impacts. The REF was determined under Part 5, Division 5.1 of the *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act).

1.2 The proponent

ARTC is the proponent for the determined Review of Environmental Factors (DREF) as well as this Supplementary Review of Environmental Factors (SREF), and has a program to deliver Inland Rail. ARTC is an Australian Government-owned statutory corporation that manages more than 8,500 km of rail track in NSW, Queensland, South Australia, Victoria, and Western Australia.

1.3 Summary of approved project

The approved proposal comprised enhancement works to achieve horizonal clearances at six enhancement sites along the rail corridor between Stockinbingal and Parkes in NSW. Forbes Station and Yard (the site) is one of the six sites requiring enhancement; specifically, realignment of approximately 640 m of the track by up to 540 millimetres (mm), and associated drainage works and trimming of the platform awning at Forbes Station. The approved proposal site, specific to Forbes Station and Yard (FS&Y), is located between chainages 597.2 and 597.8 within the Forbes township. The proposal is located within the existing rail corridor.

The approved REF for works at FS&Y includes:

- realignment of approximately 500 m of the main line by up to 540 mm and associated drainage works,
- realignment of approximately 140 m of the goods siding track, including installation of a new catch point
- trimming of the platform awning at Forbes Station by 300 mm for the full length.

Construction duration of the FS&Y is predicted to extend over approximately six weeks, with works commencing in early 2024.

The DREF detailed that the construction activities will be undertaken during standard working hours (as shown):

- 7:00 am to 6:00 pm Monday to Friday
- 8:00 am to 1:00 pm Saturday
- no work on Sunday or public holidays.

However, due to the requirement for a safe working site, some works may be undertaken outside standard working hours and during scheduled track possessions. Any works required to be completed outside standard working hours would be in accordance with ARTC's Environment Protection Licence (EPL) 3142 (conditions O9.1 to O9.6) and the affected community would be advised in accordance with the Community Management Plan.

1.4 Description of the proposed works

The proposed change to the proposal is additional to the approved construction impact zones (CIZ) (referred to as the proposed works). The additional CIZs, approximately 9,006 m^2 in total is required to:

- undertake approximately 370-metres of track and associated infrastructure removal along the Forbes Yard and Forbes Station including:
- removal of C-Frame, catch point, mainline turnout and silo turnout
- removal of lever ground frame, channel iron rodding, A-frame braces, C-Frame supportive signals and non-track circuits
- undertake straight railing and track tamping in the vicinity of Forbes Yard and Forbes Station
- erect scaffolding and storage of equipment temporarily to enable the approved Forbes Station awning trimming
- rectify existing rail infrastructure such as rail drainage, if impacted by track removal and/or tamping
- book out the level crossing on Dowling St/Parkes Rd to remove a fuse from the signal hut and tie a rope to the boom gate.

The proposed works are shown in Figure 1-1 and Figure 1-2 below. The proposed works will require minor ground disturbance (Appendix F) and clearing (Appendix B). Some localised, minor ground disturbance in the form of clearing and grubbing will be required where the proposed track and rail infrastructure removal is required to be undertaken.

Clearing and grubbing will not occur on landscaping vegetation at Forbes Station as this landscaping forms part of the protected heritage items.

Removal of large trees, particularly in the Forbes Yard, is not anticipated to be required to enable the works. Mature trees within the heritage curtilage will be protected. Predominantly brush and groundcover such as grass to be cleared to establish access and compound amenities.

No changes to construction methodology for the permanent works, construction duration or rail operations are proposed.

No ground disturbance works will be undertaken prior to the DSI being reviewed and accepted by IR/ARTC.

1.5 Purpose of this Supplementary REF report

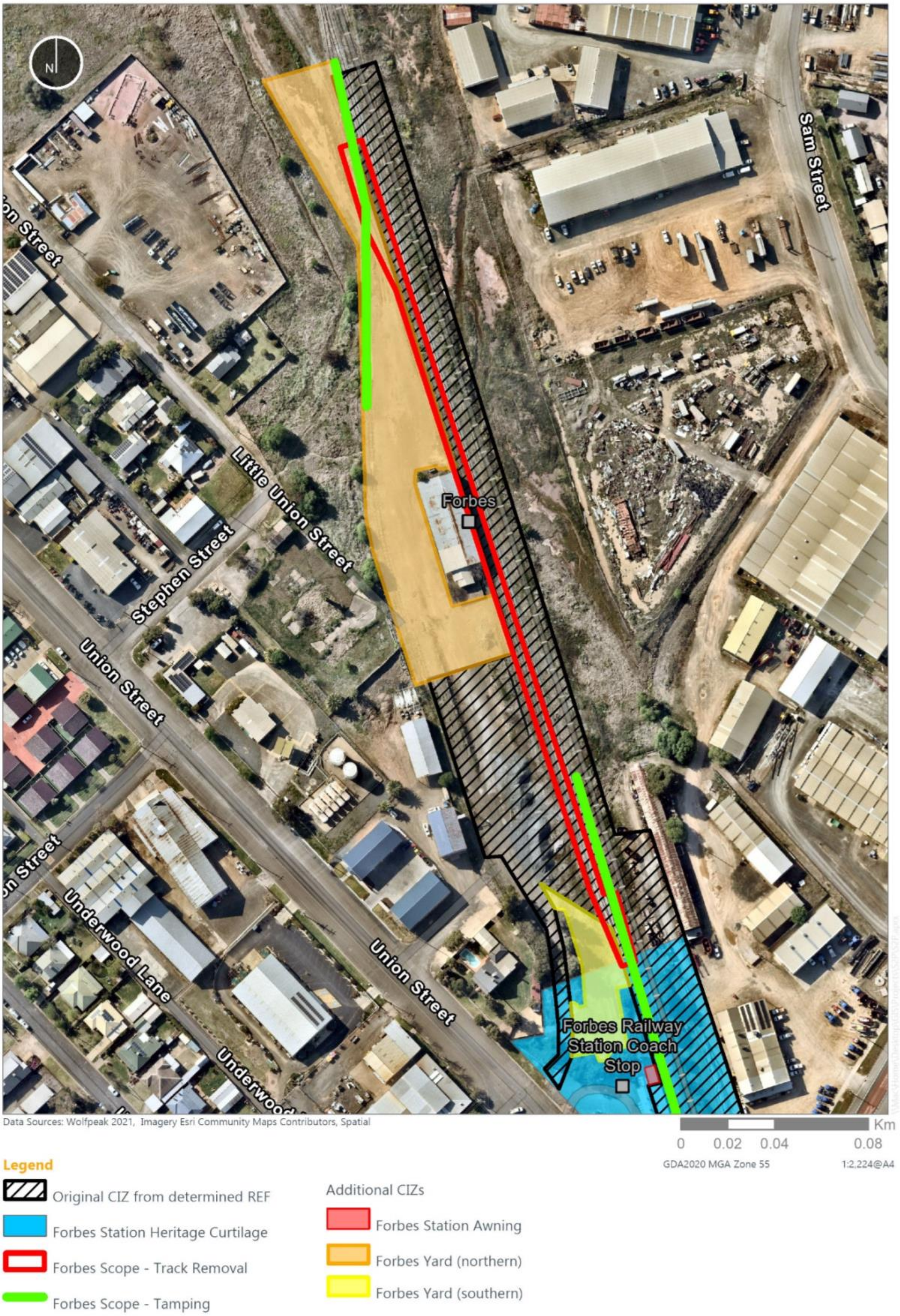
The ARTC REF Work Instruction states that a SREF must be prepared to assess material changes to scope or construction hours that were not assessed in the existing DREF. As such, Martinus is required to prepare a SREF, which accounts for the factors under section 171(2) of the Environmental Planning and Assessment Regulation 2021 (EP&A Regulation) associated with the works amendments.

The SREF has been prepared by Martinus and considers all matters affecting or likely to affect the environment as a result of the proposal so that the determining authority can determine the proposal under Division 5.1 of the EP&A Act and Part 8, Division 1 of the EP&A Regulation.

Construction works will be carried out during the rail possessions identified in section 2.7.1 of the DREF, which includes an 88-hour period in March 2024.

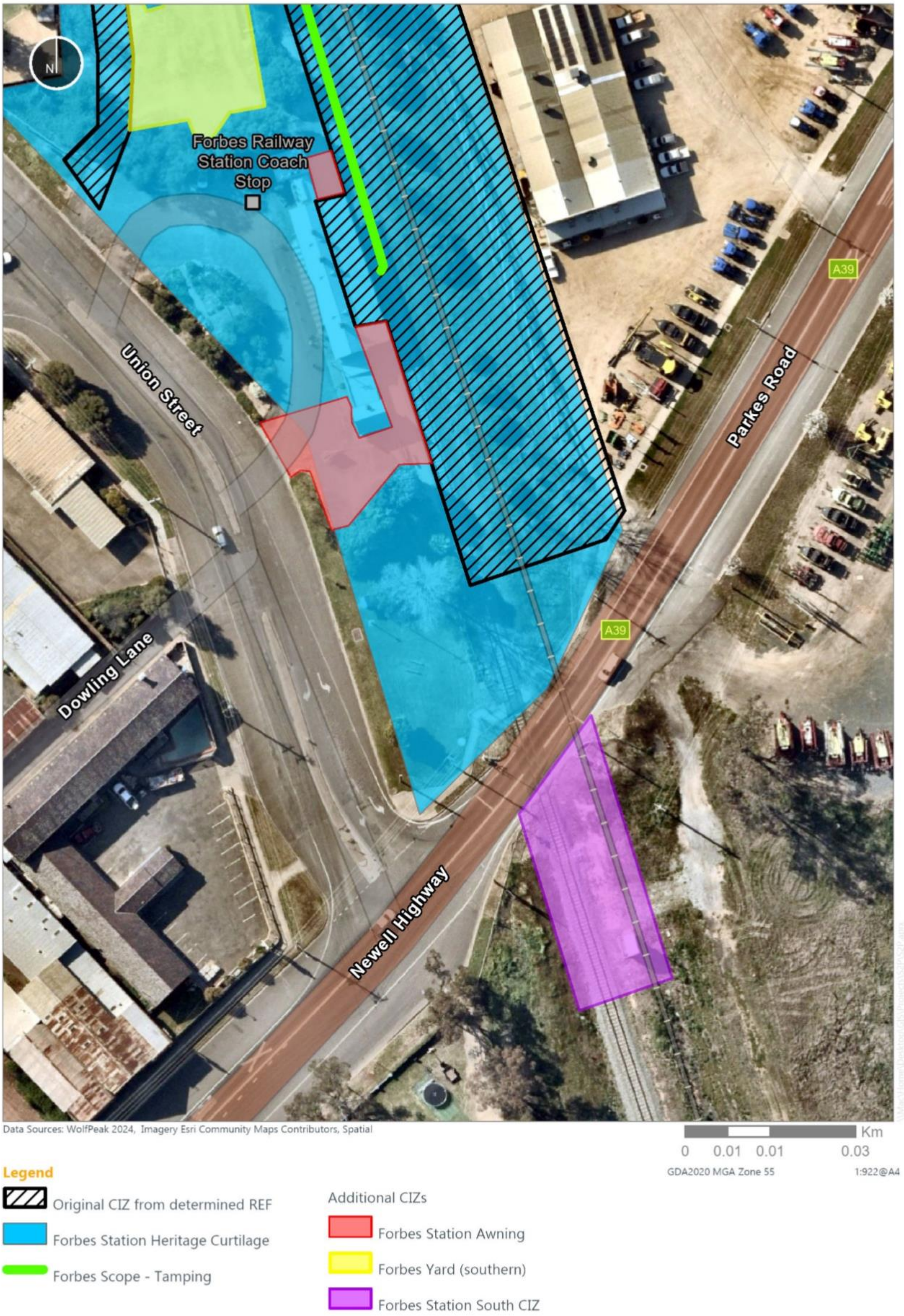
Additional impacts have been assessed in the findings of this SREF to determine:

- whether the proposal is likely to have a significant environmental impact
- the requirement for implementation of additional mitigation measures to those outlined in the DREF.



Data Sources: Wolfpeak 2021, Imagery Esri Community Maps Contributors, Spatial

FIGURE 1-1 ADDITIONAL CIZS AND SCOPE OF WORKS REQUIRED AT FORBES YARD



Data Sources: WolfPeak 2024, Imagery Esri Community Maps Contributors, Spatial

FIGURE 1-2 ADDITIONAL CIZS AND SCOPE OF WORKS AT FORBES STATION

2. PROPOSED WORKS DESCRIPTION

2.1 Proposal location

Nearby land consists predominantly of agricultural use, with some rural residential, recreational and developing industrial land uses in the surrounding area.

The proposed change in design requirement and additional CIZs for associated works are located within the Forbes Station and Yard as shown in Figure 1-1 and Figure 1-2. The proximity of residential receivers to the works locations is illustrated in Figure 3-2. below.

The additional CIZs proposed are required to meet the change in design requirements at Forbes Station and Yard. A summary of the additional CIZs is provided in Table 2-1 below.

TABLE 2-1 DESCRIPTION OF ADDITIONAL CIZS

CIZ	SIZE (m^2)	APPROXIMATE DISTANCE FROM APPROVED CIZ	SCOPE OF WORKS	LAND TENURE STATUS
Forbes Yard (Northern) CIZ	5965	Additional CIZ up to 45m west	Rail tamping, rail tamper operation, track removal and associated ground disturbance works, material storage including stockpiling, plant and vehicle parking, ablutions and crib hut	Rail corridor—ARTC
Forbes Yard (Southern) CIZ	1183	Additional CIZ up to 25m west	Track removal and associated ground disturbance works, material storage including stockpiling, plant and vehicle parking, and access works	Rail corridor—ARTC
Forbes Station Awning CIZ	431	Additional CIZ up to 25m west	Awning trimming works to: a) Works area—scaffolding erection b) Works area—scaffolding erection c) Works area—cordoned-off area for material storage and light vehicle parking d) Access area—to permit construction light vehicles to enter and exit the works area. Will remain open for public access. (Refer to Figure 1-1 for corresponding location)	Rail corridor—ARTC Union Street road reserve–Forbes Local Council (existing driveway envelope of the Forbes Station)
Forbes Station South CIZ	800	Additional CIZ up to 75m south (crossing Dowling St/ Parkes Rd)	Book out the level crossing on Dowling St /Parkes Rd to remove a fuse from the signal hut and tie a rope to the boom gate.	Rail corridor—ARTC

2.2 Methodology

The construction methodology, as described in Section 2.3 of the DREF, will not otherwise change as a result of the proposed works. Should the construction method change following this supplementary REF, ARTC would be consulted and would determine if additional assessments are required.

2.3 Plant and equipment

Plant and equipment listed in Section 2.4 of the DREF would generally remain the same; however, additional plant and equipment as listed below would be used for track works:

- front-end loader
- 17T Hyrail road-rail vehicle.

2.4 Protection of the Environment Operations Act 1997

The underlying objective of the Protection of the Environment Operations Act 1997 (NSW) (POEO Act) is to reduce pollution, and manage the storage, treatment and disposal of waste in NSW. The POEO Act establishes the procedures for issuing licences for environmental protection on aspects such as waste, air, water and noise pollution control, and outlines the required notification.

Section 48 of the POEO Act requires that the occupier of premises at which a 'scheduled activity' (i.e. an activity specified in Schedule 1 of the POEO Act) is being carried out must hold an EPL for that activity. Schedule 1 of the POEO Act specifies three rail infrastructure-related scheduled activities:

- railway infrastructure construction
- railway infrastructure operations
- rollingstock operations.

The existing rail corridor on which the proposal is to be carried out is owned by the NSW government and leased to ARTC. ARTC currently holds EPL 3142 for 'railway infrastructure operations' for that rail corridor and other corridors in the ARTC NSW rail network. The proposed works will not require the need for a separate EPL for 'railway infrastructure construction', as the proposed works does not meet the definition under section 33 of Schedule 1 to the POEO Act. The proposal will be carried out as railway construction activities in accordance with EPL 3142.

2.5 Working hours

Works under the original DREF were anticipated to be for six weeks. This timeframe is not anticipated to change for the proposed change in design requirement.

The proposed works will occur within the existing rail corridor and is therefore subject to ARTC's EPL 3142. The proposed works is considered as maintenance work under the existing EPL.

Martinus Rail will apply the conditions of the EPL 3142 to the proposed works. The NSW Interim Construction Noise Guideline (ICNG) required by EPL 3142 will be used to inform the management of works.

As described in the DREF, the majority of proposed activities would be undertaken within the recommended standard hours as per EPL 3142 O4.1 and the ICNG. Out-of-hours works are required in the form of an 88-hour rail possession to enable works within the Danger Zone for safety EPL 3142 O4.2. For these works EPL 3142 O4.3 ICNG mitigation measures will be implemented and adhered to.

2.6 TISEPP agency consultation and notification

Part 2.2 of State Environmental Planning Policy (Transport and Infrastructure) 2021 (TISEPP) contains provisions for public authorities to consult with and/or notify local councils and other public authorities prior to the commencement of certain types of development.

As a result of the increased proposal area and amended scope of works, assessment of agency consultation and notification pursuant to Part 2.2 of the TISEPP is required. This is detailed in Table 2-2 below.

TABLE 2-2 CONSULTATION AND NOTIFICATION PURSUANT TO PART 2.2 OF THE TISEPP

Is consultation with council required under sections 2.10, 2.11, 2.12 or 2.14 of the TISEPP?		
Is the proposed activity likely to have a substantial impact on the stormwater management services which are provided by council?	☐ Yes	☒ No
Is the proposed activity likely to generate traffic to an extent that will strain the existing road system in a local government area?	☐ Yes	☒ No
Will the proposed activity involve connection to a council owned sewerage system? If so, will this connection have a substantial impact on the capacity of the system?	☐ Yes	☒ No
Will the proposed activity involve connection to a council owned water supply system? If so, will this require the use of a substantial volume of water?	☐ Yes	☒ No
Will the proposed activity involve the installation of a temporary structure on, or the enclosing of, a public place which is under local council management or control? If so, will this cause more than a minor or inconsequential disruption to pedestrian or vehicular flow?	☐ Yes	☒ No
Will the proposed activity involve more than a minor or inconsequential excavation of a road or adjacent footpath for which council is the roads authority and responsible for maintenance?	☐ Yes	☒ No
Is the proposed activity located on flood liable land? If so, will the activity change flooding patterns to more than a minor extent? **The proposed activity is situated on flood liable land as determined by the *Forbes Local Environmental Plan 2013*; however, the activity will not change flooding patterns to more than a minor extent.**	☐ Yes	☒ No

Is there a local heritage item (that is not also a state heritage item) or a heritage conservation area in the study area for the works? If yes, does a heritage assessment indicate that the potential impacts to the item/area are more than minor or inconsequential?	☐ Yes	☒ No
Is the proposed activity on land that is within a coastal vulnerability area? Is the activity inconsistent with a certified coastal management program that applies to the land?	☐ Yes	☒ No

Is consultation with other agencies required under sections 2.13, 2.15 or 2.16 of the TISEPP?		
Is the proposed activity development on flood liable land that may be carried out without development consent?	☒ Yes	☐ No
Is the proposed activity adjacent to a national park, nature reserve or other area reserved under the *National Parks and Wildlife Act 1974*?	☐ Yes	☒ No
Is the proposed activity on land in Zone C1 National Parks and Nature Reserves on or in a land use zone that is equivalent to that zone, other than land reserved under the *National Parks and Wildlife Act 1974*?	☐ Yes	☒ No
Is the proposed activity adjacent to a declared aquatic reserve under the *Fisheries Management Act 1994*?	☐ Yes	☒ No
Is the proposed activity adjacent to a declared marine park under the *Marine Estate Management Act 2014*?	☐ Yes	☒ No
Is the proposed activity adjacent to a declared aquatic reserve under the *Marine Estate Management Act 2014*?	☐ Yes	☒ No
Is the proposed activity in the Sydney Harbour Foreshore Area as defined by the *Place Management NSW Act 1998*?	☐ Yes	☒ No
Does the proposed activity involve the installation of a fixed or floating structure in or over navigable waters?	☐ Yes	☒ No
Is the proposed activity for the purpose of residential development, an educational establishment, a health services facility, a correctional facility or group home in bush fire prone land?	☐ Yes	☒ No
Does the proposed activity increase the amount of artificial light in the night sky and that is on land within the dark sky region?	☐ Yes	☒ No
Is the proposed activity development on defence communications facility buffer land within the meaning of section 5.15 of the *Standard Instrument – Principal Local Environmental Plan*?	☐ Yes	☒ No
Is the development on land in a mine subsidence district within the meaning of the *Coal Mine Subsidence Compensation Act 2017*?	☐ Yes	☒ No

2.7 Supplementary REF consultation

Consultation requirements associated with stakeholders and the community have been outlined within Section 4 of the DREF. No additional stakeholder organisation consultation is triggered by the proposed works.

TISEPP consultation with other agencies

The approved works are situated on flood-liable land as determined by the Forbes Local Environmental Plan 2013 (LEP); therefore, consultation with the NSW State Emergency Service (SES) was required and consequently undertaken as part of the DREF. As the proposed works are the same activities within a similar footprint of the DREF, SES are not required to be consulted prior to works commencing. For due diligence, however, Martinus will provide the footprint and scope of the proposed works to SES for information.

Roads Act 1993 (NSW) consultation

The Forbes Station South Additional CIZ is required for the proposed works, for booking out the level crossing on Dowling St/Parkes Rd (a classified road under the NSW *Roads Act 1993*) to remove a fuse from the signal hut and tie a rope to the boom gate.

Works are not required to be undertaken on Dowling St/Parkes Rd themselves. All proposed works to be undertaken are within the rail infrastructure footprint (Figure 2-1 and Figure 1-2) and will be undertaken on ARTC leased land. As a result, Transport for NSW (TfNSW) is not required to be consulted for the proposed works.

FIGURE 2-1 DPHI E-SPATIAL VIEWER LAND PARCEL ZONING

Community and key stakeholder consultation

As the works were previously exhibited publicly during the consultation phase of the DREF, and the scope of works has decreased, further consultation is not required for the proposed works. Notwithstanding, consultation with the community and key stakeholders would be ongoing in the lead up to, and during, construction of the proposal, as outlined in the DREF and the Martinus Communication and Management Plan. Consultation on the SREF will include:

- doorknocking of residents identified to be potentially impacted by the works. This will include a notification works as well as contact details for those residents not available during doorknocking, as well as posting of notifications and contact details for those residents without letterboxes
- consideration of all feedback received
- implementation of additional reasonable and feasible mitigation to address issues and concerns
- uploading the SREF to the ARTC/IR website.

2.8 Complaints management

Complaints management as detailed in the DREF (see Section 4.8) remains the same and will be implemented in accordance with the enquiry and complaints management requirements in ARTC's EPL 3142 (conditions M2—M4) and the Martinus Complaints Management System.

3. ENVIRONMENTAL IMPACT ASSESSMENT

The potential environmental impacts of the amended proposal are summarised in Table 3-1.

TABLE 3-1 SUMMARY OF ASSESSMENT REQUIREMENTS FOR ENVIRONMENTAL FACTORS WITH REGARDS TO THE PROPOSED WORKS

	Environmental Factor	Assessment	Potential Impacts
Additional assessment required	Biodiversity	See Section 3.1 below	Biodiversity impacts associated with the Forbes Station and Yard realignment and awning trimming have been assessed in the DREF. Further assessment has been undertaken for the additional CIZs. No additional or modified control measures are proposed.
	Noise and vibration	See Section 3.2 below	Noise and vibration impacts associated with the Forbes Station and Yard realignment and awning trimming have been assessed in the DREF. Further assessment has been undertaken for the proposed works. A Forbes Station and Yard Enhancement Works CNVIS has been developed for the approved activities within the additional CIZs of the proposed works. Mitigation measures detailed in the CNVIS will be applied to the proposed works.
	Non-Aboriginal heritage	See Section 3.3 below	Non-Aboriginal heritage impacts associated with the original scope of works have been assessed in the DREF. Further assessment has been undertaken to assess whether any additional non-Aboriginal items of significance will be impacted by the proposed works. An Addendum SoHI has been developed and shows that the proposed works do not impact on heritage values.
	Aboriginal heritage	See Section 3.3 below	Aboriginal cultural heritage impacts associated with the Forbes Station and Yard realignment and awning trimming have been assessed in the DREF. Further assessment has been undertaken to ensure that no Aboriginal sites or Aboriginal places would be impacted by the proposed works. A search of AHIMS (Appendix A) revealed there are no recorded Aboriginal sites or Aboriginal places within 1 km of the Forbes Station and Yard; therefore, no additional or modified control measures are proposed. Consistent with the DREF mitigation measures, Aboriginal heritage will be included in the toolbox for the proposed works and an unexpected finds procedure will be implemented throughout the proposed works.
	Waste management	See Section 3.6 below	The nature and methodology of the approved works would not change because of the proposed works. Waste management was assessed by the DREF, and no additional impacts are predicted because of the proposed works. Minor increase in volume of waste sleepers will be managed in accordance with the ARTC waste timbers order 2019 and with the ARTC waste timbers exemption 2019, in line with the DREF, acknowledging that this exemption is currently being renewed. No additional or modified control measures are required.
	Soils and contamination	See Section 3.7 below	Soils and contamination searches in the DREF encompassed a 500 m buffer around the proposal site, which encompasses the footprint of the change in design. A detailed site investigation (DSI) has been undertaken and included in Appendix F. No ground disturbance works will commence until the DSI has been approved. Additional control measures are detailed in Section 3.7 below.
	Traffic and transport	See Section 3.5 below	Traffic and transport impacts associated with the original scope of works have been assessed in the DREF. The proposed works will be undertaken on the same parcel of land as the DREF; therefore, there would be no change in traffic and transport conditions. No additional or modified control measures are required.

	Environmental Factor	Assessment	Potential Impacts
No Further assessment required	Air quality	See Section 3.5 below	The proposed works will be carried out using the same methodology outlined in the DREF. As such, no additional significant impacts to air quality are anticipated. No additional or modified control measures are required.
	Land use, property and visual amenity	See Section 3.9 below	The land use, property and visual amenity impacts associated with the original scope of works have been assessed in the DREF. The proposed works do not change the nature, construction methodology or the use of the impact area. All works to be undertaken are within the railway corridor, which is ARTC leased land. Union St road reserve land, which is Forbes local council land, is required for vehicle access entering and exiting the additional CIZ areas including Forbes Yard Southern and Forbes Station Awning CIZs. This road reserve is already a driveway for the Forbes Station and therefore the use of the land does not change. No additional or modified control measures are required.
	Hydrology and flooding	See Section 5.4 of the DREF	The nature and methodology of the approved works would not change due to the proposed works. Constructing associated drainage was approved in the DREF, while the change in design involves reinstating an existing drain on the western side of the track. As such, no additional impacts to surface water, flooding and water quality are predicted because of the proposed works. No additional or modified control measures are required.
	Socio-economic	See Section 5.9 of the DREF	The nature and methodology of the approved works would not change because of the proposed works. As such, no additional impacts to socioeconomics are predicted because of the proposed works. No additional or modified control measures are required.

3.1 Biodiversity

A Biodiversity Assessment (BA) to support this SREF can be found in Appendix B. The BA consisted of background searches in January 2024.

3.1.1 Existing Environment

Biodiversity values of the study area of the Forbes Station and Yard was assessed by WSP and are included in the DREF. The proposed change in design will occur within the same study area of that assessed in the DREF, which is described as a heavily disturbed rail corridor where much of the native vegetation has been cleared. The NSW State Vegetation Type Mapping (SVTM) was updated in December 2023 as part of the Integrated BioNet Vegetation Data (IBVD) update. The updated SVTM indicates that the Forbes Station and Yard occurs wholly within a disturbed landscape, which does not include any vegetation classification.

Vegetation proximate to the station and yard is detailed in Table 3-2.

TABLE 3-2 PLANT COMMUNITY TYPES (PCTS) PROXIMATE TO FORBES STATION AND YARD

Plant Community Type	Distance from Forbes Station and Yard
PCT 11 – River Red Gum – Lignum very tall open forest or woodland wetland on floodplains of semi-arid (warm) climate zone (mainly Riverina Bioregion and Murray Darling Depression Bioregion)	Approximately 240 m south
PCT 76 – Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions	Approximately 550 m northeast

PCT 76 Western Grey Box tall grassy woodland on alluvial loam and clay soils in the NSW South Western Slopes and Riverina Bioregions is associated with the threatened ecological community (TEC) Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions, which is listed as endangered under the BC Act (Schedule 2, Part 2), and the TEC Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of south-eastern Australia, which is listed as endangered under the EPBC Act (Part 13, Division 1).

A NSW BioNet search was undertaken on 19 January 2024, which did not identify threatened flora species occurring within or near the proposed activity. Threatened fauna species with a moderate or higher potential to occur within the study area are discussed in Section 5.3 of the DREF.

3.1.2 Potential impact

The proposed change in design will occur within the existing disturbed footprint of the Forbes Station and Yard, which was assessed in the DREF. No PCTs occur within or adjacent to the impact area; thus, no additional biodiversity impacts are likely to occur from the change in design.

No significant impact on state or federally listed threatened biota is considered likely. A Species Impact Statement is not required. No referral to the federal Environment Minister is considered necessary. All predicted environmental impacts can be avoided, mitigated and/or managed such that the proposal would not lead to significant impacts on the environment. On balance, the proposal is considered justified.

The BA for the additional CIZ areas proposed in this SREF works (Appendix B) concluded that, based on a review of the assessment undertaken for the DREF and additional desktop searches:

- all areas in the SREF have already been covered by the DREF biodiversity assessment
- the PCTs in the DREF for Forbes Yard and Station that occur in the SREF additional CIZ area are ‘miscellaneous ecosystems – planted trees’ and ‘Miscellaneous ecosystems – highly disturbed areas with no or limited native vegetation’. There is low risk that vegetation of significance might be affected
- the SREF area south of Forbes Station does not require clearing and grubbing and therefore no biodiversity impacts are expected to occur
- for reference, PCT 11 ‘River Red Gum’ was identified in the DREF and the SREF southern extent
- the SREF additional CIZ areas are unlikely to impact on any new and/or different vegetation communities
- no threatened flora species have been recorded occurring near the proposed works
- given the study area exists within a highly modified environment, any vegetation removal would likely have similar impacts to that of the determined REF.

Based on these findings, no additional impacts to biodiversity are expected and, as such, no further assessment is required, including site surveys.

Clearing and grubbing will not occur on landscaping vegetation at Forbes Station as this landscaping forms part of the protected heritage items.

Removal of large trees, particularly in the Forbes Yard, is not anticipated to be required to enable the works. Mature trees within the heritage curtilage will be protected. Predominantly brush and groundcover such as grass to be cleared to establish access and compound amenities.

3.1.3 Mitigation Measures

The safeguards and mitigation measures listed within Table 5.21 of the DREF are considered sufficient for the proposal. No additional mitigation measures are considered necessary.

3.2 Noise and vibration

3.2.1 Context and existing environment

Noise impacts from construction are outlined in Section 5.1 of the DREF. Noise catchment areas (NCAs) were defined in the DREF to classify groups of sensitive receivers that are likely to have a similar existing noise environment and experience similar impacts from the proposed works. The amended CIZ area consists of three NCAs (NCA-06a, NCA-06b and NCA06c). The approximate number of receivers in each NCA and the existing environment description is shown in DREF Table 5.3 excerpt as Figure 3-1.

Martinus' noise and vibration consultant has completed a Construction Noise and Vibration Impact Statement (CNVIS) for all works to be undertaken for the Forbes Station and Yard enhancement works. The activities for the proposed works are the same as the activities approved in the DREF. The additional proposed CIZ is not significantly different from the DREF CIZs (Table 3-3). In summary, the proposed CIZ shortens the distance of the works to sensitive receivers by up to 45 m west at Forbes Yard North up to 25m west at Forbes Yard South and Forbes Station, and up to 75m south at Dowling St/Parkes Rd (Table 3-3). The CNVIS has been developed with the proposed CIZ footprint, and the relevant excerpts of this assessment have been included below.

This CNVIS does not assess the change in noise and vibration impacts from the DREF to the proposed CIZ areas; instead, it models all works planned with the proposed CIZ areas. The information and mitigation measures provided are not a result of a comparison of change in works locations.

The working hours for the proposed works are consistent with the DREF. For due diligence, all noise periods have been modelled for this approval.

In short, the mitigation measures identified in the CNVIS will be implemented for the proposed works and, subsequently, no additional noise and vibration mitigation measures will be required as a result of this approval. All receivers in the applicable NCAs are identified shown in Figure 3-1 below.

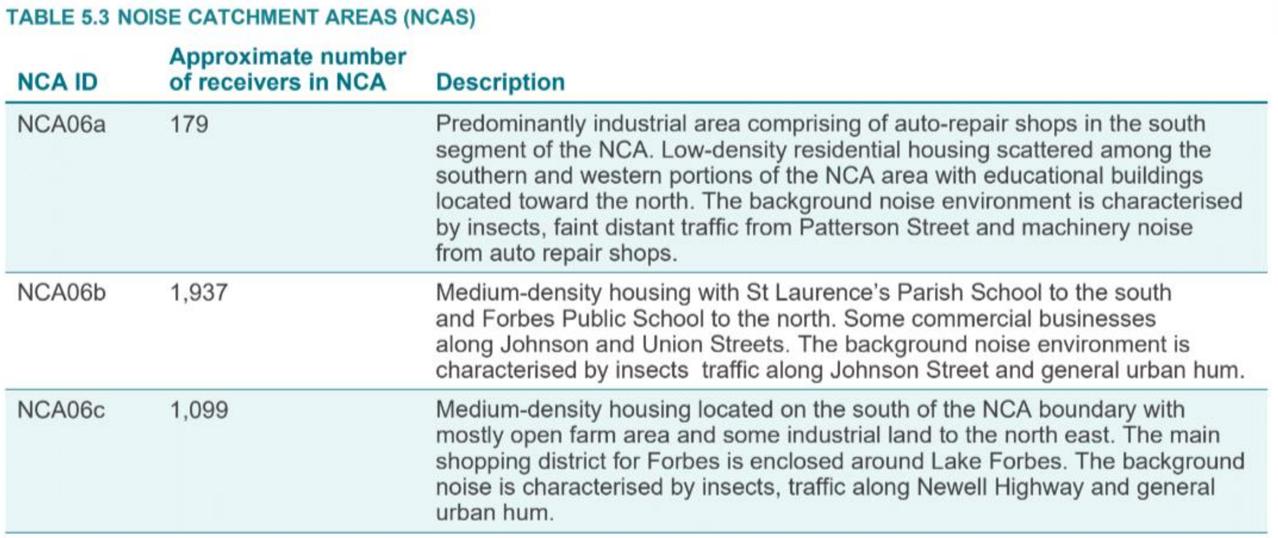


TABLE 5.3 NOISE CATCHMENT AREAS (NCAS)

NCA ID	Approximate number of receivers in NCA	Description
NCA06a	179	Predominantly industrial area comprising of auto-repair shops in the south segment of the NCA. Low-density residential housing scattered among the southern and western portions of the NCA area with educational buildings located toward the north. The background noise environment is characterised by insects, faint distant traffic from Patterson Street and machinery noise from auto repair shops.
NCA06b	1,937	Medium-density housing with St Laurence's Parish School to the south and Forbes Public School to the north. Some commercial businesses along Johnson and Union Streets. The background noise environment is characterised by insects traffic along Johnson Street and general urban hum.
NCA06c	1,099	Medium-density housing located on the south of the NCA boundary with mostly open farm area and some industrial land to the north east. The main shopping district for Forbes is enclosed around Lake Forbes. The background noise is characterised by insects, traffic along Newell Highway and general urban hum.

FIGURE 3-1 DREF NCA RECEIVER TOTALS AND EXISTING ENVIRONMENT DESCRIPTIONS

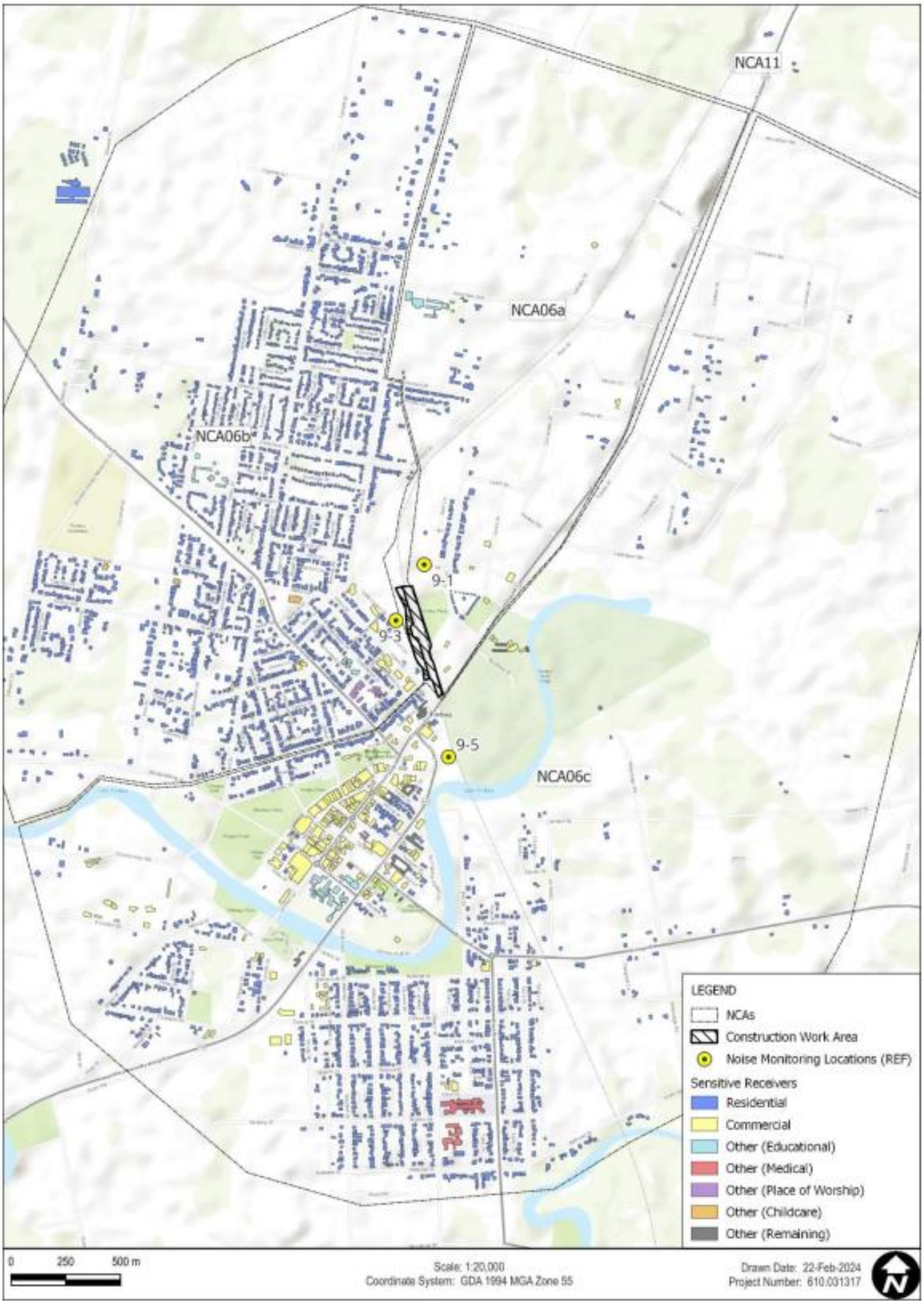
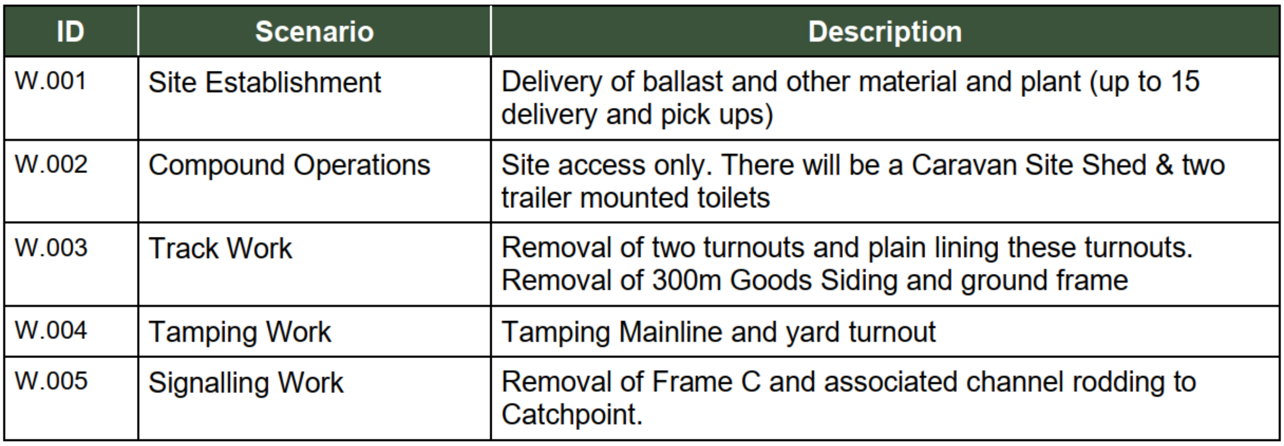


FIGURE 3-2 SLR NOISE ASSESSMENT—ALL RECEIVERS MAP

3.2.2 Assessment methodology

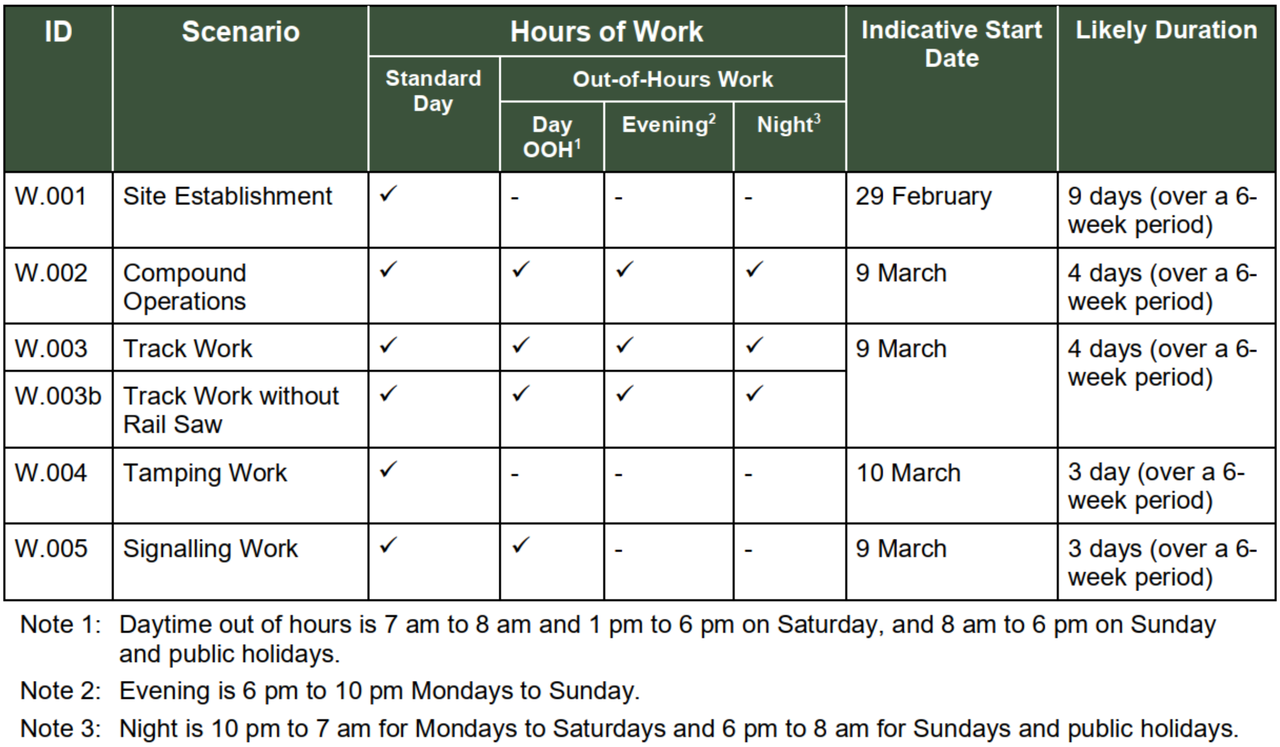
The Forbes Station and Yard CNVIS noise and vibration assessment (Appendix C) uses ‘realistic worst-case’ scenarios to determine the impacts from the noisiest 15-minute period that is likely to occur for each work scenario, as required by the ICNG. The modelling was developed in accordance with all existing, relevant approval requirements, including the environmental mitigation measures in the DREF.

Figure 3-5 to Figure 3-5 below show the noise assessment methodology of activities and equipment modelling for the proposed works; inclusive of site establishment, track work, tamping and signalling work, which comprise the proposed works. For transparency, however, all modelled work activities have been included.



ID	Scenario	Description
W.001	Site Establishment	Delivery of ballast and other material and plant (up to 15 delivery and pick ups)
W.002	Compound Operations	Site access only. There will be a Caravan Site Shed & two trailer mounted toilets
W.003	Track Work	Removal of two turnouts and plain lining these turnouts. Removal of 300m Goods Siding and ground frame
W.004	Tamping Work	Tamping Mainline and yard turnout
W.005	Signalling Work	Removal of Frame C and associated channel rodding to Catchpoint.

FIGURE 3-3 SLR FORBES NOISE ASSESSMENT WORK SCENARIO DESCRIPTIONS



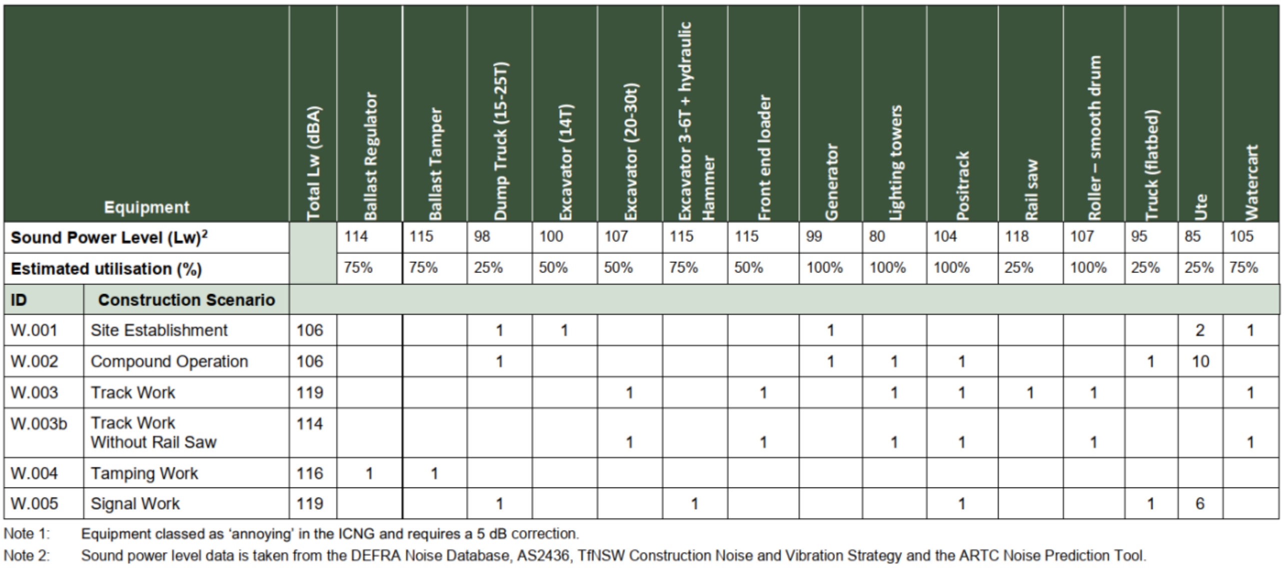
ID	Scenario	Hours of Work				Indicative Start Date	Likely Duration
		Standard Day	Out-of-Hours Work				
			Day OOH[1]	Evening[2]	Night[3]		
W.001	Site Establishment	✓	-	-	-	29 February	9 days (over a 6-week period)
W.002	Compound Operations	✓	✓	✓	✓	9 March	4 days (over a 6-week period)
W.003	Track Work	✓	✓	✓	✓	9 March	4 days (over a 6-week period)
W.003b	Track Work without Rail Saw	✓	✓	✓	✓		
W.004	Tamping Work	✓	-	-	-	10 March	3 day (over a 6-week period)
W.005	Signalling Work	✓	✓	-	-	9 March	3 days (over a 6-week period)

Note 1: Daytime out of hours is 7 am to 8 am and 1 pm to 6 pm on Saturday, and 8 am to 6 pm on Sunday and public holidays.

Note 2: Evening is 6 pm to 10 pm Mondays to Sunday.

Note 3: Night is 10 pm to 7 am for Mondays to Saturdays and 6 pm to 8 am for Sundays and public holidays.

FIGURE 3-4 SLR FORBES NOISE ASSESSMENT SCENARIOS AND PERIODS OF WORK



Equipment		Total Lw (dBA)	Ballast Regulator	Ballast Tamper	Dump Truck (15-25T)	Excavator (14T)	Excavator (20-30t)	Excavator 3-6T + hydraulic Hammer	Front end loader	Generator	Lighting towers	Positrack	Rail saw	Roller – smooth drum	Truck (flatbed)	Ute	Watercart
Sound Power Level (Lw)^2			114	115	98	100	107	115	115	99	80	104	118	107	95	85	105
Estimated utilisation (%)			75%	75%	25%	50%	50%	75%	50%	100%	100%	100%	25%	100%	25%	25%	75%
ID	**Construction Scenario**																
W.001	Site Establishment	106			1	1				1						2	1
W.002	Compound Operation	106			1					1	1	1			1	10	
W.003	Track Work	119					1		1		1	1	1	1			1
W.003b	Track Work Without Rail Saw	114					1		1		1	1		1			1
W.004	Tamping Work	116	1	1													
W.005	Signal Work	119			1			1				1			1	6	

Note 1: Equipment classed as 'annoying' in the ICNG and requires a 5 dB correction.

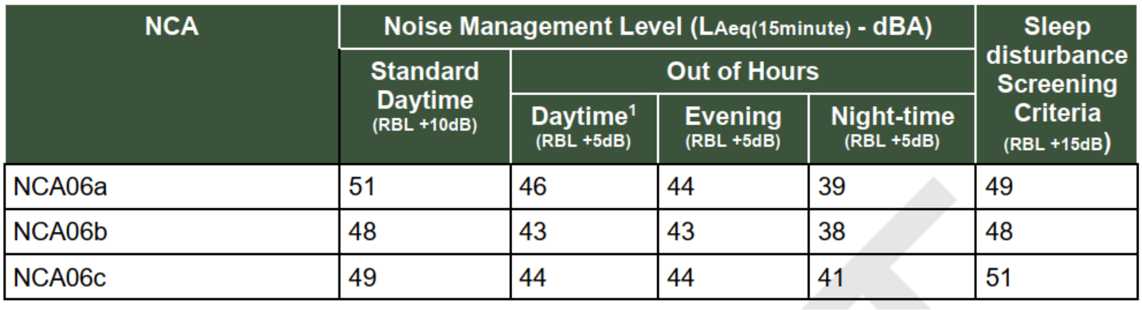
Note 2: Sound power level data is taken from the DEFRA Noise Database, AS2436, TfNSW Construction Noise and Vibration Strategy and the ARTC Noise Prediction Tool.

FIGURE 3-5 SLR FORBES NOISE ASSESSMENT MODELLING SCENARIO

3.2.3 Assessment criteria

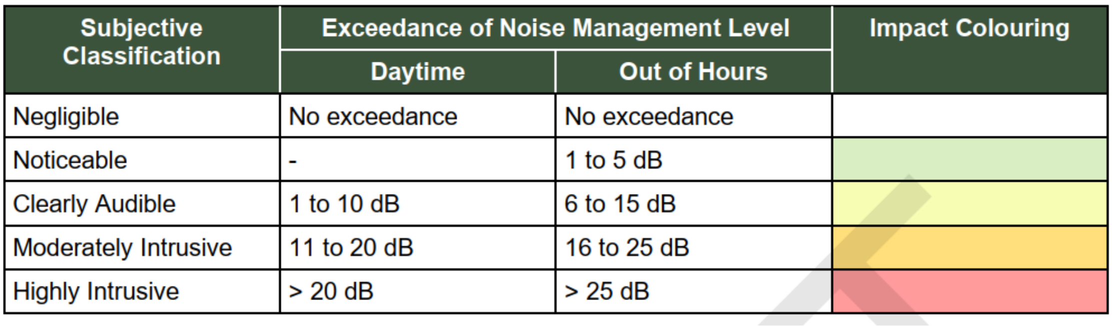
Noise assessment criteria

The Forbes Station and Yard CNVIS (Appendix C) presents the combined predicted noise impacts for each scenario; meaning, the worst-case result at each receiver is considered from all potential work areas where each scenario is to be undertaken. The noise criteria and corresponding control classification are shown below in Figure 3-6 and Figure 3-7 .



NCA	Noise Management Level ($L_{Aeq(15minute)}$ - dBA)				Sleep disturbance Screening Criteria (RBL +15dB)
	Standard Daytime (RBL +10dB)	Out of Hours			
		Daytime^1 (RBL +5dB)	Evening (RBL +5dB)	Night-time (RBL +5dB)	
NCA06a	51	46	44	39	49
NCA06b	48	43	43	38	48
NCA06c	49	44	44	41	51

FIGURE 3-6 SLR FORBES NOISE ASSESSMENT NOISE MANAGEMENT LEVELS



Subjective Classification	Exceedance of Noise Management Level		Impact Colouring
	Daytime	Out of Hours	
Negligible	No exceedance	No exceedance	
Noticeable	-	1 to 5 dB	🟩
Clearly Audible	1 to 10 dB	6 to 15 dB	🟨
Moderately Intrusive	11 to 20 dB	16 to 25 dB	🟧
Highly Intrusive	> 20 dB	> 25 dB	🟥

FIGURE 3-7 SLR FORBES NOISE ASSESSMENT CONTROL CRITERIA

Vibration assessment criteria

The vibration criteria for human comfort and building damage are shown below in Figure 3-8 to Figure 3-12. In summary, the vibration safe working distances for the proposed works are:

- cosmetic damage—5 m
- human comfort—30 m.

Heritage-listed buildings and structures should be considered on a case-by-case basis but, as noted in BS 7385, should not be assumed to be more sensitive to vibration, unless structurally unsound. Where a heritage building is deemed to be sensitive, the more stringent DIN 4150 Group 3 guideline values in Figure 3-11 can be applied.

Building Type	Assessment Period	Vibration Dose Value[1] (m/s$^{1.75}$)	
		Preferred	Maximum
Critical Working Areas (eg operating theatres or laboratories)	Day or night-time	0.10	0.20
Residential	Daytime	0.20	0.40
	Night-time	0.13	0.26
Offices, schools, educational institutions and places of worship	Day or night-time	0.40	0.80
Workshops	Day or night-time	0.80	1.60

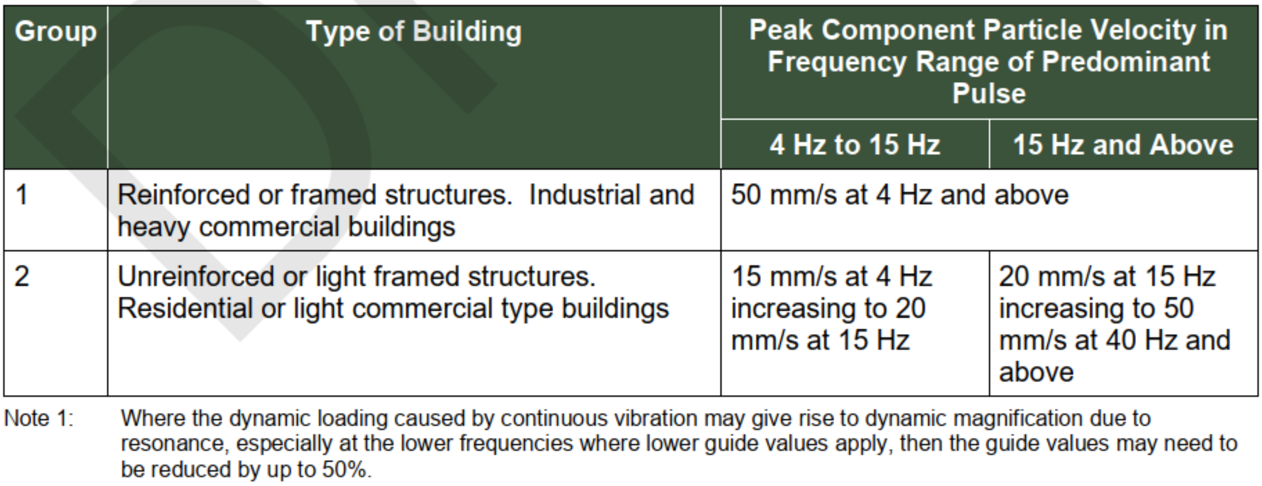
Note 1: The VDV accumulates vibration energy over the daytime and night-time assessment periods, and is dependent on the level of vibration as well as the duration.

Note 2: Daytime is 7am to 10pm, night-time is 10pm to 7am.

FIGURE 3-8 HUMAN COMFORT VIBRATION—VIBRATION DOSE VALUES FOR INTERMITTENT VIBRATION

Location	Assessment period	Preferred values		Maximum values	
		z-axis	x- and y-axis	z-axis	x- and y-axis
Continuous vibration					
Residential	Daytime	0.010	0.0071	0.020	0.014
	Night-time	0.007	0.005	0.014	0.010
Offices, schools, educational institutions and places of worship	Day or night-time	0.020	0.014	0.040	0.028
Workshops	Day or night-time	0.04	0.029	0.080	0.058
Impulsive vibration					
Residential	Daytime	0.30	0.21	0.60	0.42
	Night-time	0.10	0.071	0.20	0.14
Offices, schools, educational institutions and places of worship	Day or night-time	0.64	0.46	1.28	0.92
Workshops	Day or night-time	0.64	0.46	1.28	0.92

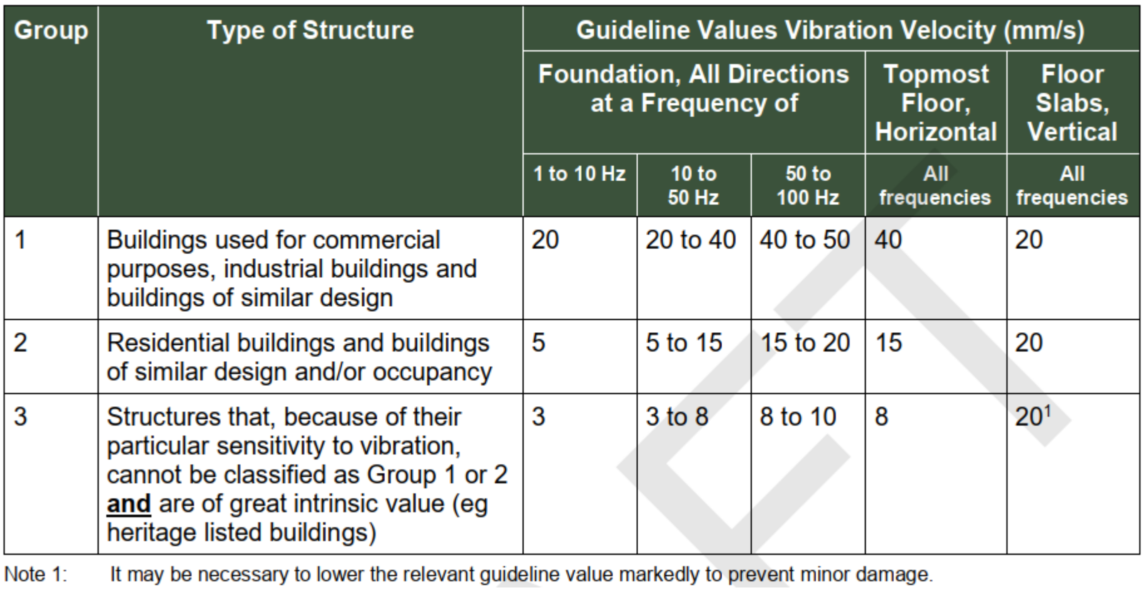
FIGURE 3-9 HUMAN COMFORT VIBRATION—PREFERRED AND MAXIMUM WEIGHTED ROOT MEAN SQUARE VALUES FOR CONTINUOUS AND IMPULSIVE VIBRATION ACCELERATION (M/S2) 1–80 HZ



Group	Type of Building	Peak Component Particle Velocity in Frequency Range of Predominant Pulse	
		4 Hz to 15 Hz	15 Hz and Above
1	Reinforced or framed structures. Industrial and heavy commercial buildings	50 mm/s at 4 Hz and above	
2	Unreinforced or light framed structures. Residential or light commercial type buildings	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above

Note 1: Where the dynamic loading caused by continuous vibration may give rise to dynamic magnification due to resonance, especially at the lower frequencies where lower guide values apply, then the guide values may need to be reduced by up to 50%.

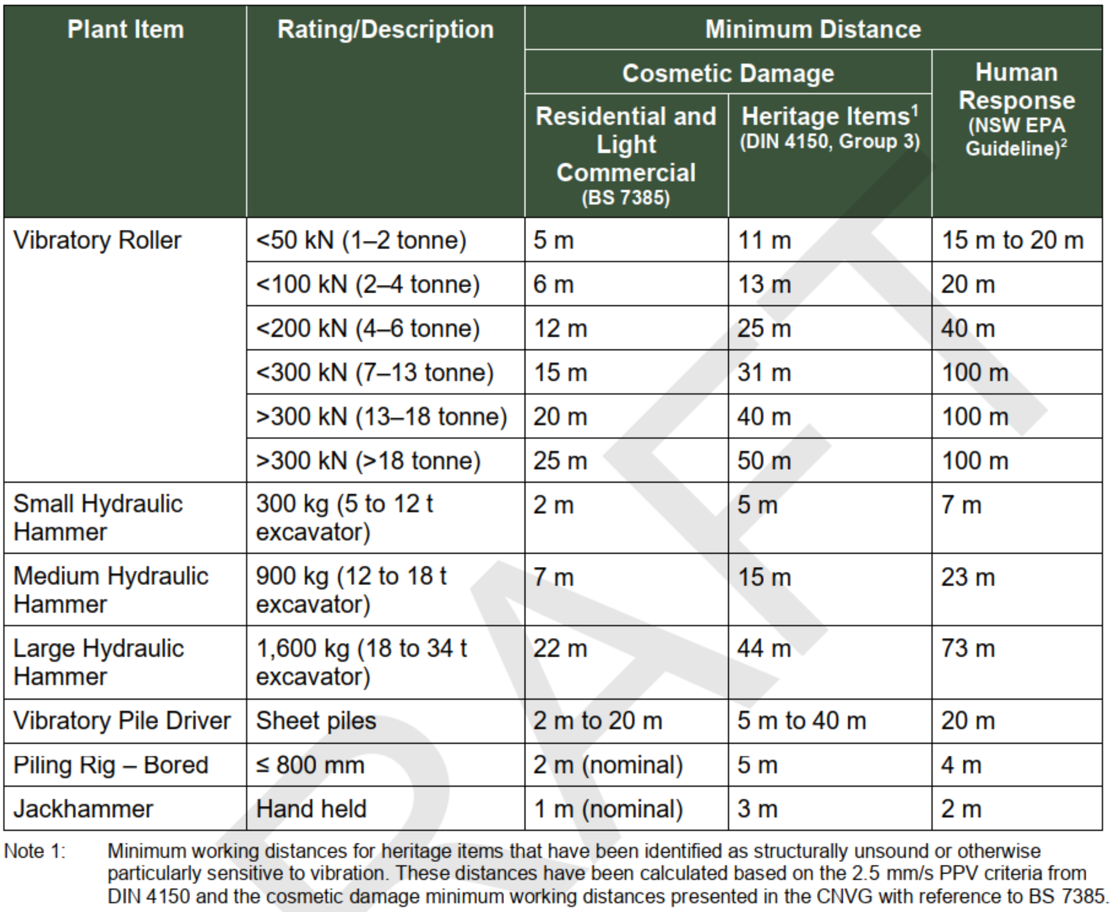
FIGURE 3-10 COSMETIC DAMAGE—BS 7385 TRANSIENT VIBRATION VALUES FOR MINIMAL RISK OF DAMAGE



Group	Type of Structure	Guideline Values Vibration Velocity (mm/s)				
		Foundation, All Directions at a Frequency of			Topmost Floor, Horizontal	Floor Slabs, Vertical
		1 to 10 Hz	10 to 50 Hz	50 to 100 Hz	All frequencies	All frequencies
1	Buildings used for commercial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40	20
2	Residential buildings and buildings of similar design and/or occupancy	5	5 to 15	15 to 20	15	20
3	Structures that, because of their particular sensitivity to vibration, cannot be classified as Group 1 or 2 **and** are of great intrinsic value (eg heritage listed buildings)	3	3 to 8	8 to 10	8	20[1]

Note 1: It may be necessary to lower the relevant guideline value markedly to prevent minor damage.

FIGURE 3-11 COSMETIC DAMAGE—DIN 4150 GUIDELINE VALUES FOR SHORT-TERM VIBRATION ON STRUCTURES



Plant Item	Rating/Description	Minimum Distance		
		Cosmetic Damage		Human Response (NSW EPA Guideline)[2]
		Residential and Light Commercial (BS 7385)	Heritage Items[1] (DIN 4150, Group 3)	
Vibratory Roller	<50 kN (1–2 tonne)	5 m	11 m	15 m to 20 m
	<100 kN (2–4 tonne)	6 m	13 m	20 m
	<200 kN (4–6 tonne)	12 m	25 m	40 m
	<300 kN (7–13 tonne)	15 m	31 m	100 m
	>300 kN (13–18 tonne)	20 m	40 m	100 m
	>300 kN (>18 tonne)	25 m	50 m	100 m
Small Hydraulic Hammer	300 kg (5 to 12 t excavator)	2 m	5 m	7 m
Medium Hydraulic Hammer	900 kg (12 to 18 t excavator)	7 m	15 m	23 m
Large Hydraulic Hammer	1,600 kg (18 to 34 t excavator)	22 m	44 m	73 m
Vibratory Pile Driver	Sheet piles	2 m to 20 m	5 m to 40 m	20 m
Piling Rig – Bored	≤ 800 mm	2 m (nominal)	5 m	4 m
Jackhammer	Hand held	1 m (nominal)	3 m	2 m

Note 1: Minimum working distances for heritage items that have been identified as structurally unsound or otherwise particularly sensitive to vibration. These distances have been calculated based on the 2.5 mm/s PPV criteria from DIN 4150 and the cosmetic damage minimum working distances presented in the CNVG with reference to BS 7385.

FIGURE 3-12 RECOMMENDED MINIMUM WORKING DISTANCES FROM VIBRATION-INTENSIVE EQUIPMENT

3.2.4 Assessment results

All construction noise impacts are temporary construction impacts and will not occur during the operation of the asset. The noise and vibration will be managed in accordance with the existing approved requirements including the environmental mitigation measures in the DREF and EPL 3142, and undertaken in accordance with the CEMP, NVMP and Stakeholder and Community Management Plan.

The CNVIS for Forbes Station and Yard (Appendix C) has been developed, with exceedances of NML summarised and shown in Table 14. This CNVIS does not assess the change in noise and vibration impacts from the DREF to the proposed CIZ areas. Instead, it models all works planned within the proposed CIZ areas. The information provided and mitigation measures are not a result of a comparison of change in works locations.

The mitigation measures identified in Appendix C will be implemented for the proposed works.

The signal hut fuse removal and boom tying scope of works required in the Forbes Station South CIZ will be undertaken during standard daytime work hours.

Are the works likely to have a vibration impact?

☒ Yes

☐ No

Martinus' noise and vibration consultant has determined that the only vibration-intensive activity proposed is rail tamping, which has the potential to generate perceptible vibration at one receiver. No vibratory rolling is proposed to occur. No likelihood of cosmetic or structural damage impacts are expected from the proposed works as there are no properties within the safe working distances (see assessment criteria section above). Similarly, no properties are expected to be within the human comfort safe working distance for rail tamping.

A number of heritage Items associated with the historic Forbes Station are located close to the potential vibration-generating proposed works. Given the current exposure to rail vibration, it is expected that they are structurally sound and of low risk of vibration damage from tamping activities.

3.2.5 Mitigation measures

In short, the mitigation measures identified in the CNVIS, summarised in Appendix C, will be implemented for the proposed works, as well as the communications mitigation measures shown in Appendix C for NML exceedances shown in Appendix C per the relevant noise period.

It is worth noting that the CNVIS models the ‘worst case scenario’ results, which means that the results are not representative of what the ‘typical’ and most experienced noise and vibration levels and impacts will be for the proposed works.

Given the activities in the proposed works are the same as the DREF, the works modelled in the CNVIS and subsequent mitigation measure are applicable. The mitigation measures required as a result of the CNVIS and OOHW permit are the applicable mitigation measures for the proposed works.

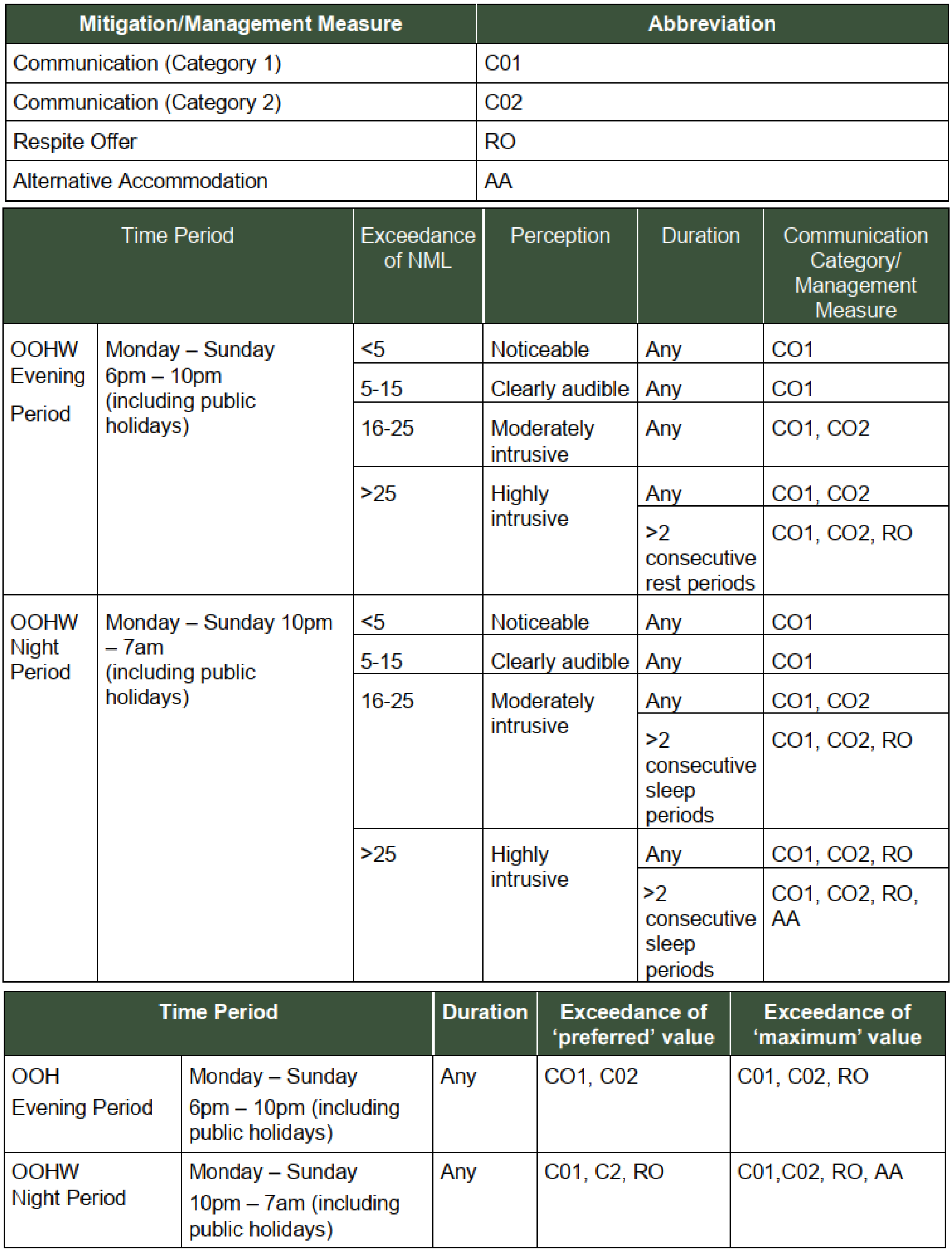
Noise- and vibration-generating activities will be undertaken in accordance with the relevant requirements in EPL 3142, the approved Project Construction Noise and Vibration Management Plan including the application of the Out of Hours Works (OOHW) Plan for works undertaken outside of standard work hours including the 88-hour rail possession.

The OOHW permit will detail the exact works schedule, and will identify which receivers, including other sensitive receivers, are required to be offered alternative accommodation based on exceedances and more than two consecutive nights of the exceeding activity. Where possible, work would be scheduled to avoid impacting the same receivers for more than two consecutive sleep periods. Receivers that would be impacted for more than two consecutive sleep periods must be identified in the OOHW permit.

In summary, the CNVIS identifies that the following residential receivers have the potential of being the greatest impacted should the worst-case scenarios be actualised:

- 1 Little Union Street, Forbes
- 2 Little Union Street, Forbes
- 4 Little Union Street, Forbes
- 6 Little Union Street, Forbes
- 8 Little Union Street, Forbes
- 1 Union Street, Forbes

The OOHW permit will include specific details on the required community management measures required for these identified residential receivers.



Mitigation/Management Measure	Abbreviation
Communication (Category 1)	C01
Communication (Category 2)	C02
Respite Offer	RO
Alternative Accommodation	AA

Time Period		Exceedance of NML	Perception	Duration	Communication Category/ Management Measure
OOHW Evening Period	Monday – Sunday 6pm – 10pm (including public holidays)	<5	Noticeable	Any	CO1
		5-15	Clearly audible	Any	CO1
		16-25	Moderately intrusive	Any	CO1, CO2
		>25	Highly intrusive	Any	CO1, CO2
				>2 consecutive rest periods	CO1, CO2, RO
OOHW Night Period	Monday – Sunday 10pm – 7am (including public holidays)	<5	Noticeable	Any	CO1
		5-15	Clearly audible	Any	CO1
		16-25	Moderately intrusive	Any	CO1, CO2
				>2 consecutive sleep periods	CO1, CO2, RO
		>25	Highly intrusive	Any	CO1, CO2, RO
				>2 consecutive sleep periods	CO1, CO2, RO, AA

Time Period		Duration	Exceedance of 'preferred' value	Exceedance of 'maximum' value
OOH Evening Period	Monday – Sunday 6pm – 10pm (including public holidays)	Any	CO1, C02	C01, C02, RO
OOHW Night Period	Monday – Sunday 10pm – 7am (including public holidays)	Any	C01, C2, RO	C01,C02, RO, AA

FIGURE 3-13 COMMUNICATIONS MITIGATION MEASURES FOR SENSITIVE RECEIVERS

3.3 Non-Aboriginal heritage

Searches of Australia's National Heritage List, the NSW State Heritage Register, and Schedule 5 Environmental Heritage of the Forbes LEP were undertaken on 19 January 2024, which identified a number of historic heritage items within the study area.

The proposed works will be carried out within the curtilage of the Forbes Railway Station Group, which is listed on the NSW State Heritage Register (SHR #01145), the Forbes LEP (LEP #I84), and on ARTC's Section 170 Heritage and Conservation Register.

3.3.1 Potential impact

A Statement of Heritage Impact (SoHI) was prepared in 2021 for the Forbes Railway Station. Martinus' heritage consultant has reviewed the proposed works and prepared an Addendum SoHI in 2024 (Appendix E) assessing whether additional impacts to non-Aboriginal heritage are likely as a result of the proposed works. The entirety of the proposed CIZ is covered by the Addendum SoHI (Appendix E).

To summarise Appendix E, the important element of the significance summary to the Addendum SOHI is that all factors of significance relate to the station building itself, its' associated platform, the garden and fences.

Removal of the frame C turnout, the associated goods siding rail and signalling infrastructure will not impact the heritage values of the station. This proposal sees the removal, in fact, of intrusive elements of rail infrastructure that date to the modern era.

The significance of the Forbes Railway Station Group focuses on the station and residence buildings, platform, fencing, entrance forecourt, remnant gardens and the contribution of the structures to the townscape of Forbes. Removal of the signalling assets and other track elements will not impact any original fabric as they are not part of the original station and do not have any heritage significance.

As a result, the Addendum SOHI determines that the proposed works will have no impact on the stations' heritage values. The proposed works are consistent with the s60 approval for Forbes Station.

The Addendum SOHI recommends that a standard exemption record-keeping form, under Standard Exemption 3: Alteration to non-significant fabric, is prepared and kept by ARTC.

3.3.2 Mitigation measures

The control measures for the construction activities outlined in Table 5.16 of the DREF are considered appropriate.

As stated in the SoHI (Appendix E), the following mitigation measures will be implemented for the proposed works:

- temporary fencing will be used to demarcate the heritage structures and gardens as 'heritage no-go zones'
- all workers will be made aware of the heritage no-go zones through site inductions prior to the commencement of the works
- Martinus will prepare and keep a standard exemption record-keeping form, under Standard Exemption 3: Alteration to non-significant fabric.

Additionally, an unexpected finds process will be implemented throughout the duration of the works.

3.4 Aboriginal cultural heritage

An Aboriginal Heritage Information Management System (AHIMS) search was undertaken on 19 January 2024, which did not identify any Aboriginal sites or Aboriginal places within 1 km of the Forbes Station and Yard (Appendix A).

An Aboriginal Due Diligence Assessment Report (ADDAR) was prepared for the DREF and a site inspection by a qualified archaeologist was conducted on 2 and 3 February 2021, which did not record any Aboriginal sites within the study area. The ADDAR determined the lack of sites is most likely due to the highly disturbed nature of the proposal site, which has been subject to impacts from railway construction and agriculture.

3.4.1 Potential impact

The change in design will involve ground disturbance within the existing rail corridor.

The proposed activity does not comprise exempt development or is the subject of a complying development certificate; thus, the proposed activity is not a low-impact activity pursuant to section 58 of the National Parks and Wildlife Regulation 2021 (NPW Regulation). Therefore, the generic due diligence process, as determined by the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (Due Diligence Code of Practice), has been applied to this SREF.

Table 3-3 outlines the generic due diligence process.

TABLE 3-3 THE GENERIC DUE DILIGENCE PROCESS

Process	ANSWER	REASONING
1. Will the activity disturb the ground surface or any culturally modified trees?	Yes	The proposed activity will disturb the ground surface during removal of existing lines and replacement of the sleepers on the main line. Ground disturbance will also occur during the reinstatement of the drain.
2. Are there any: a) relevant confirmed site records or other associated landscape feature information on AHIMS? b) any other sources of information of which a person is already aware? c) landscape features that are likely to indicate presence of Aboriginal objects?	No No further assessment required	A search of AHIMS did not identify any Aboriginal objects or Aboriginal places within 1 km of the Forbes Station and Yard. The site inspection in 2021 did not identify any Aboriginal objects. No landscape features that are likely to indicate the presence of Aboriginal objects are located near Forbes Station and Yard.
Summary	Aboriginal Heritage Impact Permit (AHIP) application not necessary. Proceed with caution. If any Aboriginal objects are found, stop work and notify the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW). If human remains are found, stop work, secure the site and notify the NSW Police and the DCCEEW.	

3.4.2 Mitigation measures

Management measures documented in Table 5.50 of the DREF are considered appropriate. Works will be undertaken in accordance with the CEMP and Heritage Management Plan.

3.5 Traffic and transport

Access to the Forbes Station and Yard would remain consistent with the DREF.

3.5.1 Potential impact

The change in design will be undertaken on the same parcel of land as the DREF, and access to the site remains consistent with the DREF; therefore, there would be no change in traffic and transport conditions and no additional impacts are anticipated.

The proposed CIZ for the Forbes Station awning trimming may impact access. Although some of the carpark at this location will be cordoned-off for temporary materials storage such as scaffolding, and the access will be used by construction light vehicles, the traffic access into and exiting the station will remain accessible to the public.

The proposed works to the level crossing on Parkes Street will require the level crossing to be booked out; however, works will not be within the road reserve, they do not require an ROL and will not impact on existing traffic movements.

3.5.2 Mitigation measures

All control measures documented in Table 5.47 of the DREF are considered appropriate.

3.6 Waste management

The DREF documented that minor quantities of waste material were noted in the rail corridor, including timber sleepers.

3.6.1 Potential impact

A minor increase in the volume of waste timber sleepers will occur as a result of the increased length of track removal in the proposed works compared to the DREF; however, the nature in which the waste timbers will be managed will be consistent with the DREF mitigation measures and EPA requirements.

Waste timber will be managed in accordance with The ARTC waste timbers order 2019 and with the ARTC waste timbers exemption 2019.

3.6.2 Mitigation measures

All mitigation measured documented in Table 5.25 of the DREF are considered appropriate.

3.7 Soil and contamination

A desktop contamination assessment and site observations were undertaken for the DREF and used to identify the risk of contamination present at Forbes Yard and Station on the basis that excavation would be required at the site. Salinity, acid sulfate soils, acid sulfate rock and naturally occurring asbestos were not identified in the site.

The DREF assessment identified registered or notified contaminated sites within 500 m of the site (Figure 3-14). Where offsite migration of contamination has occurred, this may have the potential to impact soils and/or groundwater within the proposal site. Excavation has the potential to encounter contaminated soils requiring management during construction. Two sites recorded on the ARTC contaminated land register (Former Mobil and Shell siding, and a goods shed) were also identified. The goods shed was identified as requiring further investigation.

FIGURE 3-14 HORIZONTAL CLEARANCES DETERMINED REF CONTAMINATION ASSESSMENT

3.7.1 Potential impact

Ground disturbance (excavation) is included in the proposed works. The proposed works, including all additional CIZ areas, are within the DREF 500 m contamination investigation area. There is no change in contamination risk between the DREF and the proposed works; therefore, the mitigation measures in the DREF are suitable and will be applied. Note, the proposed works will not impact on the goods shed.

In preparation for works at the Forbes Station and Yard, in accordance with the DREF mitigation measures, a detailed site investigation (DSI) has been undertaken. The DSI findings have been included in Appendix F for transparency. No ground disturbance works will be undertaken prior to the DSI being reviewed and accepted by IR/ARTC. The appropriate management will be applied in accordance with the Project's CEMP and sub-plans.

3.7.2 Mitigation measures

Based on the findings detailed in the DSI (Appendix F) the following mitigation measures will be implemented:

- the controls and procedures presented in the Asbestos Management Plan will be incorporated into the works planning, including, but not limited to, identification of site-specific risks and provision of risk-mitigation procedures to be implemented when unexpected finds occur within the works area
- the Unexpected Finds Protocol (UFP) as outlined in ADE (2021b) will be employed for the works to cater for incidents where signs of contamination are encountered within the works area.
- Martinus will test and classify material generated from the proposed works in accordance with the approved Waste Management Plan and dispose of at a suitably licenced facility and/or reuse in accordance with a valid RRO.

To address potential contamination risks that has arisen from the information of the DSI:

- an onsite emu pick by a suitably qualified occupational hygienist will be undertaken prior to works commencing across the full extent of the additional CIZs
- the suitably qualified occupational hygienist will undertake a specific site walk over of the area of environmental concern around the test pits identified in the DSI (Appendix B of Appendix F) from TP05 to TP010 (SAQP Appendix B of Appendix F)
- controls to be installed around the vegetated area in the Forbes Yard Southern CIZ to prevent access due to the unknown contamination risk
- should any excavated soil material be required to be taken offsite, PFAS should be included as an analyte for waste classification testing.

3.8 Air quality

The DREF describes air quality within the study area as largely influenced by agricultural land use and natural events, including bushfires and dust storms. The air quality around Forbes Station and Yard site is influenced by emissions associated with Forbes township, including vehicles, and from general industrial and commercial land use activities.

3.8.1 Potential impact

The proposed change in design would not significantly change air quality impacts associated with construction activities; however, there will be additional stockpile sites within the northern CIZ, as shown in Figure 1-2. These sites will be utilised to stockpile redundant material, ballast and spoil.

3.8.2 Mitigation measures

The control measures documented in Table 5.51 of the DREF are considered appropriate.

3.9 Land use, property and visual amenity

The proposed works will occur within the Forbes Station and Yard, which is located within the Forbes township on land zoned SP2—Railway Infrastructure on the Forbes LEP. The land use of the proposal site would temporarily be for construction purposes. Impacts to land use during construction would be associated with site compounds, stockpiles and laydown areas.

Given the proposed works will be carried out in the same study area as the DREF, visual amenity, as described in Section 5.6 of the DREF, is applicable with the SREF.

3.9.1 Potential impact

The change in design would not change the land use of the proposal site during operation, and no impacts to land use and property are anticipated during construction.

Given the limited scope of works required for the change in design, visual impacts during construction and operation would be similar to those described in the DREF. The additional CIZs require a larger footprint than previously assessed; however, the viewpoints identified in Section 5.3 will not be significantly impacted. The proposed timeframe for the proposed works remains the same; thus, potential impacts to visual amenity would be short-term in duration.

3.9.2 Mitigation measures

Management measures documented in the DREF are considered appropriate.

4. CUMULATIVE IMPACTS

The proposed works involves minor additional construction activities above what was proposed in the DREF, and the proposed additional CIZs will be established on land that has been subject to previous disturbance within the railway corridor.

The change in design will be carried out within the same timeframe as the DREF, which is during the March 2024 possession; therefore, potential cumulative impacts are considered unlikely.

Therefore, the additional cumulative impacts from the proposed changes, as assessed in this SREF, are considered minor and consistent with potential impacts for construction activities in the DREF. The findings of the cumulative impact assessment are identified in Table 5.56 of the DREF.

5. ENVIRONMENTAL MANAGEMENT AND IMPACT MITIGATION MEASURES

No additional environmental management and impact mitigation measures for construction activities have been identified in this SREF; therefore, the environmental management measures outlined in Section 7 of the DREF are considered appropriate. For non-Aboriginal heritage, there is one additional mitigation measure for ARTC to prepare and keep a standard exemption record-keeping form, under Standard Exemption 3: Alteration to non-significant fabric. This measure has no impact on physical works.

No ground disturbance works will commence until the DSI has been approved, as per Section 2.5.4 of the CEMP.

6. ENVIRONMENTAL MATTERS AND CHECKLISTS

6.1 Ecologically sustainable development

The principles of ecologically sustainable development have been considered in Section 6.1 of the DREF and in the Biodiversity Assessment (Appendix B).

6.2 Section 171 checklist

The following factors in Table 6-1, from section 171 of the EP&A Regulation, have also been considered to assess the likely impacts of the proposed works on the natural and built environment.

TABLE 6-1 SECTION 171 CHECKLIST

Factor	Impact
a) any environmental impact on a community?	**No significant impact** No change from DREF
b) any transformation of a locality?	**No significant impact** No change from DREF
c) any environmental impact on the ecosystems of the locality?	**No significant impact** No change from DREF
d) any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality?	**No significant impact** No change from DREF
e) any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations?	**No significant impact** No change from DREF
f) any impact on the habitat of protected animals (within the meaning of the *Biodiversity Conservation Act 2016*)?	**No significant impact** No change from DREF
g) any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air?	**No significant impact** No change from DREF
h) any long-term effects on the environment?	**No significant impact** No change from DREF
i) any degradation of the quality of the environment?	**No significant impact** No change from DREF
j) any risk to the safety of the environment?	**No significant impact** No change from DREF
k) any reduction in the range of beneficial uses of the environment?	**No significant impact** No change from DREF
l) any pollution of the environment?	**No significant impact** No change from DREF
m) any environmental problems associated with the disposal of waste?	**No significant impact** No change from DREF
n) any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply?	**No significant impact** No change from DREF
o) any cumulative environmental effect with other existing or likely future activities?	**No significant impact** No change from DREF
p) any impact on coastal processes and coastal hazards, including those under projected climate change conditions?	**No significant impact** No change from DREF
q) Applicable local strategic planning statements, regional strategic plans or district strategic plans made under the Act, Division 3.1	**No significant impact** No change from DREF
r) Other relevant environmental factors.	There are no other relevant environmental factors.

6.3 Matters of national environmental significance

The provisions of the EPBC Act required determination of whether the proposal has, will, or is likely to have a significant impact on a matter of national environmental significance (MNES). These matters have been addressed in the DREF.

In accordance with the EPBC Act significant impact guidelines, the DREF determined there is unlikely to be a significant impact on relevant MNES and that referral to the DCCEEW is not required. An EPBC Act Protected Matters Report was generated on 19 January 2024 (Appendix D), a summary of the MNES assessment is presented in Table 6-2 and further detail can be found in the Biodiversity Assessment in Appendix B.

TABLE 6-2 MNES CHECKLIST

Will the proposal HAVE…	Results	Response
Any significant impact on a World Heritage property?	None	The proposed activity would not impact on a World Heritage property as none are occurring within or in close proximity to the study area.
Any significant impact on a National Heritage Place?	None	The proposed activity would not impact on a National Heritage place as none are occurring within or in close proximity to the study area.
Any significant impact on a wetland of international importance (Ramsar)?	Four (4)	The proposed activity is in the feature areas of the following Wetlands of International Importance: ▸ Banrock station wetland complex ▸ Hattah-kulkyne lakes ▸ Riverland ▸ The Coorong, and Lakes Alexandrina and Albert Wetland The proposal would not impact on a wetland of international importance.
Any significant impact on a listed threatened species or ecological community?	40 threatened species and four (4) threatened ecological communities	A number of threatened species and/or ecological communities occur within the study area; however, the DREF has determined that no listed threatened species or ecological communities are likely to be significantly impacted by the proposed activity. The SREF searches have determined the same as the DREF.
Any significant impact on listed migratory species?	Ten (10)	Several migratory species are considered potential occurrences in the study area; however, the DREF has determined that no migratory species are likely to be significantly impacted by the proposed activity. The SREF searches have determined the same as the DREF.
Any significant impact on Commonwealth marine areas?	N/A	The proposed activity would not impact on a Commonwealth marine area.
Any significant impact on the Great Barrier Reef Marine Park?	N/A	The proposed activity would not impact on the Great Barrier Reef Marine Park.
Does the proposed activity involve a nuclear action (including uranium mining)?	N/A	The proposed activity does not involve a nuclear action (including uranium mines).
Is there any impact on a water resource, in relation to coal seam gas development and large coal mining development?	N/A	The proposed activity is not related to coal seam gas development and large coal mining development, thus, will not impact (directly, indirectly or cumulatively) on a water resource.

7. CONCLUSIONS

7.1 Significance of impact under NSW legislation

The change in design would not result in a change to the findings of the proposal REF and would be unlikely to cause a significant impact on the environment. Therefore, it is not necessary for an environmental impact statement to be prepared and approval to be sought from the Minister for Planning and Public Spaces under Division 5.2 of the EP&A Act. A Biodiversity Development Assessment Report or Species Impact Statement is not required.

7.2 Significance of impact under Australian legislation

The Stockinbingal to Parkes (S2P)—Daroobalgie Crossing Loop was referred to the Australian Government Minister for the Environment under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) for assessment to confirm the proposal was not a controlled action [2021/9138 – Inland Rail Stockinbingal to Parkes]. The Australian Government Minister determined on 6 May 2022 that the referred project was not a controlled action. For the purposes of this SREF, the controlled action determination issued by the Australian Government Minister for the Environment for the Stockinbingal to Parkes (S2P)—Daroobalgie Crossing Loop is referred to as the EPBC Act determination.

The proposed works would not likely cause a significant impact on matters of national environmental significance or the environment of Commonwealth land within the meaning of the EPBC Act. A referral to the Australian Government Department of Climate Change, Energy, the Environment and Water is not required for this SREF. This assessment concludes that it would be appropriate for the proposal to proceed.

APPENDIX

A

Aboriginal Heritage Information Management System Search Results

STOCKINBINGAL TO PARKES
SUPPLEMENTARY REVIEW OF ENVIRONMENTAL FACTORS: FORBES STATION AND YARD

Inland Rail is a subsidiary of
Australian Rail Track Corporation

INLAND
RAIL

AHIMS Web Services (AWS)
Search Result

Your Ref/PO Number : Forbes Station

Client Service ID : 856094

Wolf Peak Pty Ltd - Sydney
Level 10 189 Kent Street
Sydney New South Wales 2000
Attention: David Stubbs

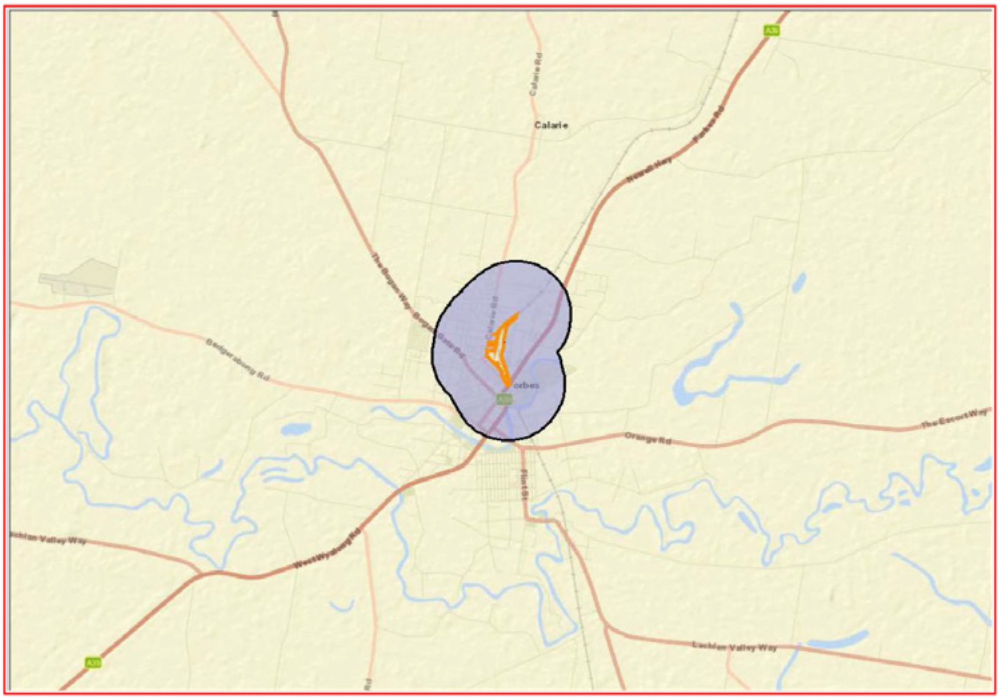
Email: dstubbs@wolfpeak.com.au

Date: 19 January 2024

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lot : 1, DP:DP1001423, Section : - with a Buffer of 1000 meters, conducted by David Stubbs on 19 January 2024.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of Heritage NSW AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	**Aboriginal sites are recorded in or near the above location.**
0	**Aboriginal places have been declared in or near the above location. ***

If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the NSW Government Gazette (https://www.legislation.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Heritage NSW upon request

Important information about your AHIMS search

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Heritage NSW and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date. Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.

B

Biodiversity Assessment

STOCKINBINGAL TO PARKES
SUPPLEMENTARY REVIEW OF ENVIRONMENTAL FACTORS: FORBES STATION AND YARD

MEMO

To:	Martinus Rail c/o Chris Standing and David Carberry
From:	Leonie Stevenson
cc:	Roisin Batch
Date:	02/03/2024
Re:	Biodiversity Assessment for inclusion in Supplementary Review of Environmental Factors – Forbes Station Yard

Dear Chris and David,

Subject: Biodiversity Assessment

WolfPeak have been engaged by Martinus Rail to provide an assessment of whether additional impacts to biodiversity are likely, as a result of additional proposed construction impact zones (CIZs) at the Forbes Station Yard, as per assessed in the Supplementary Review of Environmental Factors (SREF).

Clearing and grubbing is included in the proposed works for areas where track and rail infrastructure removal is required to be undertaken. Clearing and grubbing will not occur on landscaping vegetation at Forbes Station. Removal of large trees particularly in the Forbes Yard is not anticipated to be required to enable the works.

A comparison of the biodiversity assessment area in the Horizontal Clearances Determined Review of Environmental Factors (DREF) (Figure 1) with the additional CIZ areas in the SREF show that:

- All areas in the SREF have already been covered by the DREF biodiversity assessment.
- The plant community types (PCTs) in the DREF for Forbes Yard and Station that occur in the SREF additional CIZ area are 'miscellaneous ecosystems – planted trees' and 'Miscellaneous ecosystems – highly disturbed areas with no or limited native vegetation'. There is low risk that vegetation of significance might be affected.
- The SREF area south of Forbes Station does not require clearing and grubbing and therefore no biodiversity impacts are expected to occur.
    - For reference PCT 11 'River Red Gum' was identified in the DREF in the SREF southern extent.

Furthermore, for due diligence, WolfPeak has undertaken an additional desktop search and overlayed the SREF area with updated imagery and the 2023 State Vegetation Type Mapping (Figure 2). This has reinforced that the SREF additional CIZ areas are unlikely to impact on any new and/or different vegetation communities (refer to Figures 1 and 2 below). Similarly, BioNet searches for threatened species and populations were carried out in February 2023 which did not identify any recorded threatened flora species occurring near the proposed works. An assessment of potential Matters of Environmental Significance (MNES) which have the potential to occur was also conducted (EPBC Act Protected Matters Report provided within Appendix D of the SREF). This search did not identify any additional MNES that are likely to be significantly impacted by the additional works.

Given the study area exists within a highly modified environment and that no additional threatened species or MNES are considered likely to occur, any vegetation removal would likely have similar impacts to that of the determined REF. Based on these findings, WolfPeak do not believe there will be additional impacts to biodiversity and as such no further assessment is required including site surveys.

Should you have any queries or require further information please do not hesitate to contact the undersigned.

Kind regards,

Leonie

Leonie Stevenson
Senior Ecologist
Mobile: 0499 791 016
Email: lstevenson@wolfpeak.com.au

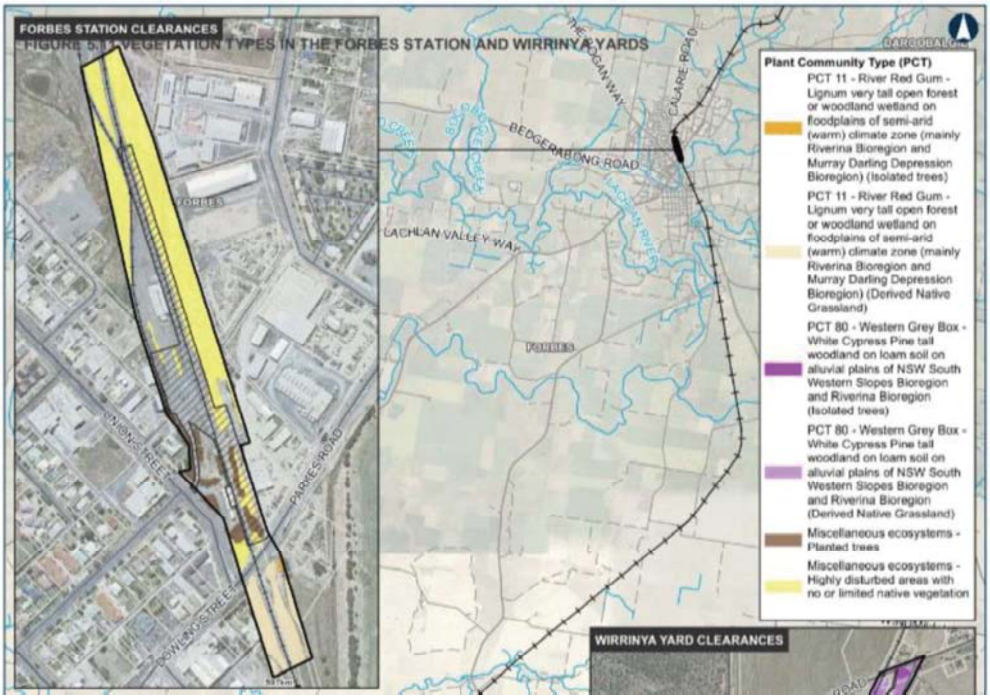


Figure 1: Horizontal Clearances Determined REF Biodiversity Assessment

Figure 2: Results of 2023 State Vegetation Type Mapping January 2024

C

Forbes Station and Yard Enhancement Project Construction Noise and Vibration Impact Statements

STOCKINBINGAL TO PARKES
SUPPLEMENTARY REVIEW OF ENVIRONMENTAL FACTORS: FORBES STATION AND YARD

S2P Enhancement Project – Forbes Station

Construction Noise and Vibration Impact Statement

Martinus Rail

Unit 1, 23-27 Waratah Street
Kirrawee NSW

Prepared by:

SLR Consulting Australia

Tenancy 202 Submarine School, Sub Base
Platypus, 120 High Street, North Sydney NSW
2060, Australia

SLR Project No.: 610.031317.00001

Client Reference No.: R04

4 March 2024

Revision: V1.0

Making Sustainability Happen

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
V1.0	4 March 2024	Nicholas Vandenberg	Steven Luzuriaga	Steven Luzuriaga

Basis of Report

This report has been prepared by SLR Consulting Australia (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Martinus Rail (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

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Acronyms and Abbreviations

ARTC	Australian Rail Track Corporation
AS	Australian Standard
BS	British Standard
dBA	A-weighted decibel (referenced 20 µPa)
CNMVF	Inland Rail NSW Construction Noise and Vibration Framework
CNVMP	Construction Noise and Vibration Management Plan
DEC	Department of Environment and Conservation
DECC	Department of Environment and Climate Change (now NSW EPA)
DECCW	Department of Environment, Climate Change & Water
DIN	Deutches Institut für Normung (German Institute for Standardisation)
EPA	NSW Environment Protection Authority
Hz	Hertz
ISO	International Standards Organisation
Km	Kilometres
L_{Aeq}	Equivalent continuous noise level, providing a representation of the cumulative level of noise exposure over a defined period.
$L_{Aeq(15hour)}$	The equivalent continuous noise level for the 15-hour daytime period of 7.00 am to 10.00 pm
$L_{Aeq(9hour)}$	The equivalent continuous noise for the 9-hour daytime period of 10.00 pm to 7.00 am
$L_{Aeq(1hour)}$	The equivalent continuous noise for the busiest 1-hour period.
L_{amax}	The maximum noise level during the measurement or assessment period. The L_{AFmax} or Fast is averaged over 0.125 of a second and the L_{ASmax} or Slow is averaged over 1-second.
M	Metres
mm	Millimetres
mm/s	Millimetres per second
m/s	Metres per second
MR	Martinus Rail
NSW	New South Wales
PPV	Peak Particle Velocity
REF	Review of Environmental Factors
S2P	Stockinbingal to Parkes section of Inland Rail
TfNSW	Transport for New South Wales
VDV	Vibration Dose Value

Compliance Table – Horizontal Clearances

ARTC	Requirement	Reference
CNV1	Prior to the commencement of construction, noise and vibration impacts would be confirmed based on the final project design.	This report
CNV2	Where vibration levels are predicted to exceed the structural screening criteria for a particular structure as a result of detailed design, a more detailed assessment of the structure and vibration monitoring would be carried out in accordance with the Inland Rail NSW Construction Noise and Vibration Management Framework, to ensure appropriate mitigation and management plans are implemented. During construction, if vibration-generating activities are conducted within 15 m of a residence, attended vibration measurements would be undertaken at the commencement of vibration-generating activities to confirm that structural vibration limits are within the acceptable range. Where vibration levels are found to be unacceptable, alternative work methods would be implemented so the vibration impacts are reduced to acceptable levels.	**Section 6.0** **Section 8.0** **Section 8.3.2**
CNV3	A Construction Noise and Vibration Management Plan (CNVMP) would be prepared and implemented as part of the CEMP in accordance with the Inland Rail NSW Construction Noise and Vibration Management Framework and ARTC's EPL3142. • The plan would have measures, processes and responsibilities to manage and monitor noise and vibration and minimise the potential for impacts during construction. This plan will include: • construction noise and vibration criteria for the proposal • location of sensitive receivers in proximity to the construction area • specific management measures for activities that could exceed the construction noise and vibration criteria • notification of impacts would be undertaken in accordance with the communication management plan for the proposal.	The CNVMP
CNV4	An out-of-hours work protocol would be developed to define the process for considering, approving and managing out-of-hours work, including implementation of feasible and reasonable measures and communication requirements. Measures would be aimed at pro-active communication and engagement with potentially affected receivers, provision of respite periods and/or alternative accommodation for defined exceedance levels. All work outside the primary proposal construction hours would be undertaken in accordance with the Inland Rail NSW Construction Noise and Vibration Management Framework and in accordance with the out-of-hours work protocol. The protocol would provide guidance for the preparation of out-of-hours work plans for each construction work location and for key works. Out-of-hours work plans would be prepared in consultation with key stakeholders (including the NSW EPA) and the community and incorporated into the construction noise and vibration management plan.	The CNVMP This report

ARTC	Requirement	Reference
CNV5	Building condition surveys would be completed before and after construction works where buildings or structures are within the minimum vibration working distances for cosmetic damage.	**Section 6.0**
CNV6	Prior to the commencement of vibration intensive works within the minimum working distances for cosmetic damage for heritage items, the potential for damage to the item would be assessed. Where there is potential for damage to heritage items, alternative methods that generate less vibration would be investigated and substituted where practicable. Where residual cosmetic damage risks to heritage items remain, condition surveys would be carried out and vibration monitoring with real-time notification of exceedance would occur during the activity. Any identified vibration-related damage to the heritage items would be rectified.	**Section 6.0**
O9.1	Maintenance activities must be undertaken: a) between the hours of 7:00am and 6:00pm Mondays to Friday b) between the hours of 8:00am and 1:00pm Saturday; and c) not on Sundays or public holidays, unless an exception in d) Condition O9.2 or Condition O9.3 applies.	**Section 2.2**
O9.2	The licensee may undertake maintenance activities outside of the hours specified in Condition O9.1: a) to provide safe and reliable services or a safe working environment; or b) for emergency works; or c) for the delivery of oversized plant or structures that require special arrangements or authorisation to be lawfully transported along public roads.	**Section 2.2.1**
O9.3	a) The licensee may undertake maintenance activities outside of the hours specified in Condition O9.1, if the activities do not exceed: i. 5dBA (LAeq, 15min) above the relevant rating background levels at day, evening and night, as determined at the nearest noise sensitive receiver as assessed by acoustic investigation, and ii. 15dBA (LA1, 1min or Lamax) above the relevant rating background level at night, as determined at the nearest noise sensitive receiver as assessed by acoustic investigation. b) The results of any acoustic investigation undertaken in relation to Conditions O9.3(a)(i) and O9.3(a)(ii) must be provided by the licensee when requested by an authorised officer of the EPA. c) An acoustic investigation referred to in Conditions O9.3(a)(i) and O9.3(a)(ii) is not required if there are no noise sensitive receivers impacted by the activities.	**Section 2.2.2**
O9.4	Where maintenance activities are undertaken, including outside of the hours specified in Condition O9.1, noise impacts must be managed in accordance with the recommendations of the Interim Construction Noise Guideline (DECCW, 2009), as updated from time to time. Consistent with those recommendations, under this condition the licensee is required to:	**Section 8.0**

ARTC	Requirement	Reference
	a) identify noise sensitive receivers that may be affected;	**Figure 1**
	b) identify hours of work for the proposed activities;	**Section 5.1**
	c) identify noise impacts at noise sensitive receivers;	**Appendix C**
	d) select and apply reasonable and feasible work practices to minimise noise impacts; and	**Section 8.0**
	e) notify the identified noise sensitive receivers at least 5 days prior to the commencement of maintenance activities undertaken outside of the hours specified in Condition O9.1, except where the licensee first becomes aware of the need to undertake those maintenance activities less than 5 days prior to the proposed commencement date, in which case the notification must be provided as soon as practicable after becoming aware of the need to undertake the maintenance activities.	**Section 8.2**
O9.5	When requested by an authorised officer of the EPA, the licensee must provide the following information regarding any proposed maintenance activities on the premises:	This CNVIS
	a) dates and times of the proposed maintenance activity;	**Section 5.1**
	b) location of the proposed maintenance activity;	**Figure 2**
	c) type(s) of work to be performed in conducting the proposed maintenance activity;	**Section 5.1**
	d) plant and equipment to be used; and	**Section 5.1**
	e) contact name and telephone number of a person who will be on site during the activity and who is authorised by the licensee to take action, including the cessation of the activity or any part of it, if so directed by the EPA. A contact person must be contactable 24 hours a day via the supplied telephone number(s) during the whole of the period that the activity takes place outside the hours specified in Condition O9.1.	**TBC**
O9.6	When requested by an authorised officer of the EPA, the licensee must provide written reasons that demonstrate that maintenance activities undertaken outside of the hours specified in Condition O9.1 comply with the licence.	**Section 2.2.1**

1.0 Introduction

SLR Consulting Australia Pty Ltd (SLR) has been engaged by Martinus Rail (MR) to prepare a construction noise and vibration impact statement (CNVIS) for the construction work at the Forbes Station enhancement site. The Forbes Station enhancement site is part of the Stockinbingal to Parkes (S2P) section of Inland Rail (the Project). This assessment has been prepared in accordance with the Construction Noise and Vibration Management Plan (CNVMP) for the Project (Project Document Number 5-0052-214-PMA-00-PL-0057).

This report assesses the potential construction noise and vibration impacts for the work associated with the construction activities undertaken at Forbes Station. An explanation of the specialist acoustic terminology used in this report is provided in **Appendix A**.

2.0 Project Description

Inland Rail is an approximate 1,600 kilometres (km) freight rail network that will connect Melbourne and Brisbane via regional Victoria, New South Wales and Queensland. The Inland Rail route would involve using approximately 1,000 km of existing track (with enhancements and upgrades where necessary) and 600 km of new track, passing through 30 local government areas. Inland Rail will accommodate double-stacked freight trains up to 1,800 metres (m) long and 6.5 m high.

The Stockinbingal to Parkes (S2P) section (the Project) forms a key component of the Inland Rail program. It is a 173 km section of existing rail corridor located in regional NSW between the towns of Stockinbingal and Parkes. S2P consists of 10 enhancement sites, which involve work to, construction or removal of various structural and track assets along the alignment.

Forbes Station enhancement work will be carried out as a railway maintenance activity in accordance with EPL 3142. Relevant noise and vibration conditions from the EPL are detailed within the compliance table at the beginning of this document and will be complied with during the work.

2.1 Scope of this CNVIS

The focus of this CNVIS are the establishment work, compound operations, track work and tamping work associated with the Forbes station enhancement work and include:

- Compound Operations
- Track Work(Track Removal)
- Tamping Work
- Signalling Work

Further details of work activities are outlines in **Section 5.1**. The area immediately surrounding the site contains a mix of industrial, commercial, and general residential housing areas. The Project location and surrounding receivers are presented in **Figure 1** and the work locations are presented in **Figure 2**.

2.2 Hours of Work

In accordance with the Construction Noise and Vibration Management Plan (CNVMP) and ARTC EPL 3142 (condition O9.1) construction work must be undertaken during standard working hours:

a) 7:00am to 6:00pm Monday to Friday

b) 8:00am to 1:00pm Saturday and

c) no work on Sundays or public holidays (unless an exception can be applied in accordance with EPL 3142)

2.2.1 Exception to Standard Railway Construction Hours

Where out of hours work (OOHW) is required, ARTC EPL 3142 allows for out of hours work activities based on the following conditions.

Condition O9.2:

i. to provide safe and reliable services or a safe working environment; or

ii. for emergency works; or

iii. for the delivery of oversized plant or structures that require special arrangements or authorisation to be lawfully transported along public roads.

In accordance with Condition O9.6, *when requested by an authorised officer of the EPA, the licensee must provide written reasons that demonstrate that maintenance activities undertaken outside of the hours specified in Condition O9.1 comply with the licence.*

2.2.2 Low Noise Impact Generating Work

The ARTC EPL 3142 condition O9.3 also allows for OOHW activities under the following conditions:

a) The licensee may undertake construction activities outside of the hours specified in Condition O9.1, if the activities do not exceed:

   i. 5 dBA ($L_{Aeq, 15min}$) above the day, evening and night relevant rating background levels, as determined at the nearest noise sensitive receiver as assessed by acoustic investigation, and

   ii. 15 dBA ($L_{A1, 1min}$ or L_{amax}) above the relevant rating background level at night, as determined at the nearest noise sensitive receiver as assessed by acoustic investigation;

b) The results of any acoustic investigation undertaken must be provided by the licensee when requested by an authorised officer of the EPA.

c) An acoustic investigation referred is not required if there are no noise sensitive receivers impacted by the activities.

2.3 Justification of Out-of-Hours Work (OOHW)

As noted in **Section 6.2** of the CNVMP, the enhancements projects will require work under rail possessions and would be carried out during scheduled possession periods (that is, the times that the movement of trains along the rail corridor are stopped for maintenance). Rail possessions are typically for a 60 to 88 hour period, two times a year in March and September. During rail possessions, work may need to be carried out on a 24-hour basis.

This work will be completed outside standard working hours, and will require ARTC approval and would be carried out in accordance with EPL3142.

Outside scheduled rail possessions, work would also occur within available five to 12-hour windows when train services are not scheduled and when authorised by ARTC (called a track occupancy authorisation). These periods are determined in consultation with operators of freight and passenger train services, and may occur outside the proposal construction hours.

The construction works at Forbes Station will require direct access to the existing rail line. To ensure a safe working environment for the workers undertaking these activities it must be done under track possession/occupancy and therefore require work to be undertaken on a 24 hour basis as required.

3.0 Existing Environment

The existing ambient noise environment was described in Appendix E (Noise and Vibration Impact Assessment) for the Stockinbingal to Parks – Horizonal Clearances, Review of Environmental Factors (REF). This section provides details of the existing ambient noise environment specifically relating to the Forbes Station enhancement work. The NCAs used are consistent with the NCAs described in the REF and are shown in **Figure 1** with the receiver classifications and approximate noise monitoring locations.

3.1 Background Noise Levels

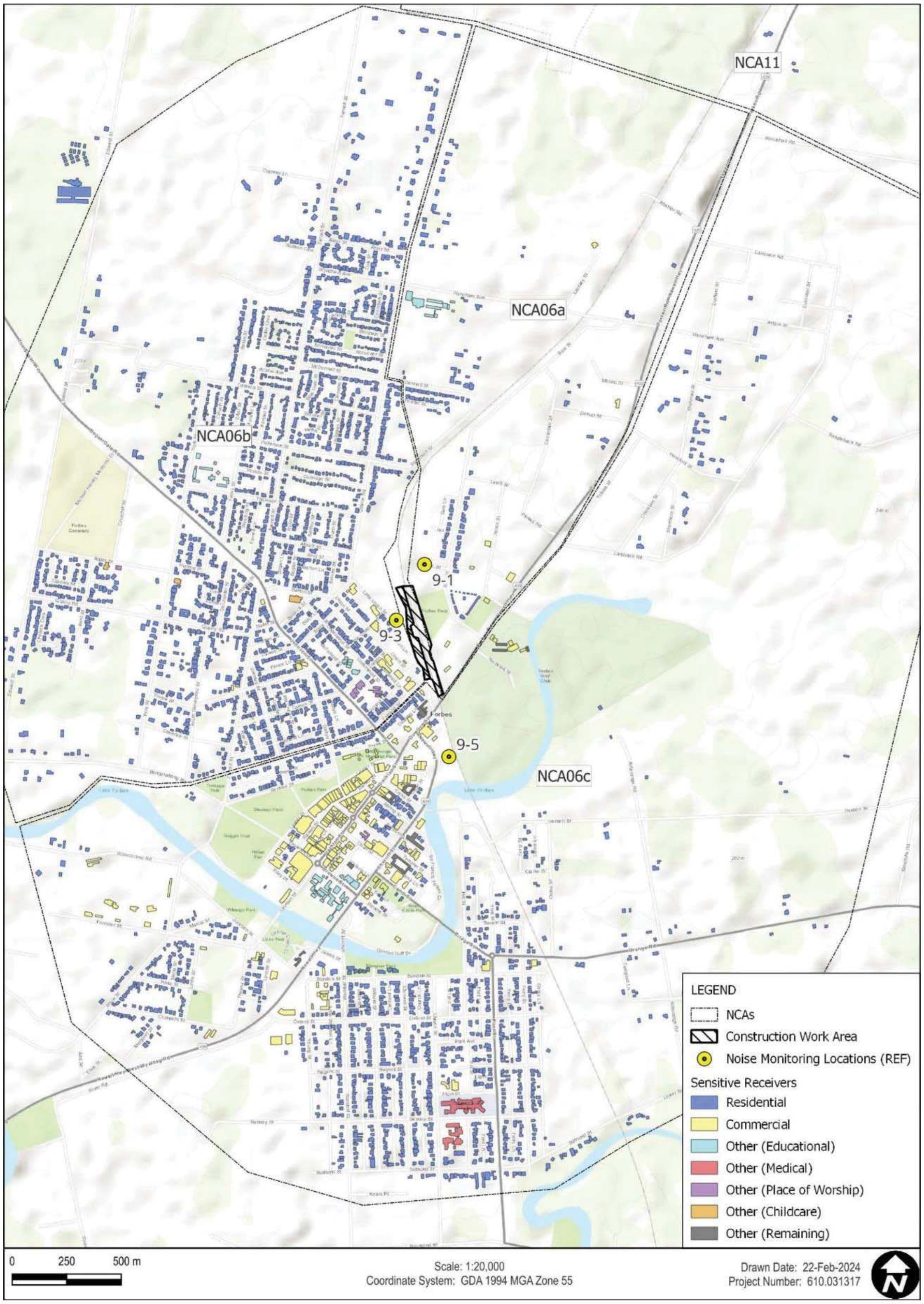
Background noise levels have been referenced from the baseline noise survey undertaken as part of the REF and reproduced in the CNVMP. The background noise levels relevant to the work at Forbs are summarised in **Table 1**.

Table 1 Background Noise Levels

Noise Monitoring Location	Rating background Level (RBL) dBA ICNG defined time periods		
	Daytime period	Evening period	Night-time period
9-1	41	39	34
9-3	38	38	33
9-5	39	39 (47)[1]	36

Note 1: The REF details that the RBL data has been adjusted to minimum background levels as per NpfI standards (bracketed figures indicates the measured value).

Figure 1 Receiver Classifications and Noise Monitoring Locations



4.0 Assessment Criteria

4.1 Construction Noise and Vibration Guidelines

The standards and guidelines relevant to the Project are listed in **Table 2**. These guidelines aim to protect the community and environment from excessive noise and vibration impacts during construction of projects.

Table 2 Construction Noise and Vibration Standards and Guidelines

Guideline/Policy Name	Where Guideline Used
Inland Rail NSE Construction Noise and Vibration Management Framework	Assessment and management protocols for airborne noise, ground-borne noise and vibration impacts for construction of Inland Rail projects
Interim Construction Noise Guideline (ICNG) (DECC, 2009)	Assessment of airborne noise impacts on sensitive receivers
AS2107:2016 Acoustics – Recommended design sound levels and reverberation times for building interiors	Provides recommended design sound levels for internal areas of occupied spaces
Environmental Criteria for Road Traffic Noise (ECRTN) (EPA, 1999)	Contains guidance for assessing potential sleep disturbance impacts
Guideline for Child Care Centre Acoustic Assessment Version 2.0 (GCCCAA), Association of Australasian Acoustical Consultants (AAAC), 2013	Contains criteria for child care centres
Road Noise Policy (RNP) (DECCW, 2011)	Assessment of construction traffic impacts
BS 7385 Part 2-1993 Evaluation and measurement for vibration in buildings Part 2, BSI, 1993	Assessment of vibration impacts (structural damage) to non-heritage sensitive structures
DIN 4150:Part 3-2016 Structural vibration – Effects of vibration on structures, Deutsches Institut für Normung, 2016	Screening assessment of vibration impacts (structural damage) to heritage sensitive structures, where the structure is found to be unsound
Assessing Vibration: a technical guideline (DEC, 2006)	Assessment of vibration impacts on sensitive receivers
AS2187.2:2006 Explosives – Storage and use Part 2: Use of explosives	Assessment of impacts from blasting activities

4.2 Noise Criteria

The noise management levels (NMLs) for residential and other sensitive receivers have been adopted from the CNVMP, as determined in the REF. Receiver types and locations are shown in **Figure 1**.

4.2.1 Residential Receivers

Project-specific NMLs for residential receivers were determined for each NCA. NMLs for other sensitive receivers are fixed values adopted from the Interim Construction Noise Guideline (ICNG) (DECC, 2009). Residential NMLs for NCAs surrounding the Forbes Station Site are shown in **Table 3**.

Table 3 Residential Noise Management Levels

NCA	Noise Management Level ($L_{Aeq(15minute)}$ – dBA)				Sleep disturbance Screening Criteria (RBL +15dB)
	Standard Daytime (RBL +10dB)	Out of Hours			
		Daytime[1] (RBL +5dB)	Evening (RBL +5dB)	Night time (RBL +5dB)	
NCA06a	51	46	44	39	49
NCA06b	48	43	43	38	48
NCA06c	49	44	44	41	51

Highly Noise Affected

In addition to the NMLs presented above, the ICNG highly noise affected level (75 dBA) is applicable to all residential receivers during approved project hours as outlined in the NVMP and the ICNG. The highly noise affected level represents the point above which there may be strong community reaction to noise.

Sleep Disturbance

Where the sleep disturbance screening level (RBL + 15 dB, refer **Table 3**) is exceeded, further assessment is required to determine whether the 'awakening reaction' level of Lamax 65 dBA (external) would be exceeded and the likely number of these events. The awakening reaction level is the level above which residents are likely to be awoken from sleep.

4.2.2 Other Sensitive Land Uses and Commercial Receivers

The ICNG NMLs for 'other sensitive' non-residential land uses are shown in **Table 4**.

The ICNG references *AS2107:2016 Acoustics – Recommended design sound levels and reverberation times for building interiors* for criteria for 'other sensitive' receivers which are not listed in the guideline. Neither the ICNG nor AS2107 provide criteria for child care centres so the Association of Australian Acoustical Consultants *Guideline for Child Care Centre Acoustic Assessment* (GCCCAA) has been referenced.

Table 4 NMLs for 'Other Sensitive' Receivers

Land Use	Noise Management Level $L_{Aeq(15minute)}$ (dBA) (Applied when the property is in use)	
	Internal	External
ICNG 'Other Sensitive' Receivers		
Classrooms at schools and other educational institutions	45	55[1]
Hospital wards and operating theatres	45	65[2]
Places of worship	45	55[1]
Active recreation areas (characterised by sporting activities which generate noise)	-	65
Passive recreation areas (characterised by contemplative activities that generate little noise)	-	60
Commercial	-	70

Land Use	Noise Management Level $L_{Aeq(15minute)}$ (dBA) (Applied when the property is in use)	
	Internal	**External**
Industrial	-	75
Non-ICNG ‘Other Sensitive’ Receivers		
Hotel – daytime & evening[3]	50	60[1]
Hotel – night-time[3]	35	45[1]
Child care centres – sleeping areas[4]	35	45[1]
Library	45	55
Aged Care	Considered as Residential	

Note 1: It is assumed that these receivers have windows partially open for ventilation which results in internal noise levels being around 10 dB lower than the external noise level.

Note 2: It is assumed that these receivers have fixed windows which conservatively results in internal noise levels being around 20 dB lower than the external noise level.

Note 3: Criteria taken from AS2107.

Note 4: Criteria taken from Association of Australian Acoustical Consultants Guideline for Child Care Centre Acoustic Assessment.

4.2.3 Construction Traffic Noise Guidelines

The potential impacts from construction traffic associated with the proposal when travelling on public roads are assessed under the NSW EPA *Road Noise Policy* (RNP) and Roads and Maritime (now Transport) *Construction Noise and Vibration Guideline* (CNVG).

An initial screening test is first applied to evaluate if existing road traffic noise levels are expected to increase by more than 2.0 dB as a result of construction traffic. Where this is considered likely, further assessment is required using the RNP and Roads and Maritime (now Transport) *Noise Criteria Guideline* (NCG) base criteria shown in **Table 5**.

Table 5 RNP/NCG Criteria for Assessing Construction Traffic on Public Roads

Road Category	Type of Project/Land Use	Assessment Criteria (dBA)	
		Daytime (7 am – 10 pm)	**Night-time (10 pm – 7 am)**
Freeway/ arterial/ sub-arterial roads	Existing residences affected by additional traffic on existing freeways/arterial/sub-arterial roads generated by land use developments	$L_{Aeq(15hour)}$ 60 (external)	$L_{Aeq(9hour)}$ 55 (external)
Local roads	Existing residences affected by additional traffic on existing local roads generated by land use developments	$L_{Aeq(1hour)}$ 55 (external)	$L_{Aeq(1hour)}$ 50 (external)

4.3 Vibration Criteria

The effects of vibration from construction work can be divided into three categories:

- Those in which the occupants of buildings are disturbed (**human comfort**). People can sometimes perceive vibration impacts when vibration generating construction work is located close to occupied buildings. Vibration from construction work tends to be intermittent in nature and the EPA's *Assessing Vibration: a technical guideline* (2006) provides criteria for intermittent vibration based on the Vibration Dose Value (VDV), as shown in **Table 6**. While the construction activities for the proposal are generally not expected to result in continuous or impulsive vibration impacts, criteria are provided in **Table 7**.
- Those where building contents may be affected (**building contents**). People perceive vibration at levels well below those likely to cause damage to building contents. For most receivers, the human comfort vibration criteria are the most stringent and it is generally not necessary to set separate criteria for vibration effects on typical building contents. Exceptions to this can occur when vibration sensitive equipment, such as electron microscopes or medical imaging equipment, are in buildings near to construction work. No such equipment has been identified in the study area.
- Those where the integrity of the building may be compromised (**structural/cosmetic damage**). If vibration from construction work is sufficiently high it can cause cosmetic damage to elements of affected buildings. Industry standard cosmetic damage vibration limits are specified in British Standard BS 7385 and German Standard DIN 4150. The limits are shown in **Table 8** and **Table 9**.

Table 6 Human Comfort Vibration – Vibration Dose Values for Intermittent Vibration

Building Type	Assessment Period	Vibration Dose Value[1] ($m/s^{1.75}$)	
		Preferred	Maximum
Critical Working Areas (eg operating theatres or laboratories)	Day or night-time	0.10	0.20
Residential	Daytime	0.20	0.40
	Night-time	0.13	0.26
Offices, schools, educational institutions and places of worship	Day or night-time	0.40	0.80
Workshops	Day or night-time	0.80	1.60

Note 1: The VDV accumulates vibration energy over the daytime and night-time assessment periods, and is dependent on the level of vibration as well as the duration.

Note 2: Daytime is 7am to 10pm, night-time is 10pm to 7am.

Table 7 Human Comfort Vibration – Preferred and Maximum Weighted Root Mean Square Values for Continuous and Impulsive Vibration Acceleration (m/s^2) 1–80 Hz

Location	Assessment period	Preferred values		Maximum values	
		z-axis	x and y-axis	z-axis	x and y-axis
Continuous vibration					
Residential	Daytime	0.010	0.0071	0.020	0.014
	Night-time	0.007	0.005	0.014	0.010
Offices, schools, educational institutions and places of worship	Day or night-time	0.020	0.014	0.040	0.028
Workshops	Day or night-time	0.04	0.029	0.080	0.058
Impulsive vibration					
Residential	Daytime	0.30	0.21	0.60	0.42
	Night-time	0.10	0.071	0.20	0.14
Offices, schools, educational institutions and places of worship	Day or night-time	0.64	0.46	1.28	0.92
Workshops	Day or night-time	0.64	0.46	1.28	0.92

Table 8 Cosmetic Damage – BS 7385 Transient Vibration Values for Minimal Risk of Damage

Group	Type of Building	Peak Component Particle Velocity in Frequency Range of Predominant Pulse	
		4 Hz to 15 Hz	15 Hz and Above
1	Reinforced or framed structures. Industrial and heavy commercial buildings	50 mm/s at 4 Hz and above	
2	Unreinforced or light framed structures. Residential or light commercial type buildings	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above

Note 1: Where the dynamic loading caused by continuous vibration may give rise to dynamic magnification due to resonance, especially at the lower frequencies where lower guide values apply, then the guide values may need to be reduced by up to 50%.

Table 9 Cosmetic Damage – DIN 4150 Guideline Values for Short-term Vibration on Structures

Group	Type of Structure	Guideline Values Vibration Velocity (mm/s)				
		Foundation, All Directions at a Frequency of			Topmost Floor, Horizontal	Floor Slabs, Vertical
		1 to 10 Hz	10 to 50 Hz	50 to 100 Hz	All frequencies	All frequencies
1	Buildings used for commercial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40	20
2	Residential buildings and buildings of similar design and/or occupancy	5	5 to 15	15 to 20	15	20
3	Structures that, because of their particular sensitivity to vibration, cannot be classified as Group 1 or 2 **and** are of great intrinsic value (eg heritage listed buildings)	3	3 to 8	8 to 10	8	20[1]

Note 1: It may be necessary to lower the relevant guideline value markedly to prevent minor damage.

4.3.1 Heritage Buildings or Structures

Heritage listed buildings and structures should be considered on a case-by-case basis but as noted in BS 7385 should not be assumed to be more sensitive to vibration, unless structurally unsound. Where a heritage building is deemed to be sensitive, the more stringent DIN 4150 Group 3 guideline values in **Table 9** can be applied.

Heritage listed items identified in the study area are discussed in **Section 6.0**.

4.3.2 Minimum Working Distances for Vibration Intensive Work

Minimum working distances for typical vibration intensive construction equipment have been sourced from the Transport for NSW Construction Noise and Vibration Guideline (CNVG) and are shown in **Table 10**. The minimum working distances are for both cosmetic damage (from BS 7385 and DIN 4150) and human comfort (from the NSW EPA Assessing Vibration: a technical guideline). They are calculated from empirical data which suggests that where work is further from receivers than the quoted minimum distances then impacts are not considered likely.

Table 10 Recommended Minimum Working Distances from Vibration Intensive Equipment

Plant Item	Rating/Description	Minimum Distance		
		Cosmetic Damage		Human Response (NSW EPA Guideline)^2
		Residential and Light Commercial (BS 7385)	Heritage Items^1 (DIN 4150, Group 3)	
Vibratory Roller	<50 kN (1–2 tonne)	5 m	11 m	15 m to 20 m
	<100 kN (2–4 tonne)	6 m	13 m	20 m
	<200 kN (4–6 tonne)	12 m	25 m	40 m
	<300 kN (7–13 tonne)	15 m	31 m	100 m
	>300 kN (13–18 tonne)	20 m	40 m	100 m
	>300 kN (>18 tonne)	25 m	50 m	100 m
Small Hydraulic Hammer	300 kg (5 to 12 t excavator)	2 m	5 m	7 m
Medium Hydraulic Hammer	900 kg (12 to 18 t excavator)	7 m	15 m	23 m
Large Hydraulic Hammer	1,600 kg (18 to 34 t excavator)	22 m	44 m	73 m
Vibratory Pile Driver	Sheet piles	2 m to 20 m	5 m to 40 m	20 m
Piling Rig – Bored	≤ 800 mm	2 m (nominal)	5 m	4 m
Jackhammer	Hand held	1 m (nominal)	3 m	2 m

Note 1: Minimum working distances for heritage items that have been identified as structurally unsound or otherwise particularly sensitive to vibration. These distances have been calculated based on the 2.5 mm/s PPV criteria from DIN 4150 and the cosmetic damage minimum working distances presented in the CNVG with reference to BS 7385.

The minimum working distances are indicative and will vary depending on the particular item of equipment and local geotechnical conditions. The distances apply to cosmetic damage of typical buildings under typical geotechnical conditions.

5.0 Noise Assessment

The potential construction noise levels from the Project have been predicted using ISO 9613:2 algorithm in SoundPLAN noise modelling software. The model includes ground topography, buildings and representative noise sources from the Project.

5.1 Work Scenarios

Noise modelling scenarios have been determined based on key Project noise generating stages, supplied by the Project team. A detailed description of each work scenario is provided in **Table 11**. A summary of construction work periods and schedule required for each scenario is shown in **Table 12**, as per the working hours defined in the CNVMP. The locations of the various work scenarios are shown in **Figure 2**.

Table 11 Work Scenario Descriptions

ID	Scenario	Description
W.001	Site Establishment	Delivery of ballast and other material and plant (up to 15 delivery and pick ups)
W.002	Compound Operations	Site access only. There will be a Caravan Site Shed & two trailer mounted toilets
W.003	Track Work	Removal of two turnouts and plain lining these turnouts. Removal of 300m Goods Siding and ground frame
W.004	Tamping Work	Tamping Mainline and yard turnout
W.005	Signalling Work	Removal of Frame C and associated channel rodding to Catchpoint.

Table 12 Scenarios and Periods of Work

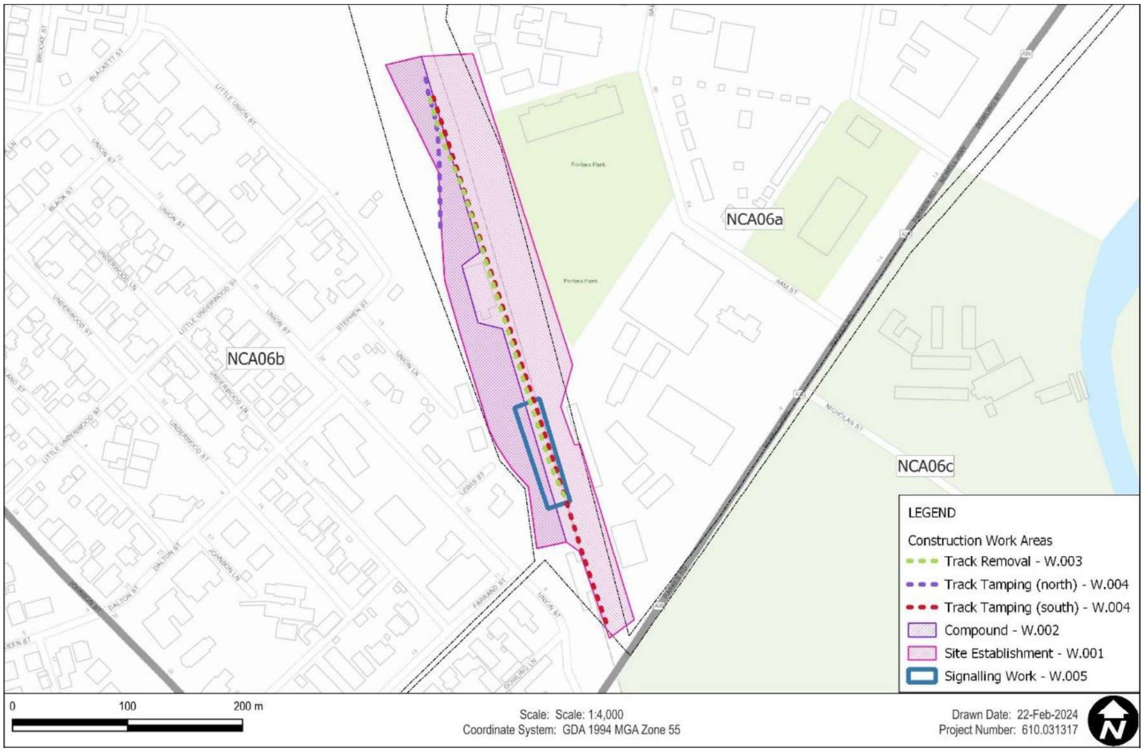
ID	Scenario	Hours of Work				Indicative Start Date	Likely Duration
		Standard Day	Out-of-Hours Work				
			Day OOH[1]	Evening[2]	Night[3]		
W.001	Site Establishment	✓	-	-	-	29 February	9 days (over a 6-week period)
W.002	Compound Operations	✓	✓	✓	✓	9 March	4 days (over a 6-week period)
W.003	Track Work	✓	✓	✓	✓	9 March	4 days (over a 6-week period)
W.003b	Track Work without Rail Saw	✓	✓	✓	✓		
W.004	Tamping Work	✓	-	-	-	10 March	3 day (over a 6-week period)
W.005	Signalling Work	✓	✓	-	-	9 March	3 days (over a 6-week period)

Note 1: Daytime out of hours is 7 am to 8 am and 1 pm to 6 pm on Saturday, and 8 am to 6 pm on Sunday and public holidays.

Note 2: Evening is 6 pm to 10 pm Mondays to Sunday.

Note 3: Night is 10 pm to 7 am for Mondays to Saturdays and 6 pm to 8 am for Sundays and public holidays.

Figure 2 Construction Work Location



5.1.1 Modelling Scenarios and Equipment

The assessment uses 'realistic worst-case' scenarios to determine the impacts from the noisiest 15-minute period that is likely to occur for each work scenario, as required by the ICNG. Sound power levels (LW) for the construction equipment used in the modelling are listed in **Appendix B**.

5.2 Predicted Noise Levels

The following overview is based on the predicted impacts at the most affected receivers and is representative of the worst-case noise levels that are likely to occur during construction.

The assessment shows the predicted 'mitigated' impacts based on the exceedance of the noise management levels, as per the categories in **Table 13**. Recommendations for mitigation and management are provided in **Section 8.0**.

Table 13 Exceedance Bands and Impact Colouring

Subjective Classification	Exceedance of Noise Management Level		Impact Colouring
	Daytime	Out of Hours	
Negligible	No exceedance	No exceedance	
Noticeable	-	1 to 5 dB	🟩
Clearly Audible	1 to 10 dB	6 to 15 dB	🟨
Moderately Intrusive	11 to 20 dB	16 to 25 dB	🟧
Highly Intrusive	> 20 dB	> 25 dB	🟥

A summary of the number of buildings where NML exceedances were predicted for the various work scenarios is shown in **Table 14**. Maps of the predicted worst-case noise impacts are presented in **Appendix C**.

The assessment presents the combined predicted noise impacts for each scenario. Meaning, the worst-case result at each receiver is considered from all potential work areas where each scenario is to be undertaken.

The assessment is generally considered conservative as the calculations assume several items of construction equipment are in use at the same time within individual scenarios. In reality, there would frequently be periods when construction noise levels are much lower than the worst-case levels predicted as well as times when no equipment is in use and no noise impacts occur.

Table 14 Overview of NML Exceedances

ID	Scenario	Number of Receivers																	
		HNA[1]	With NML exceedance[2]																
			Approved Daytime			Out of Hours													
						Daytime OOH				Evening				Night time				Sleep Disturbance	Sleep Awakening
			1-10 dB	11-20 dB	>20 dB	1-5 dB	6-15 dB	16-25 dB	>25 dB	1-5 dB	6-15 dB	16-25 dB	>25 dB	1-5 dB	6-15 dB	16-25 dB	>25 dB	>Screening Level	>65 dB
Residential Receivers																			
W.001	Site Establishment	-	35	1	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
W.002	Compound Operation	-	31	1	-	74	31	1	-	77	34	1	-	218	106	4	1	137	1
W.003a	Track Work	1	544	47	2	898	544	47	2	923	548	51	2	791	1299	166	6	1,822	67
W.003b	Track Work w/o rail saw	-	165	6	1	421	165	6	1	425	169	6	1	887	535	47	2	1,269	30
W.004	Tamping Work	-	274	18	2	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
W.005	Signalling Work	1	316	28	1	753	316	28	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Other Sensitive Receivers[3]																			
W.001	Site Establishment	n/a	1	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
W.002	Compound Operation	n/a	-	-	-	-	-	-	-	-	-	-	-	2	1	-	-	n/a	n/a
W.003	Track Work	n/a	16	1	-	15	2	-	-	9	1	-	-	10	2	2	-	n/a	n/a
W.003b	Track Work w/o rail saw	n/a	2	-	-	1	1	-	-	1	-	-	-	1	4	-	-	n/a	n/a
W.004	Tamping Work	n/a	9	1	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
W.005	Signalling Work	n/a	16	-	-	14	2	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Note 1: Highly noise affected, based on ICNG definition (i.e. predicted $L_{Aeq(15minute)}$ noise at residential receiver is 75 dBA or greater).

Note 2: Based on worst-case predicted noise levels

Note 3: Impacts to other sensitive receivers should be considered when the receiver is 'in use'.

The assessment of the predicted worst-case noise levels shows:

- During Standard Daytime hours, 'Highly intrusive' impacts are predicted at the nearest receiver for both Track work (W.003) and Tamping work (W.004) due to the proximity of the receiver (1 Union Street and 1 Little Union Street) to the work. The highest noise levels and impacts would be experienced by adjacent receivers when noisy construction work is nearby. Where receivers are further away, or when less noise intensive work is being completed, the predicted noise impacts are correspondingly lower.
- During Standard Daytime hours, moderate impacts are predicted at receivers within approximately 200m of the work. As work moves further away from receivers, noise levels will also reduce.
- During Daytime OOH and Evening work, 'Highly intrusive' impacts are predicted at the nearest receivers for Track work (W.003) due to the proximity of the receiver (1 Union Street and 1 Little Union Street) to the work during the Daytime OOH and evening period.
- During night-time work, 'Highly intrusive' impacts are predicted at the nearest six residential receivers due to the proximity to the work.
    - 1 Little Union Street, Forbes
    - 2 Little Union Street, Forbes
    - 4 Little Union Street, Forbes
    - 6 Little Union Street, Forbes
    - 8 Little Union Street, Forbes
    - 1 Union Street, Forbes

    Note: addresses sourced from google maps, these must be verified on site with reference to impact maps in **Appendix C**.
- During the night-time, moderate impacts are predicted at receivers within approximately 400m of the work when noise intensive activities (inc Rail saw) are being used. As work moves further away from receivers, noise levels will also reduce.
- When noise intensive equipment is not in use, the noise levels are expected to be much less.
    - During night-time work, where the rail saw is not being used (W.003b – Track Work without rail saw), the impacts would reduce to 'moderately intrusive' impacts or less at all receivers except 1 Union Street and 1 Little Union Street.
- Work involving the rail saw should be undertaken during the daytime or evening periods where possible and limited during the night-time period to occur before midnight to minimise disturbance on residents, where possible.
- It is noted that for most scenarios, the noisiest work would only be required for a relatively short period of the total duration. Noise levels and impacts at other times would be much lower than the worst-case levels predicted, and there would often be times when noise levels are low and no impacts are occur.
- One residential receiver is predicted to be Highly Noise Affected (ie ≥75 dBA) at 1 Union Street, Forbes due the proximity of the work during 'W.003 – Track Work (with rail saw)' and 'W.005 – Signalling Work' due to the use of the rock breaker when work is occurring at the closes point to the property.

- During Standard Daytime hours, 'Moderately intrusive' impacts are predicted at one other sensitive receiver (8 Barton St - Forbes Preschool) during Track Work (W.003) and one other sensitive receiver (3 Dowling St – Adrian Motel) during Tamping work (W.004).
- During night-time work, 'Moderately intrusive' impacts are predicted at two other sensitive receiver buildings (3 Dowling St – Adrian Motel) during Track Work (W.003). These impacts would reduce to 'clearly audible' when the rail saw is not in use (W.003b).
- During 'W.003 Track Work', clearly audible impacts are predicted during the night-time period at two buildings associated with the 'Town & Country Motor Inn. The remaining other sensitive receivers that are predicted to be less than 5dB above NML include various churches, the Ben Hall Motor Inn and the Country Mile Motor Inn.
- Review of the predictions shows that the sleep disturbance screening criterion is likely to be exceeded when night work occurs near residential receivers. The receivers which would potentially be affected by sleep disturbance impacts are generally the same receivers where 'moderately intrusive' and 'highly intrusive' night-time impacts have been predicted (refer to **Appendix C**).

All appropriate feasible and reasonable construction noise mitigation measures will be applied to work where exceedances of the NMLs are predicted. Construction noise mitigation measures are discussed in **Section 8.0**.

6.0 Vibration Assessment

The only vibration intensive activity proposed to occur is Rail Tamping, no vibratory rolling is proposed to occur. Based on previous measurements undertaken by SLR, the offset distances to be below the criteria for cosmetic damage and human comfort are detailed below.

- Cosmetic Damage – 5 meters
- Human Comfort – 30 meters

Based on the above, no properties are expected to be within the safe working distances for cosmetic damage or within the human comfort safe working distance for rail tamping work.

If other vibration intensive activities are required to occur, a vibration assessment will need to be undertaken as per requirement CNV2 and noted in **Section 8.3.2**. Where cosmetic damage impacts are predicted, dilapidation surveys would be required as per NV7 and NV31.

Heritage Structures

A number of heritage items associated with the historic Forbes Station are also located within the vibration-sensitive distances. Given their current exposure to rail vibration, it is expected that they are structurally sound and of low risk of vibration damage from tamping activities.

If other vibration intensive activities are required within safe working distances to heritage structures, a building condition assessment should be undertaken of the heritage item/s to assess if they are considered to be sensitive to vibration prior to vibration work commencing as per NV6 detailed in **Section 8.0**.

7.0 Construction Traffic Assessment

The REF identified that during the construction phase of the project, heavy vehicles would be required for materials and equipment delivery while light vehicles will transport workers to and from the site. This additional road traffic may impact receivers along the proposed transport routes.

The type of vehicles and respective number of movements assessed to occur each day are provided below in **Table 15**.

Table 15 REF Construction Vehicle Movements

Vehicle Type	Maximum Hourly Vehicle Movements
Heavy Vehicles	8
Light Vehicles	10
Water Cart	2

No additional information has been provided regarding construction road traffic, therefore the assessment from the REF has been summarised below:

All primary access for construction would be the Newell Highway. Given existing traffic volumes on the Newell Highway and its designation as approved heavy vehicle route (refer REF), road traffic noise impacts on the Newell Highway are not anticipated.

After leaving the Newell Highway, traffic will pass along Union Street. As outlined in the REF, Union Street is designated as an ‘Approved route, pending travel conditions’. Given likely existing traffic numbers (including heavy vehicles) along Union Street, road traffic noise impacts are not anticipated as a result of construction traffic during daytime hours. Where heavy vehicle movements are required to be undertaken outside of standard hours and on routes away from the Newell Highway, impacts may occur.

Noise management measures have been recommended in **Section 8.0** to assist in minimising the potential for noise disturbance from construction traffic.

8.0 Mitigation and Management Measures

Noise from the Project may be apparent at the nearest receivers at certain times during the Project. The Project should apply all feasible and reasonable mitigation measures to minimise the impacts.

In accordance with Condition O9.4, *noise impacts must be managed in accordance with the recommendations of the ICNG. The licensee must:*

a) identify noise sensitive receivers that may be affected;

b) identify hours of work for the proposed activities;

c) identify noise impacts at noise sensitive receivers;

d) select and apply reasonable and feasible work practices to minimise noise impacts; and

e) notify the identified noise sensitive receivers at least 5 days prior to the commencement of maintenance activities undertaken outside of the hours specified in Condition O9.1, except where the licensee first becomes aware of the need to undertake those maintenance activities less than 5 days prior to the proposed commencement date, in which case the notification must be provided as soon as practicable after becoming aware of the need to undertake the maintenance activities.

Table 16 outlines the mitigation and management measures that will be adopted to minimise potential noise and vibration impacts at surrounding noise sensitive receivers as outlined in the CNMVP.

Table 16 Standard Mitigation Measures

ID	Control Measure/Requirement
Horizontal Clearances	
CNV1	Prior to the commencement of construction, noise and vibration impacts would be confirmed based on the final project design
CNV2	Where vibration levels are predicted to exceed the structural screening criteria for a particular structure as a result of detailed design, a more detailed assessment of the structure and vibration monitoring would be carried out in accordance with the Inland Rail NSW Construction Noise and Vibration Management Framework, to ensure appropriate mitigation and management plans are implemented. During construction, if vibration-generating activities are conducted within 15 m of a residence, attended vibration measurements would be undertaken at the commencement of vibration-generating activities to confirm that structural vibration limits are within the acceptable range. Where vibration levels are found to be unacceptable, alternative work methods would be implemented so the vibration impacts are reduced to acceptable levels.
CNV3	A Construction Noise and Vibration Management Plan would be prepared and implemented as part of the CEMP in accordance with the Inland Rail NSW Construction Noise and Vibration Management Framework and EPL3142. The plan would have measures, processes and responsibilities to manage and monitor noise and vibration, and 29inimize the potential for impacts during construction. This plan will include: Pre-construction/ construction • Construction noise and vibration criteria for the proposal • Location of sensitive receivers in proximity to the construction area • Specific management measures for activities that could exceed the construction noise and vibration criteria • Notification of impacts would be undertaken in accordance with the Communication Management Plan for the proposal.
CNV4	An out-of-hours work protocol would be developed to define the process for considering, approving and managing out-of-hours work, including implementation of feasible and reasonable measures and communication requirements. Measures would be aimed at pro-active communication and engagement with potentially affected receivers, provision of respite periods and/or alternative accommodation for defined exceedance levels All work outside the primary proposal construction hours would be undertaken in accordance with the Inland Rail NSW Construction Noise and Vibration Management Framework and in accordance with the out-of-hours work protocol. The protocol would provide guidance for the preparation of out-of-hours work plans for each construction work location and for key works. Out-of-hours work plans would be prepared in consultation with key stakeholders (including the NSW EPA) and the community, and incorporated into the construction noise and vibration management plan.
CNV5	Building condition surveys would be completed before and after construction works where buildings or structures are within the minimum vibration working distances for cosmetic damage.
CNV6	Prior to the commencement of vibration intensive works within the minimum working distances for cosmetic damage for heritage items, the potential for damage to the item would be assessed. Where there is potential for damage to heritage items, alternative methods that generate less vibration would be investigated and substituted where practicable.

ID	Control Measure/Requirement
	Where residual cosmetic damage risks to heritage items remain, condition surveys would be carried out and vibration monitoring with real-time notification of exceedance would occur during the activity. Any identified vibration-related damage to the heritage items would be rectified
CEMP (Conditions from the CEMF)	
NV1	Out of Hours work permit system shall be developed that requires prior consultation with impacted sensitive receptors, monitoring, modelling of noise/vibration impacts on sensitive receptors and ARTC acknowledgement and engagement interface. This will be a hold point.
NV2	Any relaxation of impact to sensitive receivers will be provided to ARTC for information before works commence. This will be a hold point
NV3	All out of hours work permits to be provided to ARTC 5 days before activities commence. Works cannot commence until the hold point is released. This will be a hold point
NV4	Noise/vibration complaints shall be responded to and assessed for further mitigation and monitoring and details provided to ARTC
NV5	Must have an approved Noise and Vibration Management Plan
NV6	Proactive vibration monitoring undertaken during high-risk activities
NV7	Dilapidation surveys undertaken and sensitive receptors identified in the potential impact zone
NV8	Proactive noise monitoring undertaken during high-risk activities
NV9	Proactive noise modelling undertaken of high-risk activities prior to activities being carried out
NV10	Communication to neighbouring sensitive receptors on upcoming high-risk activities
NV11	Site inductions for all employees and contractors will address: • Environmental aspects and impacts: • Proposal specific and standard noise management measures; • Licence and approval conditions; • Hours of work; • Environmental incident reporting and management procedures; and • Complaint management
NV12	Daily site-specific briefings for all employees and contractors will include Site specific noise management measures; • Location of nearest noise sensitive receivers; • Construction employee parking areas; • Behavioural practices (e.g. avoid swearing, shouting, dropping materials from heights); and • Designated loading/unloading areas and procedures
NV13	Work compounds, storage areas, parking areas, unloading/loading areas and other semi-permanent construction sites should be located away from noise sensitive receivers. Where this is not possible, the orientation and layout of the work site shall consider noise impacts, and opportunities to shield receivers from noise through the use of site buildings and stockpiles should be considered.

ID	Control Measure/Requirement
NV14	Static plant should be located as far as possible from sensitive receivers, be located to take advantage of natural acoustic screening such as terrain, site buildings, etc and where necessary for reduction of noise impacts, provided with an acoustic enclosure.
NV15	The number of vehicle trips to and from site will be optimised.
NV16	Behavioural practices – no swearing or unnecessary shouting or loud music on site. No dropping of materials from height, throwing metal items or slamming car doors.
NV17	Where possible, construction compounds should be located a minimum of 1km from the nearest resident or noise sensitive receiver
NV18	Plan traffic flow, parking and loading/unloading areas to minimise reversing movements within the site
NV19	**Equipment Selection** • Pre-start checks will be undertaken on all plant and equipment daily
NV20	• Use quieter and less vibration emitting construction methods where feasible and reasonable.
NV21	• Non-tonal reversing beepers will be fitted and used on construction vehicles and mobile plant regularly used on site and for out of hours work.
NV22	• Where available, equipment selection will favour the use of quieter and less vibration emitting construction methods.
NV23	• Avoid the simultaneous operation of noisy plant within discernible range of noise sensitive receivers where possible
NV24	• The offset distance between noisy plant and noise sensitive receivers will be maximised
NV25	• Plant used intermittently will be throttled down / shut down
Stakeholder And Community Management	
NV26	A telephone, email and web-based community information service shall be established to allow the community to obtain additional information on construction activities, provide feedback or make a complaint.
NV27	Regular communications on the activities and progress of the proposal shall be provided to the community (e.g. via newsletter, email and/or website).
NV28	Noise or vibration monitoring in response to complaints shall be undertaken where the results or the process assist in resolving or understanding the receiver's issue.
NV29	When working adjacent to schools, medical centres, childcare centres or places of worship, particularly noisy activities will be scheduled outside of operating or service hours where possible.
NV30	Where vibration levels are predicted to approach the criteria for cosmetic building damage or limits for critical or sensitive areas, attended vibration measurements shall be undertaken at the commencement of vibration generating activities to confirm that vibration limits are within the acceptable range.
NV31	Where vibration or construction activities are predicted to approach the relevant limits, dilapidation surveys on potentially affected buildings shall be undertaken

8.1 Additional Mitigation and Management Measures for Out of Hours Work

The Inland Rail NSW Construction Noise and Vibration Management Framework (CNVMF) and CNVMP outline the appropriate additional mitigation measures for noise sensitive receivers by matching the predicted exceedance category of NMLs to the appropriate management measure for OOHW. OOHW has been divided into two periods (Evening and Night).

The type of additional mitigation measures are listed in **Table 17** and described in CNVMP. The additional mitigation measures to be adopted for airborne noise are identified in **Table 18**. The additional mitigation measures for construction vibration are identified in **Table 19**.

Table 17 Additional Mitigation Measures

Mitigation/Management Measure	Abbreviation
Communication (Category 1)	C01
Communication (Category 2)	C02
Respite Offer	RO
Alternative Accommodation	AA

Table 18 Airborne Noise – Additional Mitigation Measures Matrix

Time Period		Exceedance of NML	Perception	Duration	Communication Category/ Management Measure
OOHW Evening Period	Monday – Sunday 6pm – 10pm (including public holidays)	<5	Noticeable	Any	CO1
		5-15	Clearly audible	Any	CO1
		16-25	Moderately intrusive	Any	CO1, CO2
		>25	Highly intrusive	Any	CO1, CO2
				>2 consecutive rest periods	CO1, CO2, RO
OOHW Night Period	Monday – Sunday 10pm – 7am (including public holidays)	<5	Noticeable	Any	CO1
		5-15	Clearly audible	Any	CO1
		16-25	Moderately intrusive	Any	CO1, CO2
				>2 consecutive sleep periods	CO1, CO2, RO
		>25	Highly intrusive	Any	CO1, CO2, RO
				>2 consecutive sleep periods	CO1, CO2, RO, AA

Table 19 Vibration – Additional Mitigation Measures Matrix

Time Period		Duration	Exceedance of 'preferred' value	Exceedance of 'maximum' value
OOH Evening Period	Monday – Sunday 6pm – 10pm (including public holidays)	Any	CO1, C02	C01, C02, RO
OOHW Night Period	Monday – Sunday 10pm – 7am (including public holidays)	Any	C01, C2, RO	C01,C02, RO, AA

8.1.1 Receivers Eligible for Additional Mitigation Measures – Noise

The receivers eligible for additional mitigation and management measures due to construction noise from the project work are presented in **Appendix C**. Where work occurs for greater than two consecutive nights receivers may be eligible for respite offers (RO) or alternative accommodation (AA) depending on the exceedance level and work period as detailed in **Table 18**.

As outlined in **Section 5.2**, 'Highly intrusive' impacts are predicted at the nearest six residential receivers due to the proximity to the work.

- 1 Little Union Street, Forbes
- 2 Little Union Street, Forbes
- 4 Little Union Street, Forbes
- 6 Little Union Street, Forbes
- 8 Little Union Street, Forbes
- 1 Union Street, Forbes

  Note: addresses sourced from google maps, these must be verified on site with reference to impact maps in **Appendix C**.

Where possible work would be scheduled to avoid impacting the same receivers for more than two consecutive sleep periods. Receivers that would be impacted for more than two consecutive sleep periods must be identified in the OOHW permit.

8.1.2 Receivers Eligible for Additional Mitigation Measures – Vibration

No vibration intensive work is proposed to occur during the evening and night-time periods, therefore additional mitigation measures do not apply. Rail Tamping is understood to be limited to standard daytime hours only as outlined in **Section 5.1**.

8.2 Community Notification

As detailed in the standard management measures outlined in **Table 16**:

- A telephone, email and web based community information service will be established to allow the community to obtain additional information on construction activities, provide feedback or make a complaint.
- Regular communications on the activities and progress of the proposal will be provided to the community (e.g. via newsletter, email and/or website).

As required in Condition O9.4, where maintenance activities are undertaken outside of the standard hours (as specified Condition O9.1), the licensee is required to notify the identified noise sensitive receivers at least 5 days prior to the commencement of maintenance activities.

8.3 Monitoring

Noise and vibration monitoring will be undertaken in accordance with the CNVMP and the CNVMF including conditions CNV2, CNV4, CNV6 and O9.3(b).

8.3.1 Construction Noise Monitoring

Construction noise monitoring will be carried out at the commencement of activities to confirm that actual noise levels are consistent with the predictions presented in this CNVIS, and that the management measures that have been implemented are effective or as per the CNVMP.

Monitoring locations will be focused to the most impacted receivers identified in **Appendix C**. Indicative locations are identified in **Table 20**, however, these will be subject to provision of safe access and the specific location of work being undertaken at the time of monitoring.

Table 20 Indicative Monitoring Locations

Location	Type	Monitoring	Timing
R02: 1 Union Street **R06:** 1 Little Union Street	Activities based noise monitoring	• Confirming that actual noise levels are consistent with predicted noise impacts and that the effectiveness of actions and mitigation measures implemented are satisfactory, • In response to a noise related complaint(s) (determined on a case-by-case basis) • Following implementation of mitigation measures or noise attenuation because of exceedance of predicted noise levels	At the commencement of the range of OOHW activities being undertaken, in particular compound operations and track/tamping work.
	Out of Hours Work	Attended monitoring as required by the Out of Hours Work (OOHW) plan to validate noise levels are consistent with predicted noise impacts and that the effectiveness of actions and mitigation measures implemented are satisfactory	At the commencement of the range of OOHW activities being undertaken.
	Plant / Equipment Checks	Spot checks would be carried out as required on a case-by-case basis, such as • In response to a specific noise related complaint and • During noise verification monitoring when it is possible to isolate the noise from one piece of plant or equipment.	Case-by-case basis

Noise monitoring will, where practicable, be in a positions with unobstructed views of general site activities, whilst shielded as much as possible from non-construction site noise (e.g. road traffic, rail noise and other surrounding noise). The preferred measurement height is 1.2-1.5m above the ground. In accordance with *Australian Standard AS1055:2018*, outdoor noise monitoring is to be undertaken at least 3.5m from any reflecting structure other than the ground.

Noise monitoring will be carried out on or near the property boundary at the locations representative of the nominated receivers in **Table 20** (i.e. in publicly accessible areas near the nominated receivers, if it is safe to do so). Noise monitoring results will be assessed against the noise management levels (NMLs) and predicted noise levels outlined in **Section 4.2** and **Section 5.2**.

The results will be documented with discussion about the details of work underway at the time and mitigation in place. Noise monitoring results will be recorded on the MR Noise Monitoring Form in Procore.

8.3.2 Construction Vibration monitoring

No vibration monitoring is required for this work based on the equipment lists provided. The only vibration intensive activity proposed is rail tamping which has the potential generate perceptible vibration at one receiver as outlined in **Section 6.0**. If other vibration intensive activities are required, an assessment of their potential impact is required as per requirement CNV2:

- *For buildings that are predicted to exceed the cosmetic damage screening criteria (refer to **Section 6.0**), a detailed assessment of the structure and vibration monitoring would be carried out in accordance with the Inland Rail NSW Construction Noise and Vibration Management Framework, to ensure appropriate mitigation and management plans are implemented.*
- *During construction, if vibration-generating activities are conducted within 15 m of a residence, attended vibration measurements would be undertaken at the commencement of vibration-generating activities to confirm that structural vibration limits are within the acceptable range. Where vibration levels are found to be unacceptable, alternative work methods would be implemented so the vibration impacts are reduced to acceptable levels.*

9.0 Cumulative Impacts

Cumulative construction noise impacts can occur where multiple work activities are being completed near to a particular receiver at the same time. There is potential for cumulative construction impacts from multiple construction activities being completed in different areas of the project (ie Forbes Station and Wyndham Ave).

Since the construction scenarios required for various stages of the proposal would generally require similar items of equipment, concurrent construction work being completed near to a particular area could theoretically increase the worst-case noise levels in this report by around 3 dB (ie a logarithmic adding of two sources of noise at the same level) particularly at some receivers in the north of Forbes.

The likelihood of worst-case noise levels being generated by two different work activities at the same time is, however, considered low and rather than increase construction noise levels, the impact of concurrent work would generally be a limited to a potential increase in the duration, and annoyance, of noise impacts on the affected receivers.

In practice, construction noise levels in any one location would vary and would be frequently much lower than the worst-case scenario assessed due to construction staging moving work around within the study area and, in many cases, only a few items of equipment being used at any one time.

Martinus Rail will take feasible and reasonable steps to consult and coordinate with other construction projects when they become aware of them and if they have the potential to impact the same receivers concurrently, to minimise cumulative impacts of noise and vibration and maximise respite for affected sensitive receivers.

APPENDIX

C

Forbes Station and Yard Enhancement Project
Construction Noise and Vibration Impact Statements

Appendix A Acoustic terminology

STOCKINBINGAL TO PARKES
SUPPLEMENTARY REVIEW OF ENVIRONMENTAL FACTORS: FORBES STATION AND YARD

Inland Rail is a subsidiary of
Australian Rail Track Corporation

INLAND
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Appendix A Acoustic Terminology

S2P Enhancement Project – Forbes Station

Construction Noise and Vibration Impact Statement

Martinus Rail

SLR Project No.: 610.031317.00001

4 March 2024

Sound Level or Noise Level

The terms 'sound' and 'noise' are almost interchangeable, except that 'noise' often refers to unwanted sound.

Sound (or noise) consists of minute fluctuations in atmospheric pressure. The human ear responds to changes in sound pressure over a very wide range with the loudest sound pressure to which the human ear can respond being ten million times greater than the softest. The decibel (abbreviated as dB) scale reduces this ratio to a more manageable size by the use of logarithms.

The symbols SPL, L or LP are commonly used to represent Sound Pressure Level. The symbol LA represents A-weighted Sound Pressure Level. The standard reference unit for Sound Pressure Levels expressed in decibels is 2 x 10^{-5} Pa.

'A' Weighted Sound Pressure Level

The overall level of a sound is usually expressed in terms of dBA, which is measured using a sound level meter with an 'A-weighting' filter. This is an electronic filter having a frequency response corresponding approximately to that of human hearing.

People's hearing is most sensitive to sounds at mid frequencies (500 Hz to 4,000 Hz), and less sensitive at lower and higher frequencies. Different sources having the same dBA level generally sound about equally loud.

A change of 1 dB or 2 dB in the level of a sound is difficult for most people to detect, whilst a 3 dB to 5 dB change corresponds to a small but noticeable change in loudness. A 10 dB change corresponds to an approximate doubling or halving in loudness. The table below lists examples of typical noise levels.

Sound Pressure Level (dBA)	Typical Source	Subjective Evaluation
130	Threshold of pain	Intolerable
120	Heavy rock concert	Extremely noisy
110	Grinding on steel	
100	Loud car horn at 3 m	Very noisy
90	Construction site with pneumatic hammering	
80	Kerbside of busy street	Loud
70	Loud radio or television	
60	Department store	Moderate to quiet
50	General Office	
40	Inside private office	Quiet to very quiet
30	Inside bedroom	
20	Recording studio	Almost silent

Other weightings (eg B, C and D) are less commonly used than A-weighting. Sound Levels measured without any weighting are referred to as 'linear', and the units are expressed as dB(lin) or dB.

Sound Power Level

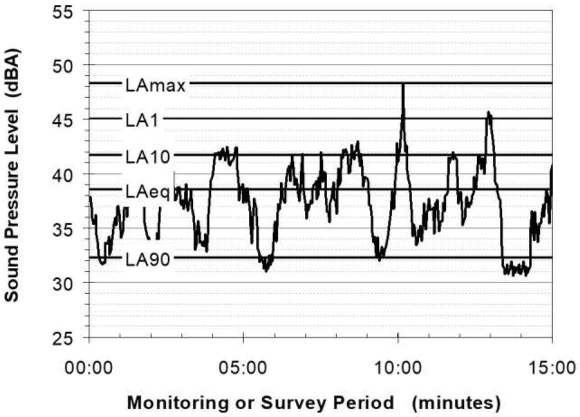
The Sound Power of a source is the rate at which it emits acoustic energy. As with Sound Pressure Levels, Sound Power Levels are expressed in decibel units (dB or dBA), but may be identified by the symbols SWL or LW, or by the reference unit 10^{-12} W.

The relationship between Sound Power and Sound Pressure is similar to the effect of an electric radiator, which is characterised by a power rating but has an effect on the surrounding environment that can be measured in terms of a different parameter, temperature.

Statistical Noise Levels

Sounds that vary in level over time, such as road traffic noise and most community noise, are commonly described in terms of the statistical exceedance levels LAN, where LAN is the A-weighted sound pressure level exceeded for N% of a given measurement period. For example, the LA1 is the noise level exceeded for 1% of the time, LA10 the noise exceeded for 10% of the time, and so on.

The following figure presents a hypothetical 15 minute noise survey, illustrating various common statistical indices of interest.



Of particular relevance, are:

LA1 The noise level exceeded for 1% of the 15 minute interval.

LA10 The noise level exceeded for 10% of the 15 minute interval. This is commonly referred to as the average maximum noise level.

LA90 The noise level exceeded for 90% of the sample period. This noise level is described as the average minimum background sound level (in the absence of the source under consideration), or simply the background level.

LAeq The A-weighted equivalent noise level (basically, the average noise level). It is defined as the steady sound level that contains the same amount of acoustical energy as the corresponding time-varying sound.

Frequency Analysis

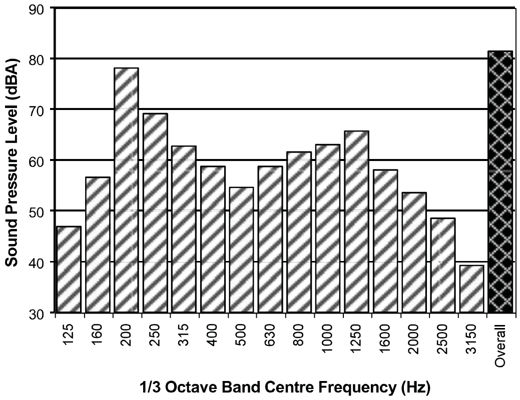
Frequency analysis is the process used to examine the tones (or frequency components) which make up the overall noise or vibration signal.

The units for frequency are Hertz (Hz), which represent the number of cycles per second.

Frequency analysis can be in:

- Octave bands (where the centre frequency and width of each band is double the previous band)
- 1/3 octave bands (three bands in each octave band)
- Narrow band (where the spectrum is divided into 400 or more bands of equal width)

The following figure shows a 1/3 octave band frequency analysis where the noise is dominated by the 200 Hz band. Note that the indicated level of each individual band is less than the overall level, which is the logarithmic sum of the bands.



Annoying Noise (Special Audible Characteristics)

A louder noise will generally be more annoying to nearby receivers than a quieter one. However, noise is often also found to be more annoying and result in larger impacts where the following characteristics are apparent:

- Tonality - tonal noise contains one or more prominent tones (ie differences in distinct frequency components between adjoining octave or 1/3 octave bands), and is normally regarded as more annoying than 'broad band' noise.
- Impulsiveness - an impulsive noise is characterised by one or more short sharp peaks in the time domain, such as occurs during hammering.
- Intermittency - intermittent noise varies in level with the change in level being clearly audible. An example would include mechanical plant cycling on and off.
- Low Frequency Noise - low frequency noise contains significant energy in the lower frequency bands, which are typically taken to be in the 10 to 160 Hz region.

Vibration

Vibration may be defined as cyclic or transient motion. This motion can be measured in terms of its displacement, velocity or acceleration. Most assessments of human response to vibration or the risk of damage to buildings use measurements of vibration velocity. These may be expressed in terms of 'peak' velocity or 'rms' velocity.

The former is the maximum instantaneous velocity, without any averaging, and is sometimes referred to as 'peak particle velocity', or PPV. The latter incorporates 'root mean squared' averaging over some defined time period.

Vibration measurements may be carried out in a single axis or alternatively as triaxial measurements (ie vertical, longitudinal and transverse).

The common units for velocity are millimetres per second (mm/s). As with noise, decibel units can also be used, in which case the reference level should always be stated. A vibration level V, expressed in mm/s can be converted to decibels by the formula 20 log (V/Vo), where Vo is the reference level (10^{-9} m/s). Care is required in this regard, as other reference levels may be used.

Human Perception of Vibration

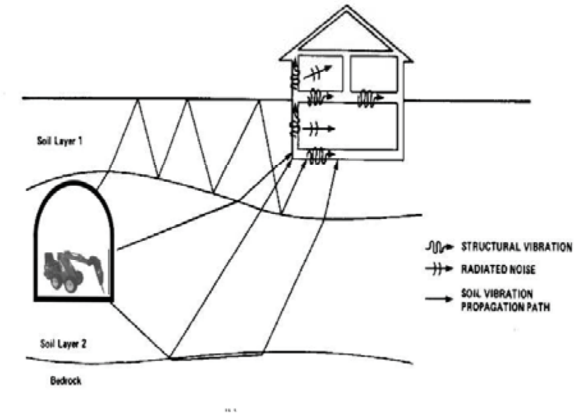
People are able to 'feel' vibration at levels lower than those required to cause even superficial damage to the most susceptible classes of building (even though they may not be disturbed by the motion). An individual's perception of motion or response to vibration depends very strongly on previous experience and expectations, and on other connotations associated with the perceived source of the vibration. For example, the vibration that a person responds to as 'normal' in a car, bus or train is considerably higher than what is perceived as 'normal' in a shop, office or dwelling.

Ground-borne Noise, Structure-borne Noise and Regenerated Noise

Noise that propagates through a structure as vibration and is radiated by vibrating wall and floor surfaces is termed 'structure-borne noise', 'ground-borne noise' or 'regenerated noise'. This noise originates as vibration and propagates between the source and receiver through the ground and/or building structural elements, rather than through the air.

Typical sources of ground-borne or structure-borne noise include tunnelling works, underground railways, excavation plant (eg rockbreakers), and building services plant (eg fans, compressors and generators).

The following figure presents an example of the various paths by which vibration and ground-borne noise may be transmitted between a source and receiver for construction activities occurring within a tunnel.



The term 'regenerated noise' is also used in other instances where energy is converted to noise away from the primary source. One example would be a fan blowing air through a discharge grill. The fan is the energy source and primary noise source. Additional noise may be created by the aerodynamic effect of the discharge grill in the airstream. This secondary noise is referred to as regenerated noise.

C

Forbes Station and Yard Enhancement Project
Construction Noise and Vibration Impact Statements

Appendix B Modelling scenarios and equipment

STOCKINBINGAL TO PARKES
SUPPLEMENTARY REVIEW OF ENVIRONMENTAL FACTORS: FORBES STATION AND YARD

Appendix B Modelling Scenarios and Equipment

S2P Enhancement Project – Forbes Station

Construction Noise and Vibration Impact Statement

Martinus Rail

SLR Project No.: 610.031317.00001

4 March 2024

Equipment		Total Lw (dBA)	Ballast Regulator	Ballast Tamper	Dump Truck (15-25T)	Excavator (14T)	Excavator (20-30t)	Excavator 3-6T + hydraulic Hammer	Front end loader	Generator	Lighting towers	Positrack	Rail saw	Roller – smooth drum	Truck (flatbed)	Ute	Watercart
Sound Power Level (Lw)^2			114	115	98	100	107	115	115	99	80	104	118	107	95	85	105
Estimated utilisation (%)			75%	75%	25%	50%	50%	75%	50%	100%	100%	100%	25%	100%	25%	25%	75%
ID	**Construction Scenario**																
W.001	Site Establishment	106			1	1				1						2	1
W.002	Compound Operation	106			1					1	1	1			1	10	
W.003	Track Work	119					1		1		1	1	1	1			1
W.003b	Track Work Without Rail Saw	114					1		1		1	1		1			1
W.004	Tamping Work	116	1	1													
W.005	Signal Work	119			1			1				1			1	6	

Note 1: Equipment classed as 'annoying' in the ICNG and requires a 5 dB correction.

Note 2: Sound power level data is taken from the DEFRA Noise Database, AS2436, TfNSW Construction Noise and Vibration Strategy and the ARTC Noise Prediction Tool.

C

Forbes Station and Yard Enhancement Project
Construction Noise and Vibration Impact Statements

Appendix C Noise impact maps

STOCKINBINGAL TO PARKES
SUPPLEMENTARY REVIEW OF ENVIRONMENTAL FACTORS: FORBES STATION AND YARD

Appendix C Noise Impact Maps

S2P Enhancement Project – Forbes Station

Construction Noise and Vibration Impact Statement

Martinus Rail

SLR Project No.: 610.031317.00001

4 March 2024

Figure C-1 W.001: Site Establishment – Daytime Standard Hours

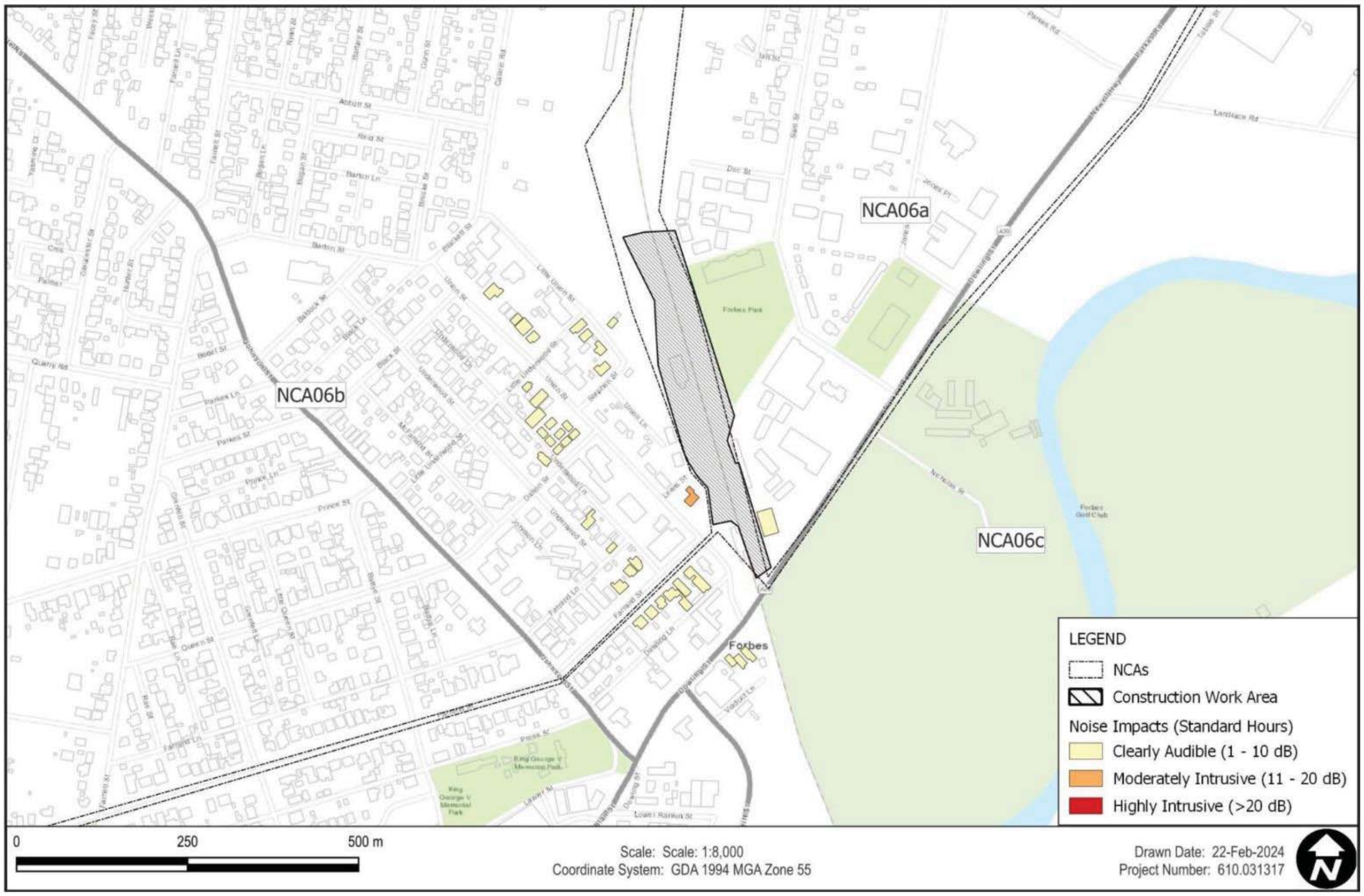


Figure C-2 W.002: Compound Operation – Daytime Standard Hours

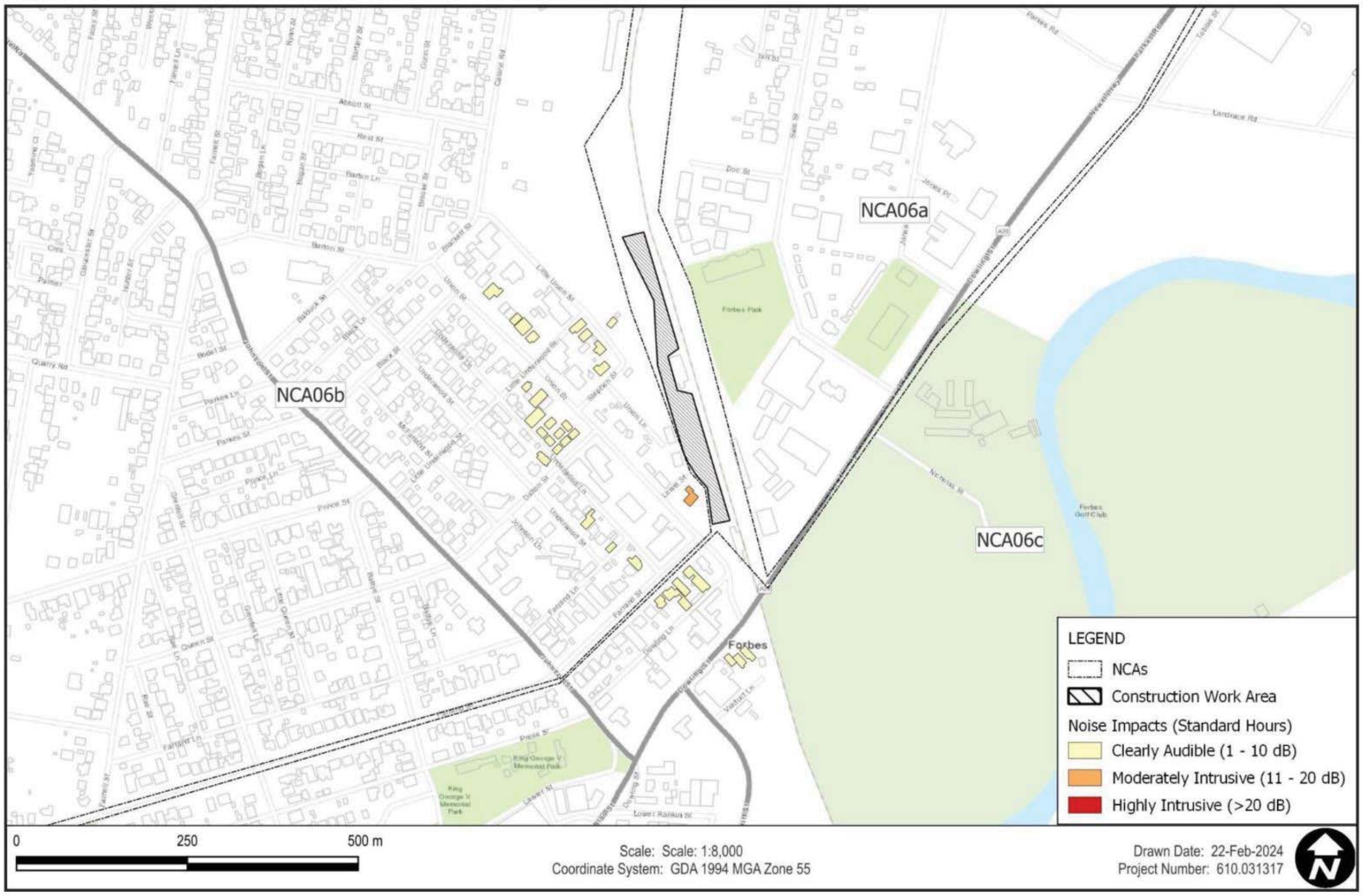


Figure C-3 W.002: Compound Operation – Daytime (OOHW)

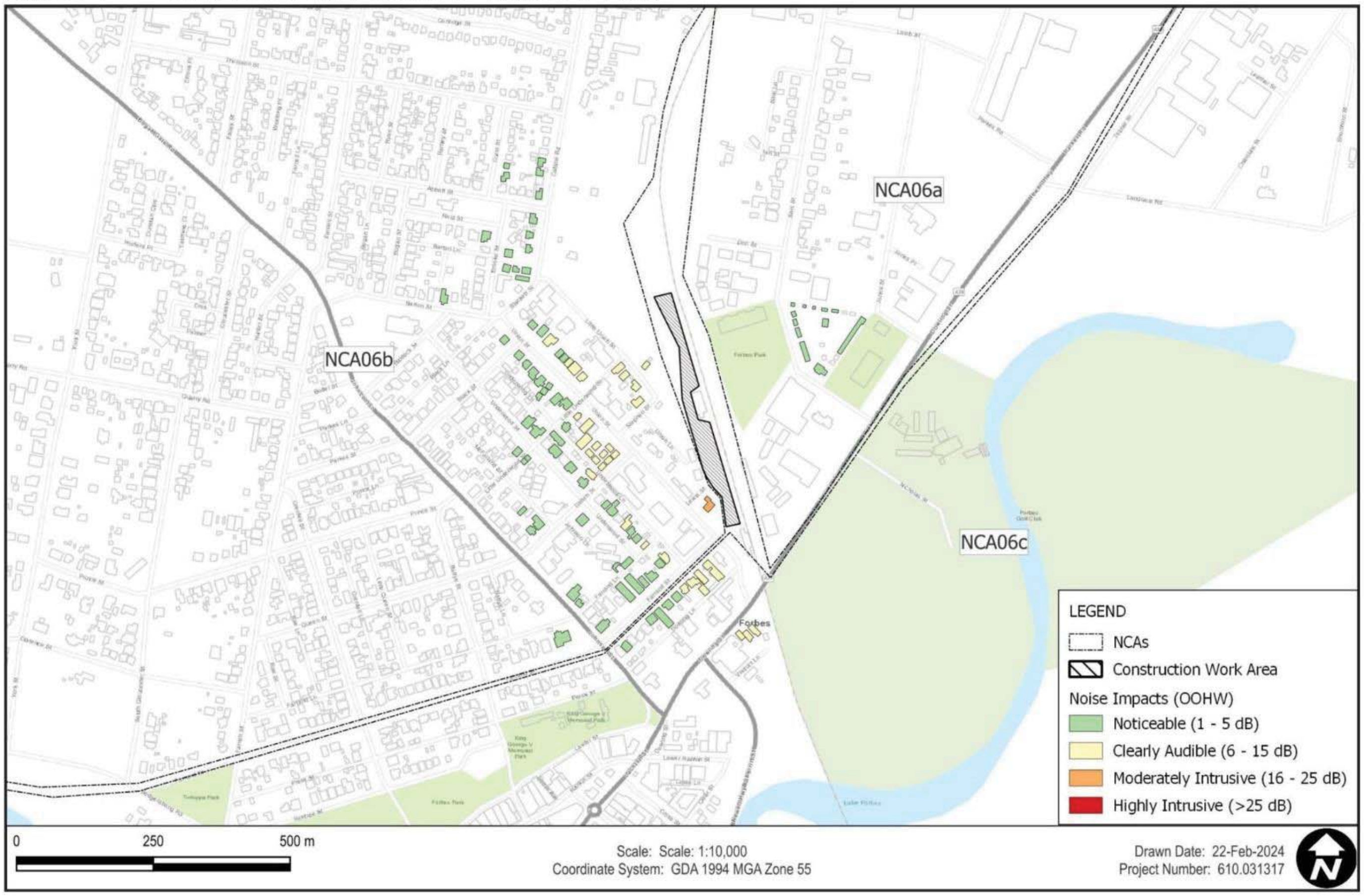


Figure C-4 W.002: Compound Operation – Evening (OOHW)

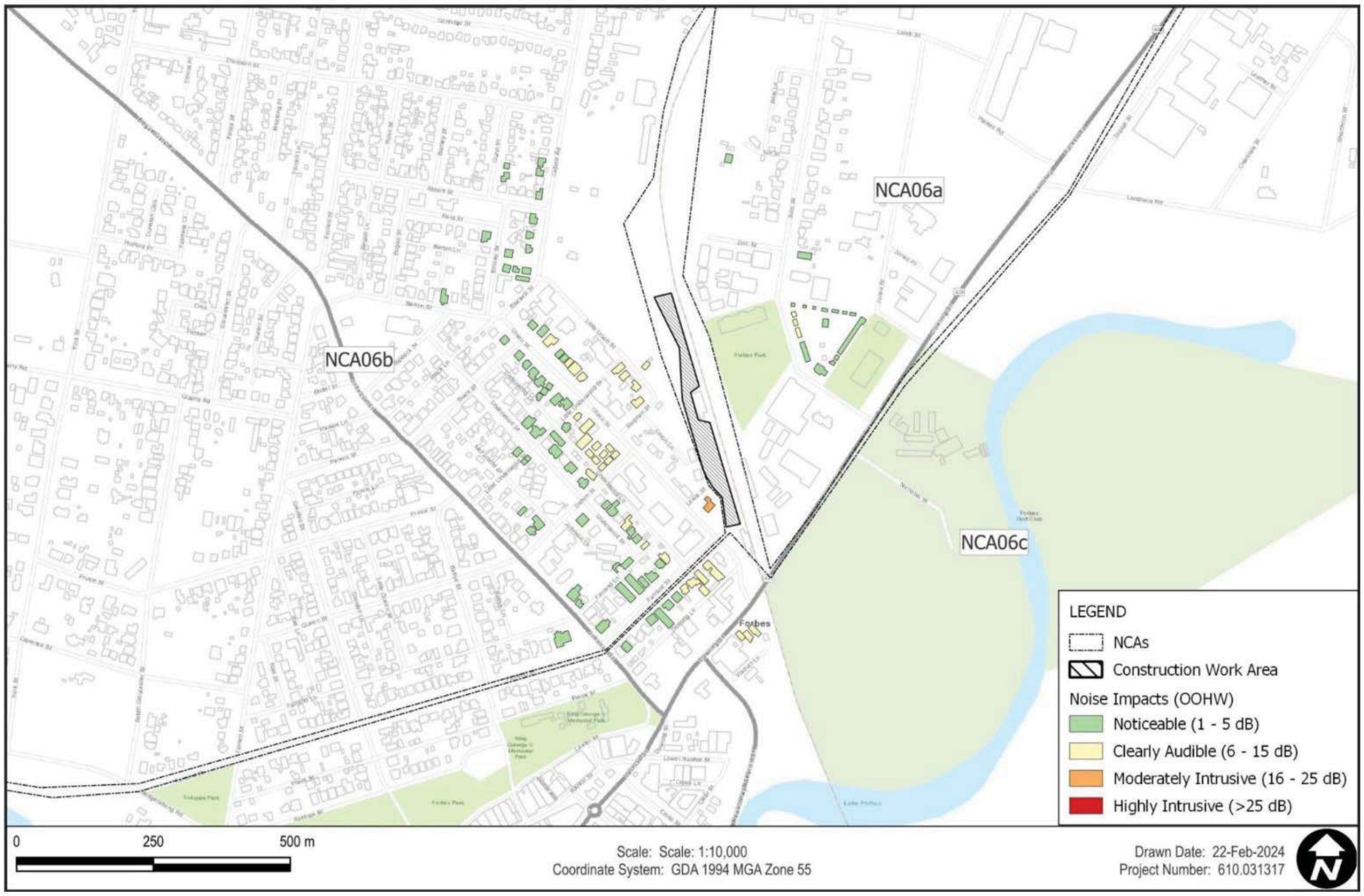


Figure C-5 W.002: Compound Operation – Night-time (OOHW)

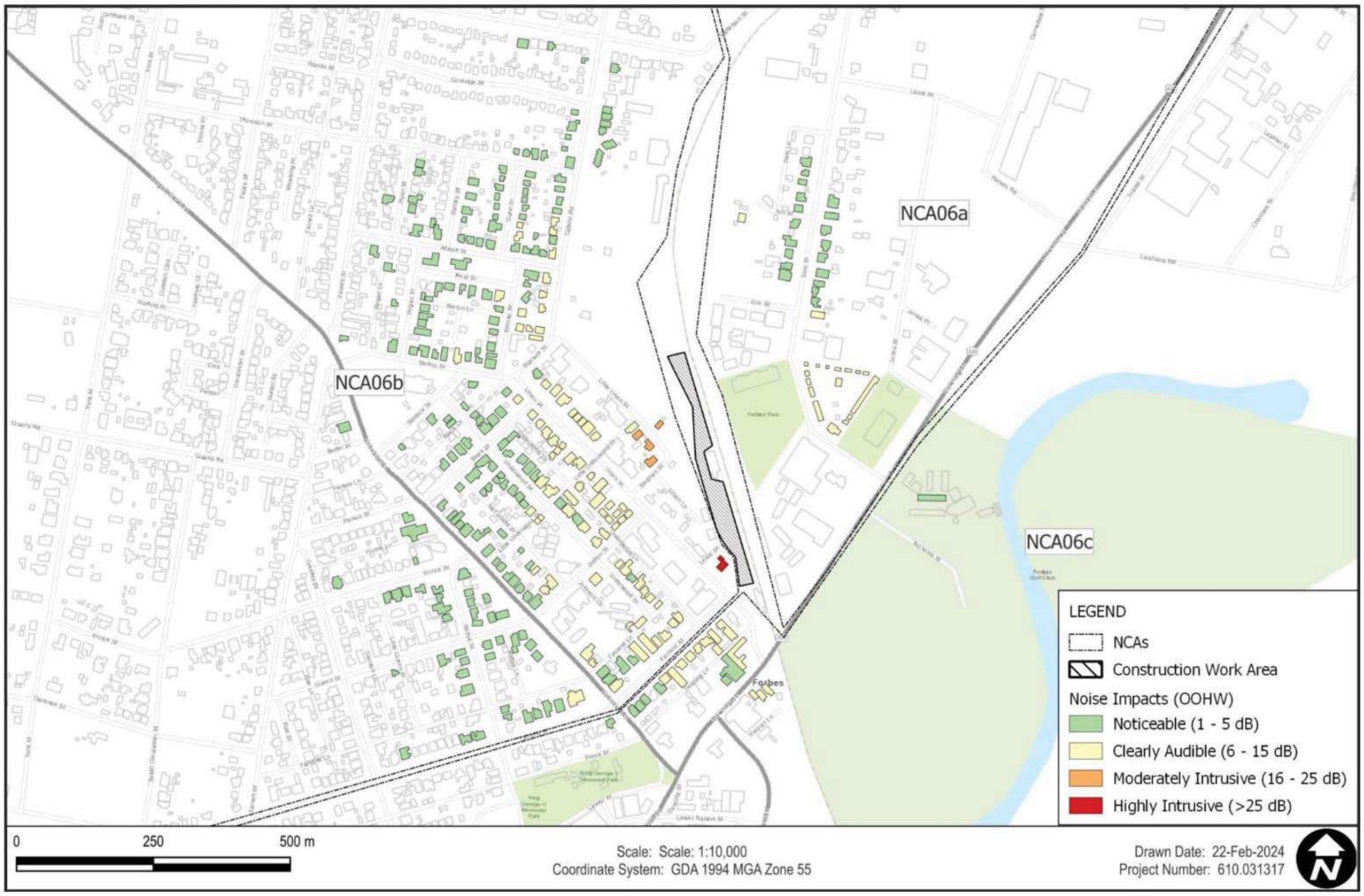


Figure C-6 W.003: Track Work – Daytime Standard Hours

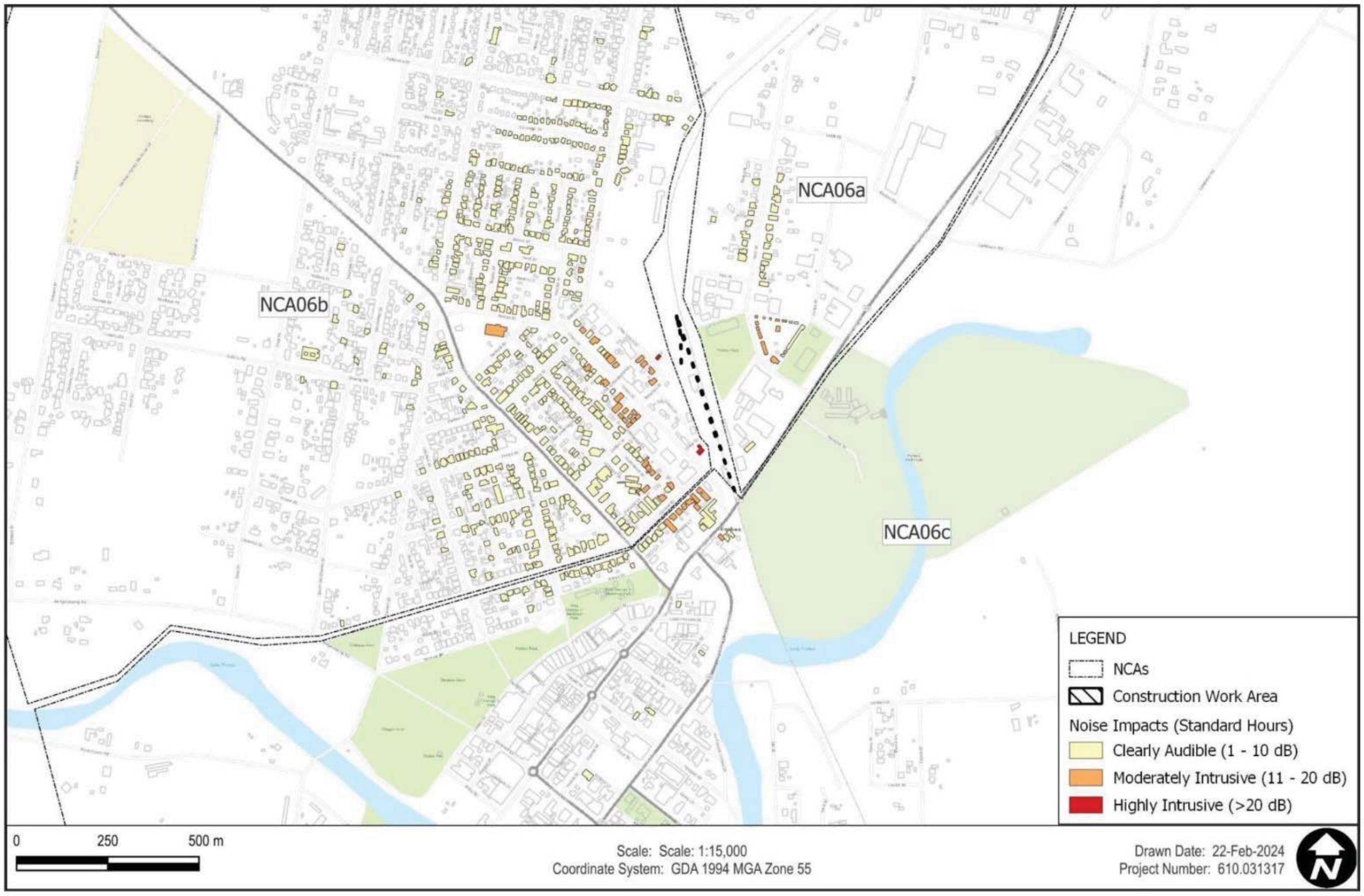


Figure C-7 W.003: Track Work – Daytime (OOHW)

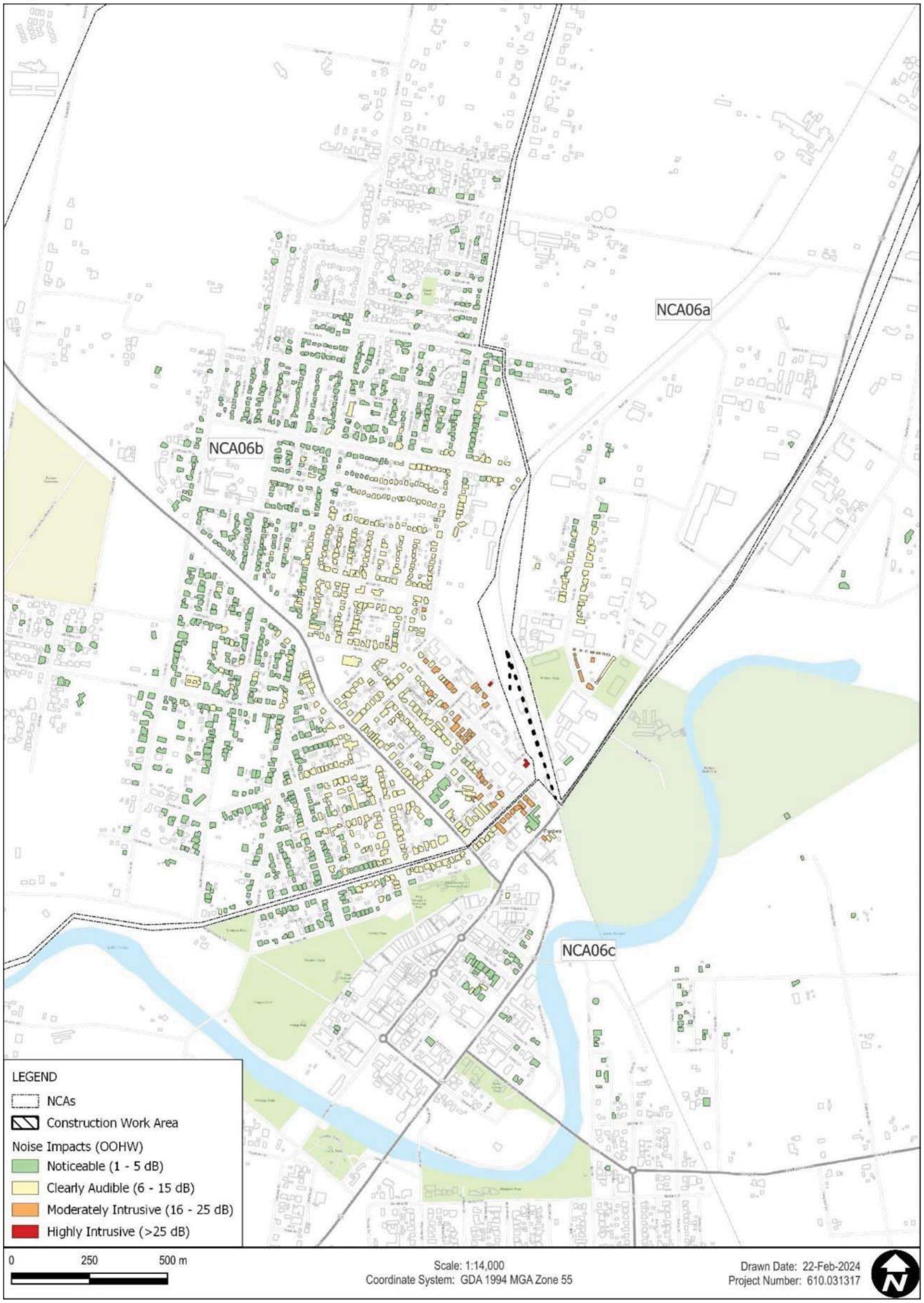


Figure C-8 W.003: Track Work – Evening (OOHW)

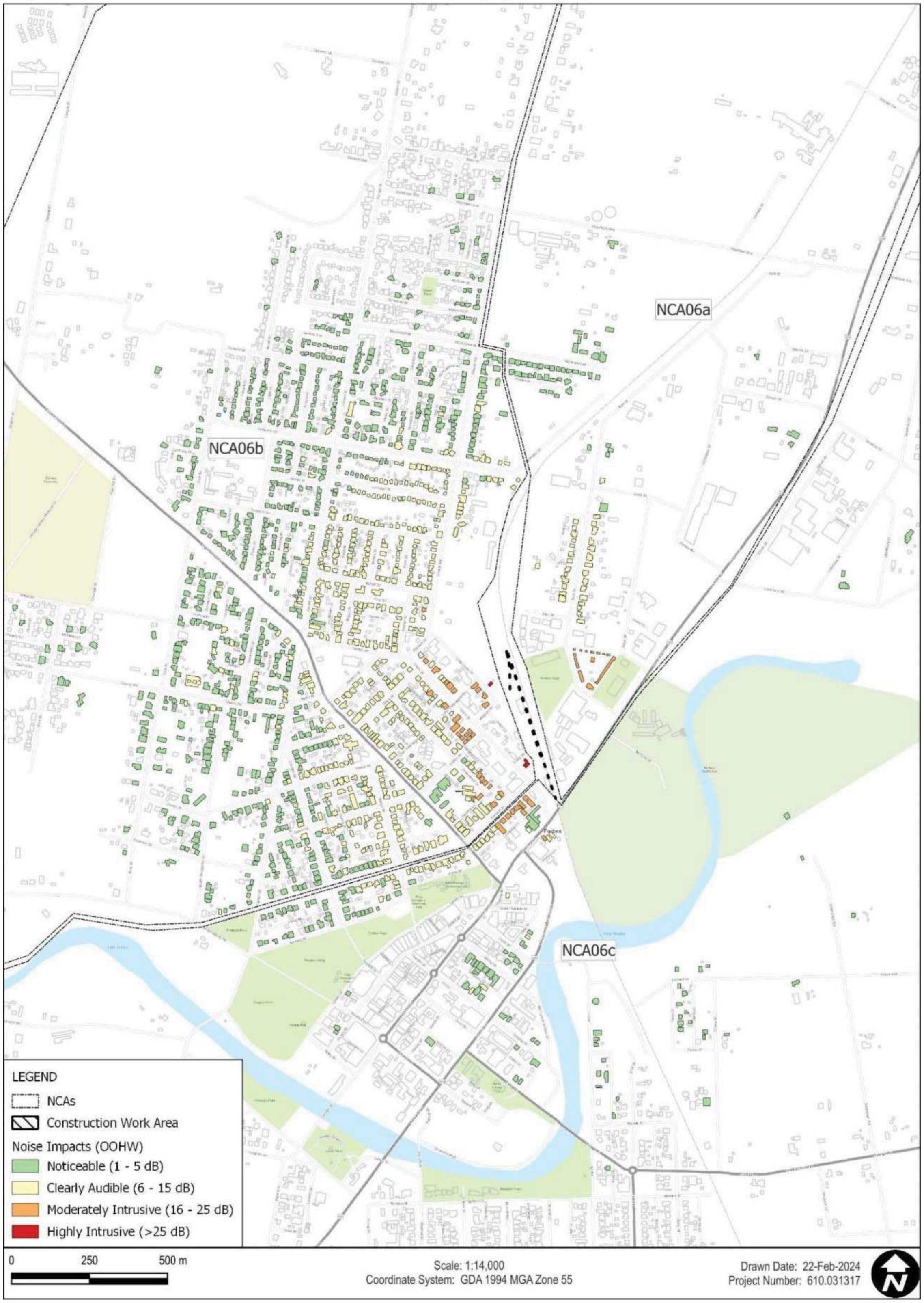


Figure C-9 W.003: Track Work – Night-time (OOHW)

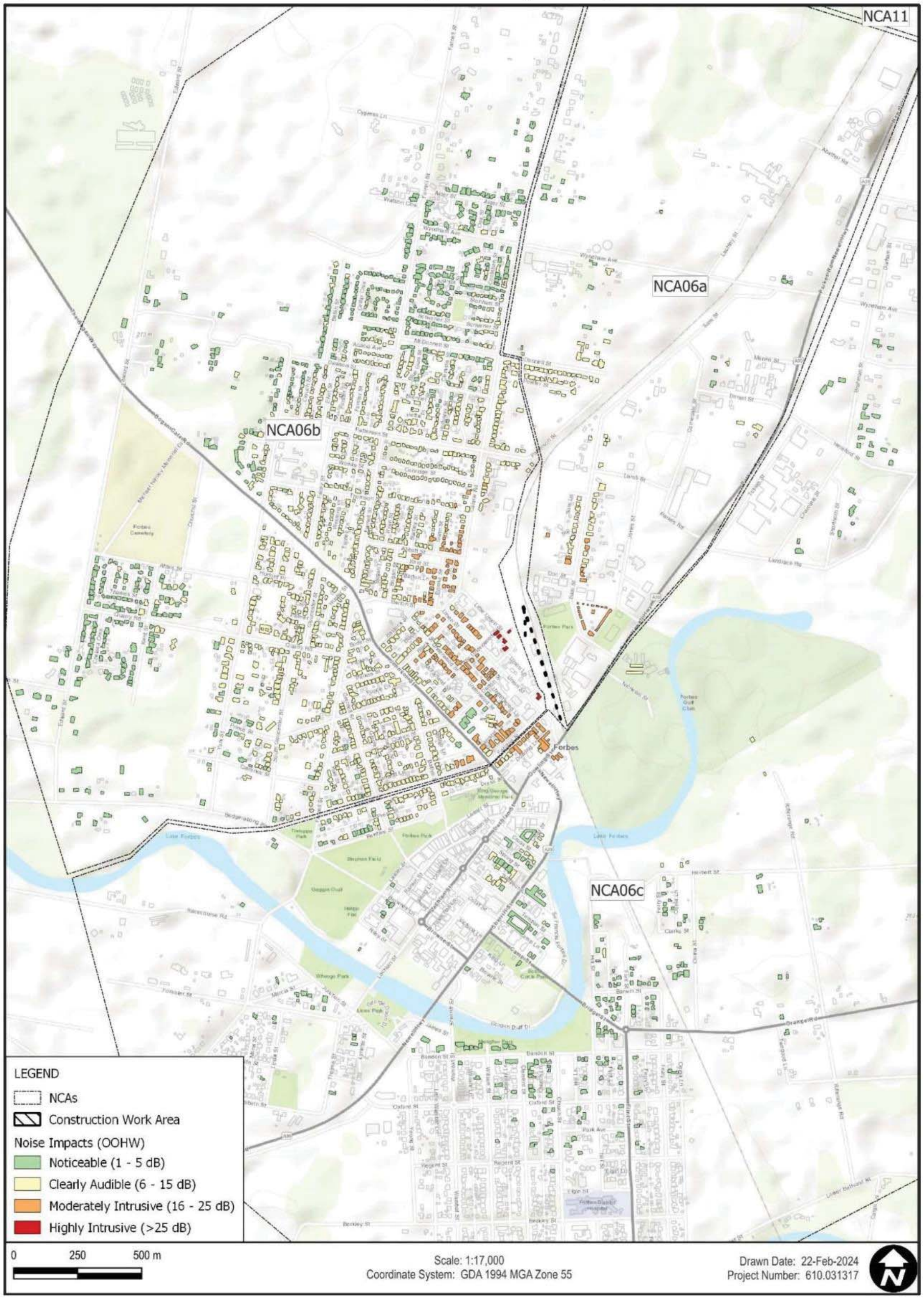


Figure C-10 W.003b: Trackwork w/o Rail saw – Daytime Standard Hours

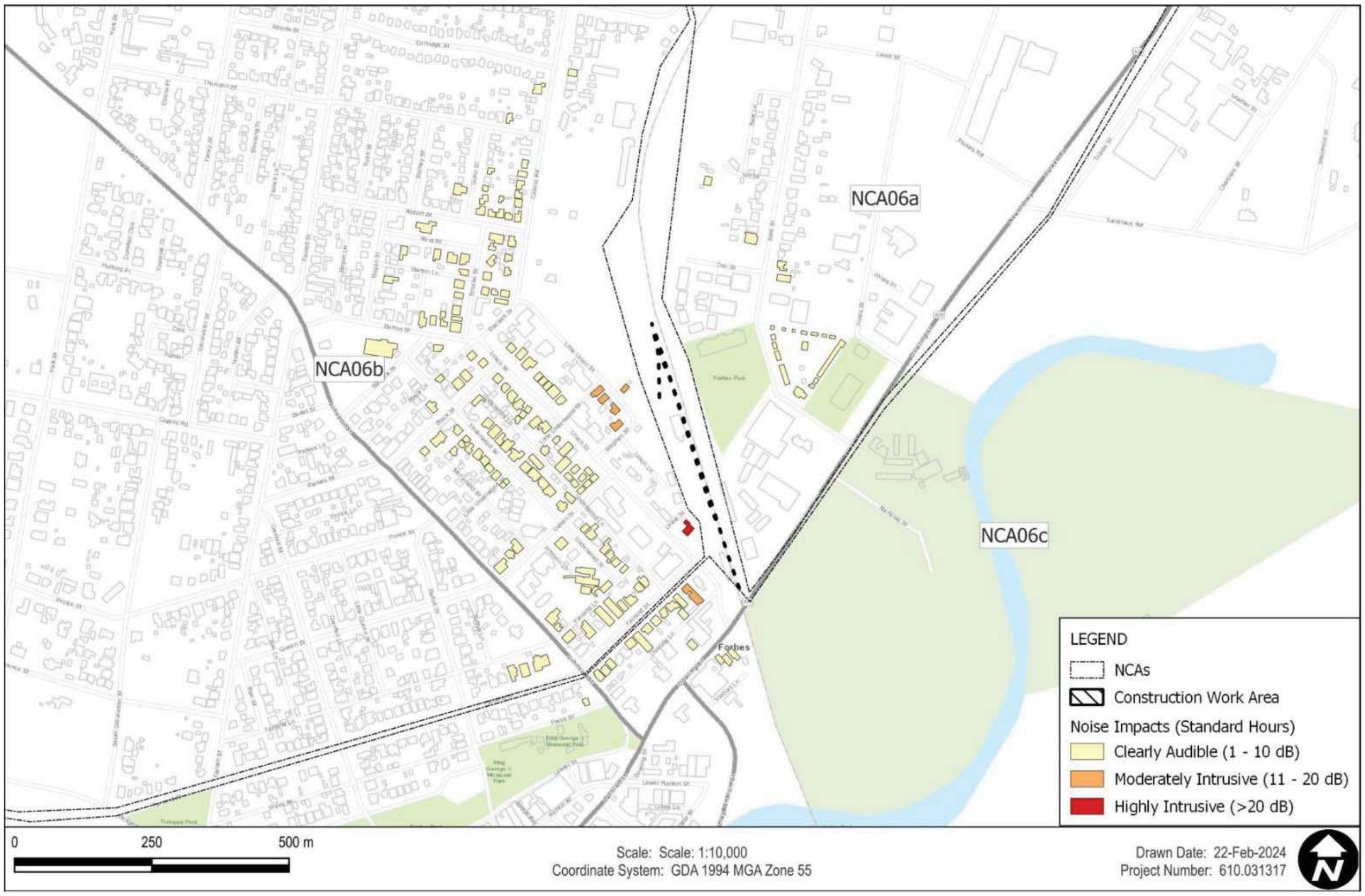


Figure C-11 W.003b: Trackwork w/o Rail saw – Daytime (OOHW)

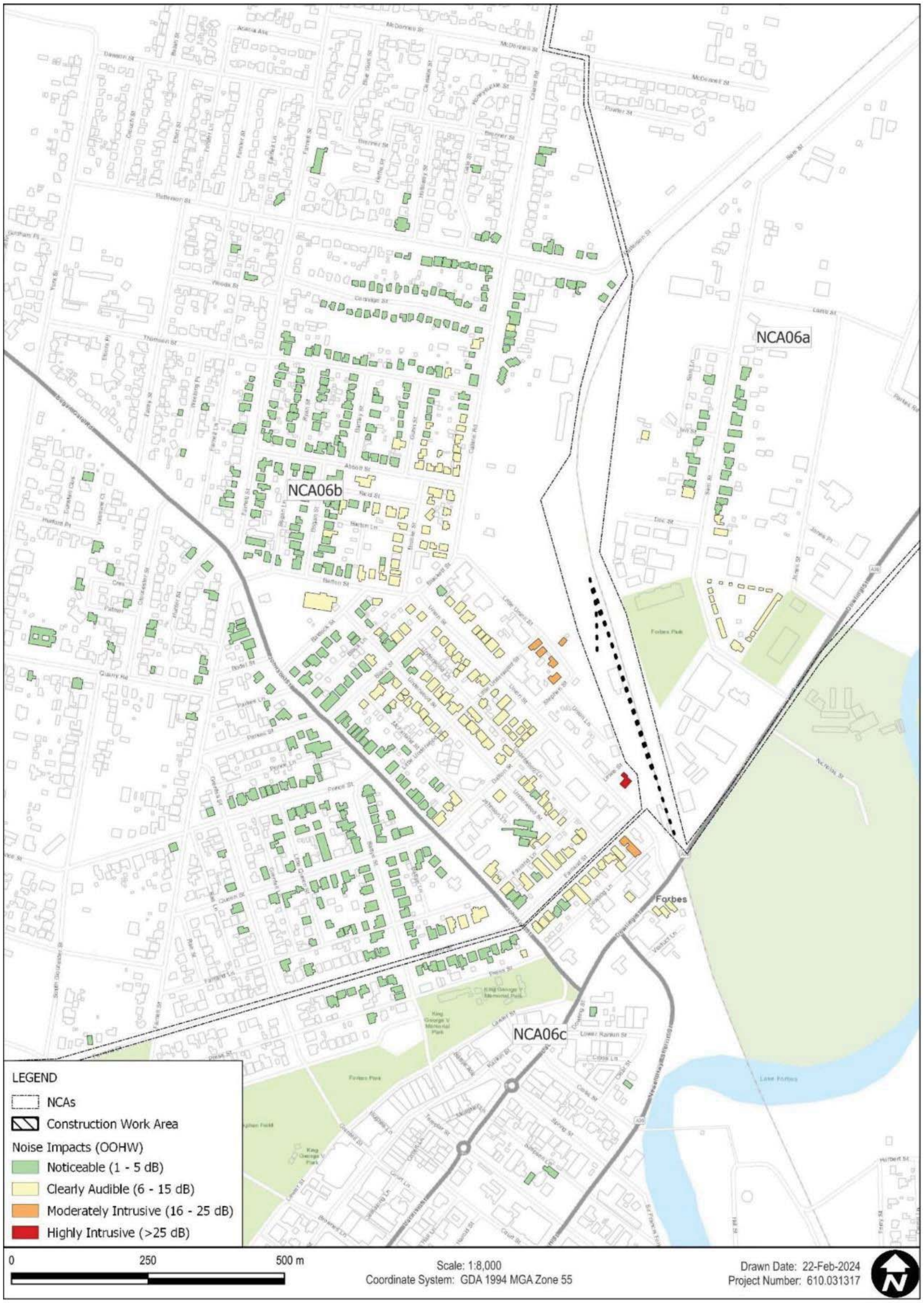


Figure C-12 W.003b: Trackwork w/o Rail saw – Evening (OOHW)

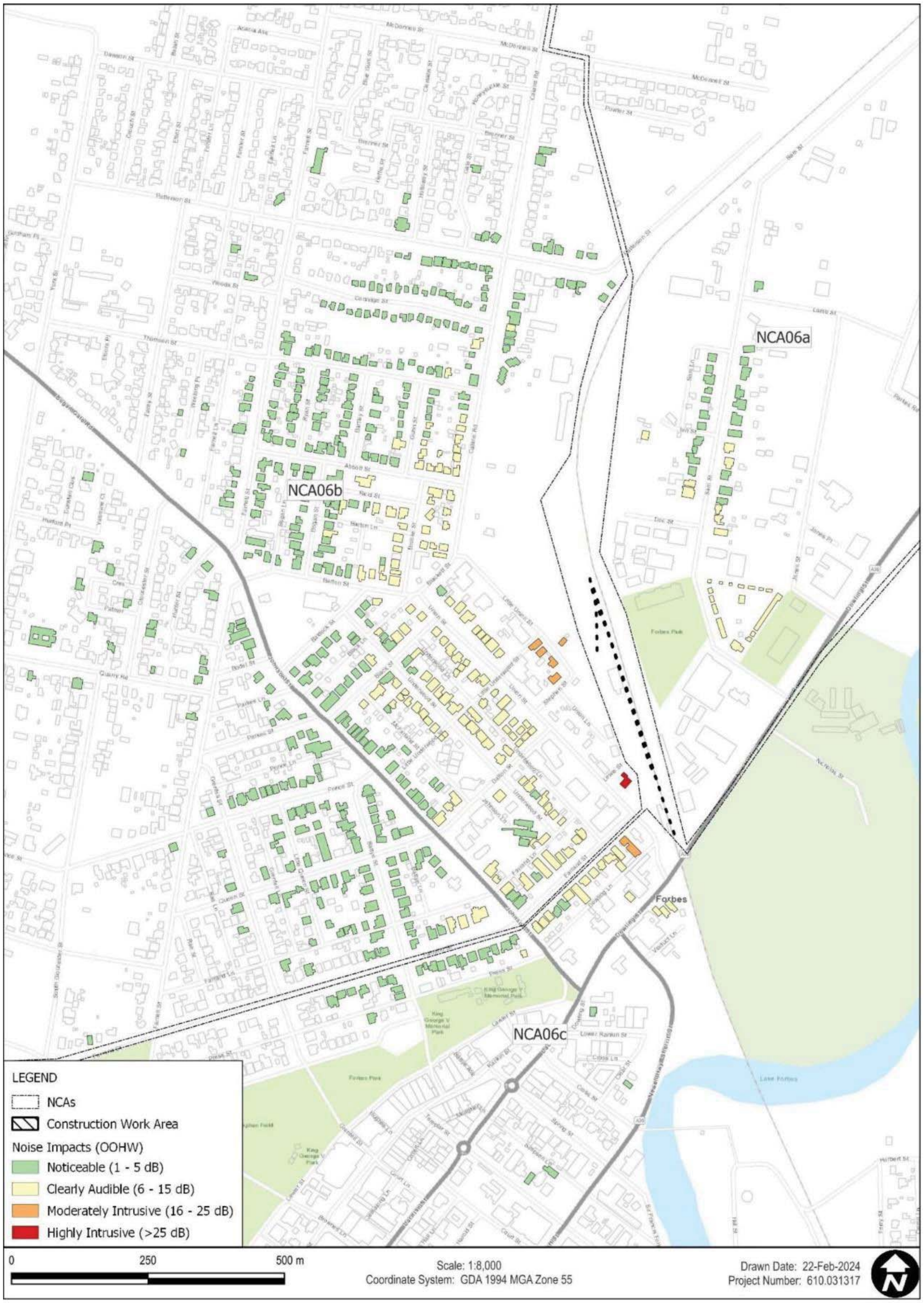


Figure C-13 W.003b: Trackwork w/o Rail saw – Night-time (OOHW)

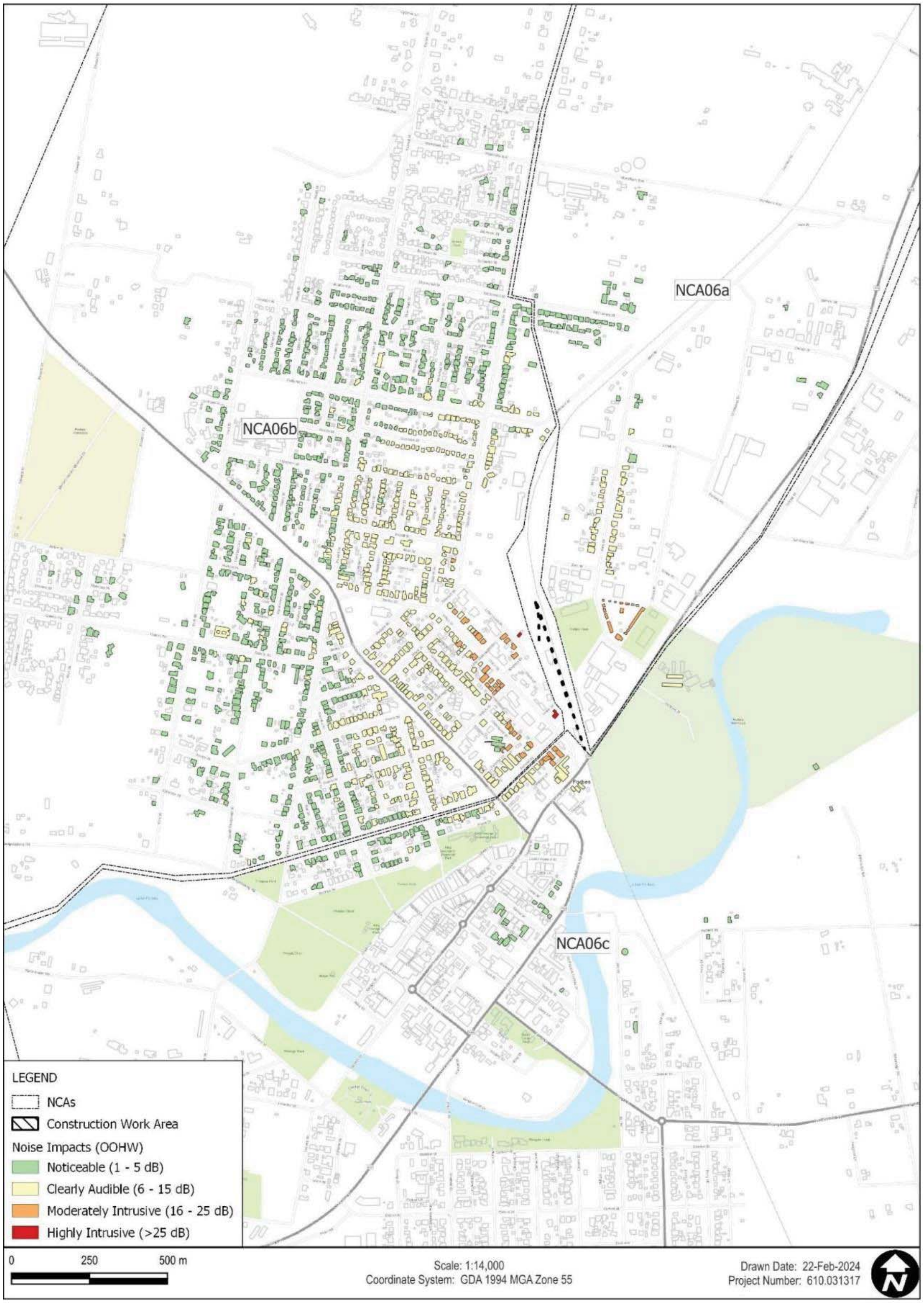


Figure C-14 W.004: Tamping Work – Daytime Standard Hours

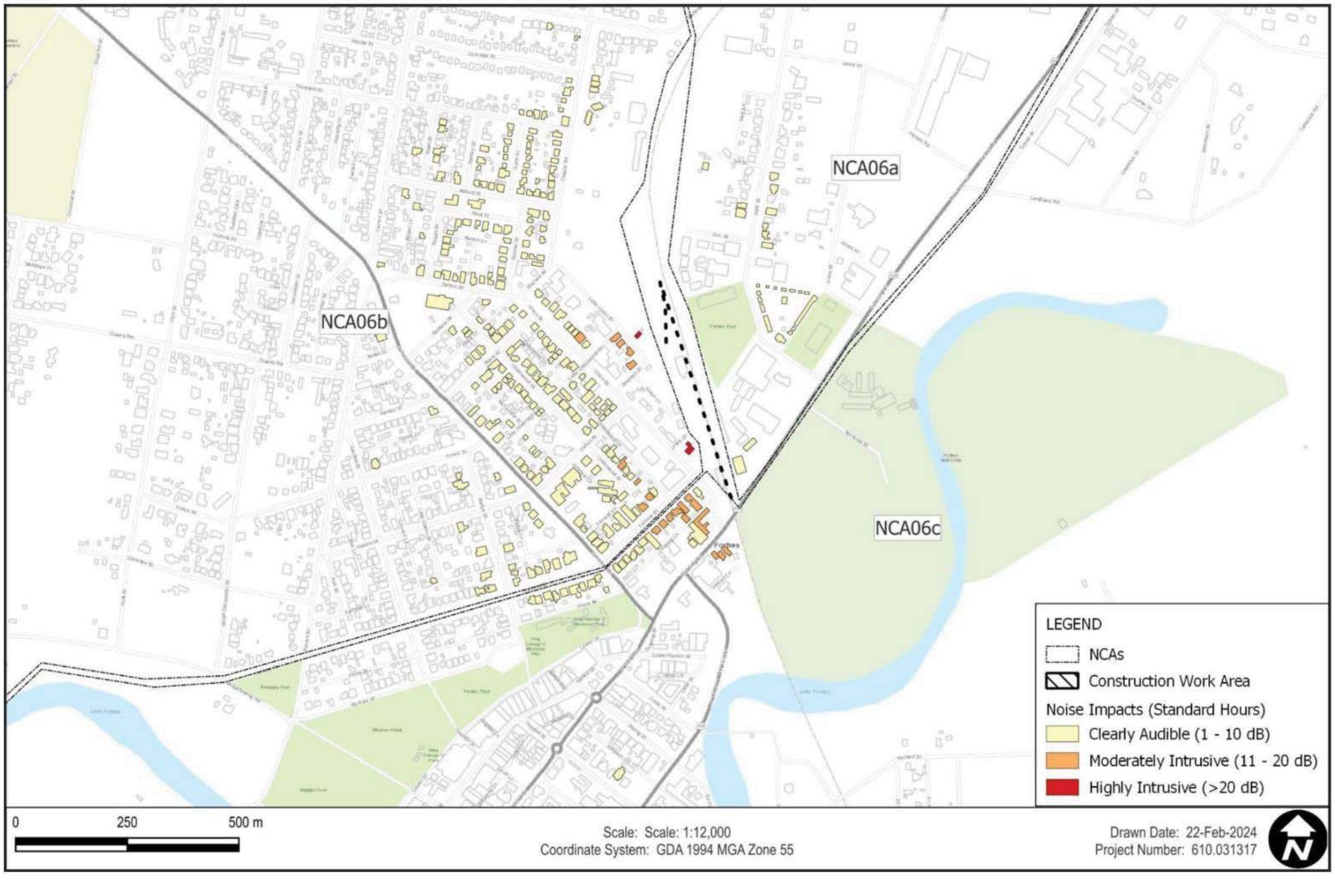


Figure C-15 W.005: Signalling Works – Daytime Standard Hours

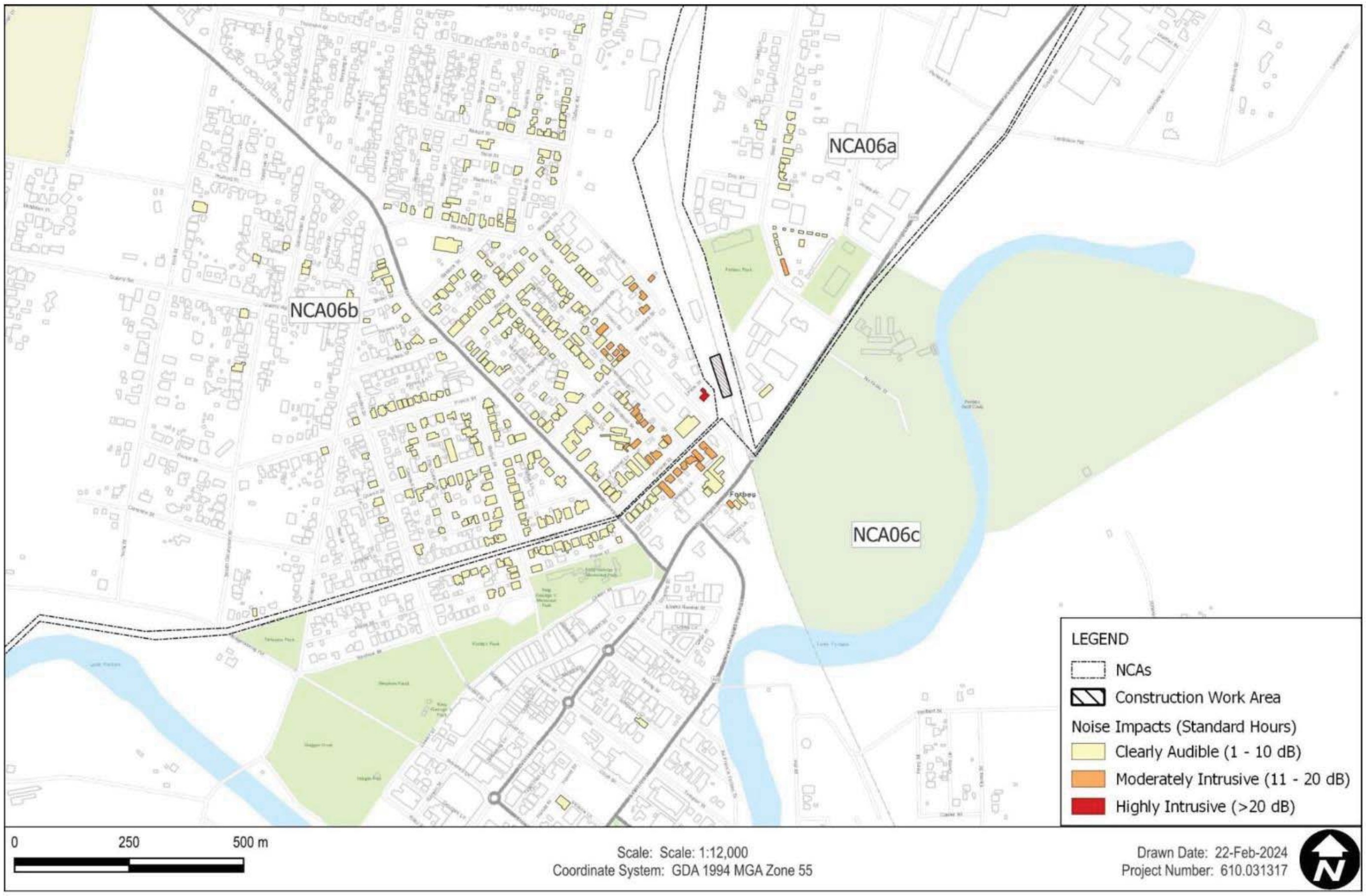
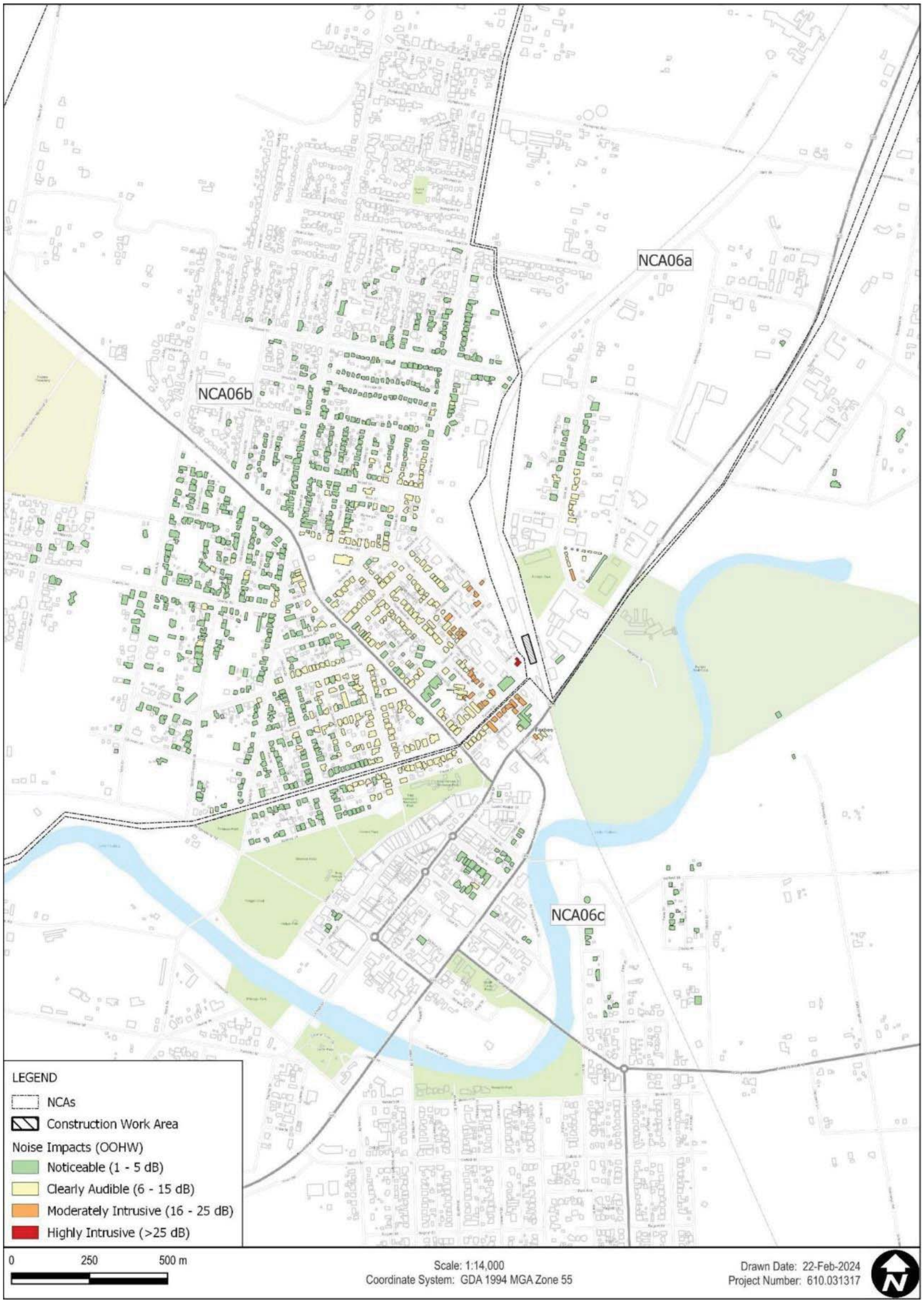


Figure C-16 W.005: Signalling Works – Daytime (OOHW)



Making Sustainability Happen

D

EPBC Act Protected Matters Report

STOCKINBINGAL TO PARKES
SUPPLEMENTARY REVIEW OF ENVIRONMENTAL FACTORS: FORBES STATION AND YARD

Australian Government
Department of Climate Change, Energy, the Environment and Water

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 19-Jan-2024

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	4
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	4
Listed Threatened Species:	40
Listed Migratory Species:	10

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	3
Commonwealth Heritage Places:	1
Listed Marine Species:	17
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	3
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands) [Resource Information]

Ramsar Site Name	Proximity	Buffer Status
Banrock station wetland complex	700 - 800km upstream from Ramsar site	In feature area
Hattah-kulkyne lakes	500 - 600km upstream from Ramsar site	In feature area
Riverland	600 - 700km upstream from Ramsar site	In feature area
The coorong, and lakes alexandrina and albert wetland	800 - 900km upstream from Ramsar site	In feature area

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Endangered	Community likely to occur within area	In feature area
Poplar Box Grassy Woodland on Alluvial Plains	Endangered	Community likely to occur within area	In feature area
Weeping Myall Woodlands	Endangered	Community likely to occur within area	In feature area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within area	In feature area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat may occur within area	In buffer area only
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat known to occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat may occur within area	In feature area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area	In feature area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Lophochroa leadbeateri leadbeateri Major Mitchell's Cockatoo (eastern), Eastern Major Mitchell's Cockatoo, Pink Cockatoo (eastern) [82926]	Endangered	Species or species habitat likely to occur within area	In feature area
Melanodryas cucullata cucullata South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat likely to occur within area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pedionomus torquatus Plains-wanderer [906]	Critically Endangered	Species or species habitat may occur within area	In feature area
Polytelis swainsonii Superb Parrot [738]	Vulnerable	Species or species habitat known to occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area	In feature area
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	Species or species habitat likely to occur within area	In feature area
FISH			
Bidyanus bidyanus Silver Perch, Bidyan [76155]	Critically Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Maccullochella macquariensis			
Trout Cod [26171]	Endangered	Species or species habitat may occur within area	In buffer area only
Maccullochella peelii			
Murray Cod [66633]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Macquaria australasica			
Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area	In feature area
FROG			
Crinia sloanei			
Sloane's Froglet [59151]	Endangered	Species or species habitat may occur within area	In feature area
MAMMAL			
Dasyurus maculatus maculatus (SE mainland population)			
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area	In feature area
Nyctophilus corbeni			
Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)			
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat likely to occur within area	In feature area
Pteropus poliocephalus			
Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour may occur within area	In feature area
PLANT			
Androcalva procumbens			
[87153]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Austrostipa metatoris			
[66704]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Austrostipa wakoolica [66623]	Endangered	Species or species habitat likely to occur within area	In feature area
Lepidium aschersonii Spiny Peppercress [10976]	Vulnerable	Species or species habitat may occur within area	In feature area
Lepidium monoplocoides Winged Pepper-cress [9190]	Endangered	Species or species habitat may occur within area	In feature area
Swainsona murrayana Slender Darling-pea, Slender Swainson, Murray Swainson-pea [6765]	Vulnerable	Species or species habitat may occur within area	In feature area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area	In feature area
Vincetoxicum forsteri listed as Tylophora linearis [92384]	Endangered	Species or species habitat may occur within area	In feature area
REPTILE			
Aprasia parapulchella Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Hemiaspis damelii Grey Snake [1179]	Endangered	Species or species habitat may occur within area	In feature area

Listed Migratory Species

[Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Terrestrial Species			
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat may occur within area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area	In buffer area only
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat may occur within area	In feature area

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State	Buffer Status
Communications, Information Technology and the Arts - Telstra Corporation Limited		
Commonwealth Land - Australian Telecommunications Commission [15130]	NSW	In buffer area only
Commonwealth Land - Australian Telecommunications Commission [15125]	NSW	In buffer area only

Commonwealth Land Name	State	Buffer Status
Commonwealth Land - Telstra Corporation Limited [15123]	NSW	In feature area

Commonwealth Heritage Places [Resource Information]

Name	State	Status	Buffer Status
Historic			
Forbes Post Office	NSW	Listed place	In feature area

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat known to occur within area overfly marine area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat may occur within area overfly marine area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat likely to occur within area overfly marine area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area	In buffer area only
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area overfly marine area	In feature area

Extra Information

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Inland Rail Stockinbingal to Parkes	2021/9138		Completed	In buffer area only
Not controlled action				
Daroobalgie Solar Farm Project	2021/9020	Not Controlled Action	Completed	In buffer area only
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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E

Heritage Statement of Heritage Impact Amendment

STOCKINBINGAL TO PARKES
SUPPLEMENTARY REVIEW OF ENVIRONMENTAL FACTORS: FORBES STATION AND YARD

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5 March 2024

ADDENDUM STATEMENT OF HERITAGE IMPACT
FORBES RAILWAY STATION

1 INTRODUCTION

OzArk Environment & Heritage (OzArk) has been engaged by Martinus Rail (MR, the client), on behalf of Australian Rail Track Corporation (ARTC, the proponent), to complete an addendum *Statement of Heritage Impact* (SOHI) following a revision to the proposed impacts at Forbes Railway Station (the Station) from the Stockinbingal to Parkes (S2P) Inland Rail (IR) Project (the project) (**Figure 1**). The project is in the Forbes Local Government Area (LGA).

The Station is an item of state heritage significance, listed on the State Heritage Register (SHR) within the Forbes LGA as the "Forbes Railway Station Group" (SHR 01145). It is also listed as an item of state heritage significance on the Australian Rail Track Corporation's (ARTC) s170 Heritage and Conservation Register (SRA343) as well as on the Forbes Local Environmental Plan 2013 (I84) as an item of local significance.

2 BACKGROUND

In 2021, OzArk prepared a SOHI for proposed modifications to the Station to enable the required clearances for rolling stock along the Inland Rail to safely pass the Station. The proposed work included modification (trimming) of the station platform awning by 300 mm and minor track slewing to provide adequate horizontal clearance for the larger container trains that will use the Inland Rail.

Due to Forbes Station being listed on the SHR, ARTC has sought and been issued with a Section 60 permit to cover the approved modifications - HMS ID 725.

In 2023, OzArk prepared a *Photographic Archival Record Report*, providing an archival record of the Station Prior to the awning modification as per Condition 5 of the Section 60 permit. The archival record documented aspects of the Station's aesthetics and technical heritage values as they currently exist.

A *Historic Heritage Management Plan* has been prepared in line with project approval conditions, to recommend actions that will contribute to positive ongoing management strategies for the Station as per the previous scope of Proposed Works.

Since the completion of this documentation, IR has requested minor alterations to the track modification scope which is described in **Section 2.1** below. This Addendum SOHI covers this change of scope.

2.1 PROPOSED WORKS - CHANGE OF SCOPE

On 24th November 2023, MR received a Client Direction IR2140-CD-000049 from ARTC regarding a change to the scope of works at Forbes Station.

The following description of the Proposed Works is as per the *Forbes Station and Yard Supplementary Review of Environmental Factors*.

The proposed change to the project is addition to the approved construction impact zones (CIZ) (referred to as the Proposed Works). The additional CIZs, approximately 9006-square-metres in total is required to:

- Undertake approximately 370-metres of track and associated infrastructure removal along the Forbes Yard and Forbes Station including:
    - Removal of C-Frame, catch point, mainline turnout and silo turnout
    - Removal of lever ground frame, channel iron rodding, A-frame braces, C-Frame supportive signals and non-track circuits
- Undertake straight railing and track tamping in the vicinity of Forbes Yard and Forbes Station,
- Erect scaffolding and storage of equipment temporarily to enable the approved Forbes Station awning trimming,
- Rectify existing rail infrastructure such as rail drainage, if impacted by track removal and/or tamping, and
- Book out the level crossing on Dowling St / Parkes Rd to remove a fuse from the signal hut and tie a rope to the boom gate.

2.1.1 Interaction with State Heritage Curtilage

The expanded CIZ will encroach into the curtilage of the SHR and LEP listing for Forbes Station as shown in **Figure 1Error! Reference source not found.**. The three separate areas of encroachment are distinguished by colour and the activities proposed in each are outlined in **Table 1** below. The Forbes Station South CIZ has been reduced in size so that it does not encroach into the SHR curtilage anymore.

Table 1: Description of additional CIZs

CIZ	SIZE ((M^2)	Approximate distance from approved CIZ	Scope of Works – Within SHR curtilage	Land Tenure Status
Forbes Yard (Southern) CIZ (yellow shade **Figure 1**)	1183	Additional CIZ up to 25 m west	1. Track removal and signaling infrastructure removal with limited associated ground disturbance works 2. Vehicle access NB: other activities in this area include material storage, laydown etc. but these activities are outside the SHR curtilage	Rail corridor - ARTC
Forbes Station Awning CIZ (red shade **Figure 1**)	431	Additional CIZ up to 25 m west	Awning trimming works to: A. Works area - scaffolding erection B. Works area - scaffolding erection C. Works area - cordoned-off area for material storage and light vehicle parking. D. Access area - to permit construction light vehicles to enter and exit the works area. Will remain open for public access. (Refer to **Figure 1** for corresponding location).	Rail corridor – ARTC Union Street road reserve – Forbes Local Council

The additional CIZs proposed are required to meet the change in design requirements at Forbes Station and Yard. A summary of the additional CIZs is provided in **Table 1** below.

2.2 PROPOSED WORKS IN RELATION TO THIS ADDENDUM SOHI

This subsection details how the Proposed Works will be assessed in this Addendum SOHI. The Proposed Works relate as follows:

- Forbes Yard (southern) CIZ
    - A portion of the SHR and LEP curtilage area will be used for material laydown and the circulation of vehicles.
    - The C-Frame, supportive signals, lever ground frame and part of the Goods Siding are located within the SHR curtilage (**Figure 3** to **Figure 5**) and will be removed as part of the Proposed Works .
- Forbes Station Awning CIZ
    - Scaffolding will be erected next to the Forbes Station building in areas A and B to allow for the approved trimming of the Forbes Station awning.
    - Area C will be used for construction light vehicle parking and for material laydown.
    - Area D will be used to provide construction light vehicle access to Area C.
- Forbes Station South CIZ
    - Works within this area are located outside the SHR curtilage and are therefore will not be discussed further.

It is important to note the only physical alteration being undertaken by the Proposed Works is the removal of the signalling assets, C-Frame and Goods Siding rail.

Figure 1: Forbes Railway Station SHR and LEP curtilages in relation to Proposed Works .

3 SUMMARY STATEMENT OF SIGNIFICANCE

The summary Statement of Significance for the Forbes Railway Station SHR is included in full in the 2021 SOHI prepared for this project (OzArk 2021) and will not be repeated here.

The important element of the significance summary to this Addendum SOHI is that all factors of significance relate to the Station building itself, its' associated platform, the garden and fences. Reference is made to some additional early buildings/elements (outside the SHR curtilage) some of which have since been demolished.

4 HISTORIC HERITAGE ASSESSMENT

This historic heritage assessment is only being applied to the physical impacts of the Proposed Works outlined in **Section 2.2** of this Addendum SOHI (**Figure 2**), being the removal of the C-Frame turnout, Goods Siding Rail and signalling infrastructure

4.1 FORBES YARD (SOUTHERN) CIZ

4.1.1 Removal of C-Frame turnout, Goods Siding and signalling infrastructure

Research into the C-Frame turnout and its associated signalling assets has revealed that these elements were installed in 2013. ARTC have provided detailed documentation of the installation of these items (**Attachment 1**).

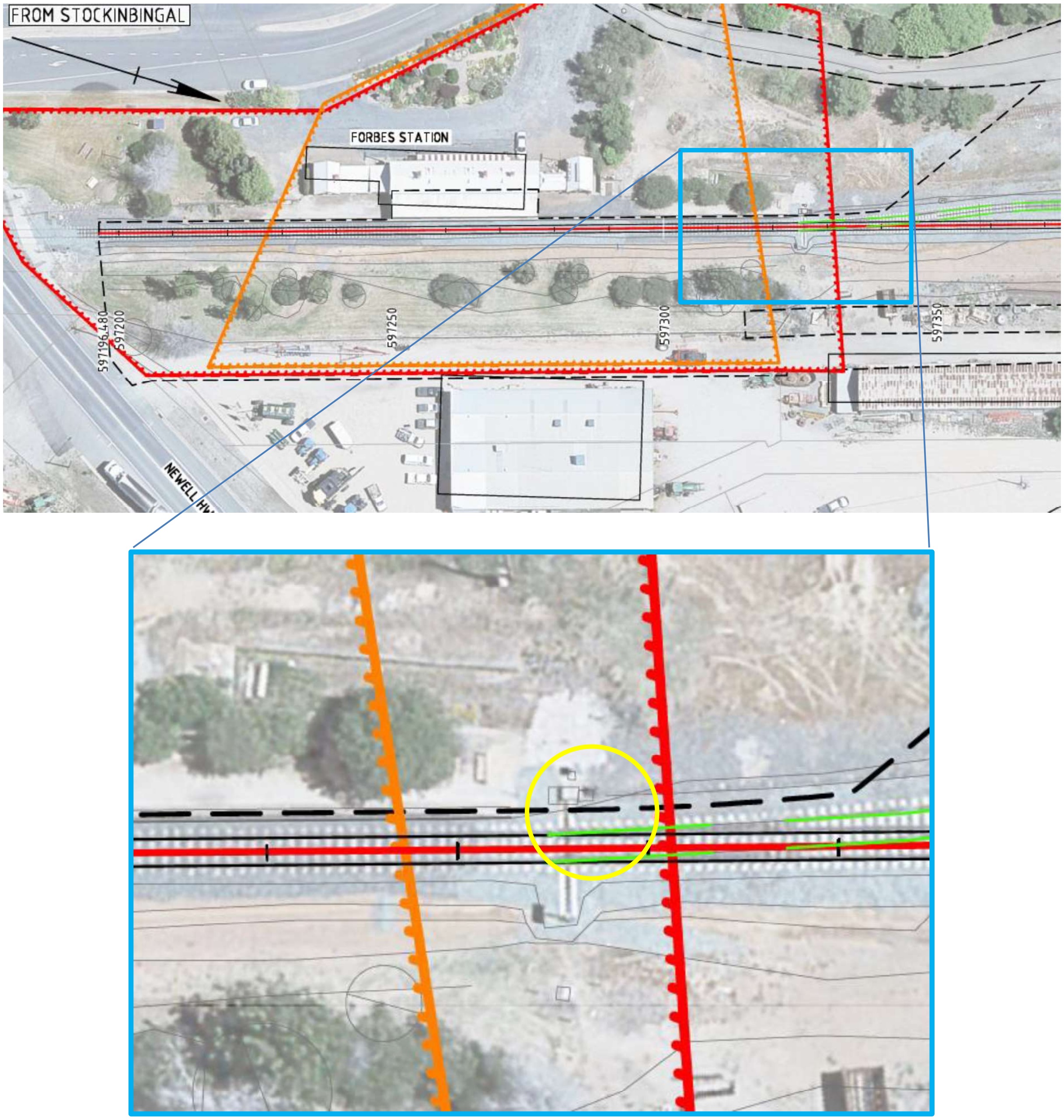
These items can therefore be assessed as comprising non-heritage fabric, with no contributory value to the heritage significance of Forbes Station.

4.2 ARCHAEOLOGICAL POTENTIAL

Survey of the land surrounding the Station did not locate any evidence indicative of the presence of identifiable archaeological deposits / relics. It is understood that there was no development on the site prior to the station construction and the buildings from the original construction within the state heritage curtilage are all still extant.

In terms of the removal of Frame C turnout with associated signalling infrastructure, it is predicted unlikely that excavation would be required. However, it is noted that the rail line is currently situated on highly disturbed land, upon which a bed of railway ballast has been compacted. No archaeological deposits are anticipated within the proposed disturbance area for the removal of the C-Frame turnout, Goods Siding and signalling infrastructure.

Figure 2: Forbes Railway Station SHR and LEP curtilages in relation to the removal of C-Frame turnout and associated signalling equipment and the Goods Siding rail (shown green)



5 STATEMENT OF HERITAGE IMPACT

5.1 FORBES YARD (SOUTHERN) CIZ (YELLOW SHADE, FIGURE 1)

The temporary use of this area within the SHR curtilage is for construction access and vehicle circulation, and will not impact the ground surface or any vegetation related to the Forbes Station gardens.

The removal of the Frame C turnout, the associated Goods Siding rail and signalling infrastructure will not impact the heritage values of the Station. This proposal sees the removal, in fact, of intrusive elements of rail infrastructure that date to the modern era.

5.2 FORBES STATION AWNING CIZ (RED SHADE, FIGURE 1)

The temporary erection of mobile scaffolding, use of construction access and material laydown in Areas A, B, C and D will not involve the clearing of vegetation or grubbing within the Forbes Station gardens and will have no direct impact on the garden beds or heritage structures. To ensure no inadvertent impacts, recommendations have been made in **Section 5.4** below.

5.3 CONCLUSION

The significance of the Forbes Railway Station Group is focused on the station and residence buildings, platform, fencing, entrance forecourt, remnant gardens and the contribution of the structures to the townscape of Forbes. Removal of the signalling assets and other track elements will not impact any original fabric as they are not part of the original Station and do not have any heritage significance.

The Proposed Works outlined in **Section 2.2** will have no impact on the Stations' heritage values.

5.4 RECOMMENDATIONS

To ensure no direct or indirect harm to Forbes Station, temporary soft delineation will be used to demarcate the heritage structures and gardens as 'Heritage No Go Zones'. All workers will be made aware of the Heritage No Go Zones through site inductions prior to the commencement of the works.

Based on the conclusion that the proposed scope of works change will not have any impact on the Station's heritage values, it is recommended that a Standard Exemption Record Keeping Form[1], under Standard Exemption 3: *Alteration to non-significant fabric,* is prepared and kept by Martinus. The Proposed Works are consistent with the s60 approval for Forbes Station.

A copy of this form is attached to this Addendum SOHI.

---

[1] The following disclaimer is from the Standard Exemption Record Keeping Form: *Use of the standard exemptions is self-assessed. In completing this form you acknowledge that this record is not for assessment purposes and does not represent an endorsement of the Heritage Council for the work or use of exemptions. This form may be requested as part of an audit or compliance investigation. This information cannot be relied on as a defence to prosecution.*

Kind regards,

Jodie Benton

Jodie Benton

Director
OzArk Environment and Heritage
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Figure 3: View of the Goods Siding (heading left from main line) with Frame C turnout.

Figure 4: View to the north of the signalling assets.

Figure 5: View to the west of the signalling assets.

APPENDIX
E

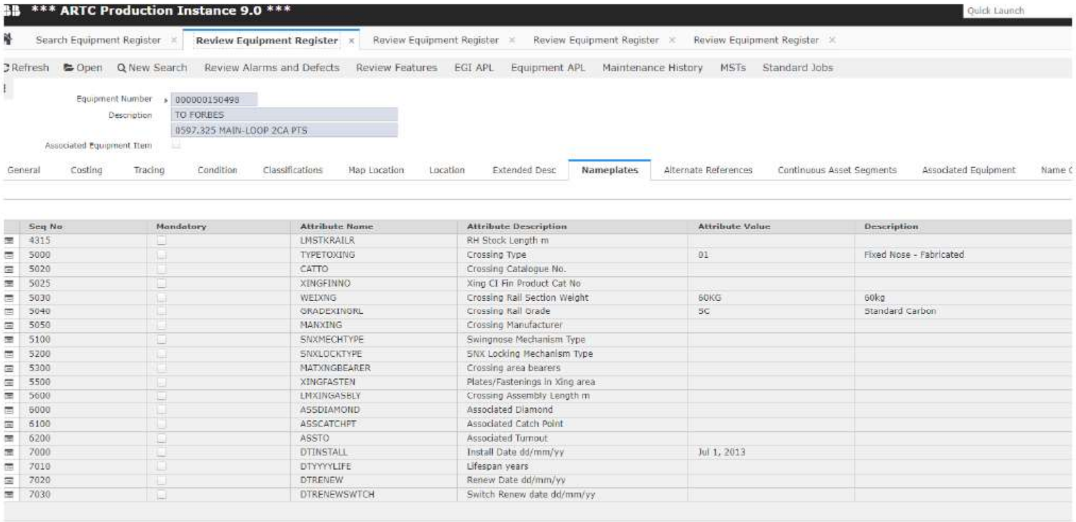
Heritage Statement of Heritage Impact Amendment

Attachment 1 Asset research from ARTC

STOCKINBINGAL TO PARKES
SUPPLEMENTARY REVIEW OF ENVIRONMENTAL FACTORS: FORBES STATION AND YARD

Inland Rail is a subsidiary of
Australian Rail Track Corporation

Attachment 1: Asset research from ARTC



Equipment Number 000000150498

Description TO FORBES
0597.325 MAIN-LOOP 2CA PTS

Associated Equipment Item ☐

Seq No	Mandatory	Attribute Name	Attribute Description	Attribute Value	Description
4315	☐	LMSTKRAILR	RH Stock Length m		
5000	☐	TYPETOXING	Crossing Type	01	Fixed Nose - Fabricated
5020	☐	CATTO	Crossing Catalogue No.		
5025	☐	XINGFINNO	Xing CI Fin Product Cat No		
5030	☐	WEIXNG	Crossing Rail Section Weight	60KG	60kg
5040	☐	GRADEXINGRL	Crossing Rail Grade	SC	Standard Carbon
5050	☐	MANXING	Crossing Manufacturer		
5100	☐	SNXMECHTYPE	Swingnose Mechanism Type		
5200	☐	SNXLOCKTYPE	SNX Locking Mechanism Type		
5300	☐	MATXNGBEARER	Crossing area bearers		
5500	☐	XINGFASTEN	Plates/Fastenings in Xing area		
5600	☐	LMXINGASBLY	Crossing Assembly Length m		
6000	☐	ASSDIAMOND	Associated Diamond		
6100	☐	ASSCATCHPT	Associated Catch Point		
6200	☐	ASSTO	Associated Turnout		
7000	☐	DTINSTALL	Install Date dd/mm/yy	Jul 1, 2013	
7010	☐	DTYYYYLIFE	Lifespan years		
7020	☐	DTRENEW	Renew Date dd/mm/yy		
7030	☐	DTRENEWSWTCH	Switch Renew date dd/mm/yy		

APPENDIX

F

Detailed Site Investigation

STOCKINBINGAL TO PARKES
SUPPLEMENTARY REVIEW OF ENVIRONMENTAL FACTORS: FORBES STATION AND YARD

Forbes Station and Yard

Detailed Site Investigation

Albury to Parkes Inland Rail

Martinus Rail

5 March 2024

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Executive Summary

D&N Geotechnical Pty Ltd were engaged to undertake a detailed site Investigation to inform potential contamination risks that may be encountered as part of construction works planned for the Forbes Station and Yard horizontal clearance works to be undertaken as part of the Albury to Parkes (A2P) Stockinbingal to Parkes Enhancement Project.

The proposed ground disturbance works (at the time of writing) included:

- Removal of two (2) turnouts and fouled ballast materials, including approximately 40 cubic metres (m^3) of fouled ballast from the northern turnout and approximately 60 m^3 of fouled ballast from the southern turnout.
- Removal of siding comprising approximately 400 timber sleepers.
- Crane pad preparation works comprising removal of approximately 20 m^3 of soil; and
- Shallow earthworks and/or soil disturbance associated with track removal.

The objective of this detailed site Investigation is to investigate the presence (or absence) of Chemicals of Potential Concern associated with the previously identified areas of environmental concern and assess potential exposure risks to relevant receptors (e.g., site workers) at Forbes Station and Yard in the nominated Investigation Areas where ground disturbance is proposed.

Based on the information obtained and reviewed, both by D&N and others, ten (10) potential sources of contamination, including both on- and off-site (potential) sources of occur within and surrounding the Site. Three (3) relevant areas of environmental concern, along with their associated Chemicals of Potential Concern, were identified, including:

1 – Rail Operations (Petroleum Transport and Handling);

2 – Legacy Structures and Surrounding Land; and

3 – Service Stations and Depots.

Field investigations were conducted between 1 and 4 February 2024, including the excavation of ten (10) exploratory holes along with proposed ground disturbance area and collected a total of twenty-one (21) primary environmental soil samples for analyses.

Residual asbestos in soil risks were identified by ADE in soils in and around the Goods Shed. However, airborne monitoring during removal works (conducted by ADE in 2020) did not record concentrations of airborne fibres above the practical air quality limit (i.e., 0.01 f/mL) and neither asbestos containing materials, fibrous asbestos nor asbestos fines were detected (above respective laboratory limits of reporting) in any sample analysed during this investigation.

No concentration of Chemicals of Potential Concern targeted during this investigation exceeded the adopted generic human health-based investigation or screening levels therefore risks posed to workers during ground disturbance works is expected to be low and acceptable. Nevertheless, noting the limitations of this investigation and the potential for bonded asbestos materials to be present in proximity to the Goods Shed, the controls and procedures presented in the existing ADE Asbestos Management Plan should be incorporated into the works planning, including, but not limited to identification of site-specific risks and provision of risk mitigation procedures to be implemented when unexpected finds occur within the works area. The Unexpected Finds Protocol as outlined in ADE should be employed for the works to cater for incidents where signs of contamination are encountered within the works area. The Unexpected Finds Protocol (UFP) should form part of the site-specific Construction Environmental Management Plan for the works and provide management actions for adequately protecting workers (and others) when unexpected finds occur.

The proposed works are expected to include minor excavation works with advice from Martinus indicating rail removal works will not extend to 0.5 m below ground level. D&N recommend that where excavation is to extend beyond a nominal depth of 300 mm below existing ground level (below rail formation), works in these areas should be delayed until intrusive assessment can be undertaken to provide greater certainty of the absence of potential contamination (e.g., asbestos) risks.

Concentrations of Arsenic exceeding the adopted ecological investigation levels were recorded on-site in surface soils at TP01 to TP03 collected from the northern part of the Site. Noting the absence of terrestrial receptors on-site, potential risks associated with elevated Arsenic concentrations is limited to off-site terrestrial and aquatic receptors downstream of the Site. Construction works should include measures for managing sediment and erosion losses during the works with such measures to be included in the site-specific Construction Environmental Management Plan prepared for the works and mitigate the mobilisation of disturbed soils off-site (through aeolian and fluvial processes).

Contents

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Abbreviations

Term	Definition
A2P	Albury to Parkes Inland Rail Project
ACM	Asbestos Containing Material
AEC	Area of Environmental Concern
AF	Asbestos Fines
ARTC	Australian Rail Track Corporation
ASC NEPM	National Environment Protection (Assessment of Site Contamination) Measure
ASRIS	Australian Soil Resource Information System
ASS	Acid Sulfate Soil
BTEXN	Benzene, Toluene, Ethylbenzene, Xylenes and Naphthalene
BoM	Bureau of Meteorology
CEMP	Construction Environmental Management Plan
CH	Chainage
CLM Act	Contaminated Land Management Act 1997
COPC	Chemical of Potential Concern
CSIRO	Commonwealth Science and Industrial Research Organisation
CSM	Conceptual Site Model
DG	Dangerous Goods
D&N	D&N Geotechnical Pty Ltd
DJV	Design joint Venture
DLWC	(NSW) Department of Land and Water Conservation
DQI	Data Quality Indicators
DQO	Data Quality Objectives
DP	Deposited Plan
DSI	Detailed Site Investigation
EPA	NSW Environment Protection Authority
FA	Fibrous Asbestos
FRS	Fire and Rescue Station
LEP	Local Environmental Plan
LGA	Local Government Authority

Term	Definition
LOR	Laboratory Limits of Reporting
NATA	National Association of Testing Authorities
PAH	Polycyclic Aromatic Hydrocarbons
POEO Act	Protection of the Environment Operations Act 1997
PPE	Personal Protection Equipment
PSI	Preliminary Site Investigation
QA	Quality Assurance
QC	Quality Control
REF	Review of Environmental Factors
RPD	Relative Percentage Difference
SAQP	Sampling and Analysis Quality Plan
S2P	Stockinbingal to Parkes Inland Rail Section
SIX maps	NSW Spatial Information Exchange
TRH	Total Recoverable Hydrocarbons
USCS	Unified Soil Classification System
WA DoH	Western Australian Department of Health

Units

Term	Definition
AHD	Australian Height Datum
Ha	Hectares
km	Kilometre
m	metres
m^2	Square metres
mm	Millimetres
m BGL	Metres below ground level
mg/kg	Milligram per kilogram
mg/L	Milligram per Litre

1 Introduction

Martinus Rail (Martinus) engaged D&N Geotechnical Pty Ltd (D&N) to conduct a Detailed Site Investigation (DSI) at the Forbes Station and Yard (hereafter referred to as the 'Site') located at the intersection of Union Street and Parkes Road, in Forbes NSW. This DSI is required to inform potential contamination risks that may be encountered as part of construction works planned for the Forbes Station and Yard horizontal clearance works to be undertaken as part of the Albury to Parkes (A2P) Stockinbingal to Parkes Enhancement Project.

This report outlines the findings of the DSI for the proposed ground disturbance areas at the Site (i.e., the 'Investigation Area') and considers the risks posed to potential receptors within the Construction Impact Zone (as per the CIZ are provided by Martinus 1 March 2024). Figure R1 F1 (after text) depicts the regional locality and layout of the Site as well as identifying the Investigation area and CIZ with Section 1.1 below providing a summary of proposed works at the Site.

The findings of this DSI are based on D&N's review of available previous reporting and information provided by Martinus representatives, geological, geomorphological and hydrogeological data, soil mapping, observations made by D&N during environmental field investigations conducted 1 February 2024 and the results of the analytical testing conducted for this and, where appropriate, previous investigations.

1.1 Background

The Albury to Parkes section (of the Inland Rail Program) involves extensive enhancements to specific sites across the 355 kilometres (km) of existing track running from Albury to Illabo and Stockinbingal to Parkes. The Stockinbingal to Parkes (S2P) section forms a key component of the A2P Inland Rail Program.

The Stockinbingal to Parkes (S2P) section consists of a 170.3 km stretch of Inland Rail with specific sites along the rail corridor to be enhanced to achieve the horizontal and vertical requirements for double-stacked trains. The S2P Project will also enhance capacity by constructing a new crossing loop north of the Daroobalgie Road Level Crossing (Daroobalgie Crossing Loop). The S2P works include track slews, bridge modifications, track lowering and other structure modifications.

The Forbes Station and Yard, located between approximate CH 597+192 km and CH 597 714 km of the S2P section, requires realignment of approximately 640 m of the track by up to 540 millimetres (mm) and associated drainage works along with trimming of the platform awning at Forbes Station. Per the Forbes Station – Contamination Risks Summary Memorandum Report (Design Joint Venture or DJV, 2024), hereafter referred to as the 'Memorandum', and correspondence supplied to D&N by Matinus on 19 January 2024, the Forbes Station and Yard ground disturbance works (at the time of writing), include:

- Removal of two (2) turnouts and fouled ballast materials, including approximately 40 cubic metres (m^3) of fouled ballast from the northern turnout and approximately 60 m^3 of fouled ballast from the southern turnout (as depicted in orange on Plate 1 below).
- Removal of siding comprising approximately 400 timber sleepers (as depicted in pink on Plate 1 below).
- Crane pad preparation works comprising removal of approximately 20 m^3 of soil (as depicted in Plate 1 below); and
- Shallow earthworks and/or soil disturbance associated with track removal.

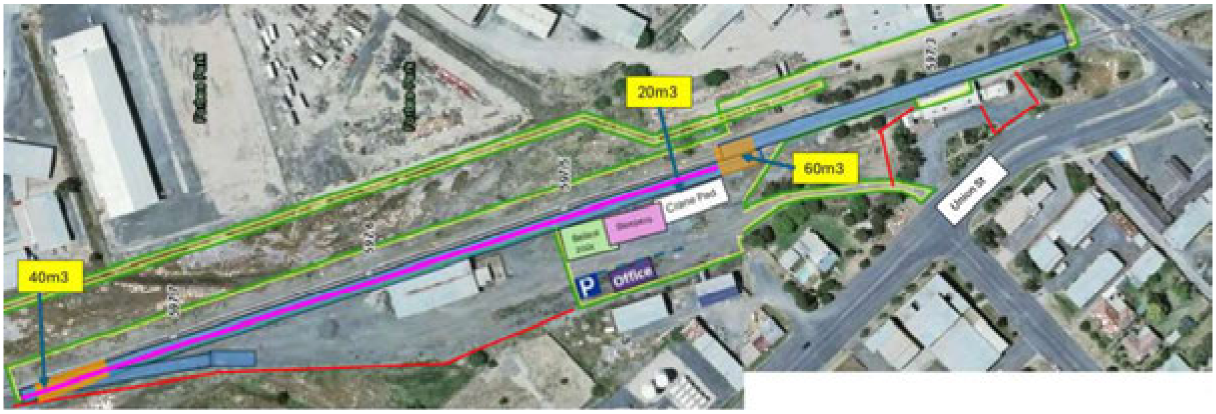

Plate 1 – Forbes Station and Yard horizontal clearance works mud map

For the purposes of this investigation, the areas of the Site proposed to be affected by ground disturbance works are referred to collectively as the 'Investigation Area' (which is depicted in Figure R1 F 1 after text).

The Review of Environmental Factors (REF) report for the S2P Horizontal Clearances works (Australian Rail Track Corporation or ARTC, 2022) states the Site has been used as a rail corridor since at least 1965 (the earliest aerial photography available); however, the rail line is understood to have been constructed in the early 1900s. ARTC contaminated land register records identified potential sources of contamination (referred to as Areas of Environmental Concern or AEC) located both on- and off-site. In accordance with the contamination site specific control measures included in the REF, a DSI should be undertaken to assess exposure risks to site workers and other receptors as a result of ground disturbances at the Forbes Station and Yard clearances.

2 Objectives

The objective of this DSI is to investigate the presence (or absence) of Chemicals of Potential Concern (COPC) associated with the previously identified AEC and assess potential exposure risks to relevant receptors (e.g., site workers) at Forbes Station and Yard in the nominated Investigation Areas where ground disturbance is proposed.

3 Scope of Works

3.1 Regulatory Framework

The NSW planning process for regulating land that is not significantly contaminated is guided by the following legislation:

- Environmental Planning and Assessment Act 1979 (EPA Act) and Contaminated Land Management Act 1997 (CLM Act).
- State Environmental Planning Policy or SEPP (Resilience and Hazards) 2021.

To meet these legislative requirements, this report has been prepared in general accordance with the above stated guidelines, along with the following relevant guidelines:

- National Environment Protection Council (1999, amended 2013), National Environment Protection (Assessment of Site Contamination) Measure (ASC NEPM).
- NSW Environment Protection Authority (EPA) (2020) Consultants Reporting on Contaminated Land Guidelines.
- NSW Environment Protection Authority (2022) Contaminated Land Guidelines Sampling Design Part 1 – application.

3.2 Scope of Works

The scope of works undertaken as part of this DSI included the following:

1. Review and summarise the findings and recommendations made in the Memorandum (DJV, 2024).
2. Development of a brief Sampling Analysis and Quality Plan (SAQP) based on the data gaps and the preliminary Conceptual Site Model (CSM) presented in the Memorandum along with preparation of specific Data Quality Objectives (DQOs) and Data Quality Indicators (DQIs) to inform a sampling and assessment regime for the media (i.e., soils) targeted during this investigation.
3. Undertake intrusive investigation works (in accordance with the SAQP) to collect environmental (soil) samples from the Investigation Area.
4. Select representative soil samples for analysis targeting the suite of COPC identified in the Memorandum (and SAQP).
5. Review and interpretation of field observations and analytical results, including relevant quality control and assurance actions and provide an assessment of exposure risks of COPC to site workers and other receptors as a result of proposed ground disturbance works; and
6. Collate and summarise the works and findings into a DSI report.

4 Site Description

4.1 Site Details and Ownership

The Site is within Lot 1 DP 1001423, an irregularly shaped 17-hectare (Ha) land parcel designated SP-2 Rail Infrastructure (per the Forbes Local Environmental Plan [LEP] 2013). Measuring approximately 500 metres (m) north to south and 50 m east to west (with a total approximate area of 2.3 Ha), the Site's southern limit is roughly the intersection of Union Street and Parkes Road, extending (approximately 500 m) north within Lot 1. Rail infrastructure on-site includes the heritage-listed Forbes Railway Station, the mainline and associated goods sidings and (Goods) shed. The Forbes Railway Station is understood to be decommissioned (per advice provided in Martinus/Inland Rail's *Detailed Design Report S2P Package: SP2 – Forbes Station Yard and Awning* dated 18 January 2024 [Martinus/Inland Rail, 2024]). Per the approximate layout presented in Plate 1 above, the Investigation Area measures approximately 375 m north to south and 10 m east to west (with a total approximate area of 0.3 ha).

Table 1 below presents a summary of the Site details.

Table 1 – Site Details Summary

Attribute		Details
Property Description		Part Lot 1 DP1001423
Street Address		Union Street, Forbes NSW
Approximate Lot Area (Ha)		17 Ha
Approximate Site Area (Ha)		2.3
Investigation Area (Ha)		0.3
District		Forbes Shire Council
Planning controls	Zoning	SP2 - Rail Infrastructure (Forbes Local Environmental Plan (LEP) 2013)
	Overlays	Land Application, Lot Size, Heritage (Forbes Railway Group Significance: State). Height of Buildings (Forbes LEP 2013)

Attribute	Details
Current Land Use	Decommissioned Railway Station, rail yard and active mainline
Proposed Land Use	Continuing

The surrounding land use is principally industrial to the south and to the east, with residential land uses to the west and north-west. A summary of land uses surrounding the site are provided in Table 2 below.

Table 2 – Surrounding Land Use Summary

Direction	Land Uses
North	The S2P rail corridor (zoned SP2 – Rail Infrastructure) extends north of the Site and is surrounded by a mixture of R1 - General Residential (in the north-west) and R5 – Large Lot Residential (further to the north-east). Industrial lands, including a grain elevator (zoned E4 – General Industrial) surround the rail corridor to the north.
East	Lands to the east predominantly consist of industrial properties (E3 – Productivity support) comprising a truck salvage yard and caravan park. Further to the east is the Newell Highway (zoned SP2 – Classified Road) running northeast to southwest followed by the Forbes Golf Course (zoned RE2 – Private Recreation), Forbes Lake and agricultural areas (zoned RU1 – Primary Production).
South	The S2P rail corridor (zoned SP2 – Rail Infrastructure) extends south of the Site, passing underneath the Newell Highway (zoned SP2 – Classified Road). Across the Newell Highway, lands consist of a mixed industrial land (E3 - Productivity Support and E1 - General Industrial), and recreational lands comprising the Forbes Golf Course (zoned RE2 – Private Recreation) and parkland (RE1 – Public Recreation) towards Forbes Lake further south.
West	Land immediately to the west is zoned E4 – General Industrial and primary consists of industrial businesses and petrol stations (i.e., BP Truckstop). A residential property (zoned R1 – General Residential) is located immediately south-west of the Site. Further west across Union Street, lands consist of industrial lands followed by and residential properties.

4.2 Environmental Setting

Table 3 below presents a summary of the Site's environmental setting.

Table 3 – Environmental Setting Summary

Attribute	Details
Topography and Hydrology	The Site is situated at an elevation between 239 m and 245 m Australian Height Datum (AHD) and is generally flat terrain with a slight grade away from the Site centre to the east and south. Surface waters not infiltrating unsealed areas (i.e., within the rail corridor) are expected to flow to the south according to topography, ultimately delivered to Forbes Lake approximately 250 m south (i.e., downstream) of the Site. Overland flow is expected to ultimately be delivered to Lake Forbes 250 m south of the Site. The Lachlan River flows in a general east to west direction, approximately 2 km south of Site at its closest with the confluence of Lake Forbes and the Lachlan River to the west of Forbes. A farm dam is visible (in aerial imagery available from google Earth^{TM}) approximately 120 m north of the Site.

Attribute	Details
Soil Landscape	The Soil Landscapes of the Forbes 1:250 000 Sheet (King, 1998) identifies the Site as the *Bald Hill* (**bh**) soil landscape, comprising Shallow (<30 cm), rapidly drained Lithosols and shallow (<50 cm), well-drained Red Earths (Gn2.11, Gn2.14); Haplic Eutrophic Red Kandosols. D&N notes the Site has been historically disturbed and developed, and previous investigations at the Site identified fill comprising sandy gravel associated with rail ballast overlying residual clay soils (ARTC, 2022). A search of the Australian Soil Resource Information System (ASRIS) (CSIRO, 2014) and Acid Sulfate Soil (ASS) risk map (DLWC, 1997) indicated that the probability of occurrence of ASS is extremely low.
Geology	Minview[1] identifies the Site as underlain by Quaternary Alluvial channel deposits (**Q_acm**) comprising unconsolidated grey humic, clayey very fine-grained sand, typically overlying light brown clayey silt. Prior investigations at the Site identified weathered shale from 1.3 to 2.0 m below ground level (BGL) (ARTC, 2022).
Hydrogeology	The Bureau of Meteorology National Groundwater Information System[2] identified the Site as within a hydrological unit comprising Cowra Formation upper aquifer, and un-named middle and lower basement aquifers. Bore records within the vicinity (e.g., within 1 km) of the Site indicate the installed depths of registered groundwater bores in proximity to Site are predominantly shallow (i.e., between 2.3 and 6.5 m BGL) indicating shallow groundwater may be present however, per the advice provided in the *Detailed Design Report* (Martinus/Inland Rail, 2024), D&N note that the ground disturbance works proposed are not expected to intersect local groundwater. Lands situated 150 m south-east of the Site are mapped as a groundwater vulnerable area per the Forbes Local Environmental Plan (2013) with the Groundwater Dependent Ecosystems Atlas[3] identifying lands approximately 100 m south of the Site as Terrestrial Groundwater Dependent Ecosystem (GDE) – River Red Gum. No aquatic GDE are identified (on the Atlas) within 1 km of the Site.

5 Site History and Land Use Summary

5.1 Previous Investigations

5.1.1 The Memorandum

The Memorandum summarises the contamination assessments that have been completed at the Forbes Station and Yard, including:

- ARTC 2021. Horizontal Clearances – Stockingbal to Parkes. Review of Environmental Factors; and
- ARTC 2022. Review of Environmental Factors (REF) Decision Report. Proposed Stockinbingal to Parkes (S2P) Horizontal Clearances.

The Memorandum also reported on desktop searches conducted for the following databases and information sources:

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[1] https://minview.geoscience.nsw.gov.au/#/(report:strat-unit/Q_acm)?lon=148.0101&lat=-33.37922&z=17&l=ge612:y:100

[2] http://www.bom.gov.au/water/groundwater/explorer/map.shtml

[3] E http://www.bom.gov.au/water/groundwater/gde/map.shtml

- NSW contaminated land public register of record of notices to the EPA under section 58 of the Contaminated Land Management Act 1997 (CLM Act)[4];
- NSW EPA Protection of the Environment Operations Act 1997 (POEO Act) public register of licence, applications, and notices (maintained under section 308 of the POEO Act)[5];
- ARTC Contaminated Sites Register;
- NSW Government PFAS Investigation Program[6], noting the Forbes Rural Fire Service (RFS) Station is located at 26 Union Street (approximately 50 m west of the Site). D&N note the Forbes RFS station is not listed on the NSW EPA PFAS investigation program list or map; and
- Department of Defence Nationwide unexploded Ordnance (UXO) Map[7].

D&N also obtained and reviewed historical aerial imagery of the site (and surrounds) for the period between 1965 and 2021.

Based on the information obtained and reviewed, the Memorandum identified ten (10) AEC, including both on- and off-site potential sources of contamination and concluded that contamination is known to occur within and surrounding the Site, noting that no intrusive contamination investigations known to have been completed at the Forbes Station and Yard site to date. The Memorandum recommended a detailed site investigation (DSI) is to be completed in order to assess exposure risks to site workers and other receptors as a result of ground disturbances at Forbes Station and Yard, which are considered to be at a higher risk of being contaminated.

5.1.2 Other Information Sources

In addition to our review of the Memorandum, D&N were also supplied with, and reviewed the following documents:

- ADE Consulting Group (ADE) (2020), Hazardous Building Material Survey Report Forbes Goods Shed, Forbes Station, Forbes NSW dated 2 November 2020.
- ADE (2021a), Targeted Soil Assessment and Asbestos Removal Railway Siding, Union Street, Forbes NSW 2871 dated 2 February 2021.
- ADE (2021b), Asbestos Management Plan Railway Siding, Union Street, Forbes NSW 2871 dated 2 February 2021.
- WSP (2021), S2P REF – Appendix I – Horizontal Clearances Surface Water Impact Assessment dated November 2021; and
- Martinus/Inland Rail (2024), Detailed Design Report S2P Package: SP2 – Forbes Station Yard and Awning dated 18 January 2024.

Table A1 (in Appendix A) presents a summary of findings and recommendations (relevant to this DSI) for each additional information source.

It is noted that the previous reports supplied to D&N identified additional investigation reports that were not provided to D&N for review and consideration, including:

- Envirowest Consulting Pty Ltd – Contamination Investigation (2006).
- Environmental & Safety Professionals (EES) - Asbestos Materials Survey (2014).
- Environmental Earth Sciences - Environmental Baseline Assessment (2018); and
- Cavvanba Consulting Pty Ltd – Contamination Summary Report (2019).

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[4] https://app.epa.nsw.gov.au/prclmapp/searchregister.aspx
[5] https://app.epa.nsw.gov.au/prpoeoapp/
[6] https://www.epa.nsw.gov.au/your-environment/contaminated-land/pfas-investigation-program
[7] https://uxo-map.defence.gov.au/

A summary of these reports was provided in ADE (2021b) with a brief summary of the findings and recommendations of these reports presented in Table A1 (in Appendix A).

5.1.3 Site Land Use History Summary

Based on the information provided to D&N, the Forbes Railway Station has operated since the early 1900's however passenger services have since ceased, the station is now closed to passengers.

In addition to now ceased passenger services, the Site historically serviced petroleum depots (Shell and Mobil) to the west of the Site with redundant infrastructure remaining in situ on-site as described in previous reporting (ADE 2021a). Previous intrusive investigations (by others) assessed the presence of petroleum hydrocarbons in proximity to this redundant aboveground infrastructure and reported concentrations of petroleum hydrocarbons (TRH $<C_{10} – C_{36}$) were below the adopted site assessment criteria (i.e., for commercial/industrial land use).

The date of construction of the Goods Shed is unknown however the presence of asbestos contained within construction materials suggest construction prior to the 1980's. Operational activities at the Goods Shed are unconfirmed however previous reporting indicates the site operated as a freight centre suggesting intermodal freight handling occurred on-site. The baseline assessment conducted by Cavvanba (2019) identified concentrations of Lead and the organochlorine pesticide Dichloro-Diphenyl-Trichloroethane (DDT) on-site. In 2020, further intrusive investigations were conducted (by ADE) did not identify concentrations of Lead or DDT exceeding the adopted (commercial/industrial) assessment criteria.

Damage to the Goods Shed's exterior triggered a hazardous materials assessment and subsequent asbestos removal and disposal works in 2020. ADE (and their subcontractors) removed approximately 1.78 tonne (t) of asbestos impacted soil and asbestos fragments along with an undefined amount of ACM fibre-cement sheet from the goods shed structure and concrete sub-platform area in 2020. Asbestos clearance certificates were provided in both the ADE targeted soil assessment (2021a) and the Asbestos Management Plan (2021b). The Asbestos Management Plan (AMP) was prepared to manage the asbestos materials that remained on-site, within the Goods Shed structural components as well as providing a framework for managing unexpected finds of asbestos containing materials in soils in proximity to the Goods Shed, principally identified as within soils under the concrete sub-platform.

Previous investigation locations are depicted on Figure 1 (after text).

6 Preliminary Conceptual Site Model

The CSM is a representation of site-related information (with regard to contamination), presenting a summary of contamination sources, receptors and exposure pathways (between sources and receptors) and provides a framework for identifying potential risks to receptors. The following sections present the elements of the current CSM for the Site, based upon the current and intended site uses, including the proposed ground disturbance activities and the current level of knowledge (with regard to contamination) available for the Site.

6.1 Areas of Environmental Concern and Associated COPC

Table 4 (below) below presents a summary of the potential sources of contamination relevant to the Site as adopted from the Memorandum and with the consideration of the information obtained from the additional sources, provides a likelihood of risk for each (AEC).

Figure R1 F2 (after text) shows the location of relevant potential contaminating land activities identified in Table 4 below, noting the 'Council Depot' has not been depicted (on Figure R1 F2) as the exact location of this source has not been confirmed.

Table 4 – Potential Contamination Land Activities Summary

Record	Potential Source	Location	Source Description	Source Location	Likelihood	Rationale
ARTC Contaminated Sites Register	Former Mobil and Shell Siding	Stephen Street, Forbes (partially mapped under the location of the Site)[8]	Rail Operations (Petroleum Transport and Handling)	On-site	Possible	The former Mobil and Shell Rail Siding was historically utilised for receiving petroleum from rail transport and its transmission to nearby depots for road distribution. Given the proximity of this particular source to Site and the historical practices associated with its operation, the potential for associated COPC to be present in soils on-site is considered possible. D&N notes that WSP (2021) also identifies the Site is within an operational rail corridor and therefore has an elevated risk for unknown contaminants associated with rail operations to be discovered during construction.
Hazardous Building Materials	Goods Shed and immediate surrounding lands	Lewis Street, Forbes (adjacent to the Site on the western boundary)[7]	Legacy Structures and Surrounding Land	On-site	Possible	The Goods Shed was previously assessed (ADE Consulting, 2021a) and although previous investigations identified pesticides (DDT) and metals (Lead) in two surface soil sampling locations around the exterior of the Good Shed, further testing did not identify soil impacts (for petroleum hydrocarbons, metals [lead] and organochlorine pesticides) above the relevant (commercial/industrial) land use criteria. The likelihood of chemical COPC associated with this potential source is low. Although asbestos fragments and associated dust and debris in the vicinity of the sub-platform and Goods Shed were reported removed circa 2020 (ADE, 2021a), an Asbestos Management Plan, also prepared by ADE Consulting (ADE, 2021b) was prepared to manage asbestos materials within the Goods Shed structure noting an ongoing asbestos in soil risk is identified in subsoils associated with the concrete sub-platform. D&N note that as part of the asbestos removal works at the Goods Shed conducted in 2020, airborne fibre monitoring did not detect asbestos fibres greater than the laboratory Limits of Reporting (i.e., < 0.01 fibres per millilitre [f/mL]) suggesting the potential for ambient exposure is low.
EPA Notified Sites	Former Shell Depot	Stephen Street, Forbes NSW	Service Stations and Depots	Off-site (20 m west)	Possible	These four (4) sites have been notified to the NSW EPA as potentially contaminated although regulation under the CLM Act is not required. The proximity of the Former (Shell and BP/Mobil) Depots to the Site and the likely operational linkages to the Former Mobil and Shell Siding suggests the potential for associated COPC to be present on-site is considered possible for potential sources adjacent to, or within proximity of the Site (i.e., Former Shell Depot and BP (Former Mobil) Depot). The Woolworths and BP Service Stations are considered sufficiently distant from the Site that risks posed by these potential sources are low and likely acceptable.
	BP (Former Mobil) Depot	3-15 Union Street, Forbes NSW		Off-site (40 m west)		
	Woolworths Service Station	26 Dowling Street, Forbes NSW		Off-site (200 m south)	Unlikely	
	BP Service Station	29 Dowling Street, Forbes NSW		Off-site (260 m south)		
ARTC Contaminated Sites Register	Council Depot (former swampland)	Little Union Street, Forbes (40m west of the Site)[7]	Depots	Off-site (40m west)	Possible	The Memorandum states a Preliminary Site Investigation or PSI (report reference and date unknown) was previously conducted at the Council Depot which did not identify significant risks of contamination however minor staining (nature unknown) was noted. Noting the absence of information regarding current and historical practices associated with the Council Depot, the lack of intrusive assessment information and the uncertainty in the exact location of the Council Depot, the potential for COPC associated with Council Depot sources to be present in soils on-site is considered possible.
EPL Licenses	Former Forbes Gasworks Site	24-26 Union Street, Forbes NSW	Gasworks	Off-site (170 m west)	Unlikely	The former Forbes Gasworks[9] is located on Lots 1 to 9 SP37775 and Lot 3 DP800039 with NSW EPA records indicating the former gasworks were subject to a Section 36 EHC Act Order in 1997, and remediation was undertaken between 1997 and 2010 and the order was subsequently revoked. The Memorandum states the site is unlikely to impact the condition of soil at the Forbes Station and Yard.
Agriculture	Rural Lots	various	(Horticulture) Incidental pesticide use	Off-site (200 m east)	Unlikely	Agricultural lands surrounding the Site, which may have been subject to incidental uses of pesticides, were identified during previous desktop searches. The likelihood of broadscale soil impact at Site as a result of this potential source is unlikely.

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[8] https://inlandrail.artc.com.au/wp-content/uploads/2022/06/s2p-ref-hc-appendix-i-surface-water-impact-sssessment-2.pdf

[9] https://app.epa.nsw.gov.au/prclmapp/sitedetails.aspx

Table 5 below provides a summary of the Areas of Environmental Concern (AEC) and associated Contaminants of Potential Concern (COPC) targeted during this investigation (based on the rationale provided in Table 4 above).

Table 5 – AEC and Associated COPC

AEC	Activity	Source	Media	COPC
On-site				
1 – Rail Operations (Petroleum Transport and Handling)	Chemical Storage, Use and Leaks and Spills	Persistent Chemicals	Fill, Soils, Subsoils Groundwater	Metals – Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Zinc Pesticides including Organochlorine Pesticides (OCP) and Organophosphorus Pesticides (OPP) Polychlorinated biphenyls (PCBs)
		Volatile and semi-volatile chemicals	Fill, Soils, Subsoils Soil gas Groundwater	Total Petroleum Hydrocarbons (TPH) and Total Recoverable Hydrocarbons (TRH), Benzene, Toluene, Ethylbenzene, Xylenes and Naphthalene (BTEXN), Polycyclic Aromatic Hydrocarbons (PAH)
	Hazardous Materials	Asbestos containing materials	Fill, Soils, Subsoils	ACM, Asbestos Fines (AF), and Fibrous Asbestos (FA)
2 – Legacy Structures and Surrounding Land	Hazardous Building Materials	Asbestos building products and hazardous materials	Building materials Fill, Soils, Subsoils	ACM, AF, FA, Lead-based paint (Lead), Galvanised sheet (Zinc)
	Chemical Storage, Use and Leaks and Spills	Persistent Chemicals	Fill, Soils, Subsoils Groundwater	Pesticides, PCB
Off-site				
3 – Service Stations and Depots	Chemical Storage, Use and Leaks and Spills	Persistent Chemicals	Groundwater	Metals, PCBs
		Volatile and semi-volatile chemicals	Soil gas Groundwater	TPH and TRH, BTEXN, PAH

6.2 Sensitive Receptors

6.2.1 Human Receptors

The Site is currently used as a rail yard and station, noting the existing buildings on-site (i.e., Goods Shed and Forbes Railway Station) are currently vacant, therefore, the current land uses occurring on-site are considered to be consistent with the commercial/industrial scenario described in the ASC NEPM (1999, amended 2013). The Site is zoned Rail Infrastructure, and the *Forbes Local Environmental Plan (2013)* indicates that sensitive land uses (such as residential uses) are not permitted under the current zoning.

The relevant sensitive human receptors adopted for this assessment include:

- On-site:
    - Intrusive maintenance and construction workers, including workers conducting incidental intrusive maintenance activities.
    - Future commercial/industrial workers; and
    - Future beneficial groundwater users.
- Off-site:
    - Future beneficial groundwater users.
    - Current and future neighbouring residential; and
    - Current and future neighbouring commercial/industrial workers.

6.2.2 Ecological Receptors

The majority of the undeveloped portions of the Site are vacant hardstand areas with terrestrial communities limited to vacant grasslands with sporadic mature vegetation in the southern portion of the Site in association with the lands around the Forbes Railway Station. Therefore, terrestrial receptors on-site have not been considered. Given the developed nature of surrounding lands, off-site terrestrial communities are also limited to the south of the Site with the River Red Gum GDE mapped lands associated with the alignment of Lake Forbes.

The nearest aquatic environments are:

- The farm dam to the north of Site noting the dam is upstream of the Site and is unlikely to be affected by potential contamination on-site. In addition, the nature of the farm dam use is unknown but beneficial uses (stock, domestic or potable supplies) are unlikely.
- Lake Forbes, approximately 250 m south (i.e., downstream) of the Site; and
- The Lachlan River, approximately 2 km south of Site at its closest with the confluence of Lake Forbes and the Lachlan River to the west of Forbes.

For the purpose of this investigation, we have considered the following ecological receptors:

- On-site:
    - Nil.
- Off-site:
    - Terrestrial ecosystems, including biota supporting ecological processes (including microorganisms and soil invertebrates); and
    - Aquatic:
        - Biota within receiving waters, noting the nearest surface water receiving environments is Lake Forbes 250 m south of the Site.
        - Local groundwater aquifer.

6.3 Transport Mechanisms and Exposure Pathways

For a source to present a significant risk of harm to a specific receptor, a linkage between a contaminant and a receptor must be either established or plausible. Table 6 below assesses relevant pathways for COPC at each source to potentially affect a given receptor. The linkage is either:

- Complete – a source has been confirmed with a complete pathway between the source and receptor.
- Plausible – a complete pathway is plausible between a source and receptor however further information is required to confirm the linkage.
- Incomplete – a complete pathway between source and receptor is not present.

Pathways with a plausible or complete classification require assessment to qualify the risks posed to relevant sensitive receptors.

Table 6 – Sensitive Receptors and Potential Exposure Pathways

	Area of Concern	COPC	Media	Key Exposure Route	Receptor							
					On-site			Off-site				
					Intrusive Construction & Maintenance	Future commercial workers	Future beneficial groundwater users	Current and future neighbouring residential occupants	Current and future neighbouring commercial/industrial workers	Future Beneficial Groundwater Users	Terrestrial Communities (River Red Gum)	Aquatic Communities (Lake Forbes)
1	Rail Operations (Petroleum Transport and Handling)	ACM, AF, FA	Fill, Soils, Subsoils	Inhalation	🟧	🟧	n/a	n/a	n/a	n/a	n/a	n/a
		Metals, Pesticides, PCB	Fill, Soils, Subsoils Groundwater	Dermal Contact, and Ingestion	🟧	🟧	🟧	🟧	🟧	🟧	🟧	🟧
		TPH and TRH, BTEXN, PAH	Fill, Soils, Subsoils Soil gas Groundwater	Inhalation, Dermal Contact, and Ingestion	🟧	🟧	🟧	🟧	🟧	🟧	🟧	🟧
2	Legacy Structures and Surrounding Land	ACM, AF, FA	Building Materials Fill and subsoils	Inhalation	🟧	🟧	n/a	n/a	n/a	n/a	n/a	n/a
		Metals (Lead, Zinc), Pesticides, PCB		Dermal contact and Ingestion	🟩	🟩	🟩	🟩	🟩	🟩	🟩	🟩
3	(Off-site) Service Stations and Depots	Metals, PCBs	Groundwater	Dermal contact and Ingestion	🟩 Incomplete	🟩 Incomplete	🟧 Plausible	n/a	n/a	n/a	n/a	n/a
		TPH and TRH, BTEXN, PAH	Fill and Sub-soils, Soil Vapour, Groundwater	Inhalation, Dermal contact and Ingestion				n/a	n/a	n/a	n/a	n/a

7 Sampling and Analysis Quality Plan

AS part of preparations to undertake Site investigations, D&N prepared a Sampling and Analysis Quality Plan (SAQP) report (report reference C-1859.00-M1). The SAQP (attached as Appendix B) was submitted to Martinus on 31 January 2024 and outlined our proposed sampling and analytical programme for the Forbes DSI. Martinus feedback was received (email advice dated 31 January 2024) and the document was finalised on 15 February 2024.

7.1 Data Gap Assessment

The preliminary CSM identifies the following plausible risks and associated data gaps requiring assessment:

Table 7 – Plausible Risks and Associated Data Gaps

COPC	Receptors	AEC	Media	Data Gap
ACM, AF, FA	Intrusive Construction & Maintenance Future Commercial Workers	1	Fill, Soils, Subsoils	The presence of asbestos containing materials in the operational rail area and siding is largely unknown with testing conducted (in the vicinity of the Goods Shed) triggering removal of ACM fragments. Characterisation of fill materials and soils (including surface and sub-soils) is required.
		2		
Metals, Pesticides, PCB	Intrusive Construction & Maintenance Future commercial workers Future beneficial groundwater users Current and future neighbouring residential occupants Current and future neighbouring commercial/industrial workers Terrestrial Communities (River Red Gum) Aquatic Communities (Lake Forbes)	1	Fill, Soils, Subsoils Groundwater	The presence of chemical COPC associated with AEC 1 is largely unknown across the operational rail area and siding with analytical information for some potential COPC not previously assessed. As groundwater is not expected to be encountered during the proposed ground disturbance works, characterisation of fill materials and soils (including surface and sub-soils) is required.
TPH and TRH, BTEXN, PAH				

7.2 Data Quality Objectives

The ASC NEPM (1999, amended 2013) presents a process for establishing data quality objectives (DQOs) for an investigation site, adopted from the US Environmental Protection Agency's seven step DQO Process. To determine the type, quantity and quality of data needed to support decisions relating to the environmental condition of the Site, during the desktop assessment, D&N undertook the seven-step process to develop the DQOs in accordance with process outlined in the ASC NEPM. Table 8 presents the DQO process applied during this assessment.

Table 8 – Data Quality Objectives

DQO	Response and Activities
Step 1: State the Problem	Horizontal clearance works at the Investigation Areas may encounter contamination associated with historical and current activities identified as having either occurred on-site, or nearby. The proposed works may disturb soils

DQO	Response and Activities
	in the Investigation Areas, and soil characterisation is required to assess potential soil contamination risks in these areas.
Step 2: Identify the Decisions	• Is contamination present in soils on-site at concentrations exceeding relevant site assessment criteria appropriate for the proposed and/or permissible land use setting? • Is there an unacceptable risk posed by contamination (if present) to human health (current and future site users) and ecological receptors (if relevant), and will contamination risks require management during construction? • If contamination that poses an unacceptable risk to human and ecological receptors is present, is there a need for further assessment or management of the contamination?
Step 3: Identify Inputs to the Decisions	The soil sampling program is required to provide information to evaluate the Step 2 decision questions. The inputs include: • Visual inspection of Investigation Area, along with soils at the test pit locations. • Collection of soil samples to provide data on which to base assessment decisions. • Comparing analytical results to applicable guidelines as set out in Section 7.2.2 below to evaluate the potential for identified contamination to adversely affect receptors. • Comparing analytical results to applicable guidelines to inform
Step 4: Define the Study Boundaries	With regard to physical boundaries, the lateral boundaries of the Investigation Area are defined in Figure R1 F1 (after text). D&N notes the proposed ground disturbance works is expected to be to depths no greater than 0.5 m BGL. The vertical extent of the investigation is up to 1.2 m BGL, which is the maximum depth of intrusive investigation. The vertical extent of the analytical investigation is limited to 0.6 m BGL, the depth from which the deepest sample analysed was collected.
Step 5: Develop a Decision Rule	The degree of impact by contaminants and the decisions associated with accepting data was assessed with reference to the chosen site investigation levels. The decision rule is: • If the data has been collected in an appropriate manner to establish completeness, comparability, representativeness, precision, and accuracy, it will be considered suitable for the purposes of this assessment; and • If soil contamination is identified on-site at concentrations exceeding the adopted site investigation levels (refer Section 7.2.2), then further assessment and/or management of the contamination may be required.
Step 6: Specify Limits on Decision Errors	Two primary decision error-types may occur due to uncertainties or limitations in the project data set: • A sample/area may be deemed to pass the nominated criteria, when in fact it does not. This may occur if contamination is 'missed' due to limitations in the sampling plan, or if the project analytical data set is unreliable.

DQO	Response and Activities
	• A sample/area may be deemed to fail the nominated criteria, when in fact it does not. This may occur if the project analytical data set is unreliable, due to inappropriate sampling, sample handling, or analytical procedures.
Step 7: Optimise the Design for Obtaining Data	This was achieved through the development of an appropriate sampling and analytical strategy which was reviewed and refined as necessary during the assessment evaluating field observations and analytical results. This included collection and analysis of soil samples, and visual, observation for surface asbestos containing materials.

7.2.1 Data Quality Indicators

To ensure that the investigation data collected is of an acceptable quality, the investigation data set will be assessed against the Data Quality Indicators (DQI). Table 9 provides a summary of field and laboratory based DQI's and procedures implemented to meet adopted DQI's.

Table 9 – Data Quality Indicators

DQI	Response and Activities
Data Representativeness - expresses the degree which sample data accurately and precisely represents a characteristic of a population or an environmental condition.	Representativeness is achieved by collecting samples in an appropriate pattern across the site, and by using an adequate number of sample locations to characterise the site. Consistent and repeatable sampling techniques and methods are utilised throughout the sampling.
Completeness - defined as the percentage of measurements made which are judged to be valid measurements.	The completeness goal is set at there being sufficient valid data generated during the study. If there is insufficient valid data, then additional data are required to be collected
Comparability - is a qualitative parameter expressing the confidence with which one data set can be compared with the other set.	This is achieved through maintaining a level of consistency in techniques used to collect samples and ensuring analysing laboratories use consistent analysis techniques and reporting methods.
Precision - measures the reproducibility of measurements under a given set of conditions.	The precision of the data is assessed by calculating the Relative Percent Difference (RPD) between duplicate sample pairs. $RPD(\%) = \frac{\lvert C_o - C_d \rvert}{C_o + C_d} \times 200$ Where C_o = Analyte concentration of the original sample C_d = Analyte concentration of the duplicate sample D&N adopts a nominal acceptance criterion of 30% RPD for field duplicates and splits for inorganics and a nominal acceptance criterion of 50% RPD for field duplicates and splits for organics. However, it is noted that this will not always be achieved, particularly in heterogeneous soil or fill materials, or at low analyte concentrations.

DQI	Response and Activities
Accuracy - measures the bias in a measurement system.	Accuracy can be undermined by such factors as field contamination of samples, poor preservation of samples, poor sample preparation techniques and poor selection of analytical techniques by the analysing laboratory. Accuracy is assessed by reference to the analytical results of laboratory control samples, laboratory spikes, laboratory blanks and analyses against reference standards. Accuracy of field works is assessed by examining the level of contamination detected in trip blanks. Blanks should return concentrations of all organic analytes as being less than the practical quantitation limit of the testing laboratory.

7.2.2 Adopted Site Assessment Criteria

For this investigation, relevant investigation and screening levels have been adopted from the following guidelines:

- ASC NEPM (1999, amended 2013) National Environment Protection (Assessment of Site Contamination) Amendment Measure, National Environment Protection Council (NEPC)
- Western Australian Department of Health (WA DoH) (2021) Guidelines for Remediation and Management of Asbestos Contaminated Sites in Western Australia.
- NSW Excavated Natural Material (ENM) Order 2014 (ENM Order); and
- NSW EPA 2014) Waste Classification Guidelines, Part 1: Classifying Waste.

As the existing and continuing (proposed) land use at the Site is railway operations, and the Site land use zoning is SP2 – Rail Infrastructure, which does not permit sensitive uses such as child-care centres and education establishments/facilities, commercial/industrial guidelines can be implemented.

For materials to be deemed suitable for reuse on-site, the concentrations of Contaminants of Potential Concern (COPC) associated with the current and historical land uses of the particular site should not exceed the human Health-based and Ecological Investigation and Screening Levels applicable to the land use scenario occurring on-site (i.e., as defined by the permissible uses).

Under the Protection of the Environment Operations (Waste) Regulation 2014 (POEO Regulation), the NSW Environment Protection Authority (EPA) provides permission for recovery and reuse of specific 'waste' materials as resource recovery orders, exempt from the typical environmental licensing and levy requirements. For the materials proposed to be excavated, the ENM Order is considered as the applicable resource recovery order and provides conditions waste generators and consumers must meet to satisfy the requirements of the POEO Regulation.

Table 10 below presents the assessment criteria adopted for this soil assessment.

Table 10 – Adopted Assessment Criteria

Source Guideline(s)	Adopted assessment Criteria	Soil Type	Depth	Rationale
ASC NEPM (1999 amended 2013)	Soil Health-based Investigation Level - D (HIL-D) for non-petroleum hydrocarbon chemical contaminants	n/a	n/a	Given the Site land use is primarily industrial and does not include sensitive uses such as residential and child-care centres, the “Commercial / Industrial” land use scenario is considered appropriate for this assessment. Whilst the NEPM Schedule B7 indicates the commercial/industrial HIL do not specifically address short-duration exposures that may occur during construction and maintenance of a site (including intrusive works), these values are considered appropriate as screening values for this DSI.
	Soil Health-based Screening Level – D (HSL-D) for fuel derived petroleum hydrocarbons	Coarse	0 m to <1 m	
	Generic and Calculated Ecological Investigation Levels (EIL) for aged contaminants – Commercial and Industrial	n/a	0 m to 2 m	Ecological receptors on-site are considered limited to 'undeveloped' portions of the Site. Noting soil characterisation data will not be obtained as part of this investigation, the most conservative generic EILs have been adopted for this assessment. As fine and coarse soil types were encountered during the intrusive investigation, the more conservative ESLs for coarse soils are considered appropriate for this assessment.
	Ecological Screening Levels (ESL) for petroleum hydrocarbons – Commercial and Industrial	Coarse		
WA DoH (2021) (as presented in the ASC NEPM Schedule B1 (1999, amended 2013)	Asbestos in soil screening levels per Table 3 All Site Uses – AF & FA	n/a	n/a	The criteria for FA and AF remain fixed for all site uses as there is high uncertainty associated with quantifying asbestos concentrations below 0.01% w/w asbestos.
	Asbestos in soil screening levels per Table 3 Commercial / Industrial D – Bonded ACM	n/a	n/a	Given the Site land use is primarily industrial and does not include sensitive uses such as residential and child-care centres, the “Commercial / Industrial” land use scenario is considered appropriate for this assessment.

Source Guideline(s)	Adopted assessment Criteria	Soil Type	Depth	Rationale
ENM Order (2014)	Maximum average and absolute maximum concentrations (Columns 1 and 2) in Table 4.	n/a	n/a	Given the materials proposed to be excavated on-site include soils and fouled ballast, the ENM Order criteria is considered appropriate to assess the material suitability for off-site beneficial reuse.
NSW EPA (2014) Waste Classification Guidelines, Part 1: Classifying Waste	Table 1: CT1 and CT2 values for classifying waste by chemical assessment without the TCLP test; and Table 2: TCLP and SCC values for classifying waste by chemical assessment	n/a	n/a	Given the materials proposed to be excavated on-site include soils and fouled ballast, the NSW EPA Waste Classification Guidelines is considered appropriate to classify material for off-site disposal.

7.2.3 SAQP Deviation Summary

Table 11 below presents a summary of the investigation activities that deviated from the scope outlined in the SAQP (D&N, 2024) along with the reason for the deviation and a statement of suitability for the change required and the effected outcome. A copy of the SAQP is included in Appendix B.

Table 11 – Summary of Deviations from SAQP

Deviation Number	Deviation Summary	SAQP Scope	Rationale and Outcome
1	Prior to mobilisation, the majority of test pits required relocation per email advice received by D&N (on 31 January 2024) from Martinus. The relocation was to align the testing locations with the scope of works for track removal.	Proposed investigation (i.e., test pit) locations were pre-defined in Plate 2 of the SAQP (D&N, 2024) noting the Test Pit Excavation section (in the SAQP) indicates locations may shift to accommodate the presence of service and utilities or access requirements.	The test pits were relocated to agreed locations at regular intervals along the Investigation Area as shown in Figure R1 F1 (after text). The sampling point frequency of ten (10) investigation locations within the combined Investigation Area of up to 0.3 ha exceeds the NSW EPA (2022) Sampling Design Part 1 - Table 2 sampling requirements.
2	Following discussions with Martinus on-site during service location and clearance (on 1 February 2024), test pits were relocated to the western side of the track at least 1 m away from the rail to not disturb the rail.	Proposed investigation (i.e., test pit) locations were pre-defined in Plate 2 of the SAQP (D&N, 2024) noting the Test Pit Excavation section (in the SAQP) indicates locations may shift to accommodate the presence of service and utilities or access requirements.	Test pits were relocated to agreed locations on the western side of the track at regular intervals along the Investigation Area as shown in Figure R1 F1 (after text).

Deviation Number	Deviation Summary	SAQP Scope	Rationale and Outcome
3	TP05 was a hand auger at the request for the Martinus representative on-site due to concerns regarding the presence of asbestos in soils	The SAQP (D&N, 2024) proposed test pits to be excavated by mechanical means.	Manual techniques were employed to mitigate potential perceived risks from asbestos in soil in proximity to TP05. Samples were obtained from the location to depths consistent with the
4	Sample collection intervals were reduced from 0.5 m down the profile.	The SAQP (D&N, 2024) proposed collection of surface samples (0.0 m to 0.2 m BGL) and collection of samples every 0.5 m down the soil profile until target depth (1.0 m BGL) was reached.	With the exception of TP05, the depth of fill encountered was typically between 0.2 m and 0.4 m BGL. The soil sampling undertaken enabled the characterisation of fill materials (at surface as well as characterisation of underlying natural soils and as considered suitable for the purpose of this DSI.

8 Intrusive Works and Sample Collection

8.1 Test Pits

A total of ten (10) exploratory holes were excavated under the supervision of a D&N environmental scientist on 1 February 2024. Nine (9) test pits were excavated to a maximum depth of 1.2 m BGL using mechanical excavation (i.e., 5.5 tonne excavator) and one (1) exploratory location (i.e., TP05) was manually excavated using a hand auger to a maximum depth of 0.4 m BGL. The location of the test pits is depicted on Figure R1 F1 (after text) and the test pit logs are provided in Appendix C.

8.2 Soil Sampling and Quality Control/Assurance

Representative environmental soil samples were collected (from each test pit and hand auger location) at surface and subsequent discrete depths down the soil profile. Samples were transferred directly from the auger to appropriate laboratory-supplied containers with (disposable nitrile) gloved hands (with gloves changed between sample depths and sampling locations). A corresponding sub-sample was collected in a plastic zip-loc bag for field screening (to determine the presence of Volatile Organic Compounds [VOC]) using a Photoionisation Detector (PID) equipped with a 10.6 electron Volt (eV) lamp, calibrated with 100 part-per-million (ppm) isobutylene.

Manual drilling implements (i.e., hand auger) were decontaminated by cleaning equipment prior to the use (of the equipment) and between investigation locations and depths (as necessary). The equipment was washed in a suitable detergent (i.e., Liquinox) solution, rinsed in clean water with a final rinse with laboratory supplied deionised water and air dried.

A total of twenty-one (21) primary environmental soil samples were collected during this investigation, including at least two (2) samples from each exploratory hole location. Six (6) quality control samples, comprising three (3) intra-laboratory duplicate samples (QC100 to QC102) and three (3) inter-laboratory duplicate sample (QC200 to QC202), were collected for quality control and assurance purposes. Each sample was placed into laboratory supplied sample containers and bags before being placed directly into a chilled esky for storage and transport.

In addition:

- One (1) trip blank and field spike pair (QC400 and QC500) were carried into the field accompanying samples, for quality assurance purposes.
- A rinsate sample, QC300, was collected (from the hand auger on 1 February 2024) for assessing the effectiveness of field decontamination procedures.

The soil profile for each test pit and sample location was recorded and described, in general accordance with the Unified Soil Classification System (USCS), along with features such as staining, odour and other indications of potential contamination. Logs for each exploratory hole location, including the PID sub-screening results, are presented in Appendix C.

8.3 Analysis

The primary laboratory used was Eurofins Environmental Testing Australia, a National Association of Testing Authorities (NATA) laboratory accredited for the analyses performed. Internal procedure and laboratory methods are in accordance with the respective laboratory quality assurance systems. Laboratory test certificates, including certificates of analysis and laboratory quality control information is provided in Appendix D.

Of the twenty-one (21) primary soil samples collected:

- Twenty (20) primary and three (3) QC samples were analysed for TRH, BTEXN, PAH, OCP, OPP, PCBs and Metals (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg)
- Twenty (20) samples were submitted for asbestos per Australian Standard AS-4964:2004.

In addition, the trip blank and field spike pair (QC400 and QC500) were analysed for volatile compounds TRH (C_6-C_{10}) and BTEXN F1. The rinsate sample (QC300) was analysed for TRH, BTEXN, PAH, OCP, OPP, PCBs and Metals (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg).

9 Results

9.1 Subsurface Conditions Encountered

The sub-surface conditions encountered during these works generally comprised FILL (Silty Sand), underlain by alluvial soil and extremely weathered material. Sub-surface conditions were generally consistent with those reported in Table 3 (above) and the anticipated Site conditions.

The sub-surface profile encountered across the Site is summarised in Table 12 below.

Table 12 – Summary of Encountered Subsurface Units

Unit	Origin	Summary Material Description	Depth to base of unit (m BGL)
1	FILL	Silty SAND to Gravelly Silty SAND, fine to coarse grained, dark grey to pale grey, with fine to coarse, sub-angular to angular gravel, and sub-angular to angular cobbles.	0.2-0.4
2	Alluvial Soil	Sandy CLAY, low to medium plasticity, red to orange, sand is fine to coarse, with fine to coarse, sub-rounded to sub-angular gravel.	1.1-1.2
3	Extremely Weathered Material	Clayey GRAVEL, fine to coarse, sub-angular to angular, pale yellow to pale brown, mottled orange, clay is low plasticity.	N/A

Ash and clinker were encountered within TP01 and TP02 at surface (i.e., 0.0 to 0.3 m BGL). No other visual signs of contamination, and no olfactory (e.g. petroleum hydrocarbon odours) signs of contamination were noted during the intrusive investigation.

Logs for each test pit are presented in Appendix C.

9.2 Analytical Results

Laboratory certificates, including Chain-of-Custody And sample receipt information from the primary and secondary laboratories are provided in Appendix D.

9.2.1 Data Adequacy

Table E1 (in Appendix E) provides a brief data validation summary for the analytical works undertaken, with the analytical results generally deemed to be acceptable for the purposes of this investigation.

Quality Control Samples and RPDs

Of the twenty-one (21) primary soil samples collected for environmental testing, twenty (20) primary soil samples were analysed. Two (2) intra-laboratory duplicate samples and one (1) inter-laboratory duplicate sample collected during this investigation were analysed. The frequency of intra- and inter-laboratory QC samples analysed was 10% and 5% respectively and considered consistent with the guidance set forth in the ASC NEPM (1999, amended 2013).

Table E2 (in Appendix E) presents a summary of the analytical results for soil duplicate samples, along with calculated Relative Percentage Difference (RPDs). For analytes with detected analyte concentrations, RPDs were generally within acceptable ranges, with the exception of:

- Copper was detected at 120 mg/kg in primary sample TP03_0.0-0.2, however was detected at 220 mg/kg in the duplicate sample QC102.
- 4,4- DDE was detected at 1.4 mg/kg in primary sample TP03_0.0-0.2, however was detected at 2.3 mg/kg in the duplicate sample QC102.
- DDT+DDE+DDD (i.e. DDT and its two major metabolites Dichlorodiphenyldichloroethylene (DDE) and Dichlorodiphenyldichloroethane (DDD) totalled together) was detected at 1.4 mg/kg in primary sample TP03_0.0-0.2, however was detected at 2.64 mg/kg in the triplicate sample QC202.

The source of variation between the primary and corresponding quality control samples may be attributed to inherent soil sample heterogeneity, with the samples collected in granular fill, or laboratory sub-sampling techniques. To cater for a worst-case scenario, increasing the highest detected DDD+DDE+DDT concentration (310 mg/kg) by a factor commensurate with the difference between the primary and triplicate sample results in a worst-case DDD+DDE+DDT concentration of approximately 450 mg/kg, below the relevant DDT and DDD+DDE+DDT investigation levels adopted. Given the detected (and worst-case calculated) concentrations are below the adopted assessment criteria, the data is considered adequate and reliable for the purpose of this investigation.

Field Rinsate and Decontamination

Table E3 (in Appendix E) presents a summary of the analytical results for the field rinsate sample QC300.

One (1) field rinsate samples were collected during the soil sampling program. The analytical results indicate that all analytical results were below LOR.

Sample Handling and Volatiles

Table E4 (in Appendix E) presents a tabulated summary of the soil trip spike and trip blank analytical results.

Analytical results for the trip blank samples recorded BTEXN and volatile TRH concentrations below the laboratory Limits of Reporting (LOR) indicating no transfer of volatile contaminants occurred during sampling or transit to the primary laboratory.

Analytical results for the trip spike samples showed sufficient recovery of BTEXN and volatile TRH concentrations (when compared to the trip spike control sample) indicating no loss of volatile contaminants occurred during sampling or transit to the primary laboratory.

Quality Control and Assurance Conclusion

On the basis of the field and laboratory quality control results (refer Table E1 in Appendix E), it is considered that the field and laboratory programs have provided acceptable quality assurance and control results and that the results of the sampling and analysis program, noting the qualifications outlined in the data adequacy statements above, are sufficiently reliable to achieve the objectives of this preliminary assessment.

9.2.2 Soil Analytical Results

Table T1 (Analytical results: Soil) provided after text, presents a summary of analytical soil results compared against the criteria presented in the ASC NEPM (1999, amended 2013), relevant to the adopted land use scenario as discussed in Section 7.2.2.

Metals

All metals analysed were detected at concentrations above LOR, with:

- Arsenic concentrations in soil ranging between 7.8 mg/kg and 290 mg/kg with an average concentration of 90 mg/kg;
- Cadmium concentrations in soil ranging between <0.4 mg/kg (<LOR) and 3.7 mg/kg with an average concentration of 1 mg/kg;
- Chromium (III+VI) concentrations in soil ranging between 8.3 mg/kg and 41 mg/kg with an average concentration of 23 mg/kg;
- Copper concentrations in soil ranging between 11 mg/kg and 220 mg/kg with an average concentration of 62 mg/kg.
- Lead concentrations in soil ranging between 5.8 mg/kg and 400 mg/kg with an average concentration of 96 mg/kg;
- Mercury concentrations in soil ranging between <0.1 mg/kg (<LOR) and 0.3 mg/kg with an average concentration of <0.1 mg/kg;
- Nickel concentrations in soil ranging between 5.3 mg/kg and 35 mg/kg with an average concentration of 16 mg/kg; and
- Zinc concentrations in soil ranging between 14 mg/kg and 740 mg/kg with an average concentration of 210 mg/kg.

No detected metal concentration exceeded the relevant adopted investigation levels, with the exception of arsenic concentrations exceeding EILs in the samples collected at TP01 from 0.0 to 0.2 m (210 mg/kg), TP02 from 0.0 to 0.2 m (290 mg/kg) and sample QC202 collected in TP03 at 0.0 to 0.2 m (199 mg/kg).

Petroleum Hydrocarbons

Concentrations of petroleum hydrocarbons were detected in fill and alluvial materials, including:

- TRH C_{10} to C_{15} fraction detected at 67 mg/kg and 140 mg/kg in samples collected in TP01 at 0.0 to 0.2 m and TP04 at 0.0 to 0.2 m, respectively;
- TRH C_{16} to C_{34} fraction detected at concentrations ranging between <100 mg/kg (<LOR) and 410 mg/kg with an average concentration of 106 mg/kg;
- TRH C_{34} to C_{40} fraction detected at 110 mg/kg and 150 mg/kg in samples collected in TP04 at 0.0 to 0.2 m and TP06 at 0.0 to 0.2 m, respectively;
- PAH Fluoranthene detected at 0.6 mg/kg in the sample collected from TP06 at 0.0 to 0.2 m; and

- PAH Pyrene detected at 0.6 mg/kg in the sample collected from TP06 at 0.0 to 0.2 m.

No other sample recorded a concentration of petroleum hydrocarbons above the respective LOR in the analysed samples. No detected concentrations of petroleum hydrocarbons exceeded the relevant adopted screening levels in the analysed samples.

Pesticides and PCBs

Concentrations of pesticides were detected above the respective laboratory LOR in fill and alluvial materials, including:

- OCP 4,4-DDE concentrations ranging between <0.05 mg/kg (<LOR) and 25 mg/kg with an average concentration of 1.5 mg/kg.
- OCP b-BHC detected at 0.65 mg/kg in the sample collected in TP04 at 0.0 to 0.2 m.
- OCP DDD detected at 0.19 mg/kg and 25 mg/kg in the samples collected in TP04 at 0.0 to 0.2 m and QC202 collected in TP03 at 0.0 to 0.2 m, respectively.
- OCP DDT mg/kg concentrations in soil ranging between <0.1 mg/kg (<LOR) and 0.3 mg/kg with an average concentration of <0.1 mg/kg;
- OPP Pyrazophos detected at 0.2 mg/kg and 0.6 mg/kg in the samples collected in TP08 at 0.0 to 0.2 m and TP02 at 0.0 to 0.2 m, respectively.

No other sample recorded a concentration of Pesticides above the respective LOR in the analysed samples. No detected concentrations of Pesticide exceeded the relevant adopted screening levels in the analysed samples.

PCB were not detected above the respective laboratory LOR in fill and alluvial materials.

Asbestos

Table T4 (Analytical results: Asbestos) provided after text, presents a summary of asbestos identification results. Asbestos was not visually identified in any of the test pits excavated, or samples recovered and asbestos containing materials, fibrous asbestos or asbestos fines were not detected in the samples analysed.

10 Discussion and Recommendations

10.1 Construction and Soil Contamination Risks

No concentration of COPC targeted during this investigation exceeded the ASC NEPM generic human health-based investigation or screening levels therefore risks posed to workers during ground disturbance works is expected to be low and acceptable. Nevertheless, noting the limitations of this investigation and the potential for bonded asbestos materials to be present in proximity to the Goods Shed, the controls and procedures presented in the ADE (2021b) Asbestos Management Plan should be incorporated into the works planning, including, but not limited to identification of site-specific risks and provision of risk mitigation procedures to be implemented when unexpected finds occur within the works area. The Unexpected Finds Protocol (UFP) as outlined in ADE (2021b) should be employed for the works to cater for incidents where signs of contamination are encountered within the works area. The UFP should form part of the site-specific Construction Environmental Management Plan (CEMP) for the works and provide management actions for adequately protecting workers (and others) when unexpected finds occur.

D&N note that the proposed works are expected to include minor excavation works with advice from Martinus indicating rail removal works will not extend to 0.5 m BGL. D&N recommend that where excavation is to extend beyond a nominal depth of 200 mm below existing ground level, works in these areas should be delayed until intrusive assessment can be undertaken to provide greater certainty of the absence of potential contamination (e.g., asbestos) risks.

Concentrations of Arsenic exceeding the adopted ecological investigation levels were recorded on-site in surface soils at TP01 to TP03 collected from the northern part of the Site. Noting the absence of terrestrial receptors on-site, potential risks associated with elevated Arsenic concentrations is limited to off-site terrestrial and aquatic receptors downstream of the Site. Construction works should include measures for managing sediment and erosion losses during the works with such measures to be included in the site-specific CEMP prepared for the works and mitigate the mobilisation of disturbed soils off-site (through aeolian and fluvial processes).

D&N note a residual asbestos in soil risk was identified by ADE (2020) in soils in and around the Goods Shed. However, airborne monitoring during removal works (conducted by ADE in 2020) did not record concentrations of airborne fibres above the practical air quality limit (i.e., 0.01 f/mL) and neither ACM, FA nor AF were detected (above respective laboratory LOR's) in any sample analysed during this investigation. Again, noting the limitations of this investigation, the UFP should include management actions in the event potential asbestos materials are encountered during the works. In addition, measures for managing dust generation during the works should be included in the site-specific CEMP.

10.2 Soil Reuse

10.2.1 Off-site Reuse (indicative)

Table T3 (Analytical results: Waste) provided after text, presents a summary of the analytical results for the COPC targeted in soils against Table 4 of the ENM Order and Specific Contaminant Concentration (SCC) and TCLP criteria presented in the Table 2 of the NSW EPA Waste Classification Guidelines – Part 1: Classifying Waste (2014).

Metals Arsenic, Cadmium, Copper, Lead and Zinc exceeded the absolute maximum threshold values presented in Table 4 of the ENM Order. No other detected COPC concentration exceeded the absolute maximum threshold values.

Based on the elevated metal concentrations, the soil material to be generated during the ground disturbance works is not considered classifiable as ENM per the ENM Order.

10.2.2 Waste Classification (Indicative)

No detected concentration of targeted COPC exceeded the threshold levels for General Solid Waste (non-putrescible) in the analysed soil and leachate samples therefore the soil material to be generated during the ground disturbance works is considered classifiable as General Solid Waste (non-putrescible) per the NSW.

11 Conclusion

D&N were engaged to undertake a DSI to inform potential contamination risks that may be encountered as part of construction works planned for the Forbes Station and Yard horizontal clearance works to be undertaken as part of the Albury to Parkes (A2P) Stockinbingal to Parkes Enhancement Project.

The proposed ground disturbance works (at the time of writing) included:

- Removal of two (2) turnouts and fouled ballast materials, including approximately 40 cubic metres (m^3) of fouled ballast from the northern turnout and approximately 60 m^3 of fouled ballast from the southern turnout.
- Removal of siding comprising approximately 400 timber sleepers.
- Crane pad preparation works comprising removal of approximately 20 m^3 of soil; and
- Shallow earthworks and/or soil disturbance associated with track removal.

The objective of this DSI is to investigate the presence (or absence) of Chemicals of Potential Concern (COPC) associated with the previously identified AEC and assess potential exposure risks to relevant receptors (e.g., site workers) at Forbes Station and Yard in the nominated Investigation Areas where ground disturbance is proposed.

Based on the information obtained and reviewed, both by D&N and others (e.g., the Memorandum), ten (10) potential sources of contamination, including both on- and off-site (potential) sources of occur within and surrounding the Site. Three (3) relevant AEC, along with their associated COPC, were identified, including:

1 – Rail Operations (Petroleum Transport and Handling);

2 – Legacy Structures and Surrounding Land; and

3 – Service Stations and Depots.

D&N conducted an intrusive field investigation between 1 and 4 February 2024, including the excavation of ten (10) exploratory holes along with proposed ground disturbance area and collected a total of twenty-one (21) primary environmental soil samples for analyses.

No concentration of COPC targeted during this investigation exceeded the human health-based investigation or screening levels therefore risks posed to workers during ground disturbance works is expected to be low and acceptable. Nevertheless, noting the limitations of this investigation and the potential for bonded asbestos materials to be present in proximity to the Goods Shed, the controls and procedures presented in the ADE (2021b) Asbestos Management Plan should be incorporated into the works planning, including, but not limited to identification of site-specific risks and provision of risk mitigation procedures to be implemented when unexpected finds occur within the works area. The Unexpected Finds Protocol (UFP) as outlined in ADE (2021b) should be employed for the works to cater for incidents where signs of contamination are encountered within the works area. The UFP should form part of the site-specific Construction Environmental Management Plan (CEMP) for the works and provide management actions for adequately protecting workers (and others) when unexpected finds occur.

D&N note that the proposed works are expected to include minor excavation works with advice from Martinus indicating rail removal works will not extend to 0.5 m BGL. D&N recommend that where excavation is to extend beyond a nominal depth of 200 mm below existing ground level, works in these areas should be delayed until intrusive assessment can be undertaken to provide greater certainty of the absence of potential contamination (e.g., asbestos) risks.

Concentrations of Arsenic exceeding the adopted ecological investigation levels were recorded on-site in surface soils at TP01 to TP03 collected from the northern part of the Site. Noting the absence of terrestrial receptors on-site, potential risks associated with elevated Arsenic concentrations is limited to off-site terrestrial and aquatic receptors downstream of the Site. Construction works should include measures for managing sediment and erosion losses during the works with such measures to be included in the site-specific CEMP prepared for the works and mitigate the mobilisation of disturbed soils off-site (through aeolian and fluvial processes).

D&N note a residual asbestos in soil risk was identified by ADE (2020) in soils in and around the Goods Shed. However, airborne monitoring during removal works (conducted by ADE in 2020) did not record concentrations of airborne fibres above the practical air quality limit (i.e., 0.01 f/mL) and neither ACM, FA nor AF were detected (above respective laboratory LOR's) in any sample analysed during this investigation. Again, noting the limitations of this investigation, the UFP should include management actions in the event potential asbestos materials are encountered during the works. In addition, measures for managing dust generation during the works should be included in the site-specific CEMP.

12 Limitations

This report is provided for the exclusive use by Martinus Rail for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of D&N, does so entirely at its own risk and without recourse to D&N for any loss or damage. In preparing this report D&N has necessarily relied upon information provided by the client and/or their agents, and other individuals and organisations. Except as otherwise stated in the report, D&N has not verified the accuracy or completeness of the data obtained. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report (conclusions) are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data. D&N will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented, or otherwise not fully disclosed to D&N.

D&N's advice is based upon the conditions identified during this investigation. The results provided in the report are indicative of the conditions on the site only within the limits of the information obtained and reviewed in the preparation of this report. The accuracy of the advice provided by D&N in this report may be affected by additional information either not available or not included as a scoped item which may identify a change in conditions and inherent risks present or otherwise affecting the Site.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. D&N cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome, or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by D&N. This is because this report has been written as advice and opinion rather than instructions for construction.

D&N will not be liable to update or revise the report to take into account any events or emergent circumstances or facts occurring or becoming apparent after the date of the report.

13 References

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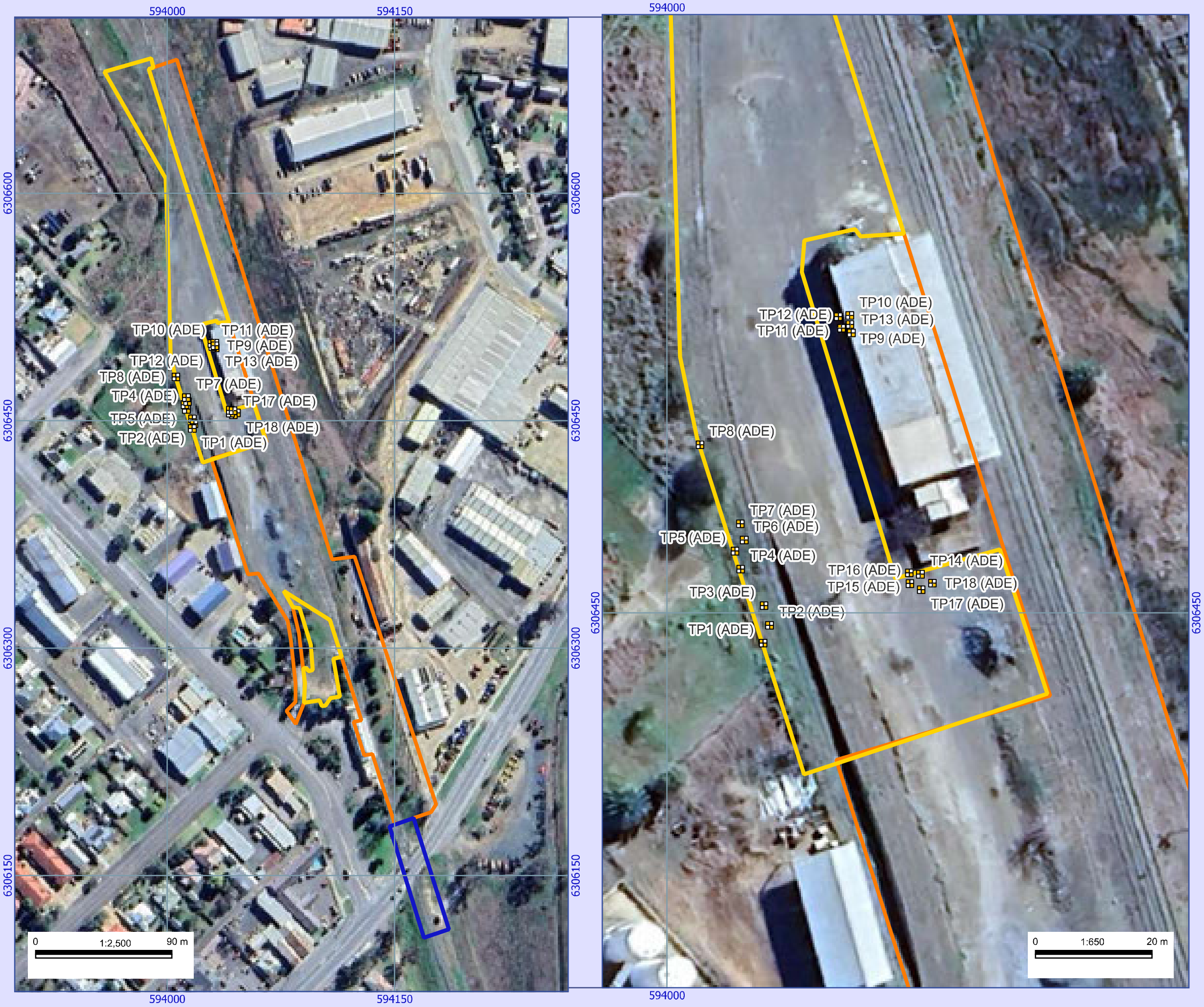
Figures

C-1859.00 | Forbes Station and Yard | Detailed Site Investigation



Legend

- 🟧 Original CIZ from determined REF
- 🟨 Forbes Yard additional CIZ
- 🟦 Forbes Station South
- ⊞ Previous Invesigation Locations (approximate)

Project Number: C-1859.00

Project Title: Forbes Station and Yard DSI

Figure Number: R1 F1

Figure Title: Investigation Location Plan

Data Source:
https://maps.six.nsw.gov.au/arcgis/rest/services/public/NSW_Imagery/MapServer

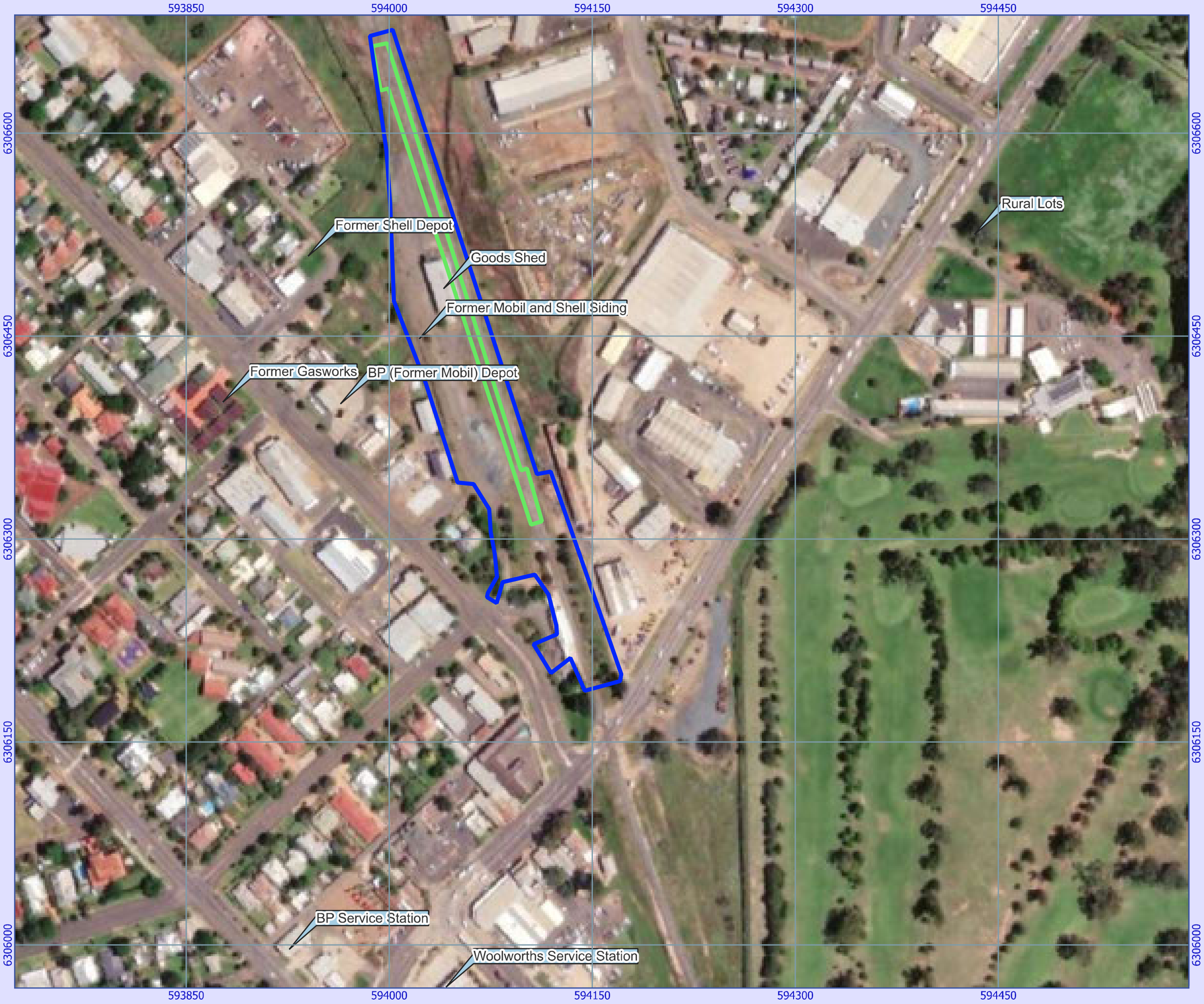
Cartographic Data and Orientation:

N

Datum: MGA2020
Coordinate Unit: Metres

Company: D&N Geotechnical
Drawn: CW
Approved: ND
Original size: A3
Date Drawn: 04/03/2024
Client: Martinus Rail

C-1859.00 | Forbes Station and Yard | Detailed Site Investigation



Legend

🟦 Site Boundary (approximate)

🟩 Investigation Area (approximate)

Project Number: C-1859.00

Project Title: Forbes Station and Yard DSI

Figure Number: R1 F2

Figure Title: Potential Contaminating Land Activities

Data Source:
https://maps.six.nsw.gov.au/arcgis/rest/services/public/NSW_Imagery/MapServer

Cartographic Data and Orientation:

N

1:2,800
Datum: MGA2020
Coordinate Unit: Metres
0 100 m

D&N

Company: D&N Geotechnical
Drawn: CW
Approved: ND
Original size: A3
Date Drawn: 23/02/2024
Client: Martinus Rail

Tables

C-1859.00-R1
Forbes Station and Yard
Detailed Site Investigation

Table T1
Analytical Results Summary - Soil

D&N Geotechnical

		BTEX								TRH							TPH					PAH																
		Naphthalene (VOC)	Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)	Xylene Total	Total BTEX	C6-C10 Fraction (F1)	C6-C10 (F1 minus BTEX)	>C10-C16 Fraction (F2)	>C10-C16 Fraction (F2 minus Naphthalene)	>C16-C34 Fraction (F3)	>C34-C40 Fraction (F4)	>C10-C40 Fraction (Sum)	C6-C9 Fraction	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction	C10-C36 Fraction (Sum)	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a) pyrene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	PAHs (Sum of total)
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand			3 | 3 | 3 | 3					230			260 | 370 | 630																											
TP01_0.0-0.2	01 Feb 2024	<0.5	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	-	<20	<20	67	67	210	<100	277	<20	72	200	62	334	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Maximum Detect		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	140	140	410	150	660	ND	120	370	140	620	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.6	ND	ND	ND	ND	0.6	1.2

🟨 2013, NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand

🟩 2013, NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Coarse Soil

🟦 2013, NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil

🟪 2013, NEPM 2013 Table 1B(5) Generic EILs for Comm/Ind, Coarse Soil

C-1859.00-R1
Forbes Station and Yard
Detailed Site Investigation

Table T1
Analytical Results Summary - Soil

D&N
Geotechnical

		Halogenated Benzenes	Inorganics		Metals								Organochlorine Pesticides																									
		Hexachlorobenzene	Moisture Content	Moisture Content (dried @ 103°C)	Arsenic	Cadmium	Chromium (III+VI)	Copper	Lead	Mercury	Nickel	Zinc	Organochlorine pesticides EPAVic	Other organochlorine pesticides EPAVic	4,4-DDE	a-BHC	Aldrin	Aldrin + Dieldrin	b-BHC	Chlordane	Chlordane (cis)	Chlordane (trans)	d-BHC	DDD	DDT	DDT+DDE+DDD	Dieldrin	Endosulfan	Endosulfan I	Endosulfan II	Endosulfan sulphate	Endrin	Endrin aldehyde	Endrin ketone	g-BHC (Lindane)	Heptachlor	Heptachlor epoxide	Methoxychlor	Toxaphene
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand																																						
TP01_0.0-0.2	01 Feb 2024	<0.05	-	14	210	0.6	11	56	57	<0.1	9.2	150	<0.1	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.5
Maximum Detect		ND	4.3	21	290	3.7	41	220	400	0.3	35	740	310.65	ND	25	ND	ND	ND	0.65	ND	ND	ND	ND	25	260	310	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

2013, NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand

2013, NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Coarse Soil

2013, NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil

2013, NEPM 2013 Table 1B(5) Generic EILs for Comm/Ind, Coarse Soil

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Table T1
Analytical Results Summary - Soil

		Organophosphorous Pesticides																																		
		Tokuthion	Azinophos methyl	Bolstar (Sulprofos)	Bromophos-ethyl	Carbophenothion	Chlorfenvinphos	Chlorpyrifos	Chlorpyrifos-methyl	Coumaphos	Demeton-O	Demeton-S	Diazinon	Dichlorvos	Dimethoate	Disulfoton	Ethion	Ethoprop	Fenitrothion	Fensulfothion	Fenthion	EPN	Malathion	Merphos	Methyl parathion	Mevinphos (Phosdrin)	Monocrotophos	Naled (Dibrom)	Omethoate	Phorate	Prothiofos	Pyrazophos	Ronnel	Terbufos	Trichloronate	Tetrachlorvinphos
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand																																				
TP01_0.0-0.2	01 Feb 2024	<0.2	<0.2	<0.2	-	-	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.2

Maximum Detect	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.6	ND	ND	ND	ND

2013, NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand

2013, NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Coarse Soil

2013, NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil

2013, NEPM 2013 Table 1B(5) Generic EILs for Comm/Ind, Coarse Soil

Table T1
Analytical Results Summary - Soil

		PCBs								Pesticides				
		Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260	PCBs (Sum of total)	Demeton-S-methyl	Fenamiphos	Parathion	Pirimiphos-methyl	Pirimphos-ethyl
NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand														
TP01_0.0-0.2	01 Feb 2024	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<0.2	<0.2	-
Maximum Detect		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

2013, NEPM 2013 Table 1A(3) Comm/Ind D Soil HSL for Vapour Intrusion, Sand

2013, NEPM 2013 Table 1B(6) ESLs for Comm/Ind, Coarse Soil

2013, NEPM 2013 Table 1A(1) HILs Comm/Ind D Soil

2013, NEPM 2013 Table 1B(5) Generic EILs for Comm/Ind, Coarse Soil

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Table T2
Analytical Results Summary - Asbestos

		Asbestos						Mass			
		ACM - Comment	AF - Comment	Bonded Asbestos	FA- Comment	Friable Asbestos (FA & AF)	Organic Fibres - Comment	Approximate Sample Mass	Mass ACM	Mass AF	Mass FA
		Comment	Comment	%w/w	Comment	%w/w	Comment				
EQL											
NEPM 2013 Table 7 Comm/Ind D HSL for Asbestos in Soil				0.05		0.001					
Field ID	**Date**										
TP01_0.0-0.2	**01 Feb 2024**	No asbestos detected at the reporting limit of 0.01% w/w.	No trace asbestos detected.	0	No trace asbestos detected.	0	Organic fibre detected.	464	0	0	0
TP01_0.5-0.6	**01 Feb 2024**	No asbestos detected at the reporting limit of 0.01% w/w.	No trace asbestos detected.	0	No trace asbestos detected.	0	Organic fibre detect				
TP02_0.0-0.2	**01 Feb 2024**	No asbestos detected at the reporting limit of 0.01% w/w.	No trace asbestos detected.	0	No trace asbestos detected.	0	Organic fibre detect				
TP02_0.5-0.6	**01 Feb 2024**	No asbestos detected at the reporting limit of 0.01% w/w.	No trace asbestos detected.	0	No trace asbestos detected.	0	Organic fibre detect				
TP03_0.0-0.2	**01 Feb 2024**	No asbestos detected at the reporting limit of 0.01% w/w.	No trace asbestos detected.	0	No trace asbestos detected.	0	Organic fibre detect				
TP03_0.5-0.6	**01 Feb 2024**	No asbestos detected at the reporting limit of 0.01% w/w.	No trace asbestos detected.	0	No trace asbestos detected.	0	Organic fibre detect				
TP04_0.5-0.6	**01 Feb 2024**	No asbestos detected at the reporting limit of 0.01% w/w.	No trace asbestos detected.	0	No trace asbestos detected.	0	Organic fibre detect				
TP05_0.0-0.2	**01 Feb 2024**	No asbestos detected at the reporting limit of 0.01% w/w.	No trace asbestos detected.	0	No trace asbestos detected.	0	Organic fibre detect				
TP05_0.0-0.2 A	**01 Feb 2024**	No asbestos detected at the reporting limit of 0.01% w/w.	No trace asbestos detected.	0	No trace asbestos detected.	0	Organic fibre detect				
		No asbestos detected at the reporting limit of 0.01% w/w.	No trace asbestos detected.		No trace asbestos detected.						
		No asbestos detected at the reporting limit of 0.01% w/w.	No trace asbestos detected.		No trace asbestos detected.						
		No asbestos detected at the reporting limit of 0.01% w/w.	No trace asbestos detected.		No trace asbestos detected.						
		No asbestos detected at the reporting limit of 0.01% w/w.	No trace asbestos detected.		No trace asbestos detected.						
		No asbestos detected at the reporting limit of 0.01% w/w.	No trace asbestos detected.		No trace asbestos detected.						
		No asbestos detected at the reporting limit of 0.01% w/w.	No trace asbestos detected.		No trace asbestos detected.						
		No asbestos detected at the reporting limit of 0.01% w/w.	No trace asbestos detected.		No trace asbestos detected.						
		No asbestos detected at the reporting limit of 0.01% w/w.	No trace asbestos detected.		No trace asbestos detected.						
		No asbestos detected at the reporting limit of 0.01% w/w.	No trace asbestos detected.		No trace asbestos detected.						
		No asbestos detected at the reporting limit of 0.01% w/w.	No trace asbestos detected.		No trace asbestos detected.						
		No asbestos detected at the reporting limit of 0.01% w/w.	No trace asbestos detected.		No trace asbestos detected.						

Number of Results	**20**	**20**	**20**	**20**	**20**	**20**	**20**	**20**	**20**	**20**

NEPM, 2013, NEPM 2013 Table 7 Comm/Ind D HSL for Asbestos in Soil

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Table T3
Analytical Results Summary - Waste (indicative)

		BTEX								TRH							TPH				
		Naphthalene (VOC)	Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)	Xylene Total	Total BTEX	C6-C10 Fraction (F1)	C6-C10 (F1 minus BTEX)	>C10-C16 Fraction (F2)	>C10-C16 Fraction (F2 minus Naphthalene)	>C16-C34 Fraction (F3)	>C34-C40 Fraction (F4)	>C10-C40 Fraction (Sum)	C6-C9 Fraction	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction	C10-C36 Fraction (Sum)
NSW 2014 Excavated Natural Material (Absolute Max)			0.5	65	25			15													500
TP01_0.0-0.2	01 Feb 2024	<0.5	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	-	<20	<20	67	67	210	<100	277	<20	72	200	62	334

		PAH																	Halogenated Benzenes	Inorganics	
		Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a) pyrene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	PAHs (Sum of total)	Hexachlorobenzene	Moisture Content	Moisture Content (dried @ 103°C)
NSW 2014 Excavated Natural Material (Absolute Max)						1												40			
TP01_0.0-0.2	01 Feb 2024	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	-	14

NSW EPA, November 2014, NSW 2014 Excavated Natural Material (Absolute Max)

NSW EPA, November 2014, NSW 2014 Excavated Natural Material (Max Average)

NSW EPA, November 2014, NSW 2014 General Solid Waste CT1 (No Leaching)

NSW EPA, November 2014, NSW 2014 General Solid Waste SCC1 (with leached)

NSW EPA, November 2014, NSW 2014 General Solid Waste TCLP1 (leached)

NSW EPA, November 2014, NSW 2014 Restricted Solid Waste CT2 (No Leaching)

NSW EPA, November 2014, NSW 2014 Restricted Solid Waste SCC2 (with leached)

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Table T3
Analytical Results Summary - Waste (indicative)

		Metals									
		Arsenic		Cadmium	Chromium (III+VI)	Copper	Lead		Mercury	Nickel	Zinc
NSW 2014 Excavated Natural Material (Absolute Max)		40		1	150	200	100		1	60	300
TP01_0.0-0.2	01 Feb 2024	210	-	0.6	11	56	57	-	<0.1	9.2	150

		Organochlorine Pesticides																										
		Organochlorine pesticides EPAVic	Other organochlorine pesticides EPAVic	4,4-DDE	a-BHC	Aldrin	Aldrin + Dieldrin	b-BHC	Chlordane	Chlordane (cis)	Chlordane (trans)	d-BHC	DDD	DDT	DDT+DDE+DDD	Dieldrin	Endosulfan	Endosulfan I	Endosulfan II	Endosulfan sulphate	Endrin	Endrin aldehyde	Endrin ketone	g-BHC (Lindane)	Heptachlor	Heptachlor epoxide	Methoxychlor	Toxaphene
NSW 2014 Excavated Natural Material (Absolute Max)																												
TP01_0.0-0.2	01 Feb 2024	<0.1	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.5

NSW EPA, November 2014, NSW 2014 Excavated Natural Material (Absolute Max)

NSW EPA, November 2014, NSW 2014 Excavated Natural Material (Max Average)

NSW EPA, November 2014, NSW 2014 General Solid Waste CT1 (No Leaching)

NSW EPA, November 2014, NSW 2014 General Solid Waste SCC1 (with leached)

NSW EPA, November 2014, NSW 2014 General Solid Waste TCLP1 (leached)

NSW EPA, November 2014, NSW 2014 Restricted Solid Waste CT2 (No Leaching)

NSW EPA, November 2014, NSW 2014 Restricted Solid Waste SCC2 (with leached)

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Forbes Station and Yard
Detailed Site Investigation

Table T3
Analytical Results Summary - Waste (indicative)

		Organophosphorous Pesticides																																			PCBs								Pesticides				
		Tokuthion	Azinophos methyl	Bolstar (Sulprofos)	Bromophos-ethyl	Carbophenothion	Chlorfenvinphos	Chlorpyrifos	Chlorpyrifos-methyl	Coumaphos	Demeton-O	Demeton-S	Diazinon	Dichlorvos	Dimethoate	Disulfoton	Ethion	Ethoprop	Fenitrothion	Fensulfothion	Fenthion	EPN	Malathion	Merphos	Methyl parathion	Mevinphos (Phosdrin)	Monocrotophos	Naled (Dibrom)	Omethoate	Phorate	Prothiofos	Pyrazophos	Ronnel	Terbufos	Trichloronate	Tetrachlorvinphos	Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260	PCBs (Sum of total)	Demeton-S-methyl	Fenamiphos	Parathion	Pirimiphos-methyl	Pirimphos-ethyl
NSW 2014 Excavated Natural Material (Absolute Max)																																																	
TP01_0.0-0.2	01 Feb 2024	<0.2	<0.2	<0.2	-	-	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<0.2	<0.2	-

NSW EPA, November 2014, NSW 2014 Excavated Natural Material (Absolute Max)

NSW EPA, November 2014, NSW 2014 Excavated Natural Material (Max Average)

NSW EPA, November 2014, NSW 2014 General Solid Waste CT1 (No Leaching)

NSW EPA, November 2014, NSW 2014 General Solid Waste SCC1 (with leached)

NSW EPA, November 2014, NSW 2014 General Solid Waste TCLP1 (leached)

NSW EPA, November 2014, NSW 2014 Restricted Solid Waste CT2 (No Leaching)

NSW EPA, November 2014, NSW 2014 Restricted Solid Waste SCC2 (with leached)

APPENDIX
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Detailed Site Investigation

Appendix A Other information source summary

STOCKINBINGAL TO PARKES
SUPPLEMENTARY REVIEW OF ENVIRONMENTAL FACTORS: FORBES STATION AND YARD

Table A1 – Other Information Sources

Information Source	Findings Summary	Recommendations
ADE, Hazardous Building Material Survey Report Forbes Goods Shed, Forbes Station, Forbes NSW dated 2 November 2020	• ACM were either detected or presumed to be present in: ○ Below building, subfloor, top of floor, debris; ○ Southern bathroom area, below tiles, fibre cement. • Synthetic Mineral Fibres (SMF) were either detected or presumed to be present in: ○ Southern bathroom area, walls, sarking. • Lead-based paint was either detected or presumed to be present in: ○ Western exterior, support beams, grey (orange undercoat) paint system. ○ Main warehouse, northern side, wooden support beams, grey paint system. • No lead containing dust (LCD) was identified within the building at the time of the inspection. • Materials containing PCB were either detected or presumed to be present in: ○ Ceiling, fluorescent lighting fixtures. • No ozone depleting substances (ODSs) were identified within the building at the time of the inspection. • At the time of the inspection, it was observed that dust and significant amounts of bird droppings were present throughout the warehouse. • Hazardous materials should be assumed to be present within inaccessible areas (i.e., Goods Shed Sub-floor).	• ACM: ○ Asbestos debris identified below building, subfloor, top of floor, and debris should be removed or labelled and enclosed/encapsulated by a Class A or B licensed asbestos removal contractor. ○ Fibre cement in southern bathroom area, below tiles, fibre cement should be maintained in its current condition and not disturbed. • SMF: ○ Sarking in southern bathroom area, walls should be maintained in its current condition and not disturbed. • Lead-based paint: ○ Flaking areas of Grey (orange undercoat) paint on the western exterior should be removed and stabilise the paint system by overpainting using lead-free paint. ○ Grey paint on the main warehouse, northern side, wooden support beams should be maintained in its current condition and not disturbed. • PCB: ○ Fluorescent lighting fixtures should be maintained in its current condition and not disturbed. • ADE recommended accumulated dust and bird droppings should be removed and entry points should be sealed to prevent bird entry.

ADE, Targeted Soil Assessment and Asbestos Removal Railway Siding, Union Street, Forbes NSW 2871 dated 2 February 2021.	• Previous investigations: o Envirowest Consulting Pty Ltd – Contamination Investigation (2006): ▪ Contamination assessment of unidentified storage facility on Lewis Street (Forbes) identified elevated levels of TRH ($>C_{10}$-C_{36}) in the surface of the carpark did not require remediation. TRH (>C10-C_{36}) are contained in the bitumen and is stable in the soil however further assessment was required to assess the levels of TRH in soils beneath bituminous asphalt. o Environmental & Safety Professionals (EES) - Asbestos Materials Survey (2014): ▪ Asbestos materials survey at the Goods Shed and Freight Centre Forbes. The 2014 survey did not identify the presence of asbestos. o Environmental Earth Sciences - Environmental Baseline Assessment (2018): ▪ Environmental baseline assessment of the railway siding and surrounding land located off Union Street, Forbes identified DDT and Lead in two locations around the exterior of the Goods Shed, asbestos fragments under the concrete platform at the Goods Shed requiring removal, Stormwater drains on-site required maintenance and the baseline assessment considered the site was suitable for industrial land uses if the recommendations provided are undertaken. o Cavvanba Consulting Pty Ltd – Contamination Summary Report (2019). ▪ Contamination Summary Report at the Forbes Good Shed, based on available documentation which noted Lead and DDT were reported on-site, bonded asbestos fragments were identified beneath the concrete loading ramp and recommended targeted soil and groundwater investigations be undertaken. • An inspection of petroleum storage and handling infrastructure on-site identified: o No evidence of Underground Petroleum Storage Systems (UPSS) being present on-site; o TRH and BTEX concentrations were reported below the adopted criteria (commercial/industrial) indicating the site had not been adversely impacted by the operation of observable petroleum storage and handling infrastructure; and o No operational fuel storage or handling was being undertaken on-site. • Soil Assessment: o Thirty-six (36) primary soil samples (excluding QA/QC) were collected and submitted for analysis. o All soil samples returned concentrations below the adopted human health and ecological site assessment criteria. o Potential Above Ground Fuel Infrastructure - TRH and BTEX concentrations were reported below the adopted criteria. No visual or olfactory contamination indicators were observed in the vicinity of the infrastructure. o Pesticide (DDT) - concentrations were reported to decrease laterally and vertically from the location of the original DDT exceedance. All concentrations from samples collected by ADE were within the nominated criteria. o Lead - Lead concentrations were reported to decrease laterally and vertically from the centre of delineation. All concentrations from samples collected by ADE were within the nominated criteria. It is noted that the lead exceedance was detected close to the western wall of the Goods Shed; and o A Hazardous Building Materials Survey (HBMS) of the Goods Shed (ADE, 2020) identified a lead-based paint system with a medium risk category to the support beams on the western exterior of the shed structure. • Asbestos: o Goods Shed: ▪ Non-friable ACM and associated dust and debris had been removed to a satisfactory standard.	ADE recommended the following: • Assessing soil in the areas potentially exposed to paint flakes and removing where identified; and • Per the advice provided in ADE HBMS 2020: • Remove flaking areas and stabilise the paint system by overpainting using lead-free paint; and • Clearance following the removal and stabilisation of flakes. • Label and enclose the sub-platform by a Class A or B licensed asbestos removal Contractor.

Information Source	Findings Summary	Recommendations
	▪ Significant bird droppings were noted within the building. These were not removed, and asbestos may be present beneath these droppings. ▪ Inaccessible ACM had been appropriately sealed with spray paint; and ▪ The Subject Area at the time of inspection was considered safe with regards to the asbestos hazard. ○ Sub-platform: ▪ Visual examination of the Subject Area following the removal works revealed the non-friable ACM and associated dust and debris had been removed from the soil surface to a satisfactory standard. ▪ The Subject Area at the time of inspection was considered safe with regards to the asbestos hazard; and ▪ ACM remains in situ within the soil subsurface under the concrete sub-platform.	
ADE, Asbestos Management Plan Railway Siding, Union Street, Forbes NSW 2871 dated 2 February 2021	ADE prepared an Asbestos Management Plan (AMP) in response to risks identified in the previous reports summarised above . The AMP was prepared to manage the risks involved in ACM remaining in the Goods Shed structure and ACM-contaminated soils. Asbestos Clearance Certificates provided indicated no ACM fragments remained within the 'subject area' as defined by the mud map accompanying the clearance certificate with the area external to the subject area identified as not considered to be impacted.	The AMP provides a process for managing asbestos risks to workers undertaking works on the Site, including an unexpected finds protocol in the event that works encounter asbestos materials.
WSP, S2P REF – Appendix I – Horizontal Clearances Surface Water Impact Assessment dated November 2021	The proposal (i.e., Site) is within an operational rail corridor and therefore has an elevated risk for unknown contaminants to be discovered during construction. Contaminants that may be present in the rail corridor include (but are not limited to) asbestos, heavy metals, TRH, BTEX, PAHs and dust or paint containing lead.	Due to the close proximity of the contaminated sites near the Forbes Station and Yard site, there is potential for contaminated soil to be present.
Martinus/Inland Rail, Detailed Design Report S2P Package: SP2 – Forbes Station Yard and Awning dated 18 January 2024	Registered or notified contaminated sites have been identified within 500 m of the proposal site as part of the REF. Where off-site migration of contamination has occurred, this may have the potential to impact soils and/or groundwater within the proposal site. Two sites recorded on the ARTC contaminated land register (Former Mobil and Shell Siding and a goods shed) have been identified. The goods shed is identified as requiring further investigation. It is concluded that contamination is known to occur within and surrounding the proposal site. Earthworks have the potential to encounter contaminated soils requiring management during construction works. No impact to the Forbes goods shed structure is envisaged as part of the proposed works. Furthermore, the proposal would not impact the ongoing management of hazardous materials within the structure. In addition, impact to groundwater is not anticipated and the risk of encountering contaminated groundwater during construction is considered to be low.	Detailed site investigations (DSI) would be undertaken by a suitably qualified and experience consultant as defined in Schedule B9 of the National Environment Protection (Assessment of Site Contamination) Measure 1999 to assess exposure risks to site workers and other receptors as a result of ground disturbances at Forbes Station and Yard clearances, which are considered to be at a higher risk of being contaminated. The results of the site investigations would be assessed against the criteria contained within the National Environment Protection (Assessment of Site Contamination) Measure 1999 to determine the need for any remediation or further management. Construction waste management plan and a contamination management plan (CMP) are to be prepared and implemented as part of the CEMP. Any excavated material would be managed in accordance with the spoil management strategy to be developed for the works and all waste generated is to be classified in accordance with the NSW Waste Classification Guidelines. CMP would include measures, processes, and responsibilities to minimise the potential for contamination impacts on the local community, workers and environment, and procedures for incident management and managing unexpected contamination finds (an unexpected finds protocol). The contamination management plan will include details of any existing site contamination for the Forbes Station and Yard clearances.

APPENDIX F

Detailed Site Investigation

Appendix B Forbes Railway Station DSI sampling and analysis quality plan

STOCKINBINGAL TO PARKES
SUPPLEMENTARY REVIEW OF ENVIRONMENTAL FACTORS: FORBES STATION AND YARD

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Project Memorandum – Sampling and Analysis Quality Plan

To:	Mohamad Hannouf	**Company:**	Martinus
CC:		**Date:**	15 February 2024
From:	Nick Davison		
Project Ref:	C-1859.00 M1		
Subject:	Forbes Station and Yard SAQP		

Introduction

As part of the Stockinbingal to Parkes Enhancement Project, Martinus Rail has engaged D&N Geotechnical Pty Ltd (D&N) to undertake a Detailed Site Investigation (DSI) to assess exposure risks to site workers and other receptors as a result of proposed ground disturbances at the Forbes Station and Yard.

This (contamination) Sampling and Analysis Quality plan (SAQP) has been prepared to outline our proposed environmental sampling and analytical program along with providing Martinus Rail with our rationale for the sampling locations, sample collection frequency and the adopted analytical schedule along with describing the assessment criteria used to interpret analytical data collected.

The SAQP has been prepared in general accordance with SAQP reporting checklist presented in Table 2.2 of the NSW Environment Protection Authority Consultants Reporting on Contaminated Land Guidelines (NSW EPA, 2020).

Background

Forbes Station and Yard (referred to as the 'Site') is located at the intersection of Union Street and Parkes Road, in Forbes NSW. Martinus Rail are planning to increase horizontal clearances within the rail corridor at the Site to accommodate double-stacked freight trains up to 1,800 m long and 6.5 m high.

The proposed Site works (at the time of writing), include removal of two (2) turnouts and associated fouled ballast, removal of siding and crane pad preparation works. Plate 1 (below) depicts the works layout planned for these works. For the purposes of this investigation, the areas of Forbes Station and Yard to be affected by the horizontal clearance works (as depicted in orange on Plate 1 below) are referred to collectively as the 'Investigation Area'. This DSI is limited to the Investigation Area as these are the areas currently proposed to be disturbed at the Site. The Forbes Station – Contamination Risks Summary

Memorandum Report[1] identifies areas of environmental concern outside of the Investigation Area requiring further investigation, however the scope of the DSI is limited to the Investigation Area as these are the areas proposed to be disturbed at the Site.

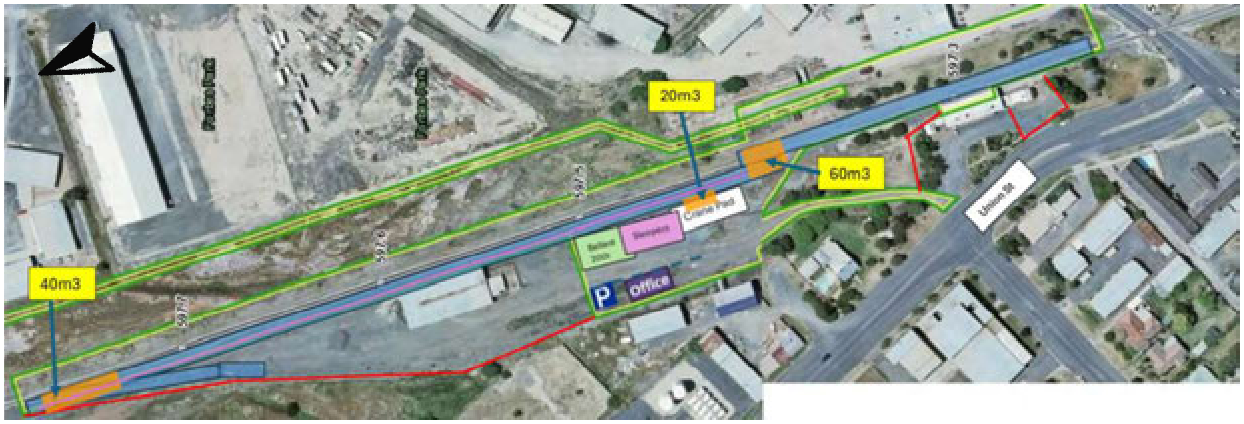

Plate 1 – Forbes Station and Yard horizontal clearance works mud map.

The proposed construction activities for the project will include:

- Removal of two (2) turnouts and fouled ballast materials, including approximately 40 cubic metres (m^3) of fouled ballast from the northern turnout and approximately 60 cubic metres (m^3) of fouled ballast from the southern turnout (as depicted on Plate 1 above).
- Removal of siding comprising approximately 400 timber sleepers.
- Crane pad preparation works comprising removal of approximately 20 m^3 of soil; and
- Shallow earthworks and/or soil disturbance up to 0.5 metres (m) in depth.

Objectives and Scope of Works

Objectives

The primary objective of these DSI works are to characterise soils (with respect to contamination) that are likely to be disturbed as part of the horizontal clearance works.

The objectives of this SAQP are:

- Outline the scope and rationale for intrusive investigations which form part of the DSI.
- Describe the methodologies employed to ensure field measurements and analytical results are obtained in accordance with relevant EPA endorsed guidelines and the ASC NEPM (1999, amended 2013).
- Define the proposed Data Quality Objectives (DQOs) and indicators (Quality Control / Assurance [QA/QC]) procedures for the DSI.

Proposed Scope of Works

The following scope of work has been proposed to meet the objectives of DSI outlined above:

- Preparation of this SAQP for review by Martinus Rail.

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[1] DJV (2024), STOCKINBINGAL TO PARKES ENHANCEMENT PROJECT, Forbes Station – Contamination Risks Summary Memorandum.

- Collect environmental soil samples from the Investigation Area at frequencies identified in this SAQP.
- Select representative soil samples for analysis targeting the suite of analytes as identified in this SAQP; and
- Review field observations and analytical results, including relevant quality control and assurance actions and provide an assessment of exposure risks to site workers and other receptors as a result of proposed ground disturbances.

Legislative Framework and Guidance

The NSW planning process for regulating land that is not significantly contaminated is guided by the following legislation:

- Environmental Planning and Assessment Act 1979 (EPA Act) and Contaminated Land Management Act 1997 (CLM Act).
- State Environmental Planning Policy or SEPP (Resilience and Hazards) 2021.

To meet these legislative requirements, this SAQP has been prepared in general accordance with the above stated guidelines, along with the following relevant guidelines:

- National Environment Protection Council (1999, amended 2013), National Environment Protection (Assessment of Site Contamination) Measure (ASC NEPM).
- NSW Environment Protection Authority (EPA) (2020) Consultants Reporting on Contaminated Land Guidelines.
- NSW Environment Protection Authority (2022) Contaminated Land Guidelines Sampling Design Part 1 – application.

Site Description and Conditions

Site Details

Table 1 below presents a summary of the Site details.

Table 1 – Site Details Summary

Attribute		Details
Property Description		Lot 1 DP1001423
Street Address		Union Street, Forbes NSW
Approximate Block Area (hectares or Ha)		18
Investigation Area (Ha)		0.3
District		Forbes Shire Council
Planning controls	Zoning	SP2 - Rail Infrastructure
	Overlays	Land Application, Lot Size, Heritage (Forbes Railway Group Significance: State). Height of Buildings
Current Land Use		Railway station and yard
Proposed Land Use		Railway station and yard

Environmental Setting

Table 2 below presents a summary of the Site's environmental setting.

Table 2 – Site Environmental Setting Summary

Attribute	Details
Topography and Hydrology	The Site is situated at an elevation between 239 metres (m) and 245 m Australian Height Datum (AHD), gently sloping (at <1%) from north to south. Surface water not infiltrating into unsealed areas (i.e., within the rail corridor) is expected to flow to the south through natural drainage lines in the Site west. Overland flow is expected to ultimately be delivered to Forbes Lake 1km south-east of the Site.
Soil Landscape	The Site is within an area mapped as the Bald Hill (bh)[2] soil landscape, comprising Shallow (<30 cm), rapidly drained Lithosols and shallow (<50 cm), well-drained Red Earths (Gn2.11, Gn2.14; Haplic Eutrophic Red Kandosols. D&N notes the Site has been historically disturbed and developed, and thus the presence of fill materials on-site is likely.
Geology	Minview[3] identifies the Site as underlain by Quaternary Alluvial channel deposits (Q_acm) comprising Unconsolidated grey humic, clayey very fine-grained sand, typically overlying light brown clayey silt.
Hydrogeology	The Bureau of Meteorology National Groundwater Information System[4] identified the Site as within a hydrological unit comprising upper, middle and lower basement aquifers. Lands situated 150 m south-east of the Site are mapped as a groundwater vulnerable area per the Forbes Local Environmental Plan (2013).

Areas of Environmental Concern and COPC

The Forbes Station – Contamination Risks Summary Memorandum Report report (the 'memorandum'), dated 18 January 2024, was provided to D&N. The memorandum report included a desktop review of the Site setting and history; however D&N understands a site walkover and intrusive investigations were not performed during the preliminary investigations.

The Memorandum provides a summary of the potential contaminant sources to the Site which are discussed in Table 3 below.

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[2] King, D.P. 1998, Soil Landscapes of the Forbes 1:250 000 Sheet Report - Department of Land & Water Conservation.

[3] https://minview.geoscience.nsw.gov.au/#/(report:strat-unit/Q_acm)?lon=148.0101&lat=-33.37922&z=17&l=ge612:y:100

[4] http://www.bom.gov.au/water/groundwater/explorer/map.shtml

Table 3 – Potential Contamination Land Activities Summary

Description	Potential Source	Source Location	Likelihood	Details
Service Stations and Depots	Former Shell Depot	Off-site (20 m west)	🟧	These sites have been notified to the NSW EPA as potentially contaminated but have not been regulated under the CLM Act, therefore there is considered to be a risk of contamination.
	BP Service Station	Off-site (260 m south)		
	Woolworths Service Station	Off-site (200 m south)		
	BP (Former Mobil) Depot	Off-site (40 m west)		
	Council Depot	Off-site (40m west)	🟩	The Memorandum states a Preliminary Site Investigation was previously conducted for the Council Depot which did not identify significant risk of contamination.
Gasworks	Former Forbes Gasworks Site	Off-site (170 m west)	🟩	The former Gasworks site was subject to notice in 1989, however remediation was undertaken at the site to the satisfaction of the EPA and the notice was revoked in 2010. The Memorandum states the site is unlikely to impact the condition of soil at the Forbes Station and Yard clearances site.
Rail Operations	Former Mobil and Shell Siding	Adjacent to Site (on Stephen Street)	🟧	The former Mobil and Shell siding has been utilised as a fuel depot siding and is listed on ARTC contaminated sites register. The Memorandum states that an assessment of the site was not available for review.
Legacy Structures	Goods Shed	Adjacent to Site	🟧	The Memorandum states the Goods Shed was previously assessed (ADE Consulting, 2020), and no soil impacts were reported over the relevant (commercial/industrial) land use criteria. An Asbestos Management Plan applies to the structure which contains Asbestos Containing Materials (ACM) and lead paint.
Agriculture	Rural Lots	Off-site (200 m east)	🟧	Agricultural lands surrounding the Site were identified during desktop searches which may have been subject to incidental uses of pesticides.

Table 4 below provides a summary of the Area's of Environmental Concern (AEC) and associated Contaminants of Potential Concern (COPC) to be targeted during this investigation based on the rationale provided in Table 3 above.

Table 4 AEC and Associated COPC

AEC	Activity	Source	COPC
Site-adjacent			
1 – Rail Operations	Chemical Storage, Use and Leaks and Spills	Persistent Chemicals	Metals – Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Zinc
		Volatile and semi-volatile chemicals	Total Recoverable Hydrocarbons (TRH), Benzene, Toluene, Ethylbenzene, Xylenes and Naphthalene (BTEXN), Polycyclic Aromatic Hydrocarbons (PAH)
	Hazardous Building Materials	Asbestos containing materials	ACM, Asbestos Fines (AF), and Fibrous Asbestos (FA), Lead-based paint (Lead)
2 – Legacy Structures	Hazardous Building Materials	Asbestos building products and hazardous materials	ACM, Asbestos Fines (AF), and Fibrous Asbestos (FA), Lead-based paint (Lead)
Off-site			
3 – Service Stations and Depots	Chemical Storage, Use and Leaks and Spills	Persistent Chemicals	Metals, Polychlorinated biphenyls (PCBs)
		Volatile and semi-volatile chemicals	TRH, BTEX, PAH
4 - Agriculture	Chemical Storage, Use and Leaks and Spills	Persistent Chemicals	Organochlorine Pesticides (OCP) and Organophosphorus Pesticides (OPP)

Sampling and Analysis Program

Data Quality Objectives

The ASC NEPM (1999, amended 2013) presents a process for establishing data quality objectives (DQOs) for an investigation site, adopted from the US Environmental Protection Agency's seven step DQO Process. To determine the type, quantity and quality of data needed to support decisions relating to the environmental condition of the Site, during the desktop assessment, D&N undertook the seven-step process to develop the DQOs in accordance with process outlined in the ASC NEPM. Table 5 presents the DQO process applied during this assessment.

Table 5 – Data Quality Objectives: Detailed Soil Investigation

DQO	Response and Activities
Step 1: State the Problem	Horizontal clearance works at the Investigation Areas may encounter contamination associated with historical and current activities identified as having either occurred on-site, or nearby. The proposed works may disturb soils in the Investigation Areas, and soil characterisation is required to assess potential soil contamination risks in these areas.

DQO	Response and Activities
Step 2: Identify the Decisions	• Is contamination present in soils on-site at concentrations exceeding relevant site assessment criteria appropriate for the proposed and/or permissible land use setting? • Is there an unacceptable risk posed by contamination (if present) to human health (current and future site users) and ecological receptors (if relevant), and will contamination risks require management during construction? • If contamination that poses an unacceptable risk to human and ecological receptors is present, is there a need for further assessment or management of the contamination?
Step 3: Identify Inputs to the Decisions	The soil sampling program is required to provide information to evaluate the Step 2 decision questions. The inputs include: • Visual inspection of Site areas, along with soils at the test pit locations. • Collection of soil samples to provide data on which to base assessment decisions. • Comparing analytical results to applicable guidelines as set out in Table 7 below to evaluate the potential for identified contamination to adversely affect receptors. • Comparing analytical results to applicable guidelines to inform
Step 4: Define the Study Boundaries	With regard to physical boundaries, the lateral boundaries of the Investigation Area are defined in Plate 2 below. The vertical extent of the investigation is up to 1.0 m BGL, which is the maximum depth of intrusive investigation. The analytical depth of investigation will be confirmed following completion of the analytical effort.
Step 5: Develop a Decision Rule	The degree of impact by contaminants and the decisions associated with accepting data was assessed with reference to the chosen site investigation levels. The decision rule is: • If the data has been collected in an appropriate manner to establish completeness, comparability, representativeness, precision and accuracy, it will be considered suitable for the purposes of this assessment; and • If soil contamination is identified on-site at concentrations exceeding the adopted site investigation levels (refer **Error! Reference source not found.**), then further assessment and/or m anagement of the contamination may be required.
Step 6: Specify Limits on Decision Errors	Two primary decision error-types may occur due to uncertainties or limitations in the project data set: • A sample/area may be deemed to pass the nominated criteria, when in fact it does not. This may occur if contamination is 'missed' due to limitations in the sampling plan, or if the project analytical data set is unreliable. • A sample/area may be deemed to fail the nominated criteria, when in fact it does not. This may occur if the project analytical data set is unreliable, due to inappropriate sampling, sample handling, or analytical procedures.
Step 7: Optimise the Design for Obtaining Data	This was achieved through the development of an appropriate sampling and analytical strategy which was reviewed and refined as necessary during the assessment evaluating field observations and analytical results. This included collection and analysis of soil samples, and visual, observation for surface asbestos containing materials.

Data Quality Indicators

To ensure that the investigation data collected is of an acceptable quality, the investigation data set will be assessed against the Data Quality Indicators (DQI). Table 6 provides a summary of field and laboratory based DQI's and procedures implemented to meet adopted DQI's.

Table 6 – Data Quality Indicators: Detailed Site Investigation

DQI	Response and Activities
Data Representativeness - expresses the degree which sample data accurately and precisely represents a characteristic of a population or an environmental condition.	Representativeness is achieved by collecting samples in an appropriate pattern across the site, and by using an adequate number of sample locations to characterise the site. Consistent and repeatable sampling techniques and methods are utilised throughout the sampling.
Completeness - defined as the percentage of measurements made which are judged to be valid measurements.	The completeness goal is set at there being sufficient valid data generated during the study. If there is insufficient valid data, then additional data are required to be collected
Comparability - is a qualitative parameter expressing the confidence with which one data set can be compared with the other set.	This is achieved through maintaining a level of consistency in techniques used to collect samples and ensuring analysing laboratories use consistent analysis techniques and reporting methods.
Precision - measures the reproducibility of measurements under a given set of conditions.	The precision of the data is assessed by calculating the Relative Percent Difference (RPD) between duplicate sample pairs. $RPD(\%) = \frac{\lvert C_o - C_d \rvert}{C_o + C_d} \times 200$ Where C_o = Analyte concentration of the original sample C_d = Analyte concentration of the duplicate sample D&N adopts a nominal acceptance criterion of 30% RPD for field duplicates and splits for inorganics and a nominal acceptance criterion of 50% RPD for field duplicates and splits for organics. However, it is noted that this will not always be achieved, particularly in heterogeneous soil or fill materials, or at low analyte concentrations.
Accuracy - measures the bias in a measurement system.	Accuracy can be undermined by such factors as field contamination of samples, poor preservation of samples, poor sample preparation techniques and poor selection of analytical techniques by the analysing laboratory. Accuracy is assessed by reference to the analytical results of laboratory control samples, laboratory spikes, laboratory blanks and analyses against reference standards. Accuracy of field works is assessed by examining the level of contamination detected in trip blanks. Blanks should return concentrations of all organic analytes as being less than the practical quantitation limit of the testing laboratory.

Assessment Criteria

For this investigation, relevant investigation and screening levels have been adopted from the following guidelines:

- ASC NEPM (1999, amended 2013) National Environment Protection (Assessment of Site Contamination) Amendment Measure, National Environment Protection Council (NEPC)
- Western Australian Department of Health (WA DoH) (2021) Guidelines for Remediation and Management of Asbestos Contaminated Sites in Western Australia
- NSW Excavated Natural Material (ENM) Order 2014 (ENM Order)

As the existing and continuing (proposed) land use at the Site is railway operations, and the Site land use zoning is SP2 – Rail Infrastructure, which does not permit sensitive uses such as child-care centres and education establishments/facilities, commercial/industrial guidelines can be implemented.

For materials to be deemed suitable for reuse on-site, the concentrations of Contaminants of Potential Concern (COPC) associated with the current and historical land uses of the particular site should not exceed the human Health-based and Ecological Investigation and Screening Levels applicable to the land use scenario occurring on-site (i.e., as defined by the permissible uses).

Under the Protection of the Environment Operations (Waste) Regulation 2014 (POEO Regulation), the NSW Environment Protection Authority (EPA) provides permission for recovery and reuse of specific 'waste' materials as resource recovery orders, exempt from the typical environmental licensing and levy requirements. For the materials proposed to be excavated, the ENM Order is considered as the applicable resource recovery order and provides conditions waste generators and consumers must meet to satisfy the requirements of the POEO Regulation.

Table 7 below presents the assessment criteria adopted for this preliminary assessment.

Table 7 – Adopted Assessment Criteria

Source Guideline(s)	**Adopted assessment Criteria**	**Soil Type**	**Depth**	**Rationale**
ASC NEPM (1999 amended 2013)	Soil Health-based Investigation Level - D (HIL-D) for non-petroleum hydrocarbon chemical contaminants	n/a	n/a	Given the Site land use is primarily industrial and does not include sensitive uses such as residential and child-care centres, the "Commercial / Industrial" land use scenario is considered appropriate for this assessment.
	Soil Health-based Screening Level – D (HSL-D) for fuel derived petroleum hydrocarbons	TBC	0 m to <1 m	
	Generic and Calculated Ecological Investigation Levels (EIL) for aged contaminants – Commercial and Industrial	n/a	0 m to 2 m	Ecological receptors on-site are considered limited to 'undeveloped' portions of the Site. Noting soil characterisation data will not be obtained as part of this investigation, the most conservative EILs and ESLs have been adopted for this assessment.
	Ecological Screening Levels (ESL) for petroleum hydrocarbons – Commercial and Industrial	TBC		
WA DoH (2021) (as presented in the ASC NEPM Schedule B1 (1999, amended 2013)	Asbestos on soil screening levels per Table 3 All Site Uses – AF & FA	n/a	n/a	The criteria for FA and AF remain fixed for all site uses as there is high uncertainty associated with quantifying asbestos concentrations below 0.01% w/w asbestos.
	Asbestos on soil screening levels per Table 3 Commercial / Industrial D – Bonded ACM	n/a	n/a	Given the Site land use is primarily industrial and does not include sensitive uses such as residential and child-care centres, the "Commercial / Industrial" land use scenario is considered appropriate for this assessment.
ENM Order (2014)	Maximum average and absolute maximum concentrations (Columns 1 and 2) in Table 4.	n/a	n/a	Given the materials proposed to be excavated on-site include soils and fouled ballast, the ENM Order criteria is considered appropriate to assess the material suitability for off-site beneficial reuse.

Intrusive Investigation and Soil Sampling Methodology

Test Pit Excavation

A total of ten (10) test pits are proposed within the Investigation Area, including:

- Four (4) test pits to a maximum depth of one (1) m below ground level (BGL) or prior refusal, within the northern turnout

- Two (2) test pits to a maximum depth of one (1) m below ground level (BGL) or prior refusal within or adjacent to the proposed crane pad.
- Four (4) test pits to maximum depth of one (1) m below ground level (BGL) or prior refusal, within the southern turnout

The proposed sampling point frequency of ten (10) investigation locations within the combined Investigation Area of up to 0.3 ha exceeds the NSW EPA (2022) Sampling Design Part 1 - Table 2 sampling requirements.

The proposed test pit locations are shown in Plate 2 – Proposed Test Pit LocationsPlate 2 below, noting locations may shift to accommodate the presence of service and utilities, or access requirements.

Plate 2 – Proposed Test Pit Locations

Manual and mechanical drilling implements will be decontaminated with the decontamination procedure to include cleaning of soil sampling equipment prior to the use (of the equipment) and between investigation locations and depths (as necessary). The equipment will be washed in a suitable detergent (i.e., Liquinox) solution, rinsed in clean water with a final rinse with laboratory-supplied deionised water and air-dried. The effectiveness of decontamination procedures will be evaluated by the collection and analysis of field rinsate samples from the sampling equipment whereby laboratory-supplied distilled water will be poured over the decontaminated sampling equipment and collected in appropriate laboratory-supplied containers and analysed (for COPC relevant to the investigation).

Recovered soils will be inspected by suitably experienced D&N field staff and classified in the field with respect to lithological characteristics and qualitatively evaluated for indications of potential contamination (e.g., odour and staining). Soil classifications and descriptions (based on the Unified Soil Classification System [USCS]) will be recorded for each borehole.

Soil Sampling, Quality Control and Sample Handling

Soil samples will be collected (from each investigation location) during hand augering and mechanical excavation, with samples collected at discrete depths, nominally including at surface (at 0.0 to 0.2 m BGL) and at 0.5 m intervals down the soil profile to a maximum depth of 1 m BGL or prior practical refusal, whichever occurs first. Samples will be transferred directly from the auger to appropriate laboratory-supplied containers with (disposable nitrile) gloved hands (with gloves changed between sample depths and sampling locations).

A corresponding sub-sample will also be collected in a plastic zip-loc bag for field screening (to determine the presence of VOC) using a PID equipped with a 10.6 electron Volt (eV) lamp, calibrated with 100 part-per-million (ppm) isobutylene. Sub-samples will be disposed of with soil cuttings (minus plastic bags, collected on-site with disposable sampling equipment for appropriate off-site disposal). Soil sampling will be conducted by suitably qualified and experienced D&N field staff.

For quality control purposes, field duplicate (intra-laboratory) and triplicate (inter-laboratory) samples will be collected at respective minimum frequencies of 10 % and 5. For quality assurance purposes, a field rinsate sample will be collected from reusable sampling implements to assess field decontamination procedures. Volatile trip spike and trip blank pairs will be carried into the field, accompanying samples during field works and transit.

Each sample will be placed directly into a chilled esky for storage and transport to the selected laboratories for receipt under Chain-of-Custody (COC) protocol within respective holding times and conditions for the analyses requested.

Soil Analysis

Select soil samples will be analysed for the COPC identified in Table 4 at the expected frequencies outlined in Table 8 below.

Table 8 – Soil Analytical Schedule

		Test Method	**Sample Type**			
			Primary	**Duplicate**	**Triplicate**	**Rinsate**
Analyte	**BTEXN**	USEPA 5030/8260	20	2	1	1
	TRH	USEPA 3510/8015	20	2	1	1
	Metals	US EPA 6010,6020	20	2	1	1
	PAH	USEPA 8270/8100	20	2	1	1
	PCB	US EPA 8082	20	2	1	1
	OCP/OPP	US EPA 8141/8081/8270	20	2	1	1
	Asbestos	AS4964	20	n/a	n/a	n/a

Reporting

Following completion of the intrusive investigation and analytical effort, an Environmental Testing report detailing the results of the investigation is to be prepared in general accordance with the following guidelines:

- National Environment Protection (Assessment of Site Contamination) Amendment Measure (1999, amended 2013);
- NSW EPA (2020) Contaminated Land Guidelines: Consultant Reporting on Contaminated Land;

The report will include:

- A summary of the works undertaken.
- Objectives of the assessment, sampling plans and methodology descriptions.
- QA/QC procedures and findings.
- Discussion of assessment criteria applicable to the site.
- Discussion of results against relevant assessment criteria.

- Attachments including site maps, sample locations, summary analytical tables, field notes, historical data review, laboratory reports, equipment calibration records, etc.

Where changes to the scope of works and/or methodologies described above are required, the DSI report will include a tabulated summary of SAQP deviations, describing the change, the reason and rationale for the change, and if necessary, a statement outlining the changes effects on data usability and reliability.

Closing

Should you have questions feel free to contact the undersigned on +61 428 347 992.

For and on behalf of D&N

Nick Davison
Principal Environmental Scientist

APPENDIX
F

Detailed Site Investigation

Appendix C Test pit logs

STOCKINBINGAL TO PARKES
SUPPLEMENTARY REVIEW OF ENVIRONMENTAL FACTORS: FORBES STATION AND YARD

D&N
Geotechnical

TEST PIT: TP01

Sheet 1 of 1

Project: Inland Rail - Forbes Station and Yard
Location: Forbes, NSW
Coords: 593998.0 m E 6306633.0 m N MGA2020-55
Client: Martinus Pty Ltd
Contractor:
Date: 1/2/2024
Job No.: C-1859.00
Machine: 5.5t Excavator Bucket Size: Excavation
Logged: EP

Excavation					Sampling		Field Material Description					
METHOD	EXCAVATION RESISTANCE	WATER	DEPTH (metres)	*DEPTH* RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
E	F	Not Encountered	0.0	*0.20*	ES 0.00-0.20 m	■		SM	FILL Silty SAND: fine to coarse grained, dark grey, pale grey-, silt is low plasticity; with fine to coarse, sub-angular to angular gravel; with clinker, with ash.	D		FILL 0.00: PID = 0.0 ppm
	F		0.2	*1.00*	ES 0.50-0.60 m	■		CL-CI	Sandy CLAY: low to medium plasticity, red, orange, sand is fine to coarse; trace fine to coarse, sub-rounded to sub-angular gravel.	w<PL	St to VSt	ALLUVIAL SOIL 0.50: PID = 0.1 ppm 1.00: PID = 0.0 ppm
			1.0						Hole Terminated at 1.00 m Target depth			

0.0, 0.2, 0.4, 0.6, 0.8, 1.0, 1.2, 1.4, 1.6, 1.8, 2.0

Comments

Checked ND
Date 9/2/2024

D&N
Geotechnical

TEST PIT: TP02

Sheet 1 of 1

Project:	Inland Rail - Forbes Station and Yard				
Location:	Forbes, NSW	Coords:	594010.0 m E 6306596.0 m N MGA2020-55		
Client:	Martinus Pty Ltd	Contractor:		Date:	1/2/2024
Job No.:	C-1859.00	Machine:	5.5t Excavator Bucket Size: Excavation	Logged:	EP

Excavation					Sampling		Field Material Description					
METHOD	EXCAVATION RESISTANCE	WATER	DEPTH (metres)	*DEPTH* RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
E	F	Not Encountered	0.0 0.2	*0.30*	ES 0.00-0.20 m			SM	FILL Silty SAND: fine to coarse grained, dark grey, pale grey-, silt is low plasticity; with fine to coarse, sub-angular to angular gravel; with clinker, with ash.	D		FILL 0.00: PID = 0.0 ppm
			0.4 0.6 0.8 1.0	*1.10*	ES 0.50-0.60 m			CL-CI	Sandy CLAY: low to medium plasticity, red, orange, sand is fine to coarse; with fine to medium, sub-rounded to sub-angular gravel.	w<PL	St to VSt	ALLUVIAL SOIL 0.50: PID = 0.1 ppm 1.00: PID = 0.1 ppm
	H		1.2	*1.20*				GC	Clayey GRAVEL: fine to coarse, sub-angular to angular, pale yellow, pale brown, mottled orange, clay is low plasticity.	D	D	EXTREMELY WEATHERED MATERIAL
			1.4 1.6 1.8 2.0						Hole Terminated at 1.20 m Target depth			

Comments

Checked ND
Date 9/2/2024

TEST PIT: TP03

Sheet 1 of 1

Project:	Inland Rail - Forbes Station and Yard				
Location:	Forbes, NSW	Coords:	594025.0 m E 6306559.0 m N MGA2020-55		
Client:	Martinus Pty Ltd	Contractor:		Date:	1/2/2024
Job No.:	C-1859.00	Machine:	5.5t Excavator Bucket Size: Excavation	Logged:	EP

Excavation					Sampling		Field Material Description					
METHOD	EXCAVATION RESISTANCE	WATER	DEPTH (metres)	*DEPTH* RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
E	F	Not Encountered	0.0 0.2		ES 0.00-0.20 m			SM	FILL Silty SAND: fine to coarse grained, brown, dark brown, silt is low plasticity; with fine to coarse, sub-angular to angular gravel; with sub-angular to angular cobbles.	D		FILL 0.00: PID = 0.1 ppm
				0.40				CL-CI	Sandy CLAY: low to medium plasticity, red, orange, sand is fine to coarse; with fine to medium, sub-rounded to sub-angular gravel.			ALLUVIAL SOIL
	F		0.4 0.6 0.8 1.0	*1.10*	ES 0.50-0.60 m					w<PL	St to VSt	0.50: PID = 0.0 ppm 1.00: PID = 0.0 ppm
			1.2 1.4 1.6 1.8 2.0						Hole Terminated at 1.10 m Target depth			

Comments

Checked ND
Date 9/2/2024

TEST PIT: TP04

Sheet 1 of 1

Project: Inland Rail - Forbes Station and Yard
Location: Forbes, NSW
Coords: 594034.0 m E 6306532.0 m N MGA2020-55
Client: Martinus Pty Ltd
Contractor:
Date: 1/2/2024
Job No.: C-1859.00
Machine: 5.5t Excavator Bucket Size: Excavation
Logged: EP

Excavation					Sampling		Field Material Description					
METHOD	EXCAVATION RESISTANCE	WATER	DEPTH (metres)	*DEPTH* RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
E	F	Not Encountered	0.0	*0.30*	ES 0.00-0.20 m	■		SM	FILL Silty SAND: fine to coarse grained, brown, dark brown, silt is low plasticity; with fine to coarse, sub-angular to angular gravel; with sub-angular to angular cobbles.	D		FILL 0.00: PID = 0.1 ppm
	F		0.2 0.4 0.6 0.8	*1.00*	ES 0.50-0.60 m	■		CL-CI	Sandy CLAY: low to medium plasticity, red, orange, sand is fine to coarse; with fine to medium, sub-rounded to sub-angular gravel.	w<PL to w≈PL	St to VSt	ALLUVIAL SOIL 0.50: PID = 0.0 ppm 1.00: PID = 0.0 ppm
	H		1.0	*1.10*				GC	Clayey GRAVEL: fine to coarse, sub-angular to angular, pale yellow, pale brown, mottled orange, clay is low plasticity.	D to M	D	EXTREMELY WEATHERED MATERIAL
			1.2 1.4 1.6 1.8 2.0						Hole Terminated at 1.10 m Target depth			

Comments

Checked ND
Date 9/2/2024

D&N 1.02.0 LIB.GLB Log IS AU TEST PIT 3C C-1859.00 FORBES DRAFT LOGS.GPJ <<DrawingFile>> 9/2/2024 15:38 10.03.00.09 Datgel Lab and In Situ Tool - DGD | Lib: D&N 1.02.0 2023-12-04 Prj: D&N 1.02.0 2023-12-04

D&N
Geotechnical

TEST PIT: TP05

Sheet 1 of 1

Project:	Inland Rail - Forbes Station and Yard				
Location:	Forbes, NSW	Coords:	594051.0 m E 6306492.0 m N MGA2020-55		
Client:	Martinus Pty Ltd	Contractor:		Date:	1/2/2024
Job No.:	C-1859.00	Machine:	Hand Auger Bucket Size: Hand Auger	Logged:	EP

Excavation					Sampling		Field Material Description					
METHOD	EXCAVATION RESISTANCE	WATER	DEPTH (metres)	*DEPTH* RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
HA	H	Not Encountered	0.0	*0.20*	ES 0.00-0.20 m			SM	FILL Gravelly Silty SAND: fine to coarse grained, dark brown, dark grey, silt is low plasticity; gravel is fine to coarse, sub-angular to angular; with sub-angular to angular cobbles.	D		FILL 0.00: PID = 0.0 ppm
	H		0.2	*0.40*	ES 0.20-0.40 m			CL	FILL Gravelly Sandy CLAY: low plasticity, brown, sand is fine to coarse; gravel is fine to coarse, sub-angular to angular; trace sub-angular to angular cobbles.	w<PL		0.00: PID = 0.0 ppm
			0.4						Hole Terminated at 0.40 m Obstruction in the hole			
			0.6									
			0.8									
			1.0									
			1.2									
			1.4									
			1.6									
			1.8									
			2.0									

Comments

Checked ND
Date 9/2/2024

TEST PIT: TP06

Sheet 1 of 1

Project: Inland Rail - Forbes Station and Yard
Location: Forbes, NSW
Coords: 594059.0 m E 6306455.0 m N MGA2020-55
Client: Martinus Pty Ltd
Contractor:
Date: 1/2/2024
Job No.: C-1859.00
Machine: 5.5t Excavator Bucket Size: Excavation
Logged: EP

Excavation					Sampling		Field Material Description					
METHOD	EXCAVATION RESISTANCE	WATER	DEPTH (metres)	*DEPTH* RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
E	F	Not Encountered	0.0	*0.40*	ES 0.00-0.20 m			SM	FILL Silty SAND: fine to coarse grained, brown, dark brown, silt is low plasticity; with fine to coarse, sub-angular to angular gravel; with sub-angular to angular cobbles.	D		FILL 0.00: PID = 0.0 ppm
	F		0.4	*1.15*	ES 0.50-0.60 m			CL-CI	Sandy CLAY: low to medium plasticity, red, orange, sand is fine to coarse; with fine to medium, sub-rounded to sub-angular gravel.	w<PL to w≈ PL	St to VSt	ALLUVIAL SOIL 0.50: PID = 0.1 ppm 1.00: PID = 0.0 ppm
	H			*1.20*				GC	Clayey GRAVEL: fine to coarse, sub-angular to angular, pale yellow, pale brown, mottled orange, clay is low plasticity.	D to M	D	EXTREMELY WEATHERED MATERIAL
			1.2						Hole Terminated at 1.20 m Target depth			

0.0, 0.2, 0.4, 0.6, 0.8, 1.0, 1.2, 1.4, 1.6, 1.8, 2.0

Comments

Checked ND
Date 9/2/2024

D&N 1.02.0 LIB.GLB Log IS AU TEST PIT 3C C-1859.00 FORBES DRAFT LOGS.GPJ <<DrawingFile>> 9/2/2024 15:38 10.03.00.09 Datgel Lab and In Situ Tool - DGD | Lib: D&N 1.02.0 2023-12-04 Prj: D&N 1.02.0 2023-12-04

TEST PIT: TP07

D&N Geotechnical

Sheet 1 of 1

Project:	Inland Rail - Forbes Station and Yard				
Location:	Forbes, NSW	Coords:	594068.0 m E 6306423.0 m N MGA2020-55		
Client:	Martinus Pty Ltd	Contractor:		Date:	1/2/2024
Job No.:	C-1859.00	Machine:	5.5t Excavator Bucket Size: Excavation	Logged:	EP

Excavation					Sampling		Field Material Description					
METHOD	EXCAVATION RESISTANCE	WATER	DEPTH (metres)	*DEPTH* RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
E	F	Not Encountered	0.0 0.2	*0.25*	ES 0.00-0.20 m			SM	FILL Silty SAND: fine to coarse grained, brown, dark brown, silt is low plasticity; with fine to coarse, sub-angular to angular gravel; with sub-angular to angular cobbles.	D		FILL 0.00: PID = 0.1 ppm
	F		0.4 0.6 0.8 1.0 1.2	*1.20*	ES 0.50-0.60 m			CL-CI	Sandy CLAY: low to medium plasticity, red, orange, sand is fine to coarse; with fine to medium, sub-rounded to sub-angular gravel.	w<PL to w≈PL	St to VSt	ALLUVIAL SOIL 0.50: PID = 0.0 ppm 1.00: PID = 0.0 ppm
	H			*1.30*				GC	Clayey GRAVEL: fine to coarse, sub-angular to angular, pale yellow, pale brown, mottled orange, clay is low plasticity.	D to M	D	EXTREMELY WEATHERED MATERIAL
			1.4 1.6 1.8 2.0						Hole Terminated at 1.30 m Target depth			

Comments

Checked ND

Date 9/2/2024

TEST PIT: TP08

Sheet 1 of 1

Project: Inland Rail - Forbes Station and Yard
Location: Forbes, NSW
Coords: 594081.0 m E 6306389.0 m N MGA2020-55
Client: Martinus Pty Ltd
Contractor:
Date: 1/2/2024
Job No.: C-1859.00
Machine: 5.5t Excavator Bucket Size: Excavation
Logged: EP

Excavation					Sampling		Field Material Description					
METHOD	EXCAVATION RESISTANCE	WATER	DEPTH (metres)	*DEPTH* RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
E	F	Not Encountered	0.0		ES 0.00-0.20 m			SM	FILL Silty SAND: fine to coarse grained, brown, dark brown, silt is low plasticity; with fine to coarse, sub-angular to angular gravel; with sub-angular to angular cobbles.	D		FILL 0.00: PID = 0.0 ppm
	F			*0.30*	ES 0.50-0.60 m			CL-CI	Sandy CLAY: low to medium plasticity, red, orange, sand is fine to coarse; with fine to medium, sub-rounded to sub-angular gravel.	w<PL to w≈ PL	St to VSt	ALLUVIAL SOIL 0.50: PID = 0.0 ppm 1.00: PID = 0.1 ppm
	H			*1.20*				GC	Clayey GRAVEL: fine to coarse, sub-angular to angular, pale yellow, pale brown, mottled orange, clay is low plasticity.	D to M	D	EXTREMELY WEATHERED MATERIAL
				1.30					Hole Terminated at 1.30 m Target depth			

0.0, 0.2, 0.4, 0.6, 0.8, 1.0, 1.2, 1.4, 1.6, 1.8, 2.0

Comments

Checked ND
Date 9/2/2024

TEST PIT: TP09

D&N Geotechnical

Sheet 1 of 1

Project:	Inland Rail - Forbes Station and Yard				
Location:	Forbes, NSW	Coords:	594096.0 m E 6306348.0 m N MGA2020-55		
Client:	Martinus Pty Ltd	Contractor:		Date:	1/2/2024
Job No.:	C-1859.00	Machine:	5.5t Excavator Bucket Size: Excavation	Logged:	EP

Excavation					Sampling		Field Material Description					
METHOD	EXCAVATION RESISTANCE	WATER	DEPTH (metres)	*DEPTH* RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
E	F	Not Encountered	0.0 0.2	*0.30*	ES 0.00-0.20 m			SM	FILL Silty SAND: fine to coarse grained, brown, dark brown, silt is low plasticity; with fine to coarse, sub-angular to angular gravel; with sub-angular to angular cobbles.	D		FILL 0.00: PID = 0.0 ppm
	F		0.4 0.6 0.8	*1.00*	ES 0.50-0.60 m ES 0.90-1.00 m			CL-CI	Silty Sandy CLAY: low to medium plasticity, red, orange, sand is fine to coarse.	w≈PL	St to VSt	ALLUVIAL SOIL 0.50: PID = 0.1 ppm 1.00: PID = 0.3 ppm
	H		1.0	*1.10*				GC	Clayey GRAVEL: fine to coarse, sub-angular to angular, pale yellow, pale brown, mottled orange, clay is low plasticity.	M	D to VD	EXTREMELY WEATHERED MATERIAL
			1.2 1.4 1.6 1.8 2.0						Hole Terminated at 1.10 m Target depth			

Comments

Checked ND

Date 9/2/2024

D&N
Geotechnical

TEST PIT: TP10

Sheet 1 of 1

Project:	Inland Rail - Forbes Station and Yard				
Location:	Forbes, NSW	Coords:	594104.0 m E 6306313.0 m N MGA2020-55		
Client:	Martinus Pty Ltd	Contractor:		Date:	1/2/2024
Job No.:	C-1859.00	Machine:	5.5t Excavator Bucket Size: Excavation	Logged:	EP

Excavation					Sampling		Field Material Description					
METHOD	EXCAVATION RESISTANCE	WATER	DEPTH (metres)	*DEPTH* RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
E	F	Not Encountered	0.0 0.2	*0.40*	ES 0.00-0.20 m	■		SM	FILL Silty SAND: fine to coarse grained, brown, dark brown, silt is low plasticity; with fine to coarse, sub-angular to angular gravel; with sub-angular to angular cobbles.	D		FILL 0.00: PID = 0.0 ppm
	F		0.4 0.6	*0.70*	ES 0.50-0.60 m	■		CL-CI	Sandy CLAY: low to medium plasticity, red, orange, sand is fine to coarse; with fine to medium, sub-rounded to sub-angular gravel.	w<PL to w≈PL	St to VSt	ALLUVIAL SOIL 0.50: PID = 0.0 ppm
	H		0.8	*1.00*				GC	Clayey GRAVEL: fine to coarse, sub-angular to angular, pale yellow, pale brown, mottled orange, clay is low plasticity.	M	D to VD	EXTREMELY WEATHERED MATERIAL 1.00: PID = 0.0 ppm
			1.0 1.2 1.4 1.6 1.8 2.0						Hole Terminated at 1.00 m Target depth			

Comments

Checked ND
Date 9/2/2024

APPENDIX

F

Detailed Site Investigation

Appendix D Laboratory certificates

STOCKINBINGAL TO PARKES
SUPPLEMENTARY REVIEW OF ENVIRONMENTAL FACTORS: FORBES STATION AND YARD

Certificate of Analysis

D & N Geotechnical Pty Ltd
Unit 11/22-38 Thynne St
Bruce
ACT 2617

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Attention: **Nick Davison**

Report **1065544-S**
Project name INLAND RAIL - FORBES STATION AND YARD
Project ID C-1859.00
Received Date Feb 05, 2024

Client Sample ID **Sample Matrix** **Eurofins Sample No.** **Date Sampled** Test/Reference	LOR	Unit	**TP01_0.0-0.2** **Soil** **R24-Fe0011003** **Feb 01, 2024**	**TP01_0.5-0.6** **Soil** **R24-Fe0011004** **Feb 01, 2024**	**TP02_0.0-0.2** **Soil** **R24-Fe0011005** **Feb 01, 2024**	**TP02_0.5-0.6** **Soil** **R24-Fe0011006** **Feb 01, 2024**
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	72	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	200	< 50	160	< 50
TRH C29-C36	50	mg/kg	62	< 50	140	< 50
TRH C10-C36 (Total)	50	mg/kg	334	< 50	300	< 50
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	79	99	80	95
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	67	< 50	< 50	< 50
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5

Client Sample ID			**TP01_0.0-0.2**	**TP01_0.5-0.6**	**TP02_0.0-0.2**	**TP02_0.5-0.6**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**R24-Fe0011003**	**R24-Fe0011004**	**R24-Fe0011005**	**R24-Fe0011006**
Date Sampled			**Feb 01, 2024**	**Feb 01, 2024**	**Feb 01, 2024**	**Feb 01, 2024**
Test/Reference	LOR	Unit				
Polycyclic Aromatic Hydrocarbons						
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	109	88	76	110
p-Terphenyl-d14 (surr.)	1	%	114	118	89	123
Organochlorine Pesticides						
Chlordanes - Total	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
4.4'-DDD	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
4.4'-DDE	0.05	mg/kg	< 0.05	< 0.05	0.07	< 0.05
4.4'-DDT	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
a-HCH	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Aldrin	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
b-HCH	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
d-HCH	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Dieldrin	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan I	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan II	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan sulphate	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endrin	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endrin aldehyde	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endrin ketone	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
g-HCH (Lindane)	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor epoxide	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Hexachlorobenzene	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Methoxychlor	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Toxaphene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Aldrin and Dieldrin (Total)*	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
DDT + DDE + DDD (Total)*	0.05	mg/kg	< 0.05	< 0.05	0.07	< 0.05
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Dibutylchlorendate (surr.)	1	%	113	102	98	129
Tetrachloro-m-xylene (surr.)	1	%	107	108	88	113
Organophosphorus Pesticides						
Azinphos-methyl	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Bolstar	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Chlorfenvinphos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Chlorpyrifos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Chlorpyrifos-methyl	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Coumaphos	2	mg/kg	< 2	< 2	< 2	< 2
Demeton-S	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Demeton-O	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Diazinon	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Dichlorvos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Dimethoate	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Disulfoton	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
EPN	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Ethion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2

Client Sample ID **Sample Matrix** **Eurofins Sample No.** **Date Sampled** Test/Reference	LOR	Unit	TP01_0.0-0.2 Soil R24-Fe0011003 Feb 01, 2024	TP01_0.5-0.6 Soil R24-Fe0011004 Feb 01, 2024	TP02_0.0-0.2 Soil R24-Fe0011005 Feb 01, 2024	TP02_0.5-0.6 Soil R24-Fe0011006 Feb 01, 2024
Organophosphorus Pesticides						
Ethoprop	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Ethyl parathion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Fenitrothion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Fensulfothion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Fenthion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Malathion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Merphos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Methyl parathion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Mevinphos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Monocrotophos	2	mg/kg	< 2	< 2	< 2	< 2
Naled	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Omethoate	2	mg/kg	< 2	< 2	< 2	< 2
Phorate	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Pirimiphos-methyl	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Pyrazophos	0.2	mg/kg	< 0.2	< 0.2	0.6	< 0.2
Ronnel	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Terbufos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Tetrachlorvinphos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Tokuthion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Trichloronate	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Triphenylphosphate (surr.)	1	%	107	97	78	117
Polychlorinated Biphenyls						
Aroclor-1016	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Aroclor-1221	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Aroclor-1232	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Aroclor-1242	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Aroclor-1248	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Aroclor-1254	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Aroclor-1260	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Total PCB*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Dibutylchlorendate (surr.)	1	%	113	102	98	129
Tetrachloro-m-xylene (surr.)	1	%	107	108	88	113
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	50	mg/kg	67	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	210	< 100	280	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	277	< 100	280	< 100
Metals M8						
Arsenic	2	mg/kg	210	11	290	20
Cadmium	0.4	mg/kg	0.6	< 0.4	< 0.4	< 0.4
Chromium	5	mg/kg	11	31	10.0	32
Copper	5	mg/kg	56	11	61	14
Lead	5	mg/kg	57	11	75	9.9
Mercury	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	9.2	7.3	8.0	17
Zinc	5	mg/kg	150	14	120	22
Sample Properties						
% Moisture	1	%	14	14	12	17

Client Sample ID			**TP03_0.0-0.2**	**TP03_0.5-0.6**	**TP04_0.0-0.2**	**TP04_0.5-0.6**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**R24-Fe0011007**	**R24-Fe0011008**	**R24-Fe0011009**	**R24-Fe0011010**
Date Sampled			**Feb 01, 2024**	**Feb 01, 2024**	**Feb 01, 2024**	**Feb 01, 2024**
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	120	< 20
TRH C15-C28	50	mg/kg	77	< 50	370	< 50
TRH C29-C36	50	mg/kg	< 50	< 50	130	< 50
TRH C10-C36 (Total)	50	mg/kg	77	< 50	620	< 50
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	103	90	91	87
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene^{N02}	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH >C10-C16 less Naphthalene (F2)^{N01}	50	mg/kg	< 50	< 50	140	< 50
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)^{N04}	20	mg/kg	< 20	< 20	< 20	< 20
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene^{N07}	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	90	108	93	110
p-Terphenyl-d14 (surr.)	1	%	94	118	113	122
Organochlorine Pesticides						
Chlordanes - Total	0.1	mg/kg	< 1	< 0.1	< 1	< 0.1
4.4'-DDD	0.05	mg/kg	< 0.5	< 0.05	25	< 0.05
4.4'-DDE	0.05	mg/kg	1.4	< 0.05	25	< 0.05
4.4'-DDT	0.05	mg/kg	< 0.5	< 0.05	260	< 0.05
a-HCH	0.05	mg/kg	< 0.5	< 0.05	< 0.5	< 0.05
Aldrin	0.05	mg/kg	< 0.5	< 0.05	< 0.5	< 0.05
b-HCH	0.05	mg/kg	< 0.5	< 0.05	0.65	< 0.05

Client Sample ID			TP03_0.0-0.2	TP03_0.5-0.6	TP04_0.0-0.2	TP04_0.5-0.6
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**R24-Fe0011007**	**R24-Fe0011008**	**R24-Fe0011009**	**R24-Fe0011010**
Date Sampled			Feb 01, 2024	Feb 01, 2024	Feb 01, 2024	Feb 01, 2024
Test/Reference	LOR	Unit				
Organochlorine Pesticides						
d-HCH	0.05	mg/kg	< 0.5	< 0.05	< 0.5	< 0.05
Dieldrin	0.05	mg/kg	< 0.5	< 0.05	< 0.5	< 0.05
Endosulfan I	0.05	mg/kg	< 0.5	< 0.05	< 0.5	< 0.05
Endosulfan II	0.05	mg/kg	< 0.5	< 0.05	< 0.5	< 0.05
Endosulfan sulphate	0.05	mg/kg	< 0.5	< 0.05	< 0.5	< 0.05
Endrin	0.05	mg/kg	< 0.5	< 0.05	< 0.5	< 0.05
Endrin aldehyde	0.05	mg/kg	< 0.5	< 0.05	< 0.5	< 0.05
Endrin ketone	0.05	mg/kg	< 0.5	< 0.05	< 0.5	< 0.05
g-HCH (Lindane)	0.05	mg/kg	< 0.5	< 0.05	< 0.5	< 0.05
Heptachlor	0.05	mg/kg	< 0.5	< 0.05	< 0.5	< 0.05
Heptachlor epoxide	0.05	mg/kg	< 0.5	< 0.05	< 0.5	< 0.05
Hexachlorobenzene	0.05	mg/kg	< 0.5	< 0.05	< 0.5	< 0.05
Methoxychlor	0.05	mg/kg	< 0.5	< 0.05	< 0.5	< 0.05
Toxaphene	0.5	mg/kg	< 10	< 0.5	< 10	< 0.5
Aldrin and Dieldrin (Total)*	0.05	mg/kg	< 0.5	< 0.05	< 0.5	< 0.05
DDT + DDE + DDD (Total)*	0.05	mg/kg	1.4	< 0.05	310	< 0.05
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	1.4	< 0.1	310.65	< 0.1
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	< 1	< 0.1	< 1	< 0.1
Dibutylchlorendate (surr.)	1	%	108	121	75	126
Tetrachloro-m-xylene (surr.)	1	%	93	108	90	111
Organophosphorus Pesticides						
Azinphos-methyl	0.2	mg/kg	< 0.5	< 0.2	< 0.2	< 0.2
Bolstar	0.2	mg/kg	< 0.5	< 0.2	< 0.2	< 0.2
Chlorfenvinphos	0.2	mg/kg	< 0.5	< 0.2	< 0.2	< 0.2
Chlorpyrifos	0.2	mg/kg	< 0.5	< 0.2	< 0.2	< 0.2
Chlorpyrifos-methyl	0.2	mg/kg	< 0.5	< 0.2	< 0.2	< 0.2
Coumaphos	2	mg/kg	< 5	< 2	< 2	< 2
Demeton-S	0.2	mg/kg	< 0.5	< 0.2	< 0.2	< 0.2
Demeton-O	0.2	mg/kg	< 0.5	< 0.2	< 0.2	< 0.2
Diazinon	0.2	mg/kg	< 0.5	< 0.2	< 0.2	< 0.2
Dichlorvos	0.2	mg/kg	< 0.5	< 0.2	< 0.2	< 0.2
Dimethoate	0.2	mg/kg	< 0.5	< 0.2	< 0.2	< 0.2
Disulfoton	0.2	mg/kg	< 0.5	< 0.2	< 0.2	< 0.2
EPN	0.2	mg/kg	< 0.5	< 0.2	< 0.2	< 0.2
Ethion	0.2	mg/kg	< 0.5	< 0.2	< 0.2	< 0.2
Ethoprop	0.2	mg/kg	< 0.5	< 0.2	< 0.2	< 0.2
Ethyl parathion	0.2	mg/kg	< 0.5	< 0.2	< 0.2	< 0.2
Fenitrothion	0.2	mg/kg	< 0.5	< 0.2	< 0.2	< 0.2
Fensulfothion	0.2	mg/kg	< 0.5	< 0.2	< 0.2	< 0.2
Fenthion	0.2	mg/kg	< 0.5	< 0.2	< 0.2	< 0.2
Malathion	0.2	mg/kg	< 0.5	< 0.2	< 0.2	< 0.2
Merphos	0.2	mg/kg	< 0.5	< 0.2	< 0.2	< 0.2
Methyl parathion	0.2	mg/kg	< 0.5	< 0.2	< 0.2	< 0.2
Mevinphos	0.2	mg/kg	< 0.5	< 0.2	< 0.2	< 0.2
Monocrotophos	2	mg/kg	< 5	< 2	< 2	< 2
Naled	0.2	mg/kg	< 0.5	< 0.2	< 0.2	< 0.2
Omethoate	2	mg/kg	< 5	< 2	< 2	< 2
Phorate	0.2	mg/kg	< 0.5	< 0.2	< 0.2	< 0.2
Pirimiphos-methyl	0.2	mg/kg	< 0.5	< 0.2	< 0.2	< 0.2

Client Sample ID Sample Matrix Eurofins Sample No. Date Sampled Test/Reference	LOR	Unit	TP03_0.0-0.2 Soil R24-Fe0011007 Feb 01, 2024	TP03_0.5-0.6 Soil R24-Fe0011008 Feb 01, 2024	TP04_0.0-0.2 Soil R24-Fe0011009 Feb 01, 2024	TP04_0.5-0.6 Soil R24-Fe0011010 Feb 01, 2024
Organophosphorus Pesticides						
Pyrazophos	0.2	mg/kg	< 0.5	< 0.2	< 0.2	< 0.2
Ronnel	0.2	mg/kg	< 0.5	< 0.2	< 0.2	< 0.2
Terbufos	0.2	mg/kg	< 0.5	< 0.2	< 0.2	< 0.2
Tetrachlorvinphos	0.2	mg/kg	< 0.5	< 0.2	< 0.2	< 0.2
Tokuthion	0.2	mg/kg	< 0.5	< 0.2	< 0.2	< 0.2
Trichloronate	0.2	mg/kg	< 0.5	< 0.2	< 0.2	< 0.2
Triphenylphosphate (surr.)	1	%	83	119	97	115
Polychlorinated Biphenyls						
Aroclor-1016	0.1	mg/kg	< 1	< 0.1	< 0.1	< 0.1
Aroclor-1221	0.1	mg/kg	< 1	< 0.1	< 0.1	< 0.1
Aroclor-1232	0.1	mg/kg	< 1	< 0.1	< 0.1	< 0.1
Aroclor-1242	0.1	mg/kg	< 1	< 0.1	< 0.1	< 0.1
Aroclor-1248	0.1	mg/kg	< 1	< 0.1	< 0.1	< 0.1
Aroclor-1254	0.1	mg/kg	< 1	< 0.1	< 0.1	< 0.1
Aroclor-1260	0.1	mg/kg	< 1	< 0.1	< 0.1	< 0.1
Total PCB*	0.1	mg/kg	< 1	< 0.1	< 0.1	< 0.1
Dibutylchlorendate (surr.)	1	%	108	121	75	126
Tetrachloro-m-xylene (surr.)	1	%	93	108	90	111
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	50	mg/kg	< 50	< 50	140	< 50
TRH >C16-C34	100	mg/kg	110	< 100	410	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	110	< 100
TRH >C10-C40 (total)*	100	mg/kg	110	< 100	660	< 100
Metals M8						
Arsenic	2	mg/kg	160	14	160	68
Cadmium	0.4	mg/kg	3.4	< 0.4	2.4	< 0.4
Chromium	5	mg/kg	25	32	23	34
Copper	5	mg/kg	120	19	140	29
Lead	5	mg/kg	220	11	260	15
Mercury	0.1	mg/kg	0.1	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	13	23	28	28
Zinc	5	mg/kg	410	26	600	45
Sample Properties						
% Moisture	1	%	4.0	21	3.3	17

Client Sample ID Sample Matrix Eurofins Sample No. Date Sampled Test/Reference	LOR	Unit	TP05_0.0-0.2 Soil R24-Fe0011011 Feb 01, 2024	TP05_0.2-0.4 Soil R24-Fe0011012 Feb 01, 2024	TP06_0.0-0.2 Soil R24-Fe0011013 Feb 01, 2024	TP06_0.5-0.6 Soil R24-Fe0011014 Feb 01, 2024
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	< 50	< 50	100	< 50
TRH C29-C36	50	mg/kg	< 50	< 50	130	< 50
TRH C10-C36 (Total)	50	mg/kg	< 50	< 50	230	< 50

Client Sample ID **Sample Matrix** **Eurofins Sample No.** **Date Sampled** Test/Reference	LOR	Unit	**TP05_0.0-0.2** **Soil** **R24-Fe0011011** **Feb 01, 2024**	**TP05_0.2-0.4** **Soil** **R24-Fe0011012** **Feb 01, 2024**	**TP06_0.0-0.2** **Soil** **R24-Fe0011013** **Feb 01, 2024**	**TP06_0.5-0.6** **Soil** **R24-Fe0011014** **Feb 01, 2024**
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	96	77	97	100
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50	< 50
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene[N07]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	0.6	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	0.6	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	1.2	< 0.5
2-Fluorobiphenyl (surr.)	1	%	90	109	95	111
p-Terphenyl-d14 (surr.)	1	%	101	118	106	127
Organochlorine Pesticides						
Chlordanes - Total	0.1	mg/kg	< 0.1	< 0.1	< 1	< 0.1
4.4'-DDD	0.05	mg/kg	< 0.05	< 0.05	< 0.5	< 0.05
4.4'-DDE	0.05	mg/kg	0.12	< 0.05	2.6	< 0.05
4.4'-DDT	0.05	mg/kg	0.07	< 0.05	< 0.5	< 0.05
a-HCH	0.05	mg/kg	< 0.05	< 0.05	< 0.5	< 0.05
Aldrin	0.05	mg/kg	< 0.05	< 0.05	< 0.5	< 0.05
b-HCH	0.05	mg/kg	< 0.05	< 0.05	< 0.5	< 0.05
d-HCH	0.05	mg/kg	< 0.05	< 0.05	< 0.5	< 0.05
Dieldrin	0.05	mg/kg	< 0.05	< 0.05	< 0.5	< 0.05
Endosulfan I	0.05	mg/kg	< 0.05	< 0.05	< 0.5	< 0.05
Endosulfan II	0.05	mg/kg	< 0.05	< 0.05	< 0.5	< 0.05
Endosulfan sulphate	0.05	mg/kg	< 0.05	< 0.05	< 0.5	< 0.05
Endrin	0.05	mg/kg	< 0.05	< 0.05	< 0.5	< 0.05

Client Sample ID **Sample Matrix** **Eurofins Sample No.** **Date Sampled** Test/Reference	LOR	Unit	**TP05_0.0-0.2** **Soil** **R24-Fe0011011** **Feb 01, 2024**	**TP05_0.2-0.4** **Soil** **R24-Fe0011012** **Feb 01, 2024**	**TP06_0.0-0.2** **Soil** **R24-Fe0011013** **Feb 01, 2024**	**TP06_0.5-0.6** **Soil** **R24-Fe0011014** **Feb 01, 2024**
Organochlorine Pesticides						
Endrin aldehyde	0.05	mg/kg	< 0.05	< 0.05	< 0.5	< 0.05
Endrin ketone	0.05	mg/kg	< 0.05	< 0.05	< 0.5	< 0.05
g-HCH (Lindane)	0.05	mg/kg	< 0.05	< 0.05	< 0.5	< 0.05
Heptachlor	0.05	mg/kg	< 0.05	< 0.05	< 0.5	< 0.05
Heptachlor epoxide	0.05	mg/kg	< 0.05	< 0.05	< 0.5	< 0.05
Hexachlorobenzene	0.05	mg/kg	< 0.05	< 0.05	< 0.5	< 0.05
Methoxychlor	0.05	mg/kg	< 0.05	< 0.05	< 0.5	< 0.05
Toxaphene	0.5	mg/kg	< 0.5	< 0.5	< 10	< 0.5
Aldrin and Dieldrin (Total)*	0.05	mg/kg	< 0.05	< 0.05	< 0.5	< 0.05
DDT + DDE + DDD (Total)*	0.05	mg/kg	0.19	< 0.05	2.6	< 0.05
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	0.19	< 0.1	2.6	< 0.1
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	< 0.1	< 0.1	< 1	< 0.1
Dibutylchlorendate (surr.)	1	%	92	141	105	129
Tetrachloro-m-xylene (surr.)	1	%	98	113	100	112
Organophosphorus Pesticides						
Azinphos-methyl	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Bolstar	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Chlorfenvinphos	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Chlorpyrifos	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Chlorpyrifos-methyl	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Coumaphos	2	mg/kg	< 2	< 2	< 5	< 2
Demeton-S	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Demeton-O	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Diazinon	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Dichlorvos	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Dimethoate	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Disulfoton	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
EPN	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Ethion	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Ethoprop	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Ethyl parathion	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Fenitrothion	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Fensulfothion	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Fenthion	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Malathion	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Merphos	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Methyl parathion	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Mevinphos	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Monocrotophos	2	mg/kg	< 2	< 2	< 5	< 2
Naled	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Omethoate	2	mg/kg	< 2	< 2	< 5	< 2
Phorate	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Pirimiphos-methyl	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Pyrazophos	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Ronnel	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Terbufos	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Tetrachlorvinphos	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Tokuthion	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Trichloronate	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Triphenylphosphate (surr.)	1	%	87	121	90	118

Client Sample ID			**TP05_0.0-0.2**	**TP05_0.2-0.4**	**TP06_0.0-0.2**	**TP06_0.5-0.6**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**R24-Fe0011011**	**R24-Fe0011012**	**R24-Fe0011013**	**R24-Fe0011014**
Date Sampled			**Feb 01, 2024**	**Feb 01, 2024**	**Feb 01, 2024**	**Feb 01, 2024**
Test/Reference	LOR	Unit				
Polychlorinated Biphenyls						
Aroclor-1016	0.1	mg/kg	< 0.1	< 0.1	< 1	< 0.1
Aroclor-1221	0.1	mg/kg	< 0.1	< 0.1	< 1	< 0.1
Aroclor-1232	0.1	mg/kg	< 0.1	< 0.1	< 1	< 0.1
Aroclor-1242	0.1	mg/kg	< 0.1	< 0.1	< 1	< 0.1
Aroclor-1248	0.1	mg/kg	< 0.1	< 0.1	< 1	< 0.1
Aroclor-1254	0.1	mg/kg	< 0.1	< 0.1	< 1	< 0.1
Aroclor-1260	0.1	mg/kg	< 0.1	< 0.1	< 1	< 0.1
Total PCB*	0.1	mg/kg	< 0.1	< 0.1	< 1	< 0.1
Dibutylchlorendate (surr.)	1	%	92	141	105	129
Tetrachloro-m-xylene (surr.)	1	%	98	113	100	112
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100	190	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	150	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 100	< 100	340	< 100
Metals M8						
Arsenic	2	mg/kg	49	92	88	20
Cadmium	0.4	mg/kg	0.4	< 0.4	2.5	< 0.4
Chromium	5	mg/kg	8.3	24	38	18
Copper	5	mg/kg	70	29	190	18
Lead	5	mg/kg	67	43	400	5.8
Mercury	0.1	mg/kg	< 0.1	< 0.1	0.1	< 0.1
Nickel	5	mg/kg	5.3	24	23	35
Zinc	5	mg/kg	420	100	740	20
Sample Properties						
% Moisture	1	%	< 1	15	4.3	18

Client Sample ID			**TP07_0.0-0.2**	**TP07_0.5-0.6**	**TP08_0.0-0.2**	**TP08_0.5-0.6**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**R24-Fe0011015**	**R24-Fe0011016**	**R24-Fe0011017**	**R24-Fe0011018**
Date Sampled			**Feb 01, 2024**	**Feb 01, 2024**	**Feb 01, 2024**	**Feb 01, 2024**
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	< 20	< 20
TRH C15-C28	50	mg/kg	98	< 50	100	< 50
TRH C29-C36	50	mg/kg	< 50	< 50	68	< 50
TRH C10-C36 (Total)	50	mg/kg	98	< 50	168	< 50
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	93	87	99	94

Client Sample ID			**TP07_0.0-0.2**	**TP07_0.5-0.6**	**TP08_0.0-0.2**	**TP08_0.5-0.6**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**R24-Fe0011015**	**R24-Fe0011016**	**R24-Fe0011017**	**R24-Fe0011018**
Date Sampled			**Feb 01, 2024**	**Feb 01, 2024**	**Feb 01, 2024**	**Feb 01, 2024**
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene^{N02}	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH >C10-C16 less Naphthalene (F2)^{N01}	50	mg/kg	< 50	< 50	< 50	< 50
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)^{N04}	20	mg/kg	< 20	< 20	< 20	< 20
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene^{N07}	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	98	113	121	83
p-Terphenyl-d14 (surr.)	1	%	104	121	122	INT
Organochlorine Pesticides						
Chlordanes - Total	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
4.4'-DDD	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
4.4'-DDE	0.05	mg/kg	0.12	< 0.05	0.21	< 0.05
4.4'-DDT	0.05	mg/kg	0.06	< 0.05	0.05	< 0.05
a-HCH	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Aldrin	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
b-HCH	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
d-HCH	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Dieldrin	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan I	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan II	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endosulfan sulphate	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endrin	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endrin aldehyde	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Endrin ketone	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
g-HCH (Lindane)	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Heptachlor epoxide	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Hexachlorobenzene	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Methoxychlor	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Toxaphene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5

Client Sample ID **Sample Matrix** **Eurofins Sample No.** **Date Sampled** Test/Reference	LOR	Unit	**TP07_0.0-0.2** **Soil** **R24-Fe0011015** **Feb 01, 2024**	**TP07_0.5-0.6** **Soil** **R24-Fe0011016** **Feb 01, 2024**	**TP08_0.0-0.2** **Soil** **R24-Fe0011017** **Feb 01, 2024**	**TP08_0.5-0.6** **Soil** **R24-Fe0011018** **Feb 01, 2024**
Organochlorine Pesticides						
Aldrin and Dieldrin (Total)*	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
DDT + DDE + DDD (Total)*	0.05	mg/kg	0.18	< 0.05	0.26	< 0.05
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	0.18	< 0.1	0.26	< 0.1
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Dibutylchlorendate (surr.)	1	%	111	147	131	INT
Tetrachloro-m-xylene (surr.)	1	%	106	114	115	INT
Organophosphorus Pesticides						
Azinphos-methyl	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Bolstar	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Chlorfenvinphos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Chlorpyrifos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Chlorpyrifos-methyl	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Coumaphos	2	mg/kg	< 2	< 2	< 2	< 2
Demeton-S	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Demeton-O	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Diazinon	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Dichlorvos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Dimethoate	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Disulfoton	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
EPN	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Ethion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Ethoprop	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Ethyl parathion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Fenitrothion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Fensulfothion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Fenthion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Malathion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Merphos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Methyl parathion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Mevinphos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Monocrotophos	2	mg/kg	< 2	< 2	< 2	< 2
Naled	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Omethoate	2	mg/kg	< 2	< 2	< 2	< 2
Phorate	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Pirimiphos-methyl	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Pyrazophos	0.2	mg/kg	< 0.2	< 0.2	0.2	< 0.2
Ronnel	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Terbufos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Tetrachlorvinphos	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Tokuthion	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Trichloronate	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Triphenylphosphate (surr.)	1	%	87	123	102	146
Polychlorinated Biphenyls						
Aroclor-1016	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Aroclor-1221	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Aroclor-1232	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Aroclor-1242	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Aroclor-1248	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Aroclor-1254	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1

Client Sample ID **Sample Matrix** **Eurofins Sample No.** **Date Sampled** Test/Reference	LOR	Unit	**TP07_0.0-0.2** **Soil** **R24-Fe0011015** **Feb 01, 2024**	**TP07_0.5-0.6** **Soil** **R24-Fe0011016** **Feb 01, 2024**	**TP08_0.0-0.2** **Soil** **R24-Fe0011017** **Feb 01, 2024**	**TP08_0.5-0.6** **Soil** **R24-Fe0011018** **Feb 01, 2024**
Polychlorinated Biphenyls						
Aroclor-1260	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Total PCB*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Dibutylchlorendate (surr.)	1	%	111	147	131	INT
Tetrachloro-m-xylene (surr.)	1	%	106	114	115	INT
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	120	< 100	130	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	120	< 100	130	< 100
Metals M8						
Arsenic	2	mg/kg	160	37	77	21
Cadmium	0.4	mg/kg	3.6	< 0.4	0.6	< 0.4
Chromium	5	mg/kg	9.0	31	11	41
Copper	5	mg/kg	58	19	43	18
Lead	5	mg/kg	210	16	80	19
Mercury	0.1	mg/kg	0.2	< 0.1	< 0.1	< 0.1
Nickel	5	mg/kg	7.1	18	8.4	16
Zinc	5	mg/kg	600	46	200	38
Sample Properties						
% Moisture	1	%	1.7	14	4.9	13

Client Sample ID **Sample Matrix** **Eurofins Sample No.** **Date Sampled** Test/Reference	LOR	Unit	**TP09_0.0-0.2** **Soil** **R24-Fe0011019** **Feb 01, 2024**	**TP09_0.5-0.6** **Soil** **R24-Fe0011020** **Feb 01, 2024**	**TP10_0.0-0.2** **Soil** **R24-Fe0011021** **Feb 01, 2024**	**TP10_0.5-0.6** **Soil** **R24-Fe0011022** **Feb 01, 2024**
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	< 20	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	22	< 20
TRH C15-C28	50	mg/kg	63	< 50	140	< 50
TRH C29-C36	50	mg/kg	< 50	< 50	67	< 50
TRH C10-C36 (Total)	50	mg/kg	63	< 50	229	< 50
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
4-Bromofluorobenzene (surr.)	1	%	74	92	104	93
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene[N02]	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
TRH >C10-C16 less Naphthalene (F2)[N01]	50	mg/kg	< 50	< 50	< 50	< 50
TRH C6-C10	20	mg/kg	< 20	< 20	< 20	< 20
TRH C6-C10 less BTEX (F1)[N04]	20	mg/kg	< 20	< 20	< 20	< 20

Client Sample ID **Sample Matrix** **Eurofins Sample No.** **Date Sampled** Test/Reference	LOR	Unit	**TP09_0.0-0.2** **Soil** **R24-Fe0011019** **Feb 01, 2024**	**TP09_0.5-0.6** **Soil** **R24-Fe0011020** **Feb 01, 2024**	**TP10_0.0-0.2** **Soil** **R24-Fe0011021** **Feb 01, 2024**	**TP10_0.5-0.6** **Soil** **R24-Fe0011022** **Feb 01, 2024**
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	0.6	0.6
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	1.2	1.2
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(b&j)fluoranthene^{N07}	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Chrysene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Fluorene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Pyrene	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
2-Fluorobiphenyl (surr.)	1	%	81	92	93	92
p-Terphenyl-d14 (surr.)	1	%	90	123	98	105
Organochlorine Pesticides						
Chlordanes - Total	0.1	mg/kg	< 0.1	< 0.1	< 1	< 0.1
4.4'-DDD	0.05	mg/kg	< 0.05	< 0.05	< 0.5	< 0.05
4.4'-DDE	0.05	mg/kg	< 0.05	< 0.05	< 0.5	< 0.05
4.4'-DDT	0.05	mg/kg	< 0.05	< 0.05	< 0.5	< 0.05
a-HCH	0.05	mg/kg	< 0.05	< 0.05	< 0.5	< 0.05
Aldrin	0.05	mg/kg	< 0.05	< 0.05	< 0.5	< 0.05
b-HCH	0.05	mg/kg	< 0.05	< 0.05	< 0.5	< 0.05
d-HCH	0.05	mg/kg	< 0.05	< 0.05	< 0.5	< 0.05
Dieldrin	0.05	mg/kg	< 0.05	< 0.05	< 0.5	< 0.05
Endosulfan I	0.05	mg/kg	< 0.05	< 0.05	< 0.5	< 0.05
Endosulfan II	0.05	mg/kg	< 0.05	< 0.05	< 0.5	< 0.05
Endosulfan sulphate	0.05	mg/kg	< 0.05	< 0.05	< 0.5	< 0.05
Endrin	0.05	mg/kg	< 0.05	< 0.05	< 0.5	< 0.05
Endrin aldehyde	0.05	mg/kg	< 0.05	< 0.05	< 0.5	< 0.05
Endrin ketone	0.05	mg/kg	< 0.05	< 0.05	< 0.5	< 0.05
g-HCH (Lindane)	0.05	mg/kg	< 0.05	< 0.05	< 0.5	< 0.05
Heptachlor	0.05	mg/kg	< 0.05	< 0.05	< 0.5	< 0.05
Heptachlor epoxide	0.05	mg/kg	< 0.05	< 0.05	< 0.5	< 0.05
Hexachlorobenzene	0.05	mg/kg	< 0.05	< 0.05	< 0.5	< 0.05
Methoxychlor	0.05	mg/kg	< 0.05	< 0.05	< 0.5	< 0.05
Toxaphene	0.5	mg/kg	< 0.5	< 0.5	< 10	< 0.5
Aldrin and Dieldrin (Total)*	0.05	mg/kg	< 0.05	< 0.05	< 0.5	< 0.05
DDT + DDE + DDD (Total)*	0.05	mg/kg	< 0.05	< 0.05	< 0.5	< 0.05
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	< 0.1	< 0.1	< 1	< 0.1
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	< 0.1	< 0.1	< 1	< 0.1
Dibutylchlorendate (surr.)	1	%	75	91	74	105
Tetrachloro-m-xylene (surr.)	1	%	96	101	105	118

Client Sample ID **Sample Matrix** **Eurofins Sample No.** **Date Sampled** Test/Reference	LOR	Unit	**TP09_0.0-0.2** **Soil** **R24-Fe0011019** **Feb 01, 2024**	**TP09_0.5-0.6** **Soil** **R24-Fe0011020** **Feb 01, 2024**	**TP10_0.0-0.2** **Soil** **R24-Fe0011021** **Feb 01, 2024**	**TP10_0.5-0.6** **Soil** **R24-Fe0011022** **Feb 01, 2024**
Organophosphorus Pesticides						
Azinphos-methyl	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Bolstar	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Chlorfenvinphos	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Chlorpyrifos	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Chlorpyrifos-methyl	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Coumaphos	2	mg/kg	< 2	< 2	< 5	< 2
Demeton-S	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Demeton-O	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Diazinon	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Dichlorvos	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Dimethoate	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Disulfoton	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
EPN	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Ethion	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Ethoprop	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Ethyl parathion	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Fenitrothion	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Fensulfothion	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Fenthion	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Malathion	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Merphos	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Methyl parathion	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Mevinphos	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Monocrotophos	2	mg/kg	< 2	< 2	< 5	< 2
Naled	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Omethoate	2	mg/kg	< 2	< 2	< 5	< 2
Phorate	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Pirimiphos-methyl	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Pyrazophos	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Ronnel	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Terbufos	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Tetrachlorvinphos	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Tokuthion	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Trichloronate	0.2	mg/kg	< 0.2	< 0.2	< 0.5	< 0.2
Triphenylphosphate (surr.)	1	%	78	100	71	97
Polychlorinated Biphenyls						
Aroclor-1016	0.1	mg/kg	< 0.1	< 0.1	< 1	< 0.1
Aroclor-1221	0.1	mg/kg	< 0.1	< 0.1	< 1	< 0.1
Aroclor-1232	0.1	mg/kg	< 0.1	< 0.1	< 1	< 0.1
Aroclor-1242	0.1	mg/kg	< 0.1	< 0.1	< 1	< 0.1
Aroclor-1248	0.1	mg/kg	< 0.1	< 0.1	< 1	< 0.1
Aroclor-1254	0.1	mg/kg	< 0.1	< 0.1	< 1	< 0.1
Aroclor-1260	0.1	mg/kg	< 0.1	< 0.1	< 1	< 0.1
Total PCB*	0.1	mg/kg	< 0.1	< 0.1	< 1	< 0.1
Dibutylchlorendate (surr.)	1	%	75	91	74	105
Tetrachloro-m-xylene (surr.)	1	%	96	101	105	118

Client Sample ID			**TP09_0.0-0.2**	**TP09_0.5-0.6**	**TP10_0.0-0.2**	**TP10_0.5-0.6**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**R24-Fe0011019**	**R24-Fe0011020**	**R24-Fe0011021**	**R24-Fe0011022**
Date Sampled			**Feb 01, 2024**	**Feb 01, 2024**	**Feb 01, 2024**	**Feb 01, 2024**
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	50	mg/kg	< 50	< 50	< 50	< 50
TRH >C16-C34	100	mg/kg	< 100	< 100	170	< 100
TRH >C34-C40	100	mg/kg	< 100	< 100	< 100	< 100
TRH >C10-C40 (total)*	100	mg/kg	< 100	< 100	170	< 100
Metals M8						
Arsenic	2	mg/kg	95	7.8	120	12
Cadmium	0.4	mg/kg	< 0.4	< 0.4	0.9	< 0.4
Chromium	5	mg/kg	13	31	16	25
Copper	5	mg/kg	56	14	89	15
Lead	5	mg/kg	68	11	150	11
Mercury	0.1	mg/kg	0.3	< 0.1	0.2	< 0.1
Nickel	5	mg/kg	10	17	18	17
Zinc	5	mg/kg	49	28	260	27
Sample Properties						
% Moisture	1	%	16	13	3.8	15

Client Sample ID			**QC100**	**QC102**	**QC400**	**QC500**
Sample Matrix			**Soil**	**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**R24-Fe0011023**	**R24-Fe0011024**	**R24-Fe0011026**	**R24-Fe0011027**
Date Sampled			**Feb 01, 2024**	**Feb 01, 2024**	**Feb 01, 2024**	**Feb 01, 2024**
Test/Reference	LOR	Unit				
Total Recoverable Hydrocarbons - 1999 NEPM Fractions						
TRH C6-C9	20	mg/kg	< 20	< 20	-	< 20
TRH C10-C14	20	mg/kg	< 20	< 20	-	-
TRH C15-C28	50	mg/kg	< 50	76	-	-
TRH C29-C36	50	mg/kg	< 50	52	-	-
TRH C10-C36 (Total)	50	mg/kg	< 50	128	-	-
BTEX						
Benzene	0.1	mg/kg	< 0.1	< 0.1	-	< 0.1
Toluene	0.1	mg/kg	< 0.1	< 0.1	-	< 0.1
Ethylbenzene	0.1	mg/kg	< 0.1	< 0.1	-	< 0.1
m&p-Xylenes	0.2	mg/kg	< 0.2	< 0.2	-	< 0.2
o-Xylene	0.1	mg/kg	< 0.1	< 0.1	-	< 0.1
Xylenes - Total*	0.3	mg/kg	< 0.3	< 0.3	-	< 0.3
4-Bromofluorobenzene (surr.)	1	%	95	96	-	93
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
Naphthalene^{N02}	0.5	mg/kg	< 0.5	< 0.5	-	-
TRH >C10-C16 less Naphthalene (F2)^{N01}	50	mg/kg	< 50	< 50	-	-
TRH C6-C10	20	mg/kg	< 20	< 20	-	-
TRH C6-C10 less BTEX (F1)^{N04}	20	mg/kg	< 20	< 20	-	-
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene TEQ (lower bound) *	0.5	mg/kg	< 0.5	< 0.5	-	-
Benzo(a)pyrene TEQ (medium bound) *	0.5	mg/kg	0.6	0.6	-	-
Benzo(a)pyrene TEQ (upper bound) *	0.5	mg/kg	1.2	1.2	-	-
Acenaphthene	0.5	mg/kg	< 0.5	< 0.5	-	-
Acenaphthylene	0.5	mg/kg	< 0.5	< 0.5	-	-
Anthracene	0.5	mg/kg	< 0.5	< 0.5	-	-

Client Sample ID **Sample Matrix** **Eurofins Sample No.** **Date Sampled** Test/Reference	LOR	Unit	**QC100** **Soil** **R24-Fe0011023** **Feb 01, 2024**	**QC102** **Soil** **R24-Fe0011024** **Feb 01, 2024**	**QC400** **Soil** **R24-Fe0011026** **Feb 01, 2024**	**QC500** **Soil** **R24-Fe0011027** **Feb 01, 2024**
Polycyclic Aromatic Hydrocarbons						
Benz(a)anthracene	0.5	mg/kg	< 0.5	< 0.5	-	-
Benzo(a)pyrene	0.5	mg/kg	< 0.5	< 0.5	-	-
Benzo(b&j)fluoranthene N07	0.5	mg/kg	< 0.5	< 0.5	-	-
Benzo(g.h.i)perylene	0.5	mg/kg	< 0.5	< 0.5	-	-
Benzo(k)fluoranthene	0.5	mg/kg	< 0.5	< 0.5	-	-
Chrysene	0.5	mg/kg	< 0.5	< 0.5	-	-
Dibenz(a.h)anthracene	0.5	mg/kg	< 0.5	< 0.5	-	-
Fluoranthene	0.5	mg/kg	< 0.5	< 0.5	-	-
Fluorene	0.5	mg/kg	< 0.5	< 0.5	-	-
Indeno(1.2.3-cd)pyrene	0.5	mg/kg	< 0.5	< 0.5	-	-
Naphthalene	0.5	mg/kg	< 0.5	< 0.5	-	-
Phenanthrene	0.5	mg/kg	< 0.5	< 0.5	-	-
Pyrene	0.5	mg/kg	< 0.5	< 0.5	-	-
Total PAH*	0.5	mg/kg	< 0.5	< 0.5	-	-
2-Fluorobiphenyl (surr.)	1	%	95	105	-	-
p-Terphenyl-d14 (surr.)	1	%	98	119	-	-
Organochlorine Pesticides						
Chlordanes - Total	0.1	mg/kg	< 0.1	< 1	-	-
4.4'-DDD	0.05	mg/kg	< 0.05	< 0.5	-	-
4.4'-DDE	0.05	mg/kg	< 0.05	2.3	-	-
4.4'-DDT	0.05	mg/kg	< 0.05	< 0.5	-	-
a-HCH	0.05	mg/kg	< 0.05	< 0.5	-	-
Aldrin	0.05	mg/kg	< 0.05	< 0.5	-	-
b-HCH	0.05	mg/kg	< 0.05	< 0.5	-	-
d-HCH	0.05	mg/kg	< 0.05	< 0.5	-	-
Dieldrin	0.05	mg/kg	< 0.05	< 0.5	-	-
Endosulfan I	0.05	mg/kg	< 0.05	< 0.5	-	-
Endosulfan II	0.05	mg/kg	< 0.05	< 0.5	-	-
Endosulfan sulphate	0.05	mg/kg	< 0.05	< 0.5	-	-
Endrin	0.05	mg/kg	< 0.05	< 0.5	-	-
Endrin aldehyde	0.05	mg/kg	< 0.05	< 0.5	-	-
Endrin ketone	0.05	mg/kg	< 0.05	< 0.5	-	-
g-HCH (Lindane)	0.05	mg/kg	< 0.05	< 0.5	-	-
Heptachlor	0.05	mg/kg	< 0.05	< 0.5	-	-
Heptachlor epoxide	0.05	mg/kg	< 0.05	< 0.5	-	-
Hexachlorobenzene	0.05	mg/kg	< 0.05	< 0.5	-	-
Methoxychlor	0.05	mg/kg	< 0.05	< 0.5	-	-
Toxaphene	0.5	mg/kg	< 0.5	< 10	-	-
Aldrin and Dieldrin (Total)*	0.05	mg/kg	< 0.05	< 0.5	-	-
DDT + DDE + DDD (Total)*	0.05	mg/kg	< 0.05	2.3	-	-
Vic EPA IWRG 621 OCP (Total)*	0.1	mg/kg	< 0.1	2.3	-	-
Vic EPA IWRG 621 Other OCP (Total)*	0.1	mg/kg	< 0.1	< 1	-	-
Dibutylchlorendate (surr.)	1	%	104	118	-	-
Tetrachloro-m-xylene (surr.)	1	%	118	110	-	-
Organophosphorus Pesticides						
Azinphos-methyl	0.2	mg/kg	< 0.2	< 0.5	-	-
Bolstar	0.2	mg/kg	< 0.2	< 0.5	-	-
Chlorfenvinphos	0.2	mg/kg	< 0.2	< 0.5	-	-
Chlorpyrifos	0.2	mg/kg	< 0.2	< 0.5	-	-

Client Sample ID **Sample Matrix** **Eurofins Sample No.** **Date Sampled** Test/Reference	LOR	Unit	**QC100** **Soil** **R24-Fe0011023** **Feb 01, 2024**	**QC102** **Soil** **R24-Fe0011024** **Feb 01, 2024**	**QC400** **Soil** **R24-Fe0011026** **Feb 01, 2024**	**QC500** **Soil** **R24-Fe0011027** **Feb 01, 2024**
Organophosphorus Pesticides						
Chlorpyrifos-methyl	0.2	mg/kg	< 0.2	< 0.5	-	-
Coumaphos	2	mg/kg	< 2	< 5	-	-
Demeton-S	0.2	mg/kg	< 0.2	< 0.5	-	-
Demeton-O	0.2	mg/kg	< 0.2	< 0.5	-	-
Diazinon	0.2	mg/kg	< 0.2	< 0.5	-	-
Dichlorvos	0.2	mg/kg	< 0.2	< 0.5	-	-
Dimethoate	0.2	mg/kg	< 0.2	< 0.5	-	-
Disulfoton	0.2	mg/kg	< 0.2	< 0.5	-	-
EPN	0.2	mg/kg	< 0.2	< 0.5	-	-
Ethion	0.2	mg/kg	< 0.2	< 0.5	-	-
Ethoprop	0.2	mg/kg	< 0.2	< 0.5	-	-
Ethyl parathion	0.2	mg/kg	< 0.2	< 0.5	-	-
Fenitrothion	0.2	mg/kg	< 0.2	< 0.5	-	-
Fensulfothion	0.2	mg/kg	< 0.2	< 0.5	-	-
Fenthion	0.2	mg/kg	< 0.2	< 0.5	-	-
Malathion	0.2	mg/kg	< 0.2	< 0.5	-	-
Merphos	0.2	mg/kg	< 0.2	< 0.5	-	-
Methyl parathion	0.2	mg/kg	< 0.2	< 0.5	-	-
Mevinphos	0.2	mg/kg	< 0.2	< 0.5	-	-
Monocrotophos	2	mg/kg	< 2	< 5	-	-
Naled	0.2	mg/kg	< 0.2	< 0.5	-	-
Omethoate	2	mg/kg	< 2	< 5	-	-
Phorate	0.2	mg/kg	< 0.2	< 0.5	-	-
Pirimiphos-methyl	0.2	mg/kg	< 0.2	< 0.5	-	-
Pyrazophos	0.2	mg/kg	< 0.2	< 0.5	-	-
Ronnel	0.2	mg/kg	< 0.2	< 0.5	-	-
Terbufos	0.2	mg/kg	< 0.2	< 0.5	-	-
Tetrachlorvinphos	0.2	mg/kg	< 0.2	< 0.5	-	-
Tokuthion	0.2	mg/kg	< 0.2	< 0.5	-	-
Trichloronate	0.2	mg/kg	< 0.2	< 0.5	-	-
Triphenylphosphate (surr.)	1	%	106	103	-	-
Polychlorinated Biphenyls						
Aroclor-1016	0.1	mg/kg	< 0.1	< 1	-	-
Aroclor-1221	0.1	mg/kg	< 0.1	< 1	-	-
Aroclor-1232	0.1	mg/kg	< 0.1	< 1	-	-
Aroclor-1242	0.1	mg/kg	< 0.1	< 1	-	-
Aroclor-1248	0.1	mg/kg	< 0.1	< 1	-	-
Aroclor-1254	0.1	mg/kg	< 0.1	< 1	-	-
Aroclor-1260	0.1	mg/kg	< 0.1	< 1	-	-
Total PCB*	0.1	mg/kg	< 0.1	< 1	-	-
Dibutylchlorendate (surr.)	1	%	104	118	-	-
Tetrachloro-m-xylene (surr.)	1	%	118	110	-	-
Total Recoverable Hydrocarbons - 2013 NEPM Fractions						
TRH >C10-C16	50	mg/kg	< 50	< 50	-	-
TRH >C16-C34	100	mg/kg	< 100	120	-	-
TRH >C34-C40	100	mg/kg	< 100	< 100	-	-
TRH >C10-C40 (total)*	100	mg/kg	< 100	120	-	-

Client Sample ID **Sample Matrix** **Eurofins Sample No.** **Date Sampled** Test/Reference	LOR	Unit	**QC100** **Soil** **R24-Fe0011023** **Feb 01, 2024**	**QC102** **Soil** **R24-Fe0011024** **Feb 01, 2024**	**QC400** **Soil** **R24-Fe0011026** **Feb 01, 2024**	**QC500** **Soil** **R24-Fe0011027** **Feb 01, 2024**
Metals M8						
Arsenic	2	mg/kg	12	150	-	-
Cadmium	0.4	mg/kg	< 0.4	3.7	-	-
Chromium	5	mg/kg	25	20	-	-
Copper	5	mg/kg	17	220	-	-
Lead	5	mg/kg	10	210	-	-
Mercury	0.1	mg/kg	< 0.1	0.1	-	-
Nickel	5	mg/kg	20	11	-	-
Zinc	5	mg/kg	28	440	-	-
Sample Properties						
% Moisture	1	%	16	4.3	-	-
TRH C6-C10	1	%	-	-	100	-
Naphthalene^{N02}	0.5	mg/kg	-	-	-	< 0.5
Total Recoverable Hydrocarbons						
Naphthalene	1	%	-	-	98	-
TRH C6-C9	1	%	-	-	100	-
TRH C6-C10	20	mg/kg	-	-	-	< 20
TRH C6-C10 less BTEX (F1)^{N04}	20	mg/kg	-	-	-	< 20
BTEX						
Benzene	1	%	-	-	99	-
Ethylbenzene	1	%	-	-	100	-
m&p-Xylenes	1	%	-	-	100	-
o-Xylene	1	%	-	-	100	-
Toluene	1	%	-	-	99	-
Xylenes - Total	1	%	-	-	100	-
4-Bromofluorobenzene (surr.)	1	%	-	-	83	-

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Total Recoverable Hydrocarbons - 1999 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Sydney	Feb 11, 2024	14 Days
BTEX - Method: LTM-ORG-2010 BTEX and Volatile TRH	Sydney	Feb 11, 2024	14 Days
Total Recoverable Hydrocarbons - 2013 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Sydney	Feb 11, 2024	14 Days
Total Recoverable Hydrocarbons - Method: LTM-ORG-2010 TRH C6-C40	Sydney	Feb 11, 2024	14 Days
Polycyclic Aromatic Hydrocarbons - Method: LTM-ORG-2130 PAH and Phenols in Soil and Water	Sydney	Feb 11, 2024	14 Days
Organochlorine Pesticides - Method: LTM-ORG-2220 OCP & PCB in Soil and Water	Sydney	Feb 11, 2024	14 Days
Organophosphorus Pesticides - Method: LTM-ORG-2200 Organophosphorus Pesticides by GC-MS	Sydney	Feb 11, 2024	14 Days
Total Recoverable Hydrocarbons - 2013 NEPM Fractions - Method: LTM-ORG-2010 TRH C6-C40	Sydney	Feb 11, 2024	14 Days
Metals M8 - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Sydney	Feb 11, 2024	28 Days
Polychlorinated Biphenyls - Method: LTM-ORG-2220 OCP & PCB in Soil and Water	Sydney	Feb 11, 2024	28 Days
% Moisture - Method: LTM-GEN-7080 Moisture	Sydney	Feb 06, 2024	14 Days

Company Name: D & N Geotechnical Pty Ltd
Address: Unit 11/22-38 Thynne St
Bruce
ACT 2617

Project Name: inland rail - forbes station and yard
Project ID: C-1859.00

Order No.:
Report #: 1065544
Phone:
Fax:

Received: Feb 5, 2024 3:15 PM
Due: Feb 12, 2024
Priority: 5 Day
Contact Name: Nick Davison

Eurofins Analytical Services Manager : Bonnie Pu

Sample Detail						Asbestos - AS4964	HOLD	Polychlorinated Biphenyls	Moisture Set	Eurofins Suite B10: BTEX/TRH/PAH/OCP/OPP/M8	BTEXN and Volatile TRH	BTEXN and Volatile TRH
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X	X	X
External Laboratory												
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**							
1	TP01_0.0-0.2	Feb 01, 2024		Soil	R24-Fe0011003	X		X	X	X		
2	TP01_0.5-0.6	Feb 01, 2024		Soil	R24-Fe0011004	X		X	X	X		
3	TP02_0.0-0.2	Feb 01, 2024		Soil	R24-Fe0011005	X		X	X	X		
4	TP02_0.5-0.6	Feb 01, 2024		Soil	R24-Fe0011006	X		X	X	X		
5	TP03_0.0-0.2	Feb 01, 2024		Soil	R24-Fe0011007	X		X	X	X		
6	TP03_0.5-0.6	Feb 01, 2024		Soil	R24-Fe0011008	X		X	X	X		
7	TP04_0.0-0.2	Feb 01, 2024		Soil	R24-Fe0011009	X		X	X	X		
8	TP04_0.5-0.6	Feb 01, 2024		Soil	R24-Fe0011010	X		X	X	X		
9	TP05_0.0-0.2	Feb 01, 2024		Soil	R24-Fe0011011	X		X	X	X		
10	TP05_0.2-0.4	Feb 01, 2024		Soil	R24-Fe0011012	X		X	X	X		
11	TP06_0.0-0.2	Feb 01, 2024		Soil	R24-Fe0011013	X		X	X	X		
12	TP06_0.5-0.6	Feb 01, 2024		Soil	R24-Fe0011014	X		X	X	X		
13	TP07_0.0-0.2	Feb 01, 2024		Soil	R24-Fe0011015	X		X	X	X		

Company Name: D & N Geotechnical Pty Ltd
Address: Unit 11/22-38 Thynne St
Bruce
ACT 2617

Order No.:
Report #: 1065544
Phone:
Fax:

Received: Feb 5, 2024 3:15 PM
Due: Feb 12, 2024
Priority: 5 Day
Contact Name: Nick Davison

Project Name: inland rail - forbes station and yard
Project ID: C-1859.00

Eurofins Analytical Services Manager : Bonnie Pu

Sample Detail						Asbestos - AS4964	HOLD	Polychlorinated Biphenyls	Moisture Set	Eurofins Suite B10: BTEX/TRH/PAH/OCP/OPP/M8	BTEXN and Volatile TRH	BTEXN and Volatile TRH
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X	X	X
14	TP07_0.5-0.6	Feb 01, 2024		Soil	R24-Fe0011016	X		X	X	X		
15	TP08_0.0-0.2	Feb 01, 2024		Soil	R24-Fe0011017	X		X	X	X		
16	TP08_0.5-0.6	Feb 01, 2024		Soil	R24-Fe0011018	X		X	X	X		
17	TP09_0.0-0.2	Feb 01, 2024		Soil	R24-Fe0011019	X		X	X	X		
18	TP09_0.5-0.6	Feb 01, 2024		Soil	R24-Fe0011020	X		X	X	X		
19	TP10_0.0-0.2	Feb 01, 2024		Soil	R24-Fe0011021	X		X	X	X		
20	TP10_0.5-0.6	Feb 01, 2024		Soil	R24-Fe0011022	X		X	X	X		
21	QC100	Feb 01, 2024		Soil	R24-Fe0011023			X	X	X		
22	QC102	Feb 01, 2024		Soil	R24-Fe0011024			X	X	X		
23	QC300	Feb 01, 2024		Water	R24-Fe0011025			X		X		
24	QC400	Feb 01, 2024		Soil	R24-Fe0011026							X
25	QC500	Feb 01, 2024		Soil	R24-Fe0011027				X		X	
26	LAB SPIKE	Not Provided		Soil	R24-Fe0011028							X
27	TP09_0.9-1.0	Feb 01, 2024		Soil	R24-Fe0011029		X					
28	QC200	Feb 01, 2024		Soil	R24-Fe0011030		X					
29	QC101	Feb 01, 2024		Soil	R24-Fe0011031		X					

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Sample Detail						Asbestos - AS4964	HOLD	Polychlorinated Biphenyls	Moisture Set	Eurofins Suite B10: BTEX/TRH/PAH/OCP/OPP/M8	BTEXN and Volatile TRH	BTEXN and Volatile TRH
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X	X	X
30	QC201	Feb 01, 2024		Soil	R24-Fe0011032		X					
31	TP05_0.0-0.2A	Feb 01, 2024		Soil	R24-Fe0015168	X						
Test Counts						21	4	23	23	23	1	2

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follow guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013. They are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry weight basis unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion unless otherwise stated.
4. For CEC results where the sample's origin is unknown or environmentally contaminated, the results should be used advisedly.
5. Actual LORs are matrix dependent. Quoted LORs may be raised where sample extracts are diluted due to interferences.
6. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
7. SVOC analysis on waters is performed on homogenised, unfiltered samples unless noted otherwise.
8. Samples were analysed on an 'as received' basis.
9. Information identified in this report with blue colour indicates data provided by customers that may have an impact on the results.
10. This report replaces any interim results previously issued.

Holding Times

Please refer to the 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours before sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and despite any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling; therefore, compliance with these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether, the holding time is 7 days; however, for all other VOCs, such as BTEX or C6-10 TRH, the holding time is 14 days.

Units

mg/kg: milligrams per kilogram
mg/L: milligrams per litre
ppm: parts per million
µg/L: micrograms per litre
ppb: parts per billion
%: Percentage
org/100 mL: Organisms per 100 millilitres
NTU: Nephelometric Turbidity Units
MPN/100 mL: Most Probable Number of organisms per 100 millilitres
CFU: Colony forming unit
Colour: Pt-Co Units

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however, free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should only be used as a guide and may be different when site-specific Sampling Analysis and Quality Plan (SAQP) have been implemented.

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is ≤30%; however, the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit
Results between 10-20 times the LOR: RPD must lie between 0-50%
Results >20 times the LOR: RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range, not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%, VOC recoveries 70 – 130%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 5.4, where no positive PFAS results have been reported or reviewed, and no data was affected.

QC Data General Comments

1. Where a result is reported as less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown are not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery, the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results, a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data; thus, it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	mg/kg	< 20			20	Pass	
TRH C10-C14	mg/kg	< 20			20	Pass	
TRH C15-C28	mg/kg	< 50			50	Pass	
TRH C29-C36	mg/kg	< 50			50	Pass	
Method Blank							
BTEX							
Benzene	mg/kg	< 0.1			0.1	Pass	
Toluene	mg/kg	< 0.1			0.1	Pass	
Ethylbenzene	mg/kg	< 0.1			0.1	Pass	
m&p-Xylenes	mg/kg	< 0.2			0.2	Pass	
o-Xylene	mg/kg	< 0.1			0.1	Pass	
Xylenes - Total*	mg/kg	< 0.3			0.3	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/kg	< 0.5			0.5	Pass	
TRH C6-C10	mg/kg	< 20			20	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/kg	< 0.5			0.5	Pass	
Acenaphthylene	mg/kg	< 0.5			0.5	Pass	
Anthracene	mg/kg	< 0.5			0.5	Pass	
Benz(a)anthracene	mg/kg	< 0.5			0.5	Pass	
Benzo(a)pyrene	mg/kg	< 0.5			0.5	Pass	
Benzo(b&j)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Benzo(g.h.i)perylene	mg/kg	< 0.5			0.5	Pass	
Benzo(k)fluoranthene	mg/kg	< 0.5			0.5	Pass	
Chrysene	mg/kg	< 0.5			0.5	Pass	
Dibenz(a.h)anthracene	mg/kg	< 0.5			0.5	Pass	
Fluoranthene	mg/kg	< 0.5			0.5	Pass	
Fluorene	mg/kg	< 0.5			0.5	Pass	
Indeno(1.2.3-cd)pyrene	mg/kg	< 0.5			0.5	Pass	
Naphthalene	mg/kg	< 0.5			0.5	Pass	
Phenanthrene	mg/kg	< 0.5			0.5	Pass	
Pyrene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Organochlorine Pesticides							
Chlordanes - Total	mg/kg	< 0.1			0.1	Pass	
4.4'-DDD	mg/kg	< 0.05			0.05	Pass	
4.4'-DDE	mg/kg	< 0.05			0.05	Pass	
4.4'-DDT	mg/kg	< 0.05			0.05	Pass	
a-HCH	mg/kg	< 0.05			0.05	Pass	
Aldrin	mg/kg	< 0.05			0.05	Pass	
b-HCH	mg/kg	< 0.05			0.05	Pass	
d-HCH	mg/kg	< 0.05			0.05	Pass	
Dieldrin	mg/kg	< 0.05			0.05	Pass	
Endosulfan I	mg/kg	< 0.05			0.05	Pass	
Endosulfan II	mg/kg	< 0.05			0.05	Pass	
Endosulfan sulphate	mg/kg	< 0.05			0.05	Pass	
Endrin	mg/kg	< 0.05			0.05	Pass	
Endrin aldehyde	mg/kg	< 0.05			0.05	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Endrin ketone	mg/kg	< 0.05			0.05	Pass	
g-HCH (Lindane)	mg/kg	< 0.05			0.05	Pass	
Heptachlor	mg/kg	< 0.05			0.05	Pass	
Heptachlor epoxide	mg/kg	< 0.05			0.05	Pass	
Hexachlorobenzene	mg/kg	< 0.05			0.05	Pass	
Methoxychlor	mg/kg	< 0.05			0.05	Pass	
Toxaphene	mg/kg	< 0.5			0.5	Pass	
Method Blank							
Organophosphorus Pesticides							
Azinphos-methyl	mg/kg	< 0.2			0.2	Pass	
Bolstar	mg/kg	< 0.2			0.2	Pass	
Chlorfenvinphos	mg/kg	< 0.2			0.2	Pass	
Chlorpyrifos	mg/kg	< 0.2			0.2	Pass	
Chlorpyrifos-methyl	mg/kg	< 0.2			0.2	Pass	
Coumaphos	mg/kg	< 2			2	Pass	
Demeton-S	mg/kg	< 0.2			0.2	Pass	
Demeton-O	mg/kg	< 0.2			0.2	Pass	
Diazinon	mg/kg	< 0.2			0.2	Pass	
Dichlorvos	mg/kg	< 0.2			0.2	Pass	
Dimethoate	mg/kg	< 0.2			0.2	Pass	
Disulfoton	mg/kg	< 0.2			0.2	Pass	
EPN	mg/kg	< 0.2			0.2	Pass	
Ethion	mg/kg	< 0.2			0.2	Pass	
Ethoprop	mg/kg	< 0.2			0.2	Pass	
Ethyl parathion	mg/kg	< 0.2			0.2	Pass	
Fenitrothion	mg/kg	< 0.2			0.2	Pass	
Fensulfothion	mg/kg	< 0.2			0.2	Pass	
Fenthion	mg/kg	< 0.2			0.2	Pass	
Malathion	mg/kg	< 0.2			0.2	Pass	
Merphos	mg/kg	< 0.2			0.2	Pass	
Methyl parathion	mg/kg	< 0.2			0.2	Pass	
Mevinphos	mg/kg	< 0.2			0.2	Pass	
Monocrotophos	mg/kg	< 2			2	Pass	
Naled	mg/kg	< 0.2			0.2	Pass	
Omethoate	mg/kg	< 2			2	Pass	
Phorate	mg/kg	< 0.2			0.2	Pass	
Pirimiphos-methyl	mg/kg	< 0.2			0.2	Pass	
Pyrazophos	mg/kg	< 0.2			0.2	Pass	
Ronnel	mg/kg	< 0.2			0.2	Pass	
Terbufos	mg/kg	< 0.2			0.2	Pass	
Tetrachlorvinphos	mg/kg	< 0.2			0.2	Pass	
Tokuthion	mg/kg	< 0.2			0.2	Pass	
Trichloronate	mg/kg	< 0.2			0.2	Pass	
Method Blank							
Polychlorinated Biphenyls							
Aroclor-1016	mg/kg	< 0.1			0.1	Pass	
Aroclor-1221	mg/kg	< 0.1			0.1	Pass	
Aroclor-1232	mg/kg	< 0.1			0.1	Pass	
Aroclor-1242	mg/kg	< 0.1			0.1	Pass	
Aroclor-1248	mg/kg	< 0.1			0.1	Pass	
Aroclor-1254	mg/kg	< 0.1			0.1	Pass	
Aroclor-1260	mg/kg	< 0.1			0.1	Pass	
Total PCB*	mg/kg	< 0.1			0.1	Pass	
Method Blank							

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH >C10-C16	mg/kg	< 50			50	Pass	
TRH >C16-C34	mg/kg	< 100			100	Pass	
TRH >C34-C40	mg/kg	< 100			100	Pass	
Method Blank							
Metals M8							
Arsenic	mg/kg	< 2			2	Pass	
Cadmium	mg/kg	< 0.4			0.4	Pass	
Chromium	mg/kg	< 5			5	Pass	
Copper	mg/kg	< 5			5	Pass	
Lead	mg/kg	< 5			5	Pass	
Mercury	mg/kg	< 0.1			0.1	Pass	
Nickel	mg/kg	< 5			5	Pass	
Zinc	mg/kg	< 5			5	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	92			70-130	Pass	
TRH C10-C14	%	93			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	96			70-130	Pass	
Toluene	%	91			70-130	Pass	
Ethylbenzene	%	101			70-130	Pass	
m&p-Xylenes	%	108			70-130	Pass	
o-Xylene	%	109			70-130	Pass	
Xylenes - Total*	%	108			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	98			70-130	Pass	
TRH C6-C10	%	91			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	95			70-130	Pass	
Acenaphthylene	%	98			70-130	Pass	
Anthracene	%	103			70-130	Pass	
Benz(a)anthracene	%	100			70-130	Pass	
Benzo(a)pyrene	%	104			70-130	Pass	
Benzo(b&j)fluoranthene	%	93			70-130	Pass	
Benzo(g.h.i)perylene	%	109			70-130	Pass	
Benzo(k)fluoranthene	%	98			70-130	Pass	
Chrysene	%	74			70-130	Pass	
Dibenz(a.h)anthracene	%	107			70-130	Pass	
Fluoranthene	%	97			70-130	Pass	
Fluorene	%	97			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	105			70-130	Pass	
Naphthalene	%	97			70-130	Pass	
Phenanthrene	%	95			70-130	Pass	
Pyrene	%	96			70-130	Pass	
LCS - % Recovery							
Organochlorine Pesticides							
Chlordanes - Total	%	95			70-130	Pass	
4.4'-DDD	%	100			70-130	Pass	
4.4'-DDE	%	99			70-130	Pass	
4.4'-DDT	%	93			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
a-HCH	%	93			70-130	Pass	
Aldrin	%	94			70-130	Pass	
b-HCH	%	92			70-130	Pass	
d-HCH	%	96			70-130	Pass	
Dieldrin	%	103			70-130	Pass	
Endosulfan I	%	101			70-130	Pass	
Endosulfan II	%	99			70-130	Pass	
Endosulfan sulphate	%	95			70-130	Pass	
Endrin	%	92			70-130	Pass	
Endrin aldehyde	%	85			70-130	Pass	
Endrin ketone	%	100			70-130	Pass	
g-HCH (Lindane)	%	97			70-130	Pass	
Heptachlor	%	100			70-130	Pass	
Heptachlor epoxide	%	95			70-130	Pass	
Hexachlorobenzene	%	96			70-130	Pass	
Methoxychlor	%	95			70-130	Pass	
LCS - % Recovery							
Organophosphorus Pesticides							
Diazinon	%	101			70-130	Pass	
Dimethoate	%	91			70-130	Pass	
Ethion	%	117			70-130	Pass	
Fenitrothion	%	77			70-130	Pass	
Methyl parathion	%	102			70-130	Pass	
Mevinphos	%	95			70-130	Pass	
LCS - % Recovery							
Polychlorinated Biphenyls							
Aroclor-1016	%	102			70-130	Pass	
Aroclor-1260	%	100			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH >C10-C16	%	82			70-130	Pass	
LCS - % Recovery							
Metals M8							
Arsenic	%	94			80-120	Pass	
Cadmium	%	107			80-120	Pass	
Chromium	%	107			80-120	Pass	
Copper	%	109			80-120	Pass	
Lead	%	96			80-120	Pass	
Mercury	%	98			80-120	Pass	
Nickel	%	108			80-120	Pass	
Zinc	%	108			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	S24-Fe0001896	NCP	%	92			70-130	Pass	
TRH C10-C14	S24-Fe0017840	NCP	%	75			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	S24-Fe0001896	NCP	%	100			70-130	Pass	
Toluene	S24-Fe0001896	NCP	%	84			70-130	Pass	
Ethylbenzene	S24-Fe0001896	NCP	%	105			70-130	Pass	
m&p-Xylenes	S24-Fe0001896	NCP	%	107			70-130	Pass	
o-Xylene	S24-Fe0001896	NCP	%	100			70-130	Pass	
Xylenes - Total*	S24-Fe0001896	NCP	%	105			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	S24-Fe0001896	NCP	%	81			70-130	Pass	
TRH C6-C10	S24-Fe0001896	NCP	%	94			70-130	Pass	
Spike - % Recovery									
Metals M8				Result 1					
Arsenic	S24-Fe0012616	NCP	%	84			75-125	Pass	
Copper	S24-Fe0012616	NCP	%	101			75-125	Pass	
Lead	S24-Fe0012616	NCP	%	90			75-125	Pass	
Zinc	S24-Fe0012616	NCP	%	96			75-125	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
TRH >C10-C16	R24-Fe0011004	CP	%	82			70-130	Pass	
Spike - % Recovery									
Polycyclic Aromatic Hydrocarbons				Result 1					
Acenaphthene	S24-Fe0017627	NCP	%	94			70-130	Pass	
Acenaphthylene	S24-Fe0017627	NCP	%	96			70-130	Pass	
Anthracene	S24-Fe0017627	NCP	%	89			70-130	Pass	
Benz(a)anthracene	S24-Fe0017627	NCP	%	82			70-130	Pass	
Benzo(a)pyrene	S24-Fe0017627	NCP	%	100			70-130	Pass	
Benzo(b&j)fluoranthene	S24-Fe0017627	NCP	%	90			70-130	Pass	
Benzo(g.h.i)perylene	S24-Fe0017627	NCP	%	94			70-130	Pass	
Benzo(k)fluoranthene	S24-Fe0017627	NCP	%	86			70-130	Pass	
Chrysene	S24-Fe0017627	NCP	%	91			70-130	Pass	
Dibenz(a.h)anthracene	S24-Fe0017627	NCP	%	99			70-130	Pass	
Fluoranthene	S24-Fe0017627	NCP	%	95			70-130	Pass	
Fluorene	S24-Fe0017627	NCP	%	93			70-130	Pass	
Indeno(1.2.3-cd)pyrene	S24-Fe0017627	NCP	%	102			70-130	Pass	
Naphthalene	S24-Fe0017627	NCP	%	95			70-130	Pass	
Phenanthrene	S24-Fe0017627	NCP	%	83			70-130	Pass	
Pyrene	S24-Fe0017627	NCP	%	96			70-130	Pass	
Spike - % Recovery									
Organochlorine Pesticides				Result 1					
Chlordanes - Total	S24-Fe0014290	NCP	%	101			70-130	Pass	
4.4'-DDE	S24-Fe0014290	NCP	%	112			70-130	Pass	
a-HCH	S24-Fe0014290	NCP	%	110			70-130	Pass	
Aldrin	S24-Fe0014290	NCP	%	120			70-130	Pass	
b-HCH	S24-Fe0014290	NCP	%	104			70-130	Pass	
d-HCH	S24-Fe0014290	NCP	%	126			70-130	Pass	
Dieldrin	S24-Fe0014290	NCP	%	95			70-130	Pass	
Endosulfan I	S24-Fe0014290	NCP	%	94			70-130	Pass	
Endosulfan II	S24-Fe0014290	NCP	%	90			70-130	Pass	
Endosulfan sulphate	S24-Fe0014290	NCP	%	109			70-130	Pass	
Endrin	S24-Fe0014290	NCP	%	94			70-130	Pass	
Endrin aldehyde	S24-Fe0014290	NCP	%	98			70-130	Pass	
g-HCH (Lindane)	S24-Fe0014290	NCP	%	108			70-130	Pass	
Heptachlor	S24-Fe0014290	NCP	%	114			70-130	Pass	
Heptachlor epoxide	S24-Fe0000256	NCP	%	96			70-130	Pass	
Hexachlorobenzene	S24-Fe0014290	NCP	%	118			70-130	Pass	
Spike - % Recovery									
Polychlorinated Biphenyls				Result 1					
Aroclor-1016	S24-Fe0014290	NCP	%	113			70-130	Pass	
Aroclor-1260	S24-Fe0014290	NCP	%	120			70-130	Pass	
Spike - % Recovery									

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Organochlorine Pesticides				Result 1					
4.4'-DDD	S24-Fe0010825	NCP	%	87			70-130	Pass	
4.4'-DDT	S24-Fe0010825	NCP	%	101			70-130	Pass	
Endrin ketone	S24-Fe0010825	NCP	%	88			70-130	Pass	
Methoxychlor	S24-Fe0010825	NCP	%	96			70-130	Pass	
Spike - % Recovery									
Organophosphorus Pesticides				Result 1					
Diazinon	S24-Fe0010825	NCP	%	97			70-130	Pass	
Dimethoate	S24-Fe0010825	NCP	%	85			70-130	Pass	
Ethion	S24-Fe0010825	NCP	%	92			70-130	Pass	
Fenitrothion	S24-Fe0010825	NCP	%	70			70-130	Pass	
Methyl parathion	S24-Fe0010825	NCP	%	95			70-130	Pass	
Mevinphos	S24-Fe0010825	NCP	%	92			70-130	Pass	
Spike - % Recovery									
Metals M8				Result 1					
Cadmium	R24-Fe0011024	CP	%	112			75-125	Pass	
Chromium	R24-Fe0011024	CP	%	121			75-125	Pass	
Mercury	R24-Fe0011024	CP	%	103			75-125	Pass	
Nickel	R24-Fe0011024	CP	%	124			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	R24-Fe0011003	CP	mg/kg	< 20	< 20	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	R24-Fe0011003	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Toluene	R24-Fe0011003	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Ethylbenzene	R24-Fe0011003	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
m&p-Xylenes	R24-Fe0011003	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
o-Xylene	R24-Fe0011003	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Xylenes - Total*	R24-Fe0011003	CP	mg/kg	< 0.3	< 0.3	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	R24-Fe0011003	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
TRH C6-C10	R24-Fe0011003	CP	mg/kg	< 20	< 20	<1	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	R24-Fe0011003	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	R24-Fe0011003	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	R24-Fe0011003	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	R24-Fe0011003	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	R24-Fe0011003	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	R24-Fe0011003	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	R24-Fe0011003	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	R24-Fe0011003	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	R24-Fe0011003	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	R24-Fe0011003	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	R24-Fe0011003	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	R24-Fe0011003	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	R24-Fe0011003	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	R24-Fe0011003	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	R24-Fe0011003	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	R24-Fe0011003	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	

Duplicate									
Organochlorine Pesticides				Result 1	Result 2	RPD			
Chlordanes - Total	R24-Fe0011003	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
4.4'-DDD	R24-Fe0011003	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDE	R24-Fe0011003	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDT	R24-Fe0011003	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
a-HCH	R24-Fe0011003	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Aldrin	R24-Fe0011003	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
b-HCH	R24-Fe0011003	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
d-HCH	R24-Fe0011003	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Dieldrin	R24-Fe0011003	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan I	R24-Fe0011003	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan II	R24-Fe0011003	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan sulphate	R24-Fe0011003	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin	R24-Fe0011003	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin aldehyde	R24-Fe0011003	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin ketone	R24-Fe0011003	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
g-HCH (Lindane)	R24-Fe0011003	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor	R24-Fe0011003	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor epoxide	R24-Fe0011003	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Hexachlorobenzene	R24-Fe0011003	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Methoxychlor	R24-Fe0011003	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Toxaphene	R24-Fe0011003	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Organophosphorus Pesticides				Result 1	Result 2	RPD			
Azinphos-methyl	R24-Fe0011003	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Bolstar	R24-Fe0011003	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorfenvinphos	R24-Fe0011003	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorpyrifos	R24-Fe0011003	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorpyrifos-methyl	R24-Fe0011003	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Coumaphos	R24-Fe0011003	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Demeton-S	R24-Fe0011003	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Demeton-O	R24-Fe0011003	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Diazinon	R24-Fe0011003	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Dichlorvos	R24-Fe0011003	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Dimethoate	R24-Fe0011003	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Disulfoton	R24-Fe0011003	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
EPN	R24-Fe0011003	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethion	R24-Fe0011003	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethoprop	R24-Fe0011003	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethyl parathion	R24-Fe0011003	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fenitrothion	R24-Fe0011003	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fensulfothion	R24-Fe0011003	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fenthion	R24-Fe0011003	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Malathion	R24-Fe0011003	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Merphos	R24-Fe0011003	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Methyl parathion	R24-Fe0011003	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Mevinphos	R24-Fe0011003	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Monocrotophos	R24-Fe0011003	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Naled	R24-Fe0011003	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Omethoate	R24-Fe0011003	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Phorate	R24-Fe0011003	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Pirimiphos-methyl	R24-Fe0011003	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Pyrazophos	R24-Fe0011003	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ronnel	R24-Fe0011003	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Terbufos	R24-Fe0011003	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	

Duplicate									
Organophosphorus Pesticides				Result 1	Result 2	RPD			
Tetrachlorvinphos	R24-Fe0011003	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Tokuthion	R24-Fe0011003	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Trichloronate	R24-Fe0011003	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Duplicate									
Polychlorinated Biphenyls				Result 1	Result 2	RPD			
Aroclor-1016	R24-Fe0011003	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1221	R24-Fe0011003	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1232	R24-Fe0011003	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1242	R24-Fe0011003	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1248	R24-Fe0011003	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1254	R24-Fe0011003	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1260	R24-Fe0011003	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Total PCB*	R24-Fe0011003	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Duplicate									
Metals M8				Result 1	Result 2	RPD			
Arsenic	R24-Fe0011003	CP	mg/kg	210	240	14	30%	Pass	
Cadmium	R24-Fe0011003	CP	mg/kg	0.6	0.7	28	30%	Pass	
Chromium	R24-Fe0011003	CP	mg/kg	11	9.3	13	30%	Pass	
Copper	R24-Fe0011003	CP	mg/kg	56	58	2.8	30%	Pass	
Lead	R24-Fe0011003	CP	mg/kg	57	67	16	30%	Pass	
Mercury	R24-Fe0011003	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	R24-Fe0011003	CP	mg/kg	9.2	8.4	9.7	30%	Pass	
Zinc	R24-Fe0011003	CP	mg/kg	150	170	12	30%	Pass	
Duplicate									
Sample Properties				Result 1	Result 2	RPD			
% Moisture	R24-Fe0011012	CP	%	15	18	18	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C10-C14	R24-Fe0011013	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	R24-Fe0011013	CP	mg/kg	100	72	36	30%	Fail	Q15
TRH C29-C36	R24-Fe0011013	CP	mg/kg	130	75	52	30%	Fail	Q15
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	R24-Fe0011013	CP	mg/kg	0.6	0.6	<1	30%	Pass	
Fluorene	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	R24-Fe0011013	CP	mg/kg	0.6	0.6	7.7	30%	Pass	

Duplicate									
Organochlorine Pesticides				Result 1	Result 2	RPD			
Chlordanes - Total	R24-Fe0011013	CP	mg/kg	< 1	< 1	<1	30%	Pass	
4.4'-DDD	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
4.4'-DDE	R24-Fe0011013	CP	mg/kg	2.6	2.2	19	30%	Pass	
4.4'-DDT	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
a-HCH	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Aldrin	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
b-HCH	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
d-HCH	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dieldrin	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Endosulfan I	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Endosulfan II	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Endosulfan sulphate	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Endrin	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Endrin aldehyde	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Endrin ketone	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
g-HCH (Lindane)	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Heptachlor	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Heptachlor epoxide	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Hexachlorobenzene	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Methoxychlor	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Organophosphorus Pesticides				Result 1	Result 2	RPD			
Azinphos-methyl	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Bolstar	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chlorfenvinphos	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chlorpyrifos	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chlorpyrifos-methyl	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Coumaphos	R24-Fe0011013	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Demeton-S	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Demeton-O	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Diazinon	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dichlorvos	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dimethoate	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Disulfoton	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
EPN	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Ethion	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Ethoprop	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Ethyl parathion	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fenitrothion	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fensulfothion	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fenthion	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Malathion	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Merphos	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Methyl parathion	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Mevinphos	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Monocrotophos	R24-Fe0011013	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Naled	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Omethoate	R24-Fe0011013	CP	mg/kg	< 5	< 5	<1	30%	Pass	
Phorate	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pirimiphos-methyl	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrazophos	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Ronnel	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Terbufos	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Tetrachlorvinphos	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	

Duplicate									
Organophosphorus Pesticides				Result 1	Result 2	RPD			
Tokuthion	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Trichloronate	R24-Fe0011013	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Polychlorinated Biphenyls				Result 1	Result 2	RPD			
Aroclor-1016	R24-Fe0011013	CP	mg/kg	< 1	< 1	<1	30%	Pass	
Aroclor-1221	R24-Fe0011013	CP	mg/kg	< 1	< 1	<1	30%	Pass	
Aroclor-1232	R24-Fe0011013	CP	mg/kg	< 1	< 1	<1	30%	Pass	
Aroclor-1242	R24-Fe0011013	CP	mg/kg	< 1	< 1	<1	30%	Pass	
Aroclor-1248	R24-Fe0011013	CP	mg/kg	< 1	< 1	<1	30%	Pass	
Aroclor-1254	R24-Fe0011013	CP	mg/kg	< 1	< 1	<1	30%	Pass	
Aroclor-1260	R24-Fe0011013	CP	mg/kg	< 1	< 1	<1	30%	Pass	
Total PCB*	R24-Fe0011013	CP	mg/kg	< 1	< 1	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
TRH >C10-C16	R24-Fe0011013	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C16-C34	R24-Fe0011013	CP	mg/kg	190	120	43	30%	Fail	Q15
TRH >C34-C40	R24-Fe0011013	CP	mg/kg	150	< 100	66	30%	Fail	Q15
Duplicate									
Metals M8				Result 1	Result 2	RPD			
Arsenic	R24-Fe0011013	CP	mg/kg	88	89	1.1	30%	Pass	
Cadmium	R24-Fe0011013	CP	mg/kg	2.5	2.3	8.4	30%	Pass	
Chromium	R24-Fe0011013	CP	mg/kg	38	32	16	30%	Pass	
Copper	R24-Fe0011013	CP	mg/kg	190	140	30	30%	Pass	
Lead	R24-Fe0011013	CP	mg/kg	400	460	14	30%	Pass	
Mercury	R24-Fe0011013	CP	mg/kg	0.1	0.1	5.1	30%	Pass	
Nickel	R24-Fe0011013	CP	mg/kg	23	19	20	30%	Pass	
Zinc	R24-Fe0011013	CP	mg/kg	740	660	11	30%	Pass	
Duplicate									
Sample Properties				Result 1	Result 2	RPD			
% Moisture	R24-Fe0011022	CP	%	15	14	1.8	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C10-C14	R24-Fe0011023	CP	mg/kg	< 20	< 20	<1	30%	Pass	
TRH C15-C28	R24-Fe0011023	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH C29-C36	R24-Fe0011023	CP	mg/kg	< 50	< 50	<1	30%	Pass	
Duplicate									
Polycyclic Aromatic Hydrocarbons				Result 1	Result 2	RPD			
Acenaphthene	R24-Fe0011023	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Acenaphthylene	R24-Fe0011023	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Anthracene	R24-Fe0011023	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benz(a)anthracene	R24-Fe0011023	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(a)pyrene	R24-Fe0011023	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(b&j)fluoranthene	R24-Fe0011023	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(g.h.i)perylene	R24-Fe0011023	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Benzo(k)fluoranthene	R24-Fe0011023	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Chrysene	R24-Fe0011023	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Dibenz(a.h)anthracene	R24-Fe0011023	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluoranthene	R24-Fe0011023	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Fluorene	R24-Fe0011023	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Indeno(1.2.3-cd)pyrene	R24-Fe0011023	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Naphthalene	R24-Fe0011023	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Phenanthrene	R24-Fe0011023	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Pyrene	R24-Fe0011023	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	

Duplicate									
Organochlorine Pesticides				Result 1	Result 2	RPD			
Chlordanes - Total	R24-Fe0011023	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
4.4'-DDD	R24-Fe0011023	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDE	R24-Fe0011023	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
4.4'-DDT	R24-Fe0011023	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
a-HCH	R24-Fe0011023	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Aldrin	R24-Fe0011023	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
b-HCH	R24-Fe0011023	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
d-HCH	R24-Fe0011023	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Dieldrin	R24-Fe0011023	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan I	R24-Fe0011023	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan II	R24-Fe0011023	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endosulfan sulphate	R24-Fe0011023	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin	R24-Fe0011023	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin aldehyde	R24-Fe0011023	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Endrin ketone	R24-Fe0011023	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
g-HCH (Lindane)	R24-Fe0011023	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor	R24-Fe0011023	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Heptachlor epoxide	R24-Fe0011023	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Hexachlorobenzene	R24-Fe0011023	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Methoxychlor	R24-Fe0011023	CP	mg/kg	< 0.05	< 0.05	<1	30%	Pass	
Toxaphene	R24-Fe0011023	CP	mg/kg	< 0.5	< 0.5	<1	30%	Pass	
Duplicate									
Organophosphorus Pesticides				Result 1	Result 2	RPD			
Azinphos-methyl	R24-Fe0011023	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Bolstar	R24-Fe0011023	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorfenvinphos	R24-Fe0011023	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorpyrifos	R24-Fe0011023	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Chlorpyrifos-methyl	R24-Fe0011023	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Coumaphos	R24-Fe0011023	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Demeton-S	R24-Fe0011023	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Demeton-O	R24-Fe0011023	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Diazinon	R24-Fe0011023	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Dichlorvos	R24-Fe0011023	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Dimethoate	R24-Fe0011023	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Disulfoton	R24-Fe0011023	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
EPN	R24-Fe0011023	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethion	R24-Fe0011023	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethoprop	R24-Fe0011023	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ethyl parathion	R24-Fe0011023	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fenitrothion	R24-Fe0011023	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fensulfothion	R24-Fe0011023	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Fenthion	R24-Fe0011023	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Malathion	R24-Fe0011023	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Merphos	R24-Fe0011023	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Methyl parathion	R24-Fe0011023	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Mevinphos	R24-Fe0011023	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Monocrotophos	R24-Fe0011023	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Naled	R24-Fe0011023	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Omethoate	R24-Fe0011023	CP	mg/kg	< 2	< 2	<1	30%	Pass	
Phorate	R24-Fe0011023	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Pirimiphos-methyl	R24-Fe0011023	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Pyrazophos	R24-Fe0011023	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Ronnel	R24-Fe0011023	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Terbufos	R24-Fe0011023	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	

Duplicate									
Organophosphorus Pesticides				Result 1	Result 2	RPD			
Tetrachlorvinphos	R24-Fe0011023	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Tokuthion	R24-Fe0011023	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Trichloronate	R24-Fe0011023	CP	mg/kg	< 0.2	< 0.2	<1	30%	Pass	
Duplicate									
Polychlorinated Biphenyls				Result 1	Result 2	RPD			
Aroclor-1016	R24-Fe0011023	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1221	R24-Fe0011023	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1232	R24-Fe0011023	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1242	R24-Fe0011023	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1248	R24-Fe0011023	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1254	R24-Fe0011023	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Aroclor-1260	R24-Fe0011023	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Total PCB*	R24-Fe0011023	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
TRH >C10-C16	R24-Fe0011023	CP	mg/kg	< 50	< 50	<1	30%	Pass	
TRH >C16-C34	R24-Fe0011023	CP	mg/kg	< 100	< 100	<1	30%	Pass	
TRH >C34-C40	R24-Fe0011023	CP	mg/kg	< 100	< 100	<1	30%	Pass	
Duplicate									
Metals M8				Result 1	Result 2	RPD			
Arsenic	R24-Fe0011023	CP	mg/kg	12	17	35	30%	Fail	Q15
Cadmium	R24-Fe0011023	CP	mg/kg	< 0.4	< 0.4	<1	30%	Pass	
Chromium	R24-Fe0011023	CP	mg/kg	25	26	5.4	30%	Pass	
Copper	R24-Fe0011023	CP	mg/kg	17	18	8.3	30%	Pass	
Lead	R24-Fe0011023	CP	mg/kg	10	12	13	30%	Pass	
Mercury	R24-Fe0011023	CP	mg/kg	< 0.1	< 0.1	<1	30%	Pass	
Nickel	R24-Fe0011023	CP	mg/kg	20	21	7.7	30%	Pass	
Zinc	R24-Fe0011023	CP	mg/kg	28	31	12	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	N/A
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs
Q15	The RPD reported passes Eurofins Environment Testing's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised by:

Adam Bateup	Analytical Services Manager
Fang Yee Tan	Senior Analyst-Metal
Maria Tian	Senior Analyst-Organic
Roopesh Rangarajan	Senior Analyst-Organic
Roopesh Rangarajan	Senior Analyst-Volatile
Sayeed Abu	Senior Analyst-Asbestos

Glenn Jackson
Managing Director

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

eurofins
Environment Testing

Certificate of Analysis

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025–Testing NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

D & N Geotechnical Pty Ltd
Unit 11/22-38 Thynne St
Bruce
ACT 2617

Attention:	Nick Davison
Report	1065544-AID
Project Name	INLAND RAIL - FORBES STATION AND YARD
Project ID	C-1859.00
Received Date	Feb 05, 2024
Date Reported	Feb 14, 2024

Methodology:

Asbestos Fibre Identification	Conducted in accordance with the Australian Standard AS 4964 – 2004: Method for the Qualitative Identification of Asbestos in Bulk Samples and in-house Method LTM-ASB-8020 by polarised light microscopy (PLM) and dispersion staining (DS) techniques. *NOTE: Positive Trace Analysis results indicate the sample contains detectable respirable fibres.*
Unknown Mineral Fibres	Mineral fibres of unknown type, as determined by PLM with DS, may require another analytical technique, such as Electron Microscopy, to confirm unequivocal identity. *NOTE: While Actinolite, Anthophyllite and Tremolite asbestos may be detected by PLM with DS, due to variability in the optical properties of these materials, AS4964 requires that these are reported as UMF unless confirmed by an independent technique.*
Subsampling Soil Samples	The whole sample submitted is first dried and then passed through a 10mm sieve followed by a 2mm sieve. All fibrous matter greater than 10mm, greater than 2mm as well as the material passing through the 2mm sieve are retained and analysed for the presence of asbestos. If the sub 2mm fraction is greater than approximately 30 to 60g then a sub-sampling routine based on ISO 3082:2009(E) is employed. *NOTE: Depending on the nature and size of the soil sample, the sub-2 mm residue material may need to be sub-sampled for trace analysis, in accordance with AS 4964-2004.*
Bonded asbestos-containing material (ACM)	The material is first examined and any fibres isolated for identification by PLM and DS. Where required, interfering matrices may be removed by disintegration using a range of heat, chemical or physical treatments, possibly in combination.The resultant material is then further examined in accordance with AS 4964 - 2004. *NOTE: Even after disintegration it may be difficult to detect the presence of asbestos in some asbestos-containing bulk materials using PLM and DS. This is due to the low grade or small length or diameter of the asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials. Vinyl/asbestos floor tiles, some asbestos-containing sealants and mastics, asbestos-containing epoxy resins and some ore samples are examples of these types of material, which are difficult to analyse.*
Limit of Reporting	The performance limitation of the AS 4964 (2004) method for non-homogeneous samples is around 0.1 g/kg (equivalent to 0.01% (w/w)). Where no asbestos is found by PLM and DS, including Trace Analysis, this is considered to be at the nominal reporting limit of 0.01% (w/w). The NEPM screening level of 0.001% (w/w) is intended as an on-site determination, not a laboratory Limit of Reporting (LOR), per se. Examination of a large sample size (e.g. 500 mL) may improve the likelihood of detecting asbestos, particularly AF, to aid assessment against the NEPM criteria. Gravimetric determinations to this level of accuracy are outside of AS 4964 and hence NATA Accreditation does not cover the performance of this service (non-NATA results shown with an asterisk). *NOTE: NATA News March 2014, p.7, states in relation to AS 4964: "This is a qualitative method with a nominal reporting limit of 0.01 % " and that currently in Australia "there is no validated method available for the quantification of asbestos".This report is consistent with the analytical procedures and reporting recommendations in the NEPM and the WA DoH.*

Project Name INLAND RAIL - FORBES STATION AND YARD
Project ID C-1859.00
Date Sampled Feb 01, 2024
Report 1065544-AID

Client Sample ID	Eurofins Sample No.	Date Sampled	Sample Description	Result
TP01_0.0-0.2	24-Fe0011003	Feb 01, 2024	Approximate Sample 464g Sample consisted of: Brown fine-grained soil, ashed material, organic debris and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
TP01_0.5-0.6	24-Fe0011004	Feb 01, 2024	Approximate Sample 410g Sample consisted of: Brown fine-grained clayey soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
TP02_0.0-0.2	24-Fe0011005	Feb 01, 2024	Approximate Sample 499g Sample consisted of: Brown fine-grained soil, ashed material, organic debris and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
TP02_0.5-0.6	24-Fe0011006	Feb 01, 2024	Approximate Sample 410g Sample consisted of: Brown fine-grained clayey soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
TP03_0.0-0.2	24-Fe0011007	Feb 01, 2024	Approximate Sample 630g Sample consisted of: Brown fine-grained soil, cement, organic debris and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
TP03_0.5-0.6	24-Fe0011008	Feb 01, 2024	Approximate Sample 384g Sample consisted of: Brown fine-grained clayey soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
TP04_0.5-0.6	24-Fe0011010	Feb 01, 2024	Approximate Sample 438g Sample consisted of: Brown fine-grained soil, ashed material, organic debris and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
TP05_0.0-0.2	24-Fe0011011	Feb 01, 2024	Approximate Sample 585g Sample consisted of: Brown fine-grained clayey soil, cement and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.

Client Sample ID	Eurofins Sample No.	Date Sampled	Sample Description	Result
TP05_0.2-0.4	24-Fe0011012	Feb 01, 2024	Approximate Sample 330g Sample consisted of: Brown fine-grained soil, ashed material, organic debris and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
TP06_0.0-0.2	24-Fe0011013	Feb 01, 2024	Approximate Sample 651g Sample consisted of: Brown fine-grained clayey soil, cement, glass, plaster and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
TP06_0.5-0.6	24-Fe0011014	Feb 01, 2024	Approximate Sample 376g Sample consisted of: Brown fine-grained soil, ashed material, organic debris and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
TP07_0.0-0.2	24-Fe0011015	Feb 01, 2024	Approximate Sample 521g Sample consisted of: Brown fine-grained clayey soil, cement, ceramic, brick and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
TP07_0.5-0.6	24-Fe0011016	Feb 01, 2024	Approximate Sample 495g Sample consisted of: Brown fine-grained soil, ashed material, organic debris and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
TP08_0.0-0.2	24-Fe0011017	Feb 01, 2024	Approximate Sample 569g Sample consisted of: Brown fine-grained clayey soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
TP08_0.5-0.6	24-Fe0011018	Feb 01, 2024	Approximate Sample 497g Sample consisted of: Brown fine-grained soil, ashed material, organic debris and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
TP09_0.0-0.2	24-Fe0011019	Feb 01, 2024	Approximate Sample 396g Sample consisted of: Brown fine-grained clayey soil and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
TP09_0.5-0.6	24-Fe0011020	Feb 01, 2024	Approximate Sample 436g Sample consisted of: Brown fine-grained soil, ashed material, organic debris and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
TP10_0.0-0.2	24-Fe0011021	Feb 01, 2024	Approximate Sample 490g Sample consisted of: Brown fine-grained clayey soil, plaster and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
TP10_0.5-0.6	24-Fe0011022	Feb 01, 2024	Approximate Sample 434g Sample consisted of: Brown fine-grained soil, ashed material, cement and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.
TP05_0.0-0.2 A	24-Fe0015168	Feb 01, 2024	Approximate Sample 441g Sample consisted of: Brown fine-grained clayey soil, cement, plastic, glass and rocks	No asbestos detected at the reporting limit of 0.01% w/w. Organic fibre detected. No trace asbestos detected.

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Asbestos - LTM-ASB-8020	Sydney	Feb 07, 2024	Indefinite

Company Name: D & N Geotechnical Pty Ltd
Address: Unit 11/22-38 Thynne St
Bruce
ACT 2617

Order No.:
Report #: 1065544
Phone:
Fax:

Received: Feb 5, 2024 3:15 PM
Due: Feb 12, 2024
Priority: 5 Day
Contact Name: Nick Davison

Project Name: INLAND RAIL - FORBES STATION AND YARD
Project ID: C-1859.00

Eurofins Analytical Services Manager : Bonnie Pu

Sample Detail						Asbestos - AS4964	HOLD	Polychlorinated Biphenyls	Moisture Set	Eurofins Suite B10: BTEX/TRH/PAH/OCP/OPP/M8	BTEXN and Volatile TRH	BTEXN and Volatile TRH
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X	X	X
External Laboratory												
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**							
1	TP01_0.0-0.2	Feb 01, 2024		Soil	R24-Fe0011003	X		X	X	X		
2	TP01_0.5-0.6	Feb 01, 2024		Soil	R24-Fe0011004	X		X	X	X		
3	TP02_0.0-0.2	Feb 01, 2024		Soil	R24-Fe0011005	X		X	X	X		
4	TP02_0.5-0.6	Feb 01, 2024		Soil	R24-Fe0011006	X		X	X	X		
5	TP03_0.0-0.2	Feb 01, 2024		Soil	R24-Fe0011007	X		X	X	X		
6	TP03_0.5-0.6	Feb 01, 2024		Soil	R24-Fe0011008	X		X	X	X		
7	TP04_0.0-0.2	Feb 01, 2024		Soil	R24-Fe0011009			X	X	X		
8	TP04_0.5-0.6	Feb 01, 2024		Soil	R24-Fe0011010	X		X	X	X		
9	TP05_0.0-0.2	Feb 01, 2024		Soil	R24-Fe0011011	X		X	X	X		
10	TP05_0.2-0.4	Feb 01, 2024		Soil	R24-Fe0011012	X		X	X	X		
11	TP06_0.0-0.2	Feb 01, 2024		Soil	R24-Fe0011013	X		X	X	X		
12	TP06_0.5-0.6	Feb 01, 2024		Soil	R24-Fe0011014	X		X	X	X		
13	TP07_0.0-0.2	Feb 01, 2024		Soil	R24-Fe0011015	X		X	X	X		

Company Name: D & N Geotechnical Pty Ltd
Address: Unit 11/22-38 Thynne St
Bruce
ACT 2617

Order No.:
Report #: 1065544
Phone:
Fax:

Received: Feb 5, 2024 3:15 PM
Due: Feb 12, 2024
Priority: 5 Day
Contact Name: Nick Davison

Project Name: INLAND RAIL - FORBES STATION AND YARD
Project ID: C-1859.00

Eurofins Analytical Services Manager : Bonnie Pu

Sample Detail						Asbestos - AS4964	HOLD	Polychlorinated Biphenyls	Moisture Set	Eurofins Suite B10: BTEX/TRH/PAH/OCP/OPP/M8	BTEXN and Volatile TRH	BTEXN and Volatile TRH
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X	X	X
14	TP07_0.5-0.6	Feb 01, 2024		Soil	R24-Fe0011016	X		X	X	X		
15	TP08_0.0-0.2	Feb 01, 2024		Soil	R24-Fe0011017	X		X	X	X		
16	TP08_0.5-0.6	Feb 01, 2024		Soil	R24-Fe0011018	X		X	X	X		
17	TP09_0.0-0.2	Feb 01, 2024		Soil	R24-Fe0011019	X		X	X	X		
18	TP09_0.5-0.6	Feb 01, 2024		Soil	R24-Fe0011020	X		X	X	X		
19	TP10_0.0-0.2	Feb 01, 2024		Soil	R24-Fe0011021	X		X	X	X		
20	TP10_0.5-0.6	Feb 01, 2024		Soil	R24-Fe0011022	X		X	X	X		
21	QC100	Feb 01, 2024		Soil	R24-Fe0011023			X	X	X		
22	QC102	Feb 01, 2024		Soil	R24-Fe0011024			X	X	X		
23	QC300	Feb 01, 2024		Water	R24-Fe0011025			X		X		
24	QC400	Feb 01, 2024		Soil	R24-Fe0011026							X
25	QC500	Feb 01, 2024		Soil	R24-Fe0011027						X	
26	TP09_0.9-1.0	Feb 01, 2024		Soil	R24-Fe0011029		X					
27	QC200	Feb 01, 2024		Soil	R24-Fe0011030		X					
28	QC101	Feb 01, 2024		Soil	R24-Fe0011031		X					
29	QC201	Feb 01, 2024		Soil	R24-Fe0011032		X					

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Project Name: INLAND RAIL - FORBES STATION AND YARD
Project ID: C-1859.00

Eurofins Analytical Services Manager : Bonnie Pu

Sample Detail						Asbestos - AS4964	HOLD	Polychlorinated Biphenyls	Moisture Set	Eurofins Suite B10: BTEX/TRH/PAH/OCP/OPP/M8	BTEXN and Volatile TRH	BTEXN and Volatile TRH
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X	X	X
30	TP05_0.0-0.2 A	Feb 01, 2024		Soil	R24-Fe0015168	X						
Test Counts						20	4	23	22	23	1	1

Internal Quality Control Review and Glossary General

1. QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Samples were analysed on an 'as received' basis.
4. Information identified on this report with the colour **blue** indicates data provided by customer that may have an impact on the results.
5. This report replaces any interim results previously issued.

Holding Times

Please refer to the most recent version of the 'Sample Preservation and Container Guide' for holding times (QS3001).
If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported. Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

Units

% w/w:	Percentage weight-for-weight basis, e.g. of asbestos in asbestos-containing finds in soil samples (**% w/w**)
F/fld	Airborne fibre filter loading as Fibres (**N**) per Fields counted (**n**)
F/mL	Airborne fibre reported concentration as Fibres per millilitre of air drawn over the sampler membrane (**C**)
g, kg	Mass, e.g. of whole sample (**M**) or asbestos-containing find within the sample (**m**)
g/kg	Concentration in grams per kilogram
L, mL	Volume, e.g. of air as measured in AFM (**V** = **r** x **t**)
L/min	Airborne fibre sampling Flowrate as litres per minute of air drawn over the sampler membrane (**r**)
min	Time (**t**), e.g. of air sample collection period

Calculations

Airborne Fibre Concentration: $C = \left(\frac{A}{a}\right) \times \left(\frac{N}{n}\right) \times \left(\frac{1}{r}\right) \times \left(\frac{1}{t}\right) = K \times \left(\frac{N}{n}\right) \times \left(\frac{1}{V}\right)$

Asbestos Content (as asbestos): $\% \, w/w = \frac{(m \times P_A)}{M}$

Weighted Average (of asbestos): $\%_{WA} = \sum \frac{(m \times P_A)_x}{x}$

Terms

%asbestos	Estimated percentage of asbestos in a given matrix may be derived from knowledge or experience of the material, informed by HSG264 *Appendix 2*, else assumed to be 15% in accordance with WA DOH *Appendix 2* (**P$_A$**). This estimate is not NATA-accredited.
ACM	Asbestos Containing Materials. Asbestos contained within a non-asbestos matrix, typically presented in bonded (non-friable) condition. For the purposes of the NEPM and WA DOH, ACM corresponds to material larger than 7 mm x 7 mm.
AF	Asbestos Fines. Asbestos contamination within a soil sample, as defined by WA DOH. Includes loose fibre bundles and small pieces of friable and non-friable material such as asbestos cement fragments mixed with soil. Considered under the NEPM as equivalent to "non-bonded / friable".
AFM	Airborne Fibre Monitoring, e.g., by the MFM.
Amosite	Amosite Asbestos Detected. Amosite may also refer to Fibrous Grunerite or Brown Asbestos. Identified in accordance with AS 4964-2004.
AS	Australian Standard.
Asbestos Content (as asbestos)	Total %w/w asbestos content in asbestos-containing finds in a soil sample (**% w/w**).
Chrysotile	Chrysotile Asbestos Detected. Chrysotile may also refer to Fibrous Serpentine or White Asbestos. Identified in accordance with AS 4964-2004.
COC	Chain of Custody.
Crocidolite	Crocidolite Asbestos Detected. Crocidolite may also refer to Fibrous Riebeckite or Blue Asbestos. Identified in accordance with AS 4964-2004.
Dry	Sample is dried by heating prior to analysis.
DS	Dispersion Staining. Technique required for Unequivocal Identification of asbestos fibres by PLM.
FA	Fibrous Asbestos. Asbestos containing material that is wholly or in part friable, including materials with higher asbestos content with a propensity to become friable with handling, and any material that was previously non-friable and in a severely degraded condition. For the purposes of the NEPM and WA DOH, FA generally corresponds to material larger than 7 mm x 7 mm, although FA may be more difficult to visibly distinguish and may be assessed as AF.
Fibre Count	Total of all fibres (whether asbestos or not) meeting the counting criteria set out in the NOHSC:3003
Fibre ID	Fibre Identification. Unequivocal identification of asbestos fibres according to AS 4964-2004. Includes Chrysotile, Amosite (Grunerite) or Crocidolite asbestos.
Friable	Asbestos-containing materials of any size that may be broken or crumbled by hand pressure. For the purposes of the NEPM, this includes both AF and FA. It is outside of the laboratory's remit to assess degree of friability.
HSG248	UK HSE HSG248, *Asbestos: The Analysts Guide*, 2nd Edition (2021).
HSG264	UK HSE HSG264, *Asbestos: The Survey Guide* (2012).
ISO (also ISO/IEC)	International Organization for Standardization / International Electrotechnical Commission.
K Factor	Microscope constant (**K**) as derived from the effective filter area of the given AFM membrane used for collecting the sample (**A**) and the projected eyepiece graticule area of the specific microscope used for the analysis (**a**).
LOR	Limit of Reporting.
MFM (also NOHSC:3003)	Membrane Filter Method. As described by the Australian Government National Occupational Health and Safety Commission, *Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres*, 2nd Edition [NOHSC:3003(2005)].
NEPM (also ASC NEPM)	National Environment Protection (Assessment of Site Contamination) Measure, (2013, as amended).
Organic	Organic Fibres Detected. Organic may refer to Natural or Man-Made Polymeric Fibres. Identified in accordance with AS 4964-2004.
PCM	Phase Contrast Microscopy. As used for Fibre Counting according to the MFM.
PLM	Polarised Light Microscopy. As used for Fibre Identification and Trace Analysis according to AS 4964-2004.
Sampling	Unless otherwise stated Eurofins are not responsible for sampling equipment or the sampling process.
SMF	Synthetic Mineral Fibre Detected. SMF may also refer to Man Made Vitreous Fibres. Identified in accordance with AS 4964-2004.
SRA	Sample Receipt Advice.
Trace Analysis	Analytical procedure used to detect the presence of respirable fibres (particularly asbestos) in a given sample matrix.
UK HSE HSG	United Kingdom, Health and Safety Executive, Health and Safety Guidance, publication.
UMF	Unidentified Mineral Fibre Detected. Fibrous minerals that are detected but have not been unequivocally identified by PLM with DS according the AS 4964-2004. May include (but not limited to) Actinolite, Anthophyllite or Tremolite asbestos.
WA DOH	Reference document for the NEPM. Government of Western Australia, *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia* (updated 2021), including Appendix Four: *Laboratory analysis*
Weighted Average	Combined average %w/w asbestos content of all asbestos-containing finds in the given aliquot or total soil sample (**%$_{WA}$**).

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	N/A
Some samples have been subcontracted	No

Asbestos Counter/Identifier:

Bennel Jiri	Senior Analyst-Asbestos

Authorised by:

Sayeed Abu	Senior Analyst-Asbestos

Glenn Jackson
Managing Director

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

Certificate of Analysis

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

D & N Geotechnical Pty Ltd
Unit 11/22-38 Thynne St
Bruce
ACT 2617

Attention: **Nick Davison**

Report **1065544-W**
Project name INLAND RAIL - FORBES STATION AND YARD
Project ID C-1859.00
Received Date Feb 05, 2024

Client Sample ID			**QC300**
Sample Matrix			**Water**
Eurofins Sample No.			**R24-Fe0011025**
Date Sampled			**Feb 01, 2024**
Test/Reference	LOR	Unit	
Total Recoverable Hydrocarbons - 1999 NEPM Fractions			
TRH C6-C9	0.02	mg/L	< 0.02
TRH C10-C14	0.05	mg/L	< 0.05
TRH C15-C28	0.1	mg/L	< 0.1
TRH C29-C36	0.1	mg/L	< 0.1
TRH C10-C36 (Total)	0.1	mg/L	< 0.1
BTEX			
Benzene	0.001	mg/L	< 0.001
Toluene	0.001	mg/L	< 0.001
Ethylbenzene	0.001	mg/L	< 0.001
m&p-Xylenes	0.002	mg/L	< 0.002
o-Xylene	0.001	mg/L	< 0.001
Xylenes - Total*	0.003	mg/L	< 0.003
4-Bromofluorobenzene (surr.)	1	%	101
Total Recoverable Hydrocarbons - 2013 NEPM Fractions			
Naphthalene[N02]	0.01	mg/L	< 0.01
TRH >C10-C16 less Naphthalene (F2)[N01]	0.05	mg/L	< 0.05
TRH C6-C10	0.02	mg/L	< 0.02
TRH C6-C10 less BTEX (F1)[N04]	0.02	mg/L	< 0.02
Polycyclic Aromatic Hydrocarbons			
Acenaphthene	0.001	mg/L	< 0.001
Acenaphthylene	0.001	mg/L	< 0.001
Anthracene	0.001	mg/L	< 0.001
Benz(a)anthracene	0.001	mg/L	< 0.001
Benzo(a)pyrene	0.001	mg/L	< 0.001
Benzo(b&j)fluoranthene[N07]	0.001	mg/L	< 0.001
Benzo(g.h.i)perylene	0.001	mg/L	< 0.001
Benzo(k)fluoranthene	0.001	mg/L	< 0.001
Chrysene	0.001	mg/L	< 0.001
Dibenz(a.h)anthracene	0.001	mg/L	< 0.001
Fluoranthene	0.001	mg/L	< 0.001
Fluorene	0.001	mg/L	< 0.001
Indeno(1.2.3-cd)pyrene	0.001	mg/L	< 0.001
Naphthalene	0.001	mg/L	< 0.001
Phenanthrene	0.001	mg/L	< 0.001
Pyrene	0.001	mg/L	< 0.001

Client Sample ID			**QC300**
Sample Matrix			**Water**
Eurofins Sample No.			**R24-Fe0011025**
Date Sampled			**Feb 01, 2024**
Test/Reference	LOR	Unit	
Polycyclic Aromatic Hydrocarbons			
Total PAH*	0.001	mg/L	< 0.001
2-Fluorobiphenyl (surr.)	1	%	70
p-Terphenyl-d14 (surr.)	1	%	INT
Organochlorine Pesticides			
Chlordanes - Total	0.002	mg/L	< 0.002
4.4'-DDD	0.0002	mg/L	< 0.0002
4.4'-DDE	0.0002	mg/L	< 0.0002
4.4'-DDT	0.0002	mg/L	< 0.0002
a-HCH	0.0002	mg/L	< 0.0002
Aldrin	0.0002	mg/L	< 0.0002
b-HCH	0.0002	mg/L	< 0.0002
d-HCH	0.0002	mg/L	< 0.0002
Dieldrin	0.0002	mg/L	< 0.0002
Endosulfan I	0.0002	mg/L	< 0.0002
Endosulfan II	0.0002	mg/L	< 0.0002
Endosulfan sulphate	0.0002	mg/L	< 0.0002
Endrin	0.0002	mg/L	< 0.0002
Endrin aldehyde	0.0002	mg/L	< 0.0002
Endrin ketone	0.0002	mg/L	< 0.0002
g-HCH (Lindane)	0.0002	mg/L	< 0.0002
Heptachlor	0.0002	mg/L	< 0.0002
Heptachlor epoxide	0.0002	mg/L	< 0.0002
Hexachlorobenzene	0.0002	mg/L	< 0.0002
Methoxychlor	0.0002	mg/L	< 0.0002
Toxaphene	0.005	mg/L	< 0.005
Aldrin and Dieldrin (Total)*	0.0002	mg/L	< 0.0002
DDT + DDE + DDD (Total)*	0.0002	mg/L	< 0.0002
Vic EPA IWRG 621 OCP (Total)*	0.002	mg/L	< 0.002
Vic EPA IWRG 621 Other OCP (Total)*	0.002	mg/L	< 0.002
Dibutylchlorendate (surr.)	1	%	INT
Tetrachloro-m-xylene (surr.)	1	%	142
Organophosphorus Pesticides			
Azinphos-methyl	0.002	mg/L	< 0.002
Bolstar	0.002	mg/L	< 0.002
Chlorfenvinphos	0.02	mg/L	< 0.02
Chlorpyrifos	0.002	mg/L	< 0.002
Chlorpyrifos-methyl	0.002	mg/L	< 0.002
Coumaphos	0.02	mg/L	< 0.02
Demeton-S	0.002	mg/L	< 0.002
Demeton-O	0.002	mg/L	< 0.002
Diazinon	0.002	mg/L	< 0.002
Dichlorvos	0.002	mg/L	< 0.002
Dimethoate	0.002	mg/L	< 0.002
Disulfoton	0.002	mg/L	< 0.002
EPN	0.002	mg/L	< 0.002
Ethion	0.002	mg/L	< 0.002
Ethoprop	0.002	mg/L	< 0.002
Ethyl parathion	0.002	mg/L	< 0.002
Fenitrothion	0.002	mg/L	< 0.002

Client Sample ID			**QC300**
Sample Matrix			**Water**
Eurofins Sample No.			**R24-Fe0011025**
Date Sampled			**Feb 01, 2024**
Test/Reference	LOR	Unit	
Organophosphorus Pesticides			
Fensulfothion	0.002	mg/L	< 0.002
Fenthion	0.002	mg/L	< 0.002
Malathion	0.002	mg/L	< 0.002
Merphos	0.002	mg/L	< 0.002
Methyl parathion	0.002	mg/L	< 0.002
Mevinphos	0.002	mg/L	< 0.002
Monocrotophos	0.002	mg/L	< 0.002
Naled	0.002	mg/L	< 0.002
Omethoate	0.02	mg/L	< 0.02
Phorate	0.002	mg/L	< 0.002
Pirimiphos-methyl	0.02	mg/L	< 0.02
Pyrazophos	0.002	mg/L	< 0.002
Ronnel	0.002	mg/L	< 0.002
Terbufos	0.002	mg/L	< 0.002
Tetrachlorvinphos	0.002	mg/L	< 0.002
Tokuthion	0.002	mg/L	< 0.002
Trichloronate	0.002	mg/L	< 0.002
Triphenylphosphate (surr.)	1	%	INT
Polychlorinated Biphenyls			
Aroclor-1016	0.005	mg/L	< 0.005
Aroclor-1221	0.005	mg/L	< 0.005
Aroclor-1232	0.005	mg/L	< 0.005
Aroclor-1242	0.005	mg/L	< 0.005
Aroclor-1248	0.005	mg/L	< 0.005
Aroclor-1254	0.005	mg/L	< 0.005
Aroclor-1260	0.005	mg/L	< 0.005
Total PCB*	0.005	mg/L	< 0.005
Dibutylchlorendate (surr.)	1	%	INT
Tetrachloro-m-xylene (surr.)	1	%	142
Total Recoverable Hydrocarbons - 2013 NEPM Fractions			
TRH >C10-C16	0.05	mg/L	< 0.05
TRH >C16-C34	0.1	mg/L	< 0.1
TRH >C34-C40	0.1	mg/L	< 0.1
TRH >C10-C40 (total)*	0.1	mg/L	< 0.1
Metals M8			
Arsenic	0.001	mg/L	< 0.001
Cadmium	0.0002	mg/L	< 0.0002
Chromium	0.001	mg/L	< 0.001
Copper	0.001	mg/L	< 0.001
Lead	0.001	mg/L	< 0.001
Mercury	0.0001	mg/L	< 0.0001
Nickel	0.001	mg/L	< 0.001
Zinc	0.005	mg/L	< 0.005

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Total Recoverable Hydrocarbons - 1999 NEPM Fractions	Sydney	Feb 09, 2024	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
BTEX	Sydney	Feb 09, 2024	14 Days
- Method: LTM-ORG-2010 BTEX and Volatile TRH			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Feb 09, 2024	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Polycyclic Aromatic Hydrocarbons	Sydney	Feb 09, 2024	7 Days
- Method: LTM-ORG-2130 PAH and Phenols in Soil and Water			
Organochlorine Pesticides	Sydney	Feb 09, 2024	7 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water			
Organophosphorus Pesticides	Sydney	Feb 09, 2024	7 Days
- Method: LTM-ORG-2200 Organophosphorus Pesticides by GC-MS			
Total Recoverable Hydrocarbons - 2013 NEPM Fractions	Sydney	Feb 09, 2024	7 Days
- Method: LTM-ORG-2010 TRH C6-C40			
Metals M8	Sydney	Feb 09, 2024	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Polychlorinated Biphenyls	Sydney	Feb 09, 2024	7 Days
- Method: LTM-ORG-2220 OCP & PCB in Soil and Water			

Company Name: D & N Geotechnical Pty Ltd
Address: Unit 11/22-38 Thynne St
Bruce
ACT 2617

Order No.:
Report #: 1065544
Phone:
Fax:

Received: Feb 5, 2024 3:15 PM
Due: Feb 12, 2024
Priority: 5 Day
Contact Name: Nick Davison

Project Name: inland rail - forbes station and yard
Project ID: C-1859.00

Eurofins Analytical Services Manager : Bonnie Pu

Sample Detail						Asbestos - AS4964	HOLD	Polychlorinated Biphenyls	Moisture Set	Eurofins Suite B10: BTEX/TRH/PAH/OCP/OPP/M8	BTEXN and Volatile TRH	BTEXN and Volatile TRH
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X	X	X
External Laboratory												
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**							
1	TP01_0.0-0.2	Feb 01, 2024		Soil	R24-Fe0011003	X		X	X	X		
2	TP01_0.5-0.6	Feb 01, 2024		Soil	R24-Fe0011004	X		X	X	X		
3	TP02_0.0-0.2	Feb 01, 2024		Soil	R24-Fe0011005	X		X	X	X		
4	TP02_0.5-0.6	Feb 01, 2024		Soil	R24-Fe0011006	X		X	X	X		
5	TP03_0.0-0.2	Feb 01, 2024		Soil	R24-Fe0011007	X		X	X	X		
6	TP03_0.5-0.6	Feb 01, 2024		Soil	R24-Fe0011008	X		X	X	X		
7	TP04_0.0-0.2	Feb 01, 2024		Soil	R24-Fe0011009	X		X	X	X		
8	TP04_0.5-0.6	Feb 01, 2024		Soil	R24-Fe0011010	X		X	X	X		
9	TP05_0.0-0.2	Feb 01, 2024		Soil	R24-Fe0011011	X		X	X	X		
10	TP05_0.2-0.4	Feb 01, 2024		Soil	R24-Fe0011012	X		X	X	X		
11	TP06_0.0-0.2	Feb 01, 2024		Soil	R24-Fe0011013	X		X	X	X		
12	TP06_0.5-0.6	Feb 01, 2024		Soil	R24-Fe0011014	X		X	X	X		
13	TP07_0.0-0.2	Feb 01, 2024		Soil	R24-Fe0011015	X		X	X	X		

Company Name: D & N Geotechnical Pty Ltd
Address: Unit 11/22-38 Thynne St
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Project Name: inland rail - forbes station and yard
Project ID: C-1859.00

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Contact Name: Nick Davison

Eurofins Analytical Services Manager : Bonnie Pu

Sample Detail						Asbestos - AS4964	HOLD	Polychlorinated Biphenyls	Moisture Set	Eurofins Suite B10: BTEX/TRH/PAH/OCP/OPP/M8	BTEXN and Volatile TRH	BTEXN and Volatile TRH
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X	X	X
14	TP07_0.5-0.6	Feb 01, 2024		Soil	R24-Fe0011016	X		X	X	X		
15	TP08_0.0-0.2	Feb 01, 2024		Soil	R24-Fe0011017	X		X	X	X		
16	TP08_0.5-0.6	Feb 01, 2024		Soil	R24-Fe0011018	X		X	X	X		
17	TP09_0.0-0.2	Feb 01, 2024		Soil	R24-Fe0011019	X		X	X	X		
18	TP09_0.5-0.6	Feb 01, 2024		Soil	R24-Fe0011020	X		X	X	X		
19	TP10_0.0-0.2	Feb 01, 2024		Soil	R24-Fe0011021	X		X	X	X		
20	TP10_0.5-0.6	Feb 01, 2024		Soil	R24-Fe0011022	X		X	X	X		
21	QC100	Feb 01, 2024		Soil	R24-Fe0011023			X	X	X		
22	QC102	Feb 01, 2024		Soil	R24-Fe0011024			X	X	X		
23	QC300	Feb 01, 2024		Water	R24-Fe0011025			X		X		
24	QC400	Feb 01, 2024		Soil	R24-Fe0011026							X
25	QC500	Feb 01, 2024		Soil	R24-Fe0011027				X		X	
26	LAB SPIKE	Not Provided		Soil	R24-Fe0011028							X
27	TP09_0.9-1.0	Feb 01, 2024		Soil	R24-Fe0011029		X					
28	QC200	Feb 01, 2024		Soil	R24-Fe0011030		X					
29	QC101	Feb 01, 2024		Soil	R24-Fe0011031		X					

Company Name: D & N Geotechnical Pty Ltd
Address: Unit 11/22-38 Thynne St
Bruce
ACT 2617

Project Name: inland rail - forbes station and yard
Project ID: C-1859.00

Order No.:
Report #: 1065544
Phone:
Fax:

Received: Feb 5, 2024 3:15 PM
Due: Feb 12, 2024
Priority: 5 Day
Contact Name: Nick Davison

Eurofins Analytical Services Manager : Bonnie Pu

Sample Detail						Asbestos - AS4964	HOLD	Polychlorinated Biphenyls	Moisture Set	Eurofins Suite B10: BTEX/TRH/PAH/OCP/OPP/M8	BTEXN and Volatile TRH	BTEXN and Volatile TRH
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X	X	X
30	QC201	Feb 01, 2024		Soil	R24-Fe0011032		X					
31	TP05_0.0-0.2 A	Feb 01, 2024		Soil	R24-Fe0015168	X						
Test Counts						21	4	23	23	23	1	2

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follow guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013. They are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry weight basis unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion unless otherwise stated.
4. For CEC results where the sample's origin is unknown or environmentally contaminated, the results should be used advisedly.
5. Actual LORs are matrix dependent. Quoted LORs may be raised where sample extracts are diluted due to interferences.
6. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
7. SVOC analysis on waters is performed on homogenised, unfiltered samples unless noted otherwise.
8. Samples were analysed on an 'as received' basis.
9. Information identified in this report with blue colour indicates data provided by customers that may have an impact on the results.
10. This report replaces any interim results previously issued.

Holding Times

Please refer to the 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours before sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and despite any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling; therefore, compliance with these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether, the holding time is 7 days; however, for all other VOCs, such as BTEX or C6-10 TRH, the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**ppm:** parts per million
µg/L: micrograms per litre	**ppb:** parts per billion	**%:** Percentage
org/100 mL: Organisms per 100 millilitres	**NTU:** Nephelometric Turbidity Units	**MPN/100 mL:** Most Probable Number of organisms per 100 millilitres
CFU: Colony forming unit	**Colour:** Pt-Co Units	

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however, free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should only be used as a guide and may be different when site-specific Sampling Analysis and Quality Plan (SAQP) have been implemented.

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is ≤30%; however, the following acceptance guidelines are equally applicable:

Results <10 times the LOR:	No Limit
Results between 10-20 times the LOR:	RPD must lie between 0-50%
Results >20 times the LOR:	RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range, not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%, VOC recoveries 70 – 130%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 5.4, where no positive PFAS results have been reported or reviewed, and no data was affected.

QC Data General Comments

1. Where a result is reported as less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown are not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery, the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results, a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data; thus, it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	mg/L	< 0.02			0.02	Pass	
TRH C10-C14	mg/L	< 0.05			0.05	Pass	
TRH C15-C28	mg/L	< 0.1			0.1	Pass	
TRH C29-C36	mg/L	< 0.1			0.1	Pass	
Method Blank							
BTEX							
Benzene	mg/L	< 0.001			0.001	Pass	
Toluene	mg/L	< 0.001			0.001	Pass	
Ethylbenzene	mg/L	< 0.001			0.001	Pass	
m&p-Xylenes	mg/L	< 0.002			0.002	Pass	
o-Xylene	mg/L	< 0.001			0.001	Pass	
Xylenes - Total*	mg/L	< 0.003			0.003	Pass	
Method Blank							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	mg/L	< 0.01			0.01	Pass	
TRH C6-C10	mg/L	< 0.02			0.02	Pass	
Method Blank							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/L	< 0.001			0.001	Pass	
Acenaphthylene	mg/L	< 0.001			0.001	Pass	
Anthracene	mg/L	< 0.001			0.001	Pass	
Benz(a)anthracene	mg/L	< 0.001			0.001	Pass	
Benzo(a)pyrene	mg/L	< 0.001			0.001	Pass	
Benzo(b&j)fluoranthene	mg/L	< 0.001			0.001	Pass	
Benzo(g.h.i)perylene	mg/L	0.001			0.001	Pass	
Benzo(k)fluoranthene	mg/L	< 0.001			0.001	Pass	
Chrysene	mg/L	< 0.001			0.001	Pass	
Dibenz(a.h)anthracene	mg/L	< 0.001			0.001	Pass	
Fluoranthene	mg/L	< 0.001			0.001	Pass	
Fluorene	mg/L	< 0.001			0.001	Pass	
Indeno(1.2.3-cd)pyrene	mg/L	< 0.001			0.001	Pass	
Naphthalene	mg/L	< 0.001			0.001	Pass	
Phenanthrene	mg/L	< 0.001			0.001	Pass	
Pyrene	mg/L	< 0.001			0.001	Pass	
Method Blank							
Organochlorine Pesticides							
Chlordanes - Total	mg/L	< 0.002			0.002	Pass	
4.4'-DDD	mg/L	< 0.0002			0.0002	Pass	
4.4'-DDE	mg/L	< 0.0002			0.0002	Pass	
4.4'-DDT	mg/L	< 0.0002			0.0002	Pass	
a-HCH	mg/L	< 0.0002			0.0002	Pass	
Aldrin	mg/L	< 0.0002			0.0002	Pass	
b-HCH	mg/L	< 0.0002			0.0002	Pass	
d-HCH	mg/L	< 0.0002			0.0002	Pass	
Dieldrin	mg/L	0.0002			0.0002	Pass	
Endosulfan I	mg/L	< 0.0002			0.0002	Pass	
Endosulfan II	mg/L	< 0.0002			0.0002	Pass	
Endosulfan sulphate	mg/L	< 0.0002			0.0002	Pass	
Endrin	mg/L	< 0.0002			0.0002	Pass	
Endrin aldehyde	mg/L	0.0002			0.0002	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Endrin ketone	mg/L	< 0.0002			0.0002	Pass	
g-HCH (Lindane)	mg/L	< 0.0002			0.0002	Pass	
Heptachlor	mg/L	< 0.0002			0.0002	Pass	
Heptachlor epoxide	mg/L	< 0.0002			0.0002	Pass	
Hexachlorobenzene	mg/L	< 0.0002			0.0002	Pass	
Methoxychlor	mg/L	< 0.0002			0.0002	Pass	
Toxaphene	mg/L	< 0.005			0.005	Pass	
Method Blank							
Organophosphorus Pesticides							
Azinphos-methyl	mg/L	< 0.002			0.002	Pass	
Bolstar	mg/L	< 0.002			0.002	Pass	
Chlorfenvinphos	mg/L	< 0.02			0.02	Pass	
Chlorpyrifos	mg/L	< 0.002			0.002	Pass	
Chlorpyrifos-methyl	mg/L	< 0.002			0.002	Pass	
Coumaphos	mg/L	< 0.02			0.02	Pass	
Demeton-S	mg/L	< 0.002			0.002	Pass	
Demeton-O	mg/L	< 0.002			0.002	Pass	
Diazinon	mg/L	< 0.002			0.002	Pass	
Dichlorvos	mg/L	< 0.002			0.002	Pass	
Dimethoate	mg/L	< 0.002			0.002	Pass	
Disulfoton	mg/L	< 0.002			0.002	Pass	
EPN	mg/L	< 0.002			0.002	Pass	
Ethion	mg/L	< 0.002			0.002	Pass	
Ethoprop	mg/L	< 0.002			0.002	Pass	
Ethyl parathion	mg/L	< 0.002			0.002	Pass	
Fenitrothion	mg/L	< 0.002			0.002	Pass	
Fensulfothion	mg/L	< 0.002			0.002	Pass	
Fenthion	mg/L	< 0.002			0.002	Pass	
Malathion	mg/L	< 0.002			0.002	Pass	
Merphos	mg/L	< 0.002			0.002	Pass	
Methyl parathion	mg/L	< 0.002			0.002	Pass	
Mevinphos	mg/L	< 0.002			0.002	Pass	
Monocrotophos	mg/L	< 0.002			0.002	Pass	
Naled	mg/L	< 0.002			0.002	Pass	
Omethoate	mg/L	< 0.02			0.02	Pass	
Phorate	mg/L	< 0.002			0.002	Pass	
Pirimiphos-methyl	mg/L	< 0.02			0.02	Pass	
Pyrazophos	mg/L	< 0.002			0.002	Pass	
Ronnel	mg/L	< 0.002			0.002	Pass	
Terbufos	mg/L	< 0.002			0.002	Pass	
Tetrachlorvinphos	mg/L	< 0.002			0.002	Pass	
Tokuthion	mg/L	< 0.002			0.002	Pass	
Trichloronate	mg/L	< 0.002			0.002	Pass	
Method Blank							
Polychlorinated Biphenyls							
Aroclor-1016	mg/L	< 0.005			0.005	Pass	
Aroclor-1221	mg/L	< 0.005			0.005	Pass	
Aroclor-1232	mg/L	< 0.005			0.005	Pass	
Aroclor-1242	mg/L	< 0.005			0.005	Pass	
Aroclor-1248	mg/L	< 0.005			0.005	Pass	
Aroclor-1254	mg/L	< 0.005			0.005	Pass	
Aroclor-1260	mg/L	< 0.005			0.005	Pass	
Total PCB*	mg/L	< 0.005			0.005	Pass	
Method Blank							

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH >C10-C16	mg/L	< 0.05			0.05	Pass	
TRH >C16-C34	mg/L	< 0.1			0.1	Pass	
TRH >C34-C40	mg/L	< 0.1			0.1	Pass	
Method Blank							
Metals M8							
Arsenic	mg/L	< 0.001			0.001	Pass	
Cadmium	mg/L	< 0.0002			0.0002	Pass	
Chromium	mg/L	< 0.001			0.001	Pass	
Copper	mg/L	< 0.001			0.001	Pass	
Lead	mg/L	< 0.001			0.001	Pass	
Mercury	mg/L	< 0.0001			0.0001	Pass	
Nickel	mg/L	< 0.001			0.001	Pass	
Zinc	mg/L	< 0.005			0.005	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 1999 NEPM Fractions							
TRH C6-C9	%	72			70-130	Pass	
TRH C10-C14	%	126			70-130	Pass	
LCS - % Recovery							
BTEX							
Benzene	%	99			70-130	Pass	
Toluene	%	81			70-130	Pass	
Ethylbenzene	%	100			70-130	Pass	
m&p-Xylenes	%	101			70-130	Pass	
o-Xylene	%	98			70-130	Pass	
Xylenes - Total*	%	100			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
Naphthalene	%	102			70-130	Pass	
TRH C6-C10	%	75			70-130	Pass	
LCS - % Recovery							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	%	82			70-130	Pass	
Acenaphthylene	%	80			70-130	Pass	
Anthracene	%	72			70-130	Pass	
Benz(a)anthracene	%	91			70-130	Pass	
Benzo(a)pyrene	%	90			70-130	Pass	
Benzo(b&j)fluoranthene	%	89			70-130	Pass	
Benzo(g.h.i)perylene	%	92			70-130	Pass	
Benzo(k)fluoranthene	%	96			70-130	Pass	
Chrysene	%	84			70-130	Pass	
Dibenz(a.h)anthracene	%	90			70-130	Pass	
Fluoranthene	%	88			70-130	Pass	
Fluorene	%	83			70-130	Pass	
Indeno(1.2.3-cd)pyrene	%	89			70-130	Pass	
Pyrene	%	91			70-130	Pass	
LCS - % Recovery							
Organochlorine Pesticides							
Chlordanes - Total	%	77			70-130	Pass	
4.4'-DDD	%	75			70-130	Pass	
4.4'-DDE	%	78			70-130	Pass	
4.4'-DDT	%	83			70-130	Pass	
a-HCH	%	75			70-130	Pass	
Aldrin	%	77			70-130	Pass	

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Dieldrin	%	77			70-130	Pass	
Endosulfan I	%	79			70-130	Pass	
Endosulfan II	%	79			70-130	Pass	
Endosulfan sulphate	%	84			70-130	Pass	
Endrin	%	82			70-130	Pass	
Endrin aldehyde	%	76			70-130	Pass	
Endrin ketone	%	85			70-130	Pass	
g-HCH (Lindane)	%	78			70-130	Pass	
Heptachlor	%	77			70-130	Pass	
Heptachlor epoxide	%	76			70-130	Pass	
Hexachlorobenzene	%	73			70-130	Pass	
Methoxychlor	%	81			70-130	Pass	
LCS - % Recovery							
Organophosphorus Pesticides							
Diazinon	%	81			70-130	Pass	
Ethion	%	75			70-130	Pass	
LCS - % Recovery							
Polychlorinated Biphenyls							
Aroclor-1016	%	77			70-130	Pass	
Aroclor-1260	%	73			70-130	Pass	
LCS - % Recovery							
Total Recoverable Hydrocarbons - 2013 NEPM Fractions							
TRH >C10-C16	%	126			70-130	Pass	
LCS - % Recovery							
Metals M8							
Arsenic	%	82			80-120	Pass	
Cadmium	%	89			80-120	Pass	
Chromium	%	91			80-120	Pass	
Copper	%	93			80-120	Pass	
Lead	%	84			80-120	Pass	
Mercury	%	85			80-120	Pass	
Nickel	%	90			80-120	Pass	
Zinc	%	92			80-120	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1					
TRH C6-C9	S24-Fe0013035	NCP	%	96			70-130	Pass	
TRH C10-C14	S24-Fe0016884	NCP	%	84			70-130	Pass	
Spike - % Recovery									
BTEX				Result 1					
Benzene	S24-Fe0013035	NCP	%	98			70-130	Pass	
Toluene	S24-Fe0013035	NCP	%	109			70-130	Pass	
Ethylbenzene	S24-Fe0013035	NCP	%	103			70-130	Pass	
m&p-Xylenes	S24-Fe0013035	NCP	%	108			70-130	Pass	
o-Xylene	S24-Fe0013035	NCP	%	103			70-130	Pass	
Xylenes - Total*	S24-Fe0013035	NCP	%	107			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
Naphthalene	S24-Fe0013035	NCP	%	99			70-130	Pass	
TRH C6-C10	S24-Fe0013035	NCP	%	99			70-130	Pass	
Spike - % Recovery									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1					
TRH >C10-C16	S24-Fe0016884	NCP	%	83			70-130	Pass	
Spike - % Recovery									

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Metals M8				Result 1					
Arsenic	R24-Fe0011025	CP	%	83			75-125	Pass	
Cadmium	R24-Fe0011025	CP	%	86			75-125	Pass	
Chromium	R24-Fe0011025	CP	%	88			75-125	Pass	
Copper	R24-Fe0011025	CP	%	89			75-125	Pass	
Lead	R24-Fe0011025	CP	%	81			75-125	Pass	
Mercury	R24-Fe0011025	CP	%	85			75-125	Pass	
Nickel	R24-Fe0011025	CP	%	87			75-125	Pass	
Zinc	R24-Fe0011025	CP	%	88			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Total Recoverable Hydrocarbons - 1999 NEPM Fractions				Result 1	Result 2	RPD			
TRH C6-C9	S24-Fe0014836	NCP	mg/L	0.19	0.20	5.9	30%	Pass	
TRH C10-C14	N24-Fe0017805	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH C15-C28	N24-Fe0017805	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH C29-C36	N24-Fe0017805	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Duplicate									
BTEX				Result 1	Result 2	RPD			
Benzene	S24-Fe0014836	NCP	mg/L	0.020	0.020	<1	30%	Pass	
Toluene	S24-Fe0014836	NCP	mg/L	0.020	0.020	<1	30%	Pass	
Ethylbenzene	S24-Fe0014836	NCP	mg/L	0.020	0.020	1.7	30%	Pass	
m&p-Xylenes	S24-Fe0014836	NCP	mg/L	0.021	0.021	1.5	30%	Pass	
o-Xylene	S24-Fe0014836	NCP	mg/L	0.021	0.021	<1	30%	Pass	
Xylenes - Total*	S24-Fe0014836	NCP	mg/L	0.042	0.042	<1	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
Naphthalene	S24-Fe0014836	NCP	mg/L	0.02	0.02	3.0	30%	Pass	
TRH C6-C10	S24-Fe0014836	NCP	mg/L	0.24	0.25	1.7	30%	Pass	
Duplicate									
Total Recoverable Hydrocarbons - 2013 NEPM Fractions				Result 1	Result 2	RPD			
TRH >C10-C16	N24-Fe0017805	NCP	mg/L	< 0.05	< 0.05	<1	30%	Pass	
TRH >C16-C34	N24-Fe0017805	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
TRH >C34-C40	N24-Fe0017805	NCP	mg/L	< 0.1	< 0.1	<1	30%	Pass	
Duplicate									
Metals M8				Result 1	Result 2	RPD			
Arsenic	S24-Fe0024849	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Cadmium	S24-Fe0024849	NCP	mg/L	< 0.0002	< 0.0002	<1	30%	Pass	
Chromium	S24-Fe0024849	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Copper	S24-Fe0024849	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Lead	S24-Fe0024849	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Mercury	S24-Fe0024849	NCP	mg/L	< 0.0001	< 0.0001	<1	30%	Pass	
Nickel	S24-Fe0024849	NCP	mg/L	< 0.001	< 0.001	<1	30%	Pass	
Zinc	S24-Fe0024849	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	N/A
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
N01	F2 is determined by arithmetically subtracting the "naphthalene" value from the ">C10-C16" value. The naphthalene value used in this calculation is obtained from volatiles (Purge & Trap analysis).
N02	Where we have reported both volatile (P&T GCMS) and semivolatile (GCMS) naphthalene data, results may not be identical. Provided correct sample handling protocols have been followed, any observed differences in results are likely to be due to procedural differences within each methodology. Results determined by both techniques have passed all QAQC acceptance criteria, and are entirely technically valid.
N04	F1 is determined by arithmetically subtracting the "Total BTEX" value from the "C6-C10" value. The "Total BTEX" value is obtained by summing the concentrations of BTEX analytes. The "C6-C10" value is obtained by quantitating against a standard of mixed aromatic/aliphatic analytes.
N07	Please note:- These two PAH isomers closely co-elute using the most contemporary analytical methods and both the reported concentration (and the TEQ) apply specifically to the total of the two co-eluting PAHs

Authorised by:

Adam Bateup	Analytical Services Manager
Fang Yee Tan	Senior Analyst-Metal
Maria Tian	Senior Analyst-Organic
Roopesh Rangarajan	Senior Analyst-Organic
Roopesh Rangarajan	Senior Analyst-Volatile

Glenn Jackson
Managing Director

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

CHAIN OF CUSTODY RECORD

Eurofins | Environment Testing ABN 50 005 085 521

☐ **Sydney Laboratory**
179 Magowar Road, Girraween, NSW 2145
+61 2 9900 8400 EnviroSampleNSW@eurofins.com

☐ **Brisbane Laboratory**
Unit 1/21 Smallwood Place, Murarrie, QLD 4172
+61 7 3902 4600 EnviroSampleQLD@eurofins.com

☐ **Perth Laboratory**
46-48 Banksia Road, Welshpool, WA 6106
+61 8 6253 4444 EnviroSampleWA@eurofins.com

☐ **Melbourne Laboratory**
6 Monterey Road Dandenong South VIC 3175
+61 3 8564 5000 EnviroSampleVic@eurofins.com

Company	D&N Geotechnical
Address	unit 11/22-38 Thynne St, Bruce ACT 2617
Contact Name	Eddy Polhuis
Phone №	0455 989 926
Special Directions	
Purchase Order	
Quote ID №	
Project №	C-1859.00
Project Name	Inland Rail - Forbes Station and Yard
Project Manager	Nick Davison
EDD Format (ESdat, EQuIS etc)	Esdat (esdat_au+dngeotechnical@esdatlabsync.net)
Sampler(s)	Eddy Polhuis
Handed over by	Eddy Polhuis
Email for Invoice	nick@dngeotechnical.com, chelsea@dngeotechnical.co
Email for Results	nick@dngeotechnical.com, chelsea@dngeotechnical.co

Analyses
Where metals are requested, please specify "Total" or "Filtered". SUITE code must be used to attract SUITE pricing.

Containers
Change container type & size if necessary

Required Turnaround Time (TAT)
Default will be 5 days if not ticked.
♦Surcharge will apply
☐ Overnight (reporting by 9am)♦
☐ Same day♦ ☐ 1 day♦
☐ 2 days♦ ☐ 3 days♦
☑ 5 days (Standard)
☐ Other( )

№	Client Sample ID	Sampled Date/Time dd/mm/yy hh:mm	Matrix Solid (S) Water (W)	B10 : TRH, BTEXN, PAH, OCP, OPP, Metals (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg)	Polychlorinated Biphenyls (PCB)	Asbestos Identification in Soil (Non Quantitative - identification only)	500mL Plastic	250mL Plastic	125mL Plastic	200mL Amber Glass	40mL VOA vial	500mL PFAS Bottle	Jar (Glass or HDPE)	Other (Asbestos AS4964, WA Guidelines)	Sample Comments / Dangerous Goods Hazard Warning
1	TP01_0.0-0.2	1/02/24	S	✗	✗	✗							1	1	
2	TP01_0.5-0.6	1/2/24	S	✗	✗	✗							1	1	
3	TP02_0.0-0.2	1/2/24	S	✗	✗	✗							1	1	
4	TP02_0.5-0.6	1/2/24	S	✗	✗	✗							1	1	
5	TP03_0.0-0.2	1/2/24	S	✗	✗	✗							1	1	
6	TP03_0.5-0.6	1/2/24	S	✗	✗	✗							1	1	
7	TP04_0.0-0.2	1/2/24	S	✗	✗	✗							1	1	
8	TP04_0.5-0.6	1/2/24	S	✗	✗	✗							1	1	
9	TP05_0.0-0.2	1/2/24	S	✗	✗	✗							1	1	
10	TP05_0.2-0.4	1/2/24	S	✗	✗	✗							1	1	
	Total Counts			10	10	10							10	10	

Method of Shipment ☐ Courier (#) ☑ Hand Delivered ☐ Postal | Name Chelsea W. | Signature | Date 5/2/24 | Time 3.15pm

Laboratory Use Only	Received By	Hannah Ye	SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature		Date	5/02/24	Time		Temperature	19.2
	Received By		SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature		Date		Time		Report №	1065564

Eurofins Environment Testing Australia Pty Ltd EnviroSales@eurofins.com

Submission of samples to the laboratory will be deemed as acceptance of Eurofins | Environment Testing Standard Terms and Conditions unless agreed otherwise. A copy is available on request.

15.0 20.0 19.6 +0.3

CHAIN OF CUSTODY RECORD

Eurofins | Environment Testing ABN 50 005 085 521

☐ Sydney Laboratory
179 Magowar Road, Girraween, NSW 2145
+61 2 9900 8400 EnviroSampleNSW@eurofins.com

☐ Brisbane Laboratory
Unit 1/21 Smallwood Place, Murarrie, QLD 4172
+61 7 3902 4600 EnviroSampleQLD@eurofins.com

☐ Perth Laboratory
46-48 Banksia Road, Welshpool, WA 6106
+61 8 6253 4444 EnviroSampleWA@eurofins.com

☐ Melbourne Laboratory
6 Monterey Road Dandenong South VIC 3175
+61 3 8564 5000 EnviroSampleVic@eurofins.com

Company D&N Geotechnical

Address unit 11/22-38 Thynne St, Bruce ACT 2617

Contact Name Eddy Polhuis

Phone № 0455 989 926

Special Directions

Purchase Order

Quote ID №

Project № C-1859.00

Project Name Inland Rail - Forbes Station and Yard

Project Manager Nick Davison

EDD Format (ESdat, EQuIS etc) Esdat (esdat_au+dngeotechnical@esdatlabsync.net)

Sampler(s) Eddy Polhuis

Handed over by Eddy Polhuis

Email for Invoice nick@dngeotechnical.com, chelsea@dngeotechnical.co

Email for Results nick@dngeotechnical.com, chelsea@dngeotechnical.co

Required Turnaround Time (TAT)
Default will be 5 days if not ticked
♦Surcharge will apply
☐ Overnight (reporting by 9am)♦
☐ Same day♦ ☐ 1 day♦
☐ 2 days♦ ☐ 3 days♦
☑ 5 days (Standard)
☐ Other( )

Analyses
Where metals are requested, please specify "Total" or "Filtered". SUITE code must be used to attract SUITE pricing.

Containers
Change container type & size if necessary

№	Client Sample ID	Sampled Date/Time dd/mm/yy hh:mm	Matrix Solid (S) Water (W)	B10 TRH, BTEXN, PAH, OCP, OPP, Metals (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg)	Polychlorinated Biphenyls (PCB)	Asbestos Identification in Soil (Non Quantitative - identification only)													500mL Plastic	250mL Plastic	125mL Plastic	200mL Amber Glass	40mL VOA vial	500mL PFAS Bottle	Jar (Glass or HDPE)	Other (Asbestos AS4964, WA Guidelines)	Sample Comments / Dangerous Goods Hazard Warning
1	TP06_0.0-0.2	1/02/24	S	✕	✕	✕																			1	1	
2	TP06_0.5-0.6	1/2/24	S	✕	✕	✕																			1	1	
3	TP07_0.0-0.2	1/2/24	S	✕	✕	✕																			1	1	
4	TP07_0.5-0.6	1/2/24	S	✕	✕	✕																			1	1	
5	TP08_0.0-0.2	1/2/24	S	✕	✕	✕																			1	1	
6	TP08_0.5-0.6	1/2/24	S	✕	✕	✕																			1	1	
7	TP09_0.0-0.2	1/2/24	S	✕	✕	✕																			1	1	
8	TP09_0.5-0.6	1/2/24	S	✕	✕	✕																			1	1	
9	TP09_0.9-1.0	1/2/24	S															✕							1	1	
10	TP10_0.0-0.2	1/2/24	S	✕	✕	✕																			1	1	
			Total Counts	9	9	9												1							10	10	

Method of Shipment ☐ Courier (#) ☐ Hand Delivered ☐ Postal Name Signature Date Time

Laboratory Use Only

Received By SYD | BNE | MEL | PER | ADL | NTL | DRW ACT Signature Date 05/02/24 Time 15:15 Temperature 15.8

Received By SYD | BNE | MEL | PER | ADL | NTL | DRW Signature Date Time Report № 1065544

Eurofins Environment Testing Australia Pty Ltd EnviroSales@eurofins.com

Submission of samples to the laboratory will be deemed as acceptance of Eurofins | Environment Testing Standard Terms and Conditions unless agreed otherwise. A copy is available on request.

CHAIN OF CUSTODY RECORD

Eurofins | Environment Testing ABN 50 005 085 521

☐ Sydney Laboratory
179 Magowar Road, Girraween, NSW 2145
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☐ Brisbane Laboratory
Unit 1/21 Smallwood Place, Murarrie, QLD 4172
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☐ Perth Laboratory
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+61 8 6253 4444 EnviroSampleWA@eurofins.com

☐ Melbourne Laboratory
6 Monterey Road Dandenong South VIC 3175
+61 3 8564 5000 EnviroSampleVic@eurofins.com

Company	D&N Geotechnical	**Project №**	C-1859.00	**Project Manager**	Nick Davison	**Sampler(s)**	Eddy Polhuis
Address	unit 11/22-38 Thynne St, Bruce ACT 2617	**Project Name**	Inland Rail - Forbes Station and Yard	**EDD Format** ESdat, EQuIS etc	Esdat (esdat_au+dngeotechnical@esdatlabsync.net)	**Handed over by**	Eddy Polhuis
Contact Name	Eddy Polhuis					**Email for Invoice**	nick@dngeotechnical.com, chelsea@dngeotechnical.co
Phone №	0455 989 926					**Email for Results**	nick@dngeotechnical.com, chelsea@dngeotechnical.co
Special Directions							
Purchase Order							
Quote ID №							

Analyses
Where metals are requested, please specify "Total" or "Filtered". SUITE code must be used to attract SUITE pricing

Containers
Change container type & size if necessary.

Required Turnaround Time (TAT)
Default will be 5 days if not ticked.
♦Surcharge will apply

☐ Overnight (reporting by 9am)♦
☐ Same day♦ ☐ 1 day♦
☐ 2 days♦ ☐ 3 days♦
☑ 5 days (Standard)
☐ Other( )

№	Client Sample ID	Sampled Date/Time dd/mm/yy hh:mm	Matrix Solid (S) Water (W)	B10 : TRH, BTEXN, PAH, OCP, OPP, Metals (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg)	Polychlorinated Biphenyls (PCB)	Asbestos Identification in Soil (Non Quantitative - identification only)	Polychlorinated Biphenyls (PCB) Water	TRH (C6-C10) & BTEX											500mL Plastic	250mL Plastic	125mL Plastic	500mL Amber Glass	40mL VOA vial	500mL PFAS Bottle	Jar (Glass or HDPE)	Other (Asbestos AS4964, WA Guidelines)	Sample Comments / Dangerous Goods Hazard Warning
1	TP10_0.5-0.6	1/02/24	S	X	X	X																			1	1	
2	QC100	1/2/24	S	X	X																				1		
3	QC200	1/2/24	S																X						1		
4	QC101	1/2/24	S																X						1		
5	QC201	1/2/24	S																X						1		
6	QC102	1/2/24	S	X	X																				1		
7	QC202	1/2/24	S	X	X																				1		Please forward to ALS Sydney
8	QC300	1/2/24	W	X			X													1		1	2	2			Hand Auger Rinsate
9	QC400	1/2/24	S				X																	1			Trip Spike
10	QC500	1/2/24	S				X																	1			Trip Blank
			Total Counts	5	4	1	3												3	1		1	2	4		7	1	

Method of Shipment	☐ Courier (#)	☐ Hand Delivered	☐ Postal	Name		Signature		Date		Time	
Laboratory Use Only	Received By	Hemal K.	SYD | BNE | MEL | PER | ADL | NTL | DRW (ACT)	Signature		Date	05/02/24	Time	15:15	Temperature	19-8
	Received By		SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature		Date		Time		Report №	106554

Eurofins Environment Testing Australia Pty Ltd EnviroSales@eurofins.com

Submission of samples to the laboratory will be deemed as acceptance of Eurofins | Environment Testing Standard Terms and Conditions unless agreed otherwise. A copy is available on request.

Re: CE-0148.00 - Sample drop off

#AU27_CAU001_EnviroSampleACT <EnviroSampleACT@eurofins.com>
Wed 2/7/2024 2:44 PM
To:Chelsea Weaver <chelsea@dngeotechnical.com>

Hi Chelsea,

I will Relabel the TP05_0.0-0.2 bags to TP05_0.0-0.2 and TP05_0.0-0.2A and label TP05_0.5-0.6 to TP04_0.5-0.6.

Kind Regards,
Hannah Xie
Sample Receipt Officer

Eurofins Environment Testing Australia Pty Ltd
Unit 1, 2 Dacre Street,
Mitchell ACT 2911

Email: Zifanghannahxie@eurofins.com
Website: Eurofins Environment Testing Australia

From: Chelsea Weaver <chelsea@dngeotechnical.com>
Sent: Wednesday, February 7, 2024 2:30 PM
To: #AU27_CAU001_EnviroSampleACT <EnviroSampleACT@eurofins.com>
Subject: RE: CE-0148.00 - Sample drop off

Hi Hannah,

Please see the attached amended COC. We will still analyse all bags but could you please do the following?

- Relabel the TP05_0.0-0.2 bags to TP05_0.0-0.2A and TP05_0.0-0.2B respectively (your choice – we can work it out later).
- Please relabel TP05_0.5-0.6 to TP04_0.5-0.6.

Thanks for your help.

Kind regards,

Chelsea Weaver
Environmental Scientist

D&N
Geotechnical

+61 429 055 900 | chelsea@dngeotechnical.com

www.dngeotechnical.com

From: #AU27_CAU001_EnviroSampleACT <EnviroSampleACT@eurofins.com>
Sent: Wednesday, February 7, 2024 2:10 PM
To: Chelsea Weaver <chelsea@dngeotechnical.com>
Subject: Re: CE-0148.00 - Sample drop off

Hi Chelsea,

We received 2 bags of TP05 0.0-0.2, 1 bag of TP05 0.5-0.6, 1 bag of TP05 0.2-0.4, but no bag for TP04.

Kind Regards,
Hannah Xie
Sample Receipt Officer

Eurofins Environment Testing Australia Pty Ltd
Unit 1, 2 Dacre Street,
Mitchell ACT 2911

Email: Zifanghannahxie@eurofins.com
Website: Eurofins Environment Testing Australia

From: Chelsea Weaver <chelsea@dngeotechnical.com>
Sent: Wednesday, February 7, 2024 1:46 PM
To: #AU27_CAU001_EnviroSampleACT <EnviroSampleACT@eurofins.com>
Subject: RE: CE-0148.00 - Sample drop off

Hi Hannah,

Sorry for the confusion. Did you receive 2 bags of TP05 0.0-0.2 and 2 bags of TP05 0.5-0.6?
Must have been a labelling issue on our end.

Kind regards,

Chelsea Weaver
Environmental Scientist

D&N
Geotechnical

+61 429 055 900 | chelsea@dngeotechnical.com

www.dngeotechnical.com

From: #AU27_CAU001_EnviroSampleACT <EnviroSampleACT@eurofins.com>
Sent: Wednesday, February 7, 2024 1:43 PM
To: Chelsea Weaver <chelsea@dngeotechnical.com>
Subject: Re: CE-0148.00 - Sample drop off

Hi Chelsea,

For those asbestos samples you dropped off earlier today, sample TP04 0.0-0.2 and TP04 0.5-0.6 are missing. We received extra sample TP05 0.0-0.2 and TP05 0.5-0.6, they are not on the COC, please advise.

Kind Regards,
Hannah Xie
Sample Receipt Officer

Eurofins Environment Testing Australia Pty Ltd
Unit 1, 2 Dacre Street,
Mitchell ACT 2911

Email: Zifanghannahxie@eurofins.com
Website: Eurofins Environment Testing Australia

From: Chelsea Weaver <chelsea@dngeotechnical.com>
Sent: Wednesday, February 7, 2024 9:07 AM
To: #AU27_CAU001_EnviroSampleACT <EnviroSampleACT@eurofins.com>
Subject: CE-0148.00 - Sample drop off

> **CAUTION:** EXTERNAL EMAIL - Sent from an email domain that is not formally trusted by Eurofins.
>
> Do not click on links or open attachments unless you recognise the sender and are certain that the content is safe.

Good Morning,

Please see the attached COC for the dust bottle I'll be dropping off this morning.

Kind regards,

Chelsea Weaver
Environmental Scientist

D&N
Geotechnical

+61 429 055 900 | chelsea@dngeotechnical.com

www.dngeotechnical.com

eurofins | Environment Testing

www.eurofins.com.au EnviroSales@eurofins.com

Eurofins Environment Testing Australia Pty Ltd						Eurofins ARL Pty Ltd	Eurofins Environment Testing NZ Ltd			
ABN: 50 005 085 521						ABN: 91 05 0159 898	NZBN: 9429046024954			
Melbourne	**Geelong**	**Sydney**	**Canberra**	**Brisbane**	**Newcastle**	**Perth**	**Auckland**	**Auckland (Asb)**	**Christchurch**	**Tauranga**
6 Monterey Road	19/8 Lewalan Street	179 Magowar Road	Unit 1,2 Dacre Street	1/21 Smallwood Place	1/2 Frost Drive	46-48 Banksia Road	35 O'Rorke Road	Unit C1/4 Pacific Rise,	43 Detroit Drive	1277 Cameron Road,
Dandenong South	Grovedale	Girraween	Mitchell	Murarrie	Mayfield West	Welshpool	Penrose,	Mount Wellington,	Rolleston,	Gate Pa,
VIC 3175	VIC 3216	NSW 2145	ACT 2911	QLD 4172	NSW 2304	WA 6106	Auckland 1061	Auckland 1061	Christchurch 7675	Tauranga 3112
+61 3 8564 5000	+61 3 8564 5000	+61 2 9900 8400	+61 2 6113 8091	T: +61 7 3902 4600	+61 2 4968 8448	+61 8 6253 4444	+64 9 526 4551	+64 9 525 0568	+64 3 343 5201	+64 9 525 0568
NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 2377	IANZ# 1327	IANZ# 1308	IANZ# 1290	IANZ# 1402
Site# 1254	Site# 25403	Site# 18217	Site# 25466	Site# 20794	Site# 25079 & 25289	Site# 2370				

Sample Receipt Advice

Company name:	D & N Geotechnical Pty Ltd
Contact name:	Nick Davison
Project name:	INLAND RAIL - FORBES STATION AND YARD
Project ID:	C-1859.00
Turnaround time:	5 Day
Date/Time received	Feb 5, 2024 3:15 PM
Eurofins reference	1065544

Sample Information

✓ A detailed list of analytes logged into our LIMS, is included in the attached summary table.

✓ All samples have been received as described on the above COC.

✓ COC has been completed correctly.

✓ Attempt to chill was evident.

✓ Appropriately preserved sample containers have been used.

✓ All samples were received in good condition.

✗ Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.

✓ Appropriate sample containers have been used.

✓ Sample containers for volatile analysis received with zero headspace.

✓ Split sample sent to requested external lab.

✗ Some samples have been subcontracted.

N/A Custody Seals intact (if used).

Notes

QC202 has been forwarded to ALS Sydney. No received bags for sample TP04_0.0-0.2 and TP04_0.5-0.6. Received extra bag for TP05_0.0-0.2, logged as TP05_0.0-0.2A and added asbestos analysis. Received extra sample TP05_0.5-0.6, logged as TP04_0.5-0.6. Sample volume for AS4964 asbestos analysis is excessive - this may incur excess volume fees.

Contact

If you have any questions with respect to these samples, please contact your Analytical Services Manager:

Bonnie Pu on phone : or by email: BonniePu@eurofins.com

Results will be delivered electronically via email to Nick Davison - nick@dngeotechnical.com.

Note: A copy of these results will also be delivered to the general D & N Geotechnical Pty Ltd email address.

Global Leader - Results you can trust

Company Name: D & N Geotechnical Pty Ltd
Address: Unit 11/22-38 Thynne St
Bruce
ACT 2617

Order No.:
Report #: 1065544
Phone:
Fax:

Received: Feb 5, 2024 3:15 PM
Due: Feb 12, 2024
Priority: 5 Day
Contact Name: Nick Davison

Project Name: INLAND RAIL - FORBES STATION AND YARD
Project ID: C-1859.00

Eurofins Analytical Services Manager : Bonnie Pu

Sample Detail						Asbestos - AS4964	HOLD	Polychlorinated Biphenyls	Moisture Set	Eurofins Suite B10: BTEX/TRH/PAH/OCP/OPP/M8	BTEXN and Volatile TRH	BTEXN and Volatile TRH
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X	X	X
External Laboratory												
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**							
1	TP01_0.0-0.2	Feb 01, 2024		Soil	R24-Fe0011003	X		X	X	X		
2	TP01_0.5-0.6	Feb 01, 2024		Soil	R24-Fe0011004	X		X	X	X		
3	TP02_0.0-0.2	Feb 01, 2024		Soil	R24-Fe0011005	X		X	X	X		
4	TP02_0.5-0.6	Feb 01, 2024		Soil	R24-Fe0011006	X		X	X	X		
5	TP03_0.0-0.2	Feb 01, 2024		Soil	R24-Fe0011007	X		X	X	X		
6	TP03_0.5-0.6	Feb 01, 2024		Soil	R24-Fe0011008	X		X	X	X		
7	TP04_0.0-0.2	Feb 01, 2024		Soil	R24-Fe0011009			X	X	X		
8	TP04_0.5-0.6	Feb 01, 2024		Soil	R24-Fe0011010	X		X	X	X		
9	TP05_0.0-0.2	Feb 01, 2024		Soil	R24-Fe0011011	X		X	X	X		
10	TP05_0.2-0.4	Feb 01, 2024		Soil	R24-Fe0011012	X		X	X	X		
11	TP06_0.0-0.2	Feb 01, 2024		Soil	R24-Fe0011013	X		X	X	X		
12	TP06_0.5-0.6	Feb 01, 2024		Soil	R24-Fe0011014	X		X	X	X		
13	TP07_0.0-0.2	Feb 01, 2024		Soil	R24-Fe0011015	X		X	X	X		

Company Name: D & N Geotechnical Pty Ltd
Address: Unit 11/22-38 Thynne St
Bruce
ACT 2617

Order No.:
Report #: 1065544
Phone:
Fax:

Received: Feb 5, 2024 3:15 PM
Due: Feb 12, 2024
Priority: 5 Day
Contact Name: Nick Davison

Project Name: INLAND RAIL - FORBES STATION AND YARD
Project ID: C-1859.00

Eurofins Analytical Services Manager : Bonnie Pu

Sample Detail						Asbestos - AS4964	HOLD	Polychlorinated Biphenyls	Moisture Set	Eurofins Suite B10: BTEX/TRH/PAH/OCP/OPP/M8	BTEXN and Volatile TRH	BTEXN and Volatile TRH
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X	X	X
14	TP07_0.5-0.6	Feb 01, 2024		Soil	R24-Fe0011016	X		X	X	X		
15	TP08_0.0-0.2	Feb 01, 2024		Soil	R24-Fe0011017	X		X	X	X		
16	TP08_0.5-0.6	Feb 01, 2024		Soil	R24-Fe0011018	X		X	X	X		
17	TP09_0.0-0.2	Feb 01, 2024		Soil	R24-Fe0011019	X		X	X	X		
18	TP09_0.5-0.6	Feb 01, 2024		Soil	R24-Fe0011020	X		X	X	X		
19	TP10_0.0-0.2	Feb 01, 2024		Soil	R24-Fe0011021	X		X	X	X		
20	TP10_0.5-0.6	Feb 01, 2024		Soil	R24-Fe0011022	X		X	X	X		
21	QC100	Feb 01, 2024		Soil	R24-Fe0011023			X	X	X		
22	QC102	Feb 01, 2024		Soil	R24-Fe0011024			X	X	X		
23	QC300	Feb 01, 2024		Water	R24-Fe0011025			X		X		
24	QC400	Feb 01, 2024		Soil	R24-Fe0011026							X
25	QC500	Feb 01, 2024		Soil	R24-Fe0011027						X	
26	TP09_0.9-1.0	Feb 01, 2024		Soil	R24-Fe0011029		X					
27	QC200	Feb 01, 2024		Soil	R24-Fe0011030		X					
28	QC101	Feb 01, 2024		Soil	R24-Fe0011031		X					
29	QC201	Feb 01, 2024		Soil	R24-Fe0011032		X					

Company Name: D & N Geotechnical Pty Ltd
Address: Unit 11/22-38 Thynne St
Bruce
ACT 2617

Project Name: INLAND RAIL - FORBES STATION AND YARD
Project ID: C-1859.00

Order No.:
Report #: 1065544
Phone:
Fax:

Received: Feb 5, 2024 3:15 PM
Due: Feb 12, 2024
Priority: 5 Day
Contact Name: Nick Davison

Eurofins Analytical Services Manager : Bonnie Pu

Sample Detail						Asbestos - AS4964	HOLD	Polychlorinated Biphenyls	Moisture Set	Eurofins Suite B10: BTEX/TRH/PAH/OCP/OPP/M8	BTEXN and Volatile TRH	BTEXN and Volatile TRH
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X	X	X	X	X
30	TP05_0.0-0.2 A	Feb 01, 2024		Soil	R24-Fe0015168	X						
Test Counts						20	4	23	22	23	1	1

Certificate of Analysis

D & N Geotechnical Pty Ltd
Unit 11/22-38 Thynne St
Bruce
ACT 2617

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Attention: **Nick Davison**

Report **1069120-L**
Project name ADDITIONAL: INLAND RAIL - FORBES STATION AND YARD
Project ID ADDITIONAL: C-1859.00
Received Date Feb 15, 2024

Client Sample ID **Sample Matrix** **Eurofins Sample No.** **Date Sampled** Test/Reference	LOR	Unit	**TP06_0.0-0.2** **US Leachate** **S24-Fe0038670** **Feb 01, 2024**	**TP02_0.0-0.2** **US Leachate** **S24-Fe0038671** **Feb 01, 2024**
Heavy Metals				
Arsenic	0.01	mg/L	-	0.39
Lead	0.01	mg/L	< 0.01	-
USA Leaching Procedure				
Leachate Fluid[C01]		comment	1.0	1.0
pH (initial)	0.1	pH Units	8.4	8.6
pH (off)	0.1	pH Units	5.2	5.1
pH (USA HCl addition)	0.1	pH Units	1.9	1.8

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Heavy Metals	Sydney	Feb 15, 2024	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
USA Leaching Procedure	Sydney	Feb 15, 2024	14 Days
- Method: LTM-GEN-7010 Leaching Procedure for Soils & Solid Wastes			

Company Name: D & N Geotechnical Pty Ltd
Address: Unit 11/22-38 Thynne St
Bruce
ACT 2617

Order No.:
Report #: 1069120
Phone:
Fax:

Received: Feb 15, 2024 3:56 PM
Due: Feb 19, 2024
Priority: 2 Day
Contact Name: Nick Davison

Project Name: ADDITIONAL: INLAND RAIL - FORBES STATION AND YARD
Project ID: ADDITIONAL: C-1859.00

Eurofins Analytical Services Manager : Bonnie Pu

Sample Detail						Arsenic	Lead	USA Leaching Procedure
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X
External Laboratory								
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**			
1	TP06_0.0-0.2	Feb 01, 2024		US Leachate	S24-Fe0038670		X	X
2	TP02_0.0-0.2	Feb 01, 2024		US Leachate	S24-Fe0038671	X		X
Test Counts						1	1	2

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follow guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013. They are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry weight basis unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion unless otherwise stated.
4. For CEC results where the sample's origin is unknown or environmentally contaminated, the results should be used advisedly.
5. Actual LORs are matrix dependent. Quoted LORs may be raised where sample extracts are diluted due to interferences.
6. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
7. SVOC analysis on waters is performed on homogenised, unfiltered samples unless noted otherwise.
8. Samples were analysed on an 'as received' basis.
9. Information identified in this report with blue colour indicates data provided by customers that may have an impact on the results.
10. This report replaces any interim results previously issued.

Holding Times

Please refer to the 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours before sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and despite any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling; therefore, compliance with these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether, the holding time is 7 days; however, for all other VOCs, such as BTEX or C6-10 TRH, the holding time is 14 days.

Units

mg/kg: milligrams per kilogram
µg/L: micrograms per litre
org/100 mL: Organisms per 100 millilitres
CFU: Colony forming unit
mg/L: milligrams per litre
ppb: parts per billion
NTU: Nephelometric Turbidity Units
Colour: Pt-Co Units
ppm: parts per million
%: Percentage
MPN/100 mL: Most Probable Number of organisms per 100 millilitres

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however, free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should only be used as a guide and may be different when site-specific Sampling Analysis and Quality Plan (SAQP) have been implemented.

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is ≤30%; however, the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit
Results between 10-20 times the LOR: RPD must lie between 0-50%
Results >20 times the LOR: RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range, not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%, VOC recoveries 70 – 130%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 5.4, where no positive PFAS results have been reported or reviewed, and no data was affected.

QC Data General Comments

1. Where a result is reported as less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown are not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery, the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results, a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data; thus, it is possible to have two sets of data.

Quality Control Results

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Heavy Metals									
Arsenic			mg/L	< 0.01			0.01	Pass	
Lead			mg/L	< 0.01			0.01	Pass	
LCS - % Recovery									
Heavy Metals									
Arsenic			%	92			80-120	Pass	
Lead			%	83			80-120	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Heavy Metals				Result 1					
Lead	S24-Fe0029727	NCP	%	84			75-125	Pass	
Spike - % Recovery									
Heavy Metals				Result 1					
Arsenic	S24-Fe0029727	NCP	%	93			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S24-Fe0038670	CP	mg/L	0.06	0.06	3.4	30%	Pass	
Lead	S24-Fe0038670	CP	mg/L	< 0.01	< 0.01	<1	30%	Pass	
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Arsenic	S24-Fe0035943	NCP	mg/L	< 0.01	< 0.01	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	N/A
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	N/A
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
C01	Leachate Fluid Key: 1 - pH 5.0; 2 - pH 2.9; 3 - pH 9.2; 4 - Reagent (DI) water; 5 - Client sample, 6 - other

Authorised by:

Adam Bateup	Analytical Services Manager
Mickael Ros	Senior Analyst-Metal

Glenn Jackson
Managing Director

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

2 DAY TAT LEACHATE ADDITIONAL - Fw: Eurofins Test Results, Invoice - Report 1065544 : Site INLAND RAIL - FORBES STATION AND YARD (C-1859.00)

Bonnie Pu <BonniePu@eurofins.com>
Thu 2024-02-15 3:56 PM
To:#AU25_Enviro_Sample_NSW <EnviroSampleNSW@eurofins.com>

INFO: INTERNAL EMAIL - Sent from your own Eurofins email domain.

Hi Riham,

Can you please get this leachate additional logged in tonight?

Thanks!

Kind Regards,

Bonnie Pu
Analytical Services Manager
My hours are 10 am - 6 pm

Eurofins Environment Testing Australia Pty Ltd
179 Magowar Road
Girraween, NSW, 2145

Email: BonniePu@eurofins.com
Phone: 0429 195 949
Website: www.eurofins.com.au/environmental-testing

From: Chelsea Weaver <chelsea@dngeotechnical.com>
Sent: 15 February 2024 15:54
To: Bonnie Pu <BonniePu@eurofins.com>
Cc: Nick Davison <nick@dngeotechnical.com>
Subject: RE: Eurofins Test Results, Invoice - Report 1065544 : Site INLAND RAIL - FORBES STATION AND YARD (C-1859.00)

CAUTION: EXTERNAL EMAIL - Sent from an email domain that is not formally trusted by Eurofins. Do not click on links or open attachments unless you recognise the sender and are certain that the content is safe.

Hi Bonnie,

Could we run them at 48 hour TATs please?

Kind regards,

Chelsea Weaver
Environmental Scientist

D&N
Geotechnical

+61 429 055 900 | chelsea@dngeotechnical.com

www.dngeotechnical.com

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From: Bonnie Pu <BonniePu@eurofins.com>
Sent: Thursday, February 15, 2024 3:48 PM
To: Chelsea Weaver <chelsea@dngeotechnical.com>
Cc: Nick Davison <nick@dngeotechnical.com>
Subject: Re: Eurofins Test Results, Invoice - Report 1065544 : Site INLAND RAIL - FORBES STATION AND YARD (C-1859.00)

Yep no problem, what turn around would you like for these leachates?

Kind Regards,

Bonnie Pu
Analytical Services Manager
My hours are 10 am - 6 pm

Eurofins Environment Testing Australia Pty Ltd
179 Magowar Road
Girraween, NSW, 2145

Email: BonniePu@eurofins.com
Phone: 0429 195 949
Website: www.eurofins.com.au/environmental-testing

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Transmission by e-mail is not secure and can result in errors or omissions in the content of the message. Despite state-of-the-art precautions we cannot guarantee that e-mails and attachments are free from viruses. We accept no liability for viruses or any transmission-related errors and omissions. You need to always virus-check any e-mails and attachments.
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From: Chelsea Weaver <chelsea@dngeotechnical.com>
Sent: 15 February 2024 15:45
To: Bonnie Pu <BonniePu@eurofins.com>
Cc: Nick Davison <nick@dngeotechnical.com>
Subject: FW: Eurofins Test Results, Invoice - Report 1065544 : Site INLAND RAIL - FORBES STATION AND YARD (C-1859.00)

CAUTION: EXTERNAL EMAIL - Sent from an email domain that is not formally trusted by Eurofins. Do not click on links or open attachments unless you recognise the sender and are certain that the content is safe.

Hi Bonnie,

Are we able to order some additional analyses on the following samples?

TP06_0.0-0.2 – TCLP + Lead
TP02_0.0-0.2 – TCLP + Arsenic

Kind regards,

Chelsea Weaver
Environmental Scientist

D&N
Geotechnical

+61 429 055 900 | chelsea@dngeotechnical.com

www.dngeotechnical.com

From: AdamBateup@eurofins.com <AdamBateup@eurofins.com>
Sent: Wednesday, February 14, 2024 11:53 PM
To: Nick Davison <nick@dngeotechnical.com>
Cc: Chelsea Weaver <chelsea@dngeotechnical.com>
Subject: Eurofins Test Results, Invoice - Report 1065544 : Site INLAND RAIL - FORBES STATION AND YARD (C-1859.00)

Please find the attached reports and invoice

Kind regards,
Adam Bateup
Analytical Services Manager
My hours are 9 am - 5 pm

Eurofins Environment Testing Australia Pty Ltd
179 Magowar Road
Girraween, NSW, 2145

Email: AdamBateup@eurofins.com
I’ve updated my phone number, please contact me via 0447 584 487
Website: www.eurofins.com/environmental-testing
View our latest EnviroNotes

eurofins | Environment Testing

www.eurofins.com.au EnviroSales@eurofins.com

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

Melbourne	Geelong	Sydney	Canberra	Brisbane	Newcastle	Perth	Auckland	Auckland (Asb)	Christchurch	Tauranga
6 Monterey Road	19/8 Lewalan Street	179 Magowar Road	Unit 1,2 Dacre Street	1/21 Smallwood Place	1/2 Frost Drive	46-48 Banksia Road	35 O'Rorke Road	Unit C1/4 Pacific Rise,	43 Detroit Drive	1277 Cameron Road,
Dandenong South	Grovedale	Girraween	Mitchell	Murarrie	Mayfield West	Welshpool	Penrose,	Mount Wellington,	Rolleston,	Gate Pa,
VIC 3175	VIC 3216	NSW 2145	ACT 2911	QLD 4172	NSW 2304	WA 6106	Auckland 1061	Auckland 1061	Christchurch 7675	Tauranga 3112
+61 3 8564 5000	+61 3 8564 5000	+61 2 9900 8400	+61 2 6113 8091	T: +61 7 3902 4600	+61 2 4968 8448	+61 8 6253 4444	+64 9 526 4551	+64 9 525 0568	+64 3 343 5201	+64 9 525 0568
NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 2377	IANZ# 1327	IANZ# 1308	IANZ# 1290	IANZ# 1402
Site# 1254	Site# 25403	Site# 18217	Site# 25466	Site# 20794	Site# 25079 & 25289	Site# 2370				

Sample Receipt Advice

Company name:	D & N Geotechnical Pty Ltd
Contact name:	Nick Davison
Project name:	ADDITIONAL: INLAND RAIL - FORBES STATION AND YARD
Project ID:	ADDITIONAL: C-1859.00
Turnaround time:	2 Day
Date/Time received	Feb 15, 2024 3:56 PM
Eurofins reference	1069120

Sample Information

✓	A detailed list of analytes logged into our LIMS, is included in the attached summary table.
✓	All samples have been received as described on the above COC.
✓	COC has been completed correctly.
N/A	Attempt to chill was evident.
✓	Appropriately preserved sample containers have been used.
✓	All samples were received in good condition.
✗	Samples have been provided with adequate time to commence analysis in accordance with the relevant holding times.
✓	Appropriate sample containers have been used.
✓	Sample containers for volatile analysis received with zero headspace.
✗	Split sample sent to requested external lab.
✗	Some samples have been subcontracted.
N/A	Custody Seals intact (if used).

Notes

Contact

If you have any questions with respect to these samples, please contact your Analytical Services Manager:

Bonnie Pu on phone : or by email: BonniePu@eurofins.com

Results will be delivered electronically via email to Nick Davison - nick@dngeotechnical.com.

Note: A copy of these results will also be delivered to the general D & N Geotechnical Pty Ltd email address.

Global Leader - Results you can trust

web: www.eurofins.com.au
email: EnviroSales@eurofins.com

Eurofins Environment Testing Australia Pty Ltd
ABN: 50 005 085 521

Eurofins ARL Pty Ltd
ABN: 91 05 0159 898

Eurofins Environment Testing NZ Ltd
NZBN: 9429046024954

Melbourne	**Geelong**	**Sydney**	**Canberra**	**Brisbane**	**Newcastle**	**Perth**	**Auckland**	**Auckland (Asb)**	**Christchurch**	**Tauranga**
6 Monterey Road	19/8 Lewalan Street	179 Magowar Road	Unit 1,2 Dacre Street	1/21 Smallwood Place	1/2 Frost Drive	46-48 Banksia Road	35 O'Rorke Road	Unit C1/4 Pacific Rise,	43 Detroit Drive	1277 Cameron Road,
Dandenong South	Grovedale	Girraween	Mitchell	Murarrie	Mayfield West	Welshpool	Penrose,	Mount Wellington,	Rolleston,	Gate Pa,
VIC 3175	VIC 3216	NSW 2145	ACT 2911	QLD 4172	NSW 2304	WA 6106	Auckland 1061	Auckland 1061	Christchurch 7675	Tauranga 3112
+61 3 8564 5000	+61 3 8564 5000	+61 2 9900 8400	+61 2 6113 8091	T: +61 7 3902 4600	+61 2 4968 8448	+61 8 6253 4444	+64 9 526 4551	+64 9 525 0568	+64 3 343 5201	+64 9 525 0568
NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 2377	IANZ# 1327	IANZ# 1308	IANZ# 1290	IANZ# 1402
Site# 1254	Site# 25403	Site# 18217	Site# 25466	Site# 20794	Site# 25079 & 25289	Site# 2370				

Company Name: D & N Geotechnical Pty Ltd
Address: Unit 11/22-38 Thynne St
Bruce
ACT 2617

Order No.:
Report #: 1069120
Phone:
Fax:

Received: Feb 15, 2024 3:56 PM
Due: Feb 19, 2024
Priority: 2 Day
Contact Name: Nick Davison

Project Name: ADDITIONAL: INLAND RAIL - FORBES STATION AND YARD
Project ID: ADDITIONAL: C-1859.00

Eurofins Analytical Services Manager : Bonnie Pu

Sample Detail						Arsenic	Lead	USA Leaching Procedure
Sydney Laboratory - NATA # 1261 Site # 18217						X	X	X
External Laboratory								
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**			
1	TP06_0.0-0.2	Feb 01, 2024		US Leachate	S24-Fe0038670		X	X
2	TP02_0.0-0.2	Feb 01, 2024		US Leachate	S24-Fe0038671	X		X
Test Counts						1	1	2

CERTIFICATE OF ANALYSIS

Work Order : **ES2404122**
Client : **D & N GEOTECHNICAL PTY LTD**
Contact : NICK DAVISON
Address :
Telephone : ----
Project : C.1859.00 Inland Rail - Forbes Station and Yard
Order number : ----
C-O-C number : ----
Sampler : EDDY POLHUIS
Site : ----
Quote number : EN/333
No. of samples received : 1
No. of samples analysed : 1

Page : 1 of 8
Laboratory : Environmental Division Sydney
Contact : Customer Services ES
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone : +61-2-8784 8555
Date Samples Received : 08-Feb-2024 13:35
Date Analysis Commenced : 12-Feb-2024
Issue Date : 15-Feb-2024 16:19

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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

Signatories

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

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

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In h are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP068: Where reported, Total Chlordane (sum) is the sum of the reported concentrations of cis-Chlordane and trans-Chlordane at or above the LOR.
- EP068: Where reported, Total OCP is the sum of the reported concentrations of all Organochlorine Pesticides at or above LOR.
- EP075(SIM): Where reported, Total Cresol is the sum of the reported concentrations of 2-Methylphenol and 3- & 4-Methylphenol at or above the LOR.
- EP068: Positive results have been confirmed by re-extraction and re-analysis.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	QC202	----	----	----	----
			Sampling date / time	01-Feb-2024 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	ES2404122-001	--------	--------	--------	--------
				Result	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	**4.3**	----	----	----	----
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	**199**	----	----	----	----
Cadmium	7440-43-9	1	mg/kg	**3**	----	----	----	----
Chromium	7440-47-3	2	mg/kg	**26**	----	----	----	----
Copper	7440-50-8	5	mg/kg	**121**	----	----	----	----
Lead	7439-92-1	5	mg/kg	**239**	----	----	----	----
Nickel	7440-02-0	2	mg/kg	**15**	----	----	----	----
Zinc	7440-66-6	5	mg/kg	**452**	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	**0.2**	----	----	----	----
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	----	----	----	----
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	----	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	----	----	----	----
beta-BHC	319-85-7	0.05	mg/kg	<0.05	----	----	----	----
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	----	----	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	----	----	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	----	----	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	----	----	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	----	----	----	----
^ **Total Chlordane (sum)**	----	0.05	mg/kg	<0.05	----	----	----	----
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	----	----	----	----
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	----	----	----	----
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	----	----	----	----
Dieldrin	60-57-1	0.05	mg/kg	<0.05	----	----	----	----

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)			*Sample ID*	**QC202**	----	----	----	----
			Sampling date / time	01-Feb-2024 00:00	----	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**ES2404122-001**	--------	--------	--------	--------
				Result	----	----	----	----
EP068A: Organochlorine Pesticides (OC) - Continued								
4.4`-DDE	72-55-9	0.05	mg/kg	**1.45**	----	----	----	----
Endrin	72-20-8	0.05	mg/kg	<0.05	----	----	----	----
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	----	----	----	----
^ **Endosulfan (sum)**	115-29-7	0.05	mg/kg	<0.05	----	----	----	----
4.4`-DDD	72-54-8	0.05	mg/kg	**0.19**	----	----	----	----
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	----	----	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	----	----	----	----
4.4`-DDT	50-29-3	0.2	mg/kg	**1.0**	----	----	----	----
Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	----	----	----	----
Methoxychlor	72-43-5	0.2	mg/kg	<0.2	----	----	----	----
^ **Sum of Aldrin + Dieldrin**	309-00-2/60-57-1	0.05	mg/kg	<0.05	----	----	----	----
^ **Sum of DDD + DDE + DDT**	72-54-8/72-55-9/50-2	0.05	mg/kg	**2.64**	----	----	----	----
EP068B: Organophosphorus Pesticides (OP)								
Dichlorvos	62-73-7	0.05	mg/kg	<0.05	----	----	----	----
Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	----	----	----	----
Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	----	----	----	----
Dimethoate	60-51-5	0.05	mg/kg	<0.05	----	----	----	----
Diazinon	333-41-5	0.05	mg/kg	<0.05	----	----	----	----
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	----	----	----	----
Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	----	----	----	----
Malathion	121-75-5	0.05	mg/kg	<0.05	----	----	----	----
Fenthion	55-38-9	0.05	mg/kg	<0.05	----	----	----	----
Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	----	----	----	----
Parathion	56-38-2	0.2	mg/kg	<0.2	----	----	----	----
Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	----	----	----	----
Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	----	----	----	----

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)			*Sample ID*	**QC202**	----	----	----	----
			Sampling date / time	01-Feb-2024 00:00	----	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**ES2404122-001**	--------	--------	--------	--------
				Result	----	----	----	----
EP068B: Organophosphorus Pesticides (OP) - Continued								
Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	----	----	----	----
Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	----	----	----	----
Prothiofos	34643-46-4	0.05	mg/kg	<0.05	----	----	----	----
Ethion	563-12-2	0.05	mg/kg	<0.05	----	----	----	----
Carbophenothion	786-19-6	0.05	mg/kg	<0.05	----	----	----	----
Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	----	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	----	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	----	----	----	----
Fluorene	86-73-7	0.5	mg/kg	<0.5	----	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	----	----	----	----
Anthracene	120-12-7	0.5	mg/kg	<0.5	----	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	----	----	----	----
Pyrene	129-00-0	0.5	mg/kg	<0.5	----	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	----	----	----	----
Chrysene	218-01-9	0.5	mg/kg	<0.5	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	----	----	----	----
^ **Sum of polycyclic aromatic hydrocarbons**	----	0.5	mg/kg	<0.5	----	----	----	----
^ **Benzo(a)pyrene TEQ (zero)**	----	0.5	mg/kg	<0.5	----	----	----	----
^ **Benzo(a)pyrene TEQ (half LOR)**	----	0.5	mg/kg	**0.6**	----	----	----	----
^ **Benzo(a)pyrene TEQ (LOR)**	----	0.5	mg/kg	**1.2**	----	----	----	----

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)			*Sample ID*	**QC202**	----	----	----	----
			Sampling date / time	01-Feb-2024 00:00	----	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**ES2404122-001**	--------	--------	--------	--------
				Result	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	----	----	----	----
C10 - C14 Fraction	----	50	mg/kg	<50	----	----	----	----
C15 - C28 Fraction	----	100	mg/kg	<100	----	----	----	----
C29 - C36 Fraction	----	100	mg/kg	<100	----	----	----	----
^ **C10 - C36 Fraction (sum)**	----	50	mg/kg	<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	----	----	----	----
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	10	mg/kg	<10	----	----	----	----
>C10 - C16 Fraction	----	50	mg/kg	<50	----	----	----	----
>C16 - C34 Fraction	----	100	mg/kg	<100	----	----	----	----
>C34 - C40 Fraction	----	100	mg/kg	<100	----	----	----	----
^ **>C10 - C40 Fraction (sum)**	----	50	mg/kg	<50	----	----	----	----
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	50	mg/kg	<50	----	----	----	----
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	----	----	----	----
Toluene	108-88-3	0.5	mg/kg	<0.5	----	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	----	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	----	----	----	----
^ **Sum of BTEX**	----	0.2	mg/kg	<0.2	----	----	----	----
^ **Total Xylenes**	----	0.5	mg/kg	<0.5	----	----	----	----
Naphthalene	91-20-3	1	mg/kg	<1	----	----	----	----
EP066S: PCB Surrogate								
Decachlorobiphenyl	2051-24-3	0.1	%	**76.6**	----	----	----	----
Dibromo-DDE	21655-73-2	0.05	%	**70.5**	----	----	----	----

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)			*Sample ID*	**QC202**	----	----	----	----
			Sampling date / time	01-Feb-2024 00:00	----	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**ES2404122-001**	--------	--------	--------	--------
				Result	----	----	----	----
EP068T: Organophosphorus Pesticide Surrogate								
DEF	78-48-8	0.05	%	**78.5**	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	**98.9**	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%	**96.2**	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%	**68.1**	----	----	----	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	**96.2**	----	----	----	----
Anthracene-d10	1719-06-8	0.5	%	**104**	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%	**108**	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	**90.0**	----	----	----	----
Toluene-D8	2037-26-5	0.2	%	**95.8**	----	----	----	----
4-Bromofluorobenzene	460-00-4	0.2	%	**101**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **SOIL**

Compound	*CAS Number*	*Recovery Limits (%)* Low	*Recovery Limits (%)* High
EP066S: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	39	149
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	49	147
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	35	143
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2.4.6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	63	125
Toluene-D8	2037-26-5	67	124
4-Bromofluorobenzene	460-00-4	66	131

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES2404122**	Page	: 1 of 5
Client	: **D & N GEOTECHNICAL PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: NICK DAVISON	Telephone	: +61-2-8784 8555
Project	: C.1859.00 Inland Rail - Forbes Station and Yard	Date Samples Received	: 08-Feb-2024
Site	: ----	Issue Date	: 15-Feb-2024
Sampler	: EDDY POLHUIS	No. of samples received	: 1
Order number	: ----	No. of samples analysed	: 1

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **Quality Control Sample Frequency Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

Matrix: **SOIL**

Quality Control Sample Type		Count		Rate (%)		Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)						
Moisture Content	EA055	1	12	8.33	10.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) base provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL** Evaluation: × = Holding time breach ; ✓ =

Method	*Sample Date*	*Extraction / Preparation*			*Analysis*		
Container / Client Sample ID(s)		*Date extracted*	*Due for extraction*	*Evaluation*	*Date analysed*	*Due for analysis*	*Evaluation*
EA055: Moisture Content (Dried @ 105-110°C)							
Soil Glass Jar - Unpreserved (EA055) QC202	**01-Feb-2024**	**----**	----	----	**12-Feb-2024**		✓
EG005(ED093)T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T) QC202	**01-Feb-2024**	**12-Feb-2024**	30-Jul-2024	✓	**13-Feb-2024**		✓
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T) QC202	**01-Feb-2024**	**12-Feb-2024**	29-Feb-2024	✓	**13-Feb-2024**		✓
EP066: Polychlorinated Biphenyls (PCB)							
Soil Glass Jar - Unpreserved (EP066) QC202	**01-Feb-2024**	**12-Feb-2024**	15-Feb-2024	✓	**13-Feb-2024**		✓
EP068A: Organochlorine Pesticides (OC)							
Soil Glass Jar - Unpreserved (EP068) QC202			15-Feb-2024	✓			✓
EP068B: Organophosphorus Pesticides (OP)							
QC202				✓			✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
QC202				✓			✓
EP080/071: Total Petroleum Hydrocarbons							
QC202				✓			✓
QC202				✓			✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ =

Method	***Sample Date***	*Extraction / Preparation*			*Analysis*		
***Container** / Client Sample ID(s)*		***Date extracted***	*Due for extraction*	*Evaluation*	***Date analysed***	*Due for analysis*	*Evaluation*
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved (EP080) QC202	**01-Feb-2024**	**12-Feb-2024**	15-Feb-2024	✓	**13-Feb-2024**		✓
Soil Glass Jar - Unpreserved (EP071) QC202	**01-Feb-2024**	**12-Feb-2024**	15-Feb-2024	✓	**14-Feb-2024**		✓
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080) QC202	**01-Feb-2024**	**12-Feb-2024**	15-Feb-2024	✓	**13-Feb-2024**		✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control

Quality Control Sample Type		*Count*		*Rate (%)*			*Quality Control Specification*
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Moisture Content	EA055	1	12	**8.33**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	2	14	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	2	14	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	2	15	**13.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	14	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
PAH/Phenols (SIM)	EP075(SIM)	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
PAH/Phenols (SIM)	EP075(SIM)	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	15	**6.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	14	**7.14**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	*Method*	*Matrix*	*Method Descriptions*
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM Schedule B(3).
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2) (Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3)
Polychlorinated Biphenyls (PCB)	EP066	SOIL	In house: Referenced to USEPA SW 846 - 8270 Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3).
Pesticides by GCMS	EP068	SOIL	In house: Referenced to USEPA SW 846 - 8270 Extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This technique is compliant with NEPM Schedule B(3).
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015 Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40. Compliant with NEPM Schedule B(3).
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270. Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3)
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260. Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. Compliant with NEPM Schedule B(3) amended.

Preparation Methods	*Method*	*Matrix*	*Method Descriptions*
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM Schedule B(3).
Methanolic Extraction of Soils for Purge and Trap		SOIL	In house: Referenced to USEPA SW 846 - 5030A. 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids		SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.

CHAIN OF CUSTODY RECORD

Eurofins | Environment Testing ABN 50 005 085 521

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Company	D&N Geotechnical
Address	unit 11/22-38 Thynne St, Bruce ACT 2617
Contact Name	Eddy Polhuis
Phone №	0455 989 926
Special Directions	
Purchase Order	
Quote ID №	
Project №	C-1859.00
Project Name	Inland Rail - Forbes Station and Yard
Project Manager	Nick Davison
EDD Format ESdat, EQuIS etc	Esdat (esdat_au+dngeotechnical@esdatlabsync.net)
Sampler(s)	Eddy Polhuis
Handed over by	Eddy Polhuis
Email for Invoice	nick@dngeotechnical.com, chelsea@dngeotechnical.co
Email for Results	nick@dngeotechnical.com, chelsea@dngeotechnical.co

Analyses
Where metals are requested, please specify "Total" or "Filtered". SUITE code must be used to attract SUITE pricing

Containers
Change container type & size if necessary

Required Turnaround Time (TAT)
Default will be 5 days if not ticked

♦Surcharge will apply
☐ Overnight (reporting by 9am)♦
☐ Same day♦ ☐ 1 day♦
☐ 2 days♦ ☐ 3 days♦
☑ 5 days (Standard)
☐ Other( )

№	Client Sample ID	Sampled Date/Time dd/mm/yy hh:mm	Matrix Solid (S) Water (W)	B10 : TRH, BTEXN, PAH, OCP, OPP, Metals (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg)	Polychlorinated Biphenyls (PCB)	Asbestos Identification in Soil (Non Quantitative - identification only)	Polychlorinated Biphenyls (PCB) Water	TRH (C6-C10) & BTEX		500mL Plastic	250mL Plastic	125mL Plastic	500mL Amber Glass	40mL VOA vial	500mL PFAS Bottle	Jar (Glass or HDPE)	Other (Asbestos AS4964, WA Guidelines)	Sample Comments / Dangerous Goods Hazard Warning
1	TP10_0.5-0.6	1/02/24	S	X	X	X										1	1	
2	QC100	1/2/24	S	X	X											1		
3	QC200	1/2/24	S						X							1		
4	QC101	1/2/24	S						X							1		
5	QC201	1/2/24	S						X							1		
6	QC102	1/2/24	S	X	X											1		
7 ①	QC202	1/2/24	S	X	X											1		Please forward to ALS Sydney
8	QC300	1/2/24	W	X			X			1		1	2	2				Hand Auger Rinsate
9	QC400	1/2/24	S				X							1				Trip Spike
10	QC500	1/2/24	S				X							1				Trip Blank
	Total Counts			5	4	1	3		3	1		1	2	4		7	1	

Environmental Division
Sydney
Work Order Reference
ES2404122

Telephone : + 61-2-8784 8555

Method of Shipment	☐ Courier (#)	☐ Hand Delivered	☐ Postal	Name		Signature		Date	Time
Laboratory Use Only	Received By		SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature		Date	Time	Temperature	
	Received By		SYD | BNE | MEL | PER | ADL | NTL | DRW	Signature		Date	Time	Report №	

Eurofins Environment Testing Australia Pty Ltd EnviroSales@eurofins.com

Submission of samples to the laboratory will be deemed as acceptance of Eurofins | Environment Testing Standard Terms and Conditions unless agreed otherwise. A copy is available on request.

Rec:
8/2/24 1353

QUALITY CONTROL REPORT

Work Order : **ES2404122**

Client : **D & N GEOTECHNICAL PTY LTD**
Contact : NICK DAVISON
Address :
Telephone : ----
Project : C.1859.00 Inland Rail - Forbes Station and Yard
Order number : ----
C-O-C number : ----
Sampler : EDDY POLHUIS
Site : ----
Quote number : EN/333
No. of samples received : 1
No. of samples analysed : 1

Page : 1 of 12

Laboratory : Environmental Division Sydney
Contact : Customer Services ES
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone : +61-2-8784 8555
Date Samples Received : 08-Feb-2024
Date Analysis Commenced : 12-Feb-2024
Issue Date : 15-Feb-2024

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

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

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

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In h are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC
* = The final LOR has been raised due to dilution or other sample specific cause; adjusted LOR is shown in brackets. The duplicate ranges for Acceptable RPD% are applie applicable.

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogene for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 5596370)									
ES2403554-013	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	13	14	10.0	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	6	5	0.0	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	8	9	0.0	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	40	41	0.0	No Limit
EW2400675-004	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	170	171	1.0	0% - 20%
		EG005T: Nickel	7440-02-0	2	mg/kg	14	14	0.0	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	83	84	0.0	0% - 50%
		EG005T: Lead	7439-92-1	5	mg/kg	21	20	0.0	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	303	308	1.7	0% - 20%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 5596037)									
ES2404187-002	Anonymous	EA055: Moisture Content	----	0.1 (1.0)*	%	24.0	24.4	2.1	0% - 20%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 5596371)									
ES2403554-013	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EW2400675-004	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EP066: Polychlorinated Biphenyls (PCB) (QC Lot: 5594874)									

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	
EP066: Polychlorinated Biphenyls (PCB) (QC Lot: 5594874) - continued									
ES2404122-001	QC202	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EW2400675-005	Anonymous	EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EP068A: Organochlorine Pesticides (OC) (QC Lot: 5594875)									
ES2404122-001	QC202	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	1.45	1.41	2.2	0% - 20%
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	0.19	0.19	0.0	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	1.0	0.9	19.1	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
EW2400675-005	Anonymous	EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	
EP068A: Organochlorine Pesticides (OC) (QC Lot: 5594875) - continued									
EW2400675-005	Anonymous	EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 5594875)									
ES2404122-001	QC202	EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
EW2400675-005	Anonymous	EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 5594875) - continued									
EW2400675-005	Anonymous	EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	<0.05	0.0	No Limit
		EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 5594873)									
ES2404122-001	QC202	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EW2400675-005	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 5594873) - continued									
EW2400675-005	Anonymous	EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 5594872)									
ES2404122-001	QC202	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EW2400675-005	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	130	120	12.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	180	210	15.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 5595250)									
ES2404122-001	QC202	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
ES2404242-009	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 5594872)									
ES2404122-001	QC202	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EW2400675-005	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	240	260	7.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	150	210	32.2	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 5595250)									
ES2404122-001	QC202	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
ES2404242-009	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EP080: BTEXN (QC Lot: 5595250)									
ES2404122-001	QC202	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene		0.5	mg/kg	<0.5	<0.5	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	
EP080: BTEXN (QC Lot: 5595250) - continued									
ES2404122-001	QC202	EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit
ES2404242-009	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit

Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix**: SOIL**

				Method Blank (MB) Report	*Laboratory Control Spike (LCS) Report*			
					Spike	*Spike Recovery (%)*	*Acceptable Limits (%)*	
Method: Compound	*CAS Number*	*LOR*	*Unit*	*Result*	*Concentration*	*LCS*	*Low*	*High*
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 5596370)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	121.1 mg/kg	95.1	88.0	113
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	0.74 mg/kg	70.0	70.0	130
EG005T: Chromium	7440-47-3	2	mg/kg	<2	19.6 mg/kg	112	68.0	132
EG005T: Copper	7440-50-8	5	mg/kg	<5	52.9 mg/kg	102	89.0	111
EG005T: Lead	7439-92-1	5	mg/kg	<5	60.8 mg/kg	101	82.0	119
EG005T: Nickel	7440-02-0	2	mg/kg	<2	15.3 mg/kg	95.2	80.0	120
EG005T: Zinc	7440-66-6	5	mg/kg	<5	139.3 mg/kg	87.6	66.0	133
EG035T: Total Recoverable Mercury by FIMS (QCLot: 5596371)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	0.087 mg/kg	87.9	70.0	125
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 5594874)								
EP066: Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	1 mg/kg	116	62.0	126
EP068A: Organochlorine Pesticides (OC) (QCLot: 5594875)								
EP068: alpha-BHC	319-84-6	0.05	mg/kg	<0.05	0.5 mg/kg	93.3	69.0	113
EP068: Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	0.5 mg/kg	102	65.0	117
EP068: beta-BHC	319-85-7	0.05	mg/kg	<0.05	0.5 mg/kg	94.9	67.0	119
EP068: gamma-BHC	58-89-9	0.05	mg/kg	<0.05	0.5 mg/kg	98.0	68.0	116
EP068: delta-BHC	319-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	95.2	65.0	117
EP068: Heptachlor	76-44-8	0.05	mg/kg	<0.05	0.5 mg/kg	103	67.0	115
EP068: Aldrin	309-00-2	0.05	mg/kg	<0.05	0.5 mg/kg	99.6	69.0	115
EP068: Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	0.5 mg/kg	100	62.0	118
EP068: trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	0.5 mg/kg	95.6	63.0	117
EP068: alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	0.5 mg/kg	96.8	66.0	116
EP068: cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	0.5 mg/kg	98.0	64.0	116
EP068: Dieldrin	60-57-1	0.05	mg/kg	<0.05	0.5 mg/kg	96.9	66.0	116
EP068: 4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	0.5 mg/kg	97.9	67.0	115
EP068: Endrin	72-20-8	0.05	mg/kg	<0.05	0.5 mg/kg	92.2	67.0	123
EP068: beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05	0.5 mg/kg	98.0	69.0	115
EP068: 4.4`-DDD	72-54-8	0.05	mg/kg	<0.05	0.5 mg/kg	97.9	69.0	121
EP068: Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05	0.5 mg/kg	99.7	56.0	120
EP068: Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05	0.5 mg/kg	103	62.0	124

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	*CAS Number*	*LOR*	*Unit*	*Result*	*Concentration*	*LCS*	*Low*	*High*
EP068A: Organochlorine Pesticides (OC) (QCLot: 5594875) - continued								
EP068: 4.4`-DDT	50-29-3	0.2	mg/kg	<0.2	0.5 mg/kg	102	66.0	120
EP068: Endrin ketone	53494-70-5	0.05	mg/kg	<0.05	0.5 mg/kg	104	64.0	122
EP068: Methoxychlor	72-43-5	0.2	mg/kg	<0.2	0.5 mg/kg	103	54.0	130
EP068B: Organophosphorus Pesticides (OP) (QCLot: 5594875)								
EP068: Dichlorvos	62-73-7	0.05	mg/kg	<0.05	0.5 mg/kg	87.4	59.0	119
EP068: Demeton-S-methyl	919-86-8	0.05	mg/kg	<0.05	0.5 mg/kg	89.3	62.0	128
EP068: Monocrotophos	6923-22-4	0.2	mg/kg	<0.2	0.5 mg/kg	79.0	54.0	126
EP068: Dimethoate	60-51-5	0.05	mg/kg	<0.05	0.5 mg/kg	83.5	67.0	119
EP068: Diazinon	333-41-5	0.05	mg/kg	<0.05	0.5 mg/kg	95.2	70.0	120
EP068: Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg	<0.05	0.5 mg/kg	96.6	72.0	120
EP068: Parathion-methyl	298-00-0	0.2	mg/kg	<0.2	0.5 mg/kg	89.3	68.0	120
EP068: Malathion	121-75-5	0.05	mg/kg	<0.05	0.5 mg/kg	93.6	68.0	122
EP068: Fenthion	55-38-9	0.05	mg/kg	<0.05	0.5 mg/kg	98.5	69.0	117
EP068: Chlorpyrifos	2921-88-2	0.05	mg/kg	<0.05	0.5 mg/kg	98.0	76.0	118
EP068: Parathion	56-38-2	0.2	mg/kg	<0.2	0.5 mg/kg	89.3	64.0	122
EP068: Pirimphos-ethyl	23505-41-1	0.05	mg/kg	<0.05	0.5 mg/kg	98.0	70.0	116
EP068: Chlorfenvinphos	470-90-6	0.05	mg/kg	<0.05	0.5 mg/kg	98.7	69.0	121
EP068: Bromophos-ethyl	4824-78-6	0.05	mg/kg	<0.05	0.5 mg/kg	99.4	66.0	118
EP068: Fenamiphos	22224-92-6	0.05	mg/kg	<0.05	0.5 mg/kg	86.5	68.0	124
EP068: Prothiofos	34643-46-4	0.05	mg/kg	<0.05	0.5 mg/kg	98.3	62.0	112
EP068: Ethion	563-12-2	0.05	mg/kg	<0.05	0.5 mg/kg	90.0	68.0	120
EP068: Carbophenothion	786-19-6	0.05	mg/kg	<0.05	0.5 mg/kg	102	65.0	127
EP068: Azinphos Methyl	86-50-0	0.05	mg/kg	<0.05	0.5 mg/kg	71.7	41.0	123
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 5594873)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	93.5	77.0	125
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	99.0	72.0	124
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	99.7	73.0	127
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	97.4	72.0	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	104	75.0	127
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	97.5	77.0	127
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	96.7	73.0	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	96.1	74.0	128
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	93.0	69.0	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	95.5	75.0	127

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	*CAS Number*	*LOR*	*Unit*	*Result*	*Concentration*	*LCS*	*Low*	*High*
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 5594873) - continued								
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	6 mg/kg	94.2	68.0	116
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	101	74.0	126
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	96.0	70.0	126
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	97.3	61.0	121
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	96.2	62.0	118
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	97.3	63.0	121
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5594872)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	300 mg/kg	95.0	75.0	129
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	450 mg/kg	98.9	77.0	131
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	300 mg/kg	97.5	71.0	129
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5595250)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	91.3	72.2	131
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5594872)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	375 mg/kg	87.5	77.0	125
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	525 mg/kg	99.2	74.0	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	225 mg/kg	91.5	63.0	131
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5595250)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	88.5	72.4	133
EP080: BTEXN (QCLot: 5595250)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	94.8	76.0	124
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	93.1	78.5	121
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	91.2	77.4	121
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	93.0	78.2	121
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	92.2	81.3	121
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	87.6	78.8	122

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS)
analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

			Matrix Spike (MS) Report			
			Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	*Sample ID*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 5596370)							
ES2403554-013	Anonymous	EG005T: Arsenic	7440-38-2	50 mg/kg	99.8	70.0	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	95.5	70.0	130
		EG005T: Chromium	7440-47-3	50 mg/kg	115	68.0	132
		EG005T: Copper	7440-50-8	250 mg/kg	100	70.0	130
		EG005T: Lead	7439-92-1	250 mg/kg	96.2	70.0	130
		EG005T: Nickel	7440-02-0	50 mg/kg	102	70.0	130
		EG005T: Zinc	7440-66-6	250 mg/kg	94.3	66.0	133
EG035T: Total Recoverable Mercury by FIMS (QCLot: 5596371)							
ES2403554-013	Anonymous	EG035T: Mercury	7439-97-6	5 mg/kg	101	70.0	130
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 5594874)							
ES2404122-001	QC202	EP066: Total Polychlorinated biphenyls	----	1 mg/kg	112	70.0	130
EP068A: Organochlorine Pesticides (OC) (QCLot: 5594875)							
ES2404122-001	QC202	EP068: gamma-BHC	58-89-9	0.5 mg/kg	85.2	70.0	130
		EP068: Heptachlor	76-44-8	0.5 mg/kg	98.3	70.0	130
		EP068: Aldrin	309-00-2	0.5 mg/kg	90.2	70.0	130
		EP068: Dieldrin	60-57-1	0.5 mg/kg	103	70.0	130
		EP068: Endrin	72-20-8	2 mg/kg	103	70.0	130
		EP068: 4.4`-DDT	50-29-3	2 mg/kg	102	70.0	130
EP068B: Organophosphorus Pesticides (OP) (QCLot: 5594875)							
ES2404122-001	QC202	EP068: Diazinon	333-41-5	0.5 mg/kg	77.8	70.0	130
		EP068: Chlorpyrifos-methyl	5598-13-0	0.5 mg/kg	91.4	70.0	130
		EP068: Pirimphos-ethyl	23505-41-1	0.5 mg/kg	85.7	70.0	130
		EP068: Bromophos-ethyl	4824-78-6	0.5 mg/kg	89.6	70.0	130
		EP068: Prothiofos	34643-46-4	0.5 mg/kg	78.1	70.0	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 5594873)							
ES2404122-001	QC202	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	103	70.0	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	102	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5594872)							
ES2404122-001	QC202	EP071: C10 - C14 Fraction	----	480 mg/kg	112	73.0	137
		EP071: C15 - C28 Fraction	----	3100 mg/kg	107	53.0	131
		EP071: C29 - C36 Fraction	----	2060 mg/kg	119	52.0	132
EP080/071: Total Petroleum Hydrocarbons (QCLot: 5595250)							
ES2404122-001	QC202	EP080: C6 - C9 Fraction	----	32.5 mg/kg	89.8	60.4	142
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5594872)							
ES2404122-001	QC202	EP071: >C10 - C16 Fraction	----	860 mg/kg	112	73.0	137
		EP071: >C16 - C34 Fraction	----	4320 mg/kg	111	53.0	131

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5594872) - continued							
ES2404122-001	QC202	EP071: >C34 - C40 Fraction	----	890 mg/kg	114	52.0	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 5595250)							
ES2404122-001	QC202	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	90.0	61.1	142
EP080: BTEXN (QCLot: 5595250)							
ES2404122-001	QC202	EP080: Benzene	71-43-2	2.5 mg/kg	93.8	62.1	122
		EP080: Toluene	108-88-3	2.5 mg/kg	92.9	66.6	119
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	95.1	67.4	123
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	93.6	66.4	121
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	93.3	70.7	121
		EP080: Naphthalene	91-20-3	2.5 mg/kg	76.7	61.1	115

APPENDIX F

Detailed Site Investigation

Appendix E Data validation

STOCKINBINGAL TO PARKES
SUPPLEMENTARY REVIEW OF ENVIRONMENTAL FACTORS: FORBES STATION AND YARD

Table E1
Analytical Summary

SAMPLE BATCH DATA QA SUMMARY SHEET

Project Name:	Forbes Station and Yard	Project Number:	C-1859.00
Primary Laboratory:	Eurofins Environment Testing	Laboratory Certificate Number:	1065544, 1069120
Secondary Laboratory:	ALS Environmental Services	Laboratory Certificate Number:	ES2404122
Date Sampled:	1-Feb-24	Sample Medium:	Soil, Water

Sample Information

Number of Primary Samples (collected [analysed]):	21[20]	Number of Triplicate (Interlab dup) samples (collected [analysed]):	3[1]
Number of Duplicate Samples (collected [analysed]):	3[2]	Number of Other Field QAQC Samples (collected [analysed]):	3[3]

Documentation and Sample Handling Information

	Y / N / NA	Comments
COC completed properly?	Y	Nil
All requested analysis completed?	Y	Nil
Samples received in appropriate condition for analysis?	Y	N/A
Samples analysed within appropriate holding times?	Y	N/A
Sample volumes sufficient for QC analysis?	Y	Nil
Are there non-NATA accredited methods used?	N	Nil
Chromatograms supplied as appropriate?	N	Nil
Laboratory reports signed by authorised personnel?	Y	N/A

QAQC Sample Information (Method Blank - MB, Rinsate Blank - RB, Field Blank - FB, Trip Blank - TB)

Type	Sample ID	Comments
Intra-laboratory field duplicate	QC100	TP10_0.5-0.6 - Report 1065544
Inter-laboratory field duplicate	QC200	TP10_0.5-0.6 - not analysed
Intra-laboratory field duplicate	QC101	TP07_0.0-0.2 - not analysed
Inter-laboratory field duplicate	QC201	TP07_0.0-0.2 - not analysed
Intra-laboratory field duplicate	QC102	TP03_0.0-0.2 - Report 1065544
Inter-laboratory field duplicate	QC202	TP03_0.0-0.2 - Report ES2404122
Field Rinsate	QC300	Hand auger rinsate
Trip Spike	QC400	Trip spike
Trip Blank	QC500	Trip blank

Trip Blank Information (BTEX)

Analyte	Detected Concentration	Comments
Benzene	<LOR	Pass
Toluene	<LOR	Pass
Ethylbenzene	<LOR	Pass
Xylene	<LOR	Pass
Napthalene	<LOR	Pass

Trip Spike Information (BTEX)

Analyte	% recovery	Comments
Benzene	99	Pass
Toluene	99	Pass
Ethylbenzene	100	Pass
Xylene	100	Pass
Napthalene	98	Pass

Laboratory Control Spike (LCS) Analysis

Analyte Group	Comments
BTEXN	Pass
TRH	The RPDs for TRH C1t-C28, C29-C36, C16-C34, and C34-C40 exceed the acceptance criteria, however the RPDs reported pass the internal laboratory quality control acceptance criteria.
PAH	Pass
Metals	The RPD for arsenic exceeds the acceptance criteria, however the RPD reported passes the internal laboratory quality control acceptance criteria.
OC/OP/PCB	Pass

Matrix Spike (MS) Analyses

Analyte Group	Comments
BTEXN	Pass
TRH	Pass
PAH	Pass
Metals	Pass
OC/OP/PCB	Pass

Laboratory Duplicates (LD) Analysis

Analyte Group	Comments
BTEXN	Pass
TRH	Pass
PAH	Pass
Metals	Pass
OC/OP/PCB	Pass

SAMPLE BATCH DATA QA SUMMARY SHEET

Project Name:	Forbes Station and Yard	Project Number:	C-1859.00
Primary Laboratory:	Eurofins Environment Testing	Laboratory Certificate Number:	1065544, 1069120
Secondary Laboratory:	ALS Environmental Services	Laboratory Certificate Number:	ES2404122
Date Sampled:	1-Feb-24	Sample Medium:	Soil, Water

Sample Information

Number of Primary Samples (collected [analysed]):	21[20]	Number of Triplicate (Interlab dup) samples (collected [analysed]):	3[1]
Number of Duplicate Samples (collected [analysed]):	3[2]	Number of Other Field QAQC Samples (collected [analysed]):	3[3]

Field Duplicates (FD) Analyses

Analyte Group	Primary ID	Duplicate ID	Comments
BTEX	-	-	Nil
TPH/TRH	-	-	Nil
PAH	-	-	Nil
Metals	TP03_0.0-0.2	QC102	Copper was detected at 120 mg/kg in the primary sample, however was detected at 220 mg/kg in the duplicate sample QC102. This difference may be attributed to inherent soil sample heterogeneity which was collected in granular fill, or laboratory sub-sampling techniques.
OC/OP/PCB	TP03_0.0-0.2	QC102	4,4- DDE was detected at 1.4 mg/kg in the primary sample, however was detected at 2.3 mg in the duplicate sample QC102. This difference may be attributed to inherent soil sample heterogeneity which was collected in granular fill, or laboratory sub-sampling techniques.

Inter-Lab Duplicates Analysis

Analyte Group	Primary ID	Duplicate ID	Comments
BTEX	TP03_0.0-0.2	QC202	Nil
TPH/TRH			Nil
			Nil
			Nil
PAH			Nil
Metals			Nil
OC/OP/PCB			DDT+DDE+DDD was detected at 1.4 mg/kg in the primary sample, however was detected at 2.64 mg/kg in the triplicate sample QC202. This difference may be attributed to inherent soil sample heterogeneity which was collected in granular fill, or laboratory sub-sampling techniques.

Field Rinsate Analysis

Analyte Group	Rinsate ID	Comments
BTEXN	QC300	NIl
TRH		Nil
PAH		Nil
Metals		Nil
OC/OP/PCB		Nil

Surrogate Compound Monitoring Analyses

Analyte Group	Primary ID	Duplicate ID	Comments
n/a	n/a	Nil	n/a

With sufficient quality control samples analysed for total concentration results, the data collected is considered suitable for the purpose of this environmental testing report.

Overall Comments:

Note: Data validation assesses each analyte in terms of all the data validation variables and only the exceedances and outliers are reported in this form.

Performed by:	C.Weaver	Checked By:	N. Davison
Date:	22/02/2024	Date:	23/02/2024

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Forbes Station and Yard
Detailed Site Investigation

Table E2
Analytical Summary - Soil RPD

				BTEX								TRH							TPH				
				Naphthalene (VOC)	Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)	Xylene Total	Total BTEX	C6-C10 Fraction (F1)	C6-C10 (F1 minus BTEX)	>C10-C16 Fraction (F2)	>C10-C16 Fraction (F2 minus Naphthalene)	>C16-C34 Fraction (F3)	>C34-C40 Fraction (F4)	>C10-C40 Fraction (Sum)	C6-C9 Fraction	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction	C10-C36 Fraction (Sum)
1065544	TP03_0.0-0.2	01 Feb 2024	Soil	<0.5	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	-	<20	<20	<50	<50	110	<100	110	<20	<20	77	<50	77
1065544	TP03_0.0-0.2	01 Feb 2024	Soil	<0.5	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	-	<20	<20	<50	<50	110	<100	110	<20	<20	77	<50	77
1065544	TP10_0.5-0.6	01 Feb 2024	Soil	<0.5	<0.1	<0.1	<0.1	<0.2	<0.1	<0.3	-	<20	<20	<50	<50	<100	<100	<100	<20	<20	<50	<50	<50

***RPDs have only been considered where a concentration is greater than 1 times the EQL.**
****Elevated RPDs are highlighted as per QAQC Profile settings (Acceptable RPDs for each EQL multiplier range are: 81 (1 - 10 x EQL); 50 (10 - 30 x EQL); 30 (> 30 x EQL))**

between laboratories. Any methods in the row header relate to those used in the primary laboratory

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Table E2
Analytical Summary - Soil RPD

				PAH																	Benzenes	Inorganics		Metals							
				Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a) pyrene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	PAHs (Sum of total)	Hexachlorobenzene	Moisture Content	Moisture Content (dried @ 103°C)	Arsenic	Cadmium	Chromium (III+VI)	Copper	Lead	Mercury	Nickel	Zinc
1065544	TP03_0.0-0.2	01 Feb 2024	Soil	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	4.0	160	3.4	25	120	220	0.1	13	410
																											🟥				
1065544	TP03_0.0-0.2	01 Feb 2024	Soil	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	4.0	160	3.4	25	120	220	0.1	13	410
1065544	TP10_0.5-0.6	01 Feb 2024	Soil	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	-	15	12	<0.4	25	15	11	<0.1	17	27

*RPDs have only been considered where a concentration is greater than 1 times the EQL.
**Elevated RPDs are highlighted as per QAQC Profile settings (Acceptable RPDs for each EQL multiplier range are: 81 (1 - 10 x EQL); 50 (10 - 30 x EQL); 30 (> 30 x EQL))

between laboratories. Any methods in the row header relate to those used in the primary laboratory

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Table E2
Analytical Summary - Soil RPD

D&N
Geotechnical

				Organochlorine Pesticides																										
				Organochlorine pesticides EPAVic	Other organochlorine pesticides EPAVic	4,4-DDE	a-BHC	Aldrin	Aldrin + Dieldrin	b-BHC	Chlordane	Chlordane (cis)	Chlordane (trans)	d-BHC	DDD	DDT	DDT+DDE+DDD	Dieldrin	Endosulfan	Endosulfan I	Endosulfan II	Endosulfan sulphate	Endrin	Endrin aldehyde	Endrin ketone	g-BHC (Lindane)	Heptachlor	Heptachlor epoxide	Methoxychlor	Toxaphene
1065544	TP03_0.0-0.2	01 Feb 2024	Soil	1.4	<1	1.4	<0.5	<0.5	<0.5	<0.5	<1	-	-	<0.5	<0.5	<0.5	1.4	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<10
						🟥											🟥													
1065544	TP03_0.0-0.2	01 Feb 2024	Soil	1.4	<1	1.4	<0.5	<0.5	<0.5	<0.5	<1	-	-	<0.5	<0.5	<0.5	1.4	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<10
																	🟥													
1065544	TP10_0.5-0.6	01 Feb 2024	Soil	<0.1	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.5

***RPDs have only been considered where a concentration is greater than 1 times the EQL.**

****Elevated RPDs are highlighted as per QAQC Profile settings (Acceptable RPDs for each EQL multiplier range are: 81 (1 - 10 x EQL); 50 (10 - 30 x EQL); 30 (> 30 x EQL))**

between laboratories. Any methods in the row header relate to those used in the primary laboratory

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Table E2
Analytical Summary - Soil RPD

				Organophosphorous Pesticides																
				Tokuthion	Azinophos methyl	Bolstar (Sulprofos)	Bromophos-ethyl	Carbophenothion	Chlorfenvinphos	Chlorpyrifos	Chlorpyrifos-methyl	Coumaphos	Demeton-O	Demeton-S	Diazinon	Dichlorvos	Dimethoate	Disulfoton	Ethion	Ethoprop
1065544	TP03_0.0-0.2	01 Feb 2024	Soil	<0.5	<0.5	<0.5	-	-	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1065544	TP03_0.0-0.2	01 Feb 2024	Soil	<0.5	<0.5	<0.5	-	-	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1065544	TP10_0.5-0.6	01 Feb 2024	Soil	<0.2	<0.2	<0.2	-	-	<0.2	<0.2	<0.2	<2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

				Organophosphorous Pesticides																	
				Fenitrothion	Fensulfothion	Fenthion	EPN	Malathion	Merphos	Methyl parathion	Mevinphos (Phosdrin)	Monocrotophos	Naled (Dibrom)	Omethoate	Phorate	Prothiofos	Pyrazophos	Ronnel	Terbufos	Trichloronate	Tetrachlorvinphos
1065544	TP03_0.0-0.2	01 Feb 2024	Soil	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5
1065544	TP03_0.0-0.2	01 Feb 2024	Soil	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5
1065544	TP10_0.5-0.6	01 Feb 2024	Soil	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<2	<0.2	<2	<0.2	-	<0.2	<0.2	<0.2	<0.2	<0.2

***RPDs have only been considered where a concentration is greater than 1 times the EQL.**
****Elevated RPDs are highlighted as per QAQC Profile settings (Acceptable RPDs for each EQL multiplier range are: 81 (1 - 10 x EQL); 50 (10 - 30 x EQL); 30 (> 30 x EQL))**

between laboratories. Any methods in the row header relate to those used in the primary laboratory

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Table E2
Analytical Summary - Soil RPD

				PCBs								Pesticides				
				Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260	PCBs (Sum of total)	Demeton-S-methyl	Fenamiphos	Parathion	Pirimiphos-methyl	Pirimphos-ethyl
1065544	TP03_0.0-0.2	01 Feb 2024	Soil	<1	<1	<1	<1	<1	<1	<1	<1	-	-	<0.5	<0.5	-
1065544	TP03_0.0-0.2	01 Feb 2024	Soil	<1	<1	<1	<1	<1	<1	<1	<1	-	-	<0.5	<0.5	-
1065544	TP10_0.5-0.6	01 Feb 2024	Soil	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	<0.2	<0.2	-

*RPDs have only been considered where a concentration is greater than 1 times the EQL.

**Elevated RPDs are highlighted as per QAQC Profile settings (Acceptable RPDs for each EQL multiplier range are: 81 (1 - 10 x EQL); 50 (10 - 30 x EQL); 30 (> 30 x EQL))

between laboratories. Any methods in the row header relate to those used in the primary laboratory

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Table E3
Analytical Summary - Rinsate

		BTEX							TRH							TPH					PAH																
		Naphthalene (VOC)	Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)	Xylene Total	C6-C10 Fraction (F1)	C6-C10 (F1 minus BTEX)	>C10-C16 Fraction (F2)	>C10-C16 Fraction (F2 minus Naphthalene)	>C16-C34 Fraction (F3)	>C34-C40 Fraction (F4)	>C10-C40 Fraction (Sum)	C6-C9 Fraction	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction	C10-C36 Fraction (Sum)	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a) pyrene	Benzo(b+j)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	Phenanthrene	Pyrene	PAHs (Sum of total)

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Table E3

Analytical Summary - Rinsate

		Halogenated Benzenes	Metals								Organochlorine Pesticides																							
		Hexachlorobenzene	Arsenic	Cadmium	Chromium (III+VI)	Copper	Lead	Mercury	Nickel	Zinc	Organochlorine pesticides EPAVic	Other organochlorine pesticides EPAVic	4,4-DDE	a-BHC	Aldrin	Aldrin + Dieldrin	b-BHC	Chlordane	d-BHC	DDD	DDT	DDT+DDE+DDD	Dieldrin	Endosulfan I	Endosulfan II	Endosulfan sulphate	Endrin	Endrin aldehyde	Endrin ketone	g-BHC (Lindane)	Heptachlor	Heptachlor epoxide	Methoxychlor	Toxaphene

Table E3
Analytical Summary - Rinsate

		Organophosphorous Pesticides																															
		Tokuthion	Azinophos methyl	Bolstar (Sulprofos)	Chlorfenvinphos	Chlorpyrifos	Chlorpyrifos-methyl	Coumaphos	Demeton-O	Demeton-S	Diazinon	Dichlorvos	Dimethoate	Disulfoton	Ethion	Ethoprop	Fenitrothion	Fensulfothion	Fenthion	EPN	Malathion	Merphos	Methyl parathion	Mevinphos (Phosdrin)	Monocrotophos	Naled (Dibrom)	Omethoate	Phorate	Pyrazophos	Ronnel	Terbufos	Trichloronate	Tetrachlorvinphos

Table E3
Analytical Summary - Rinsate

		PCBs								Pesticides	
		Arochlor 1016	Arochlor 1221	Arochlor 1232	Arochlor 1242	Arochlor 1248	Arochlor 1254	Arochlor 1260	PCBs (Sum of total)	Parathion	Pirimiphos-methyl

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Forbes Station and Yard
Detailed Site Investigation

Table E4
Analytical Results Summary - Trip Spike/Trip Blank

				BTEX							TRH		
				Naphthalene (VOC)	Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)	Xylene Total	C6-C10 Fraction (F1)	C6-C10 (F1 minus BTEX)	C6-C9 Fraction

				BTEX							
				Naphthalene (VOC)	Benzene	Toluene	Ethylbenzene	Xylene (m & p)	Xylene (o)	Xylene Total	C6-C10 Fraction (F1)

*Where no lab LCL and UCL is available, user defined limits between 30% and 150% have been adopted for non-compliance.