Douglas Partners
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Integrated Practical Solutions

Report on
Targeted Detailed Site Investigation (Contamination)

Proposed Jindabyne Central School
Part of Lot 101 DP 1019725, Jindabyne

Prepared for
School Infrastructure NSW

Project 103109.04
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Douglas Partners
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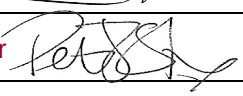
The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

	Signature		Date
Author		Shannon Goodsell	1 December2021
Reviewer		p.p Dean Woods	1 December 2021

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Douglas Partners Pty Ltd
ABN 75 053 980 117
www.douglaspartners.com.au
Unit 2, 73 Sheppard Street
Hume ACT 2620
PO Box 1487
Fyshwick ACT 2609
Phone (02) 6260 2788

Executive Summary

This Targeted Detailed Site Investigation (DSI) (contamination) conducted by Douglas Partners Pty Ltd (DP) accompanies an Environmental Impact Statement (EIS) pursuant to Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act) in support of an application for a State Significant Development (SSD No 15788005). The SSDA is for a new education campus at Jindabyne, comprising of a new primary and high school, located at the Jindabyne Sport and Recreation Centre (JSRC).

This report addresses the Secretary's Environmental Assessment Requirements (SEARs), notably:

- Key Issue 19 – Contamination:
    - Assess and quantify any soil and groundwater contamination and demonstrate that the site is suitable for the proposed use in accordance with SEPP 55. This must include the following prepared by certified consultants recognised by the NSW Environment Protection Authority:
    - Targeted Detailed Site Investigation (DSI) where recommended in the Preliminary Site Investigation (PSI) and limited intrusive investigation (contamination).

The investigation was undertaken in general accordance with DP's proposal CAN200329 dated 27 May 2021.

The objective of the targeted DSI is to assess the suitability of the site for the proposed development and whether further investigation and/or management or remediation is required.

The scope of work conducted by DP comprised the following:

- Review of previous investigations undertaken at the site;
- Review of service plans, completion of a Dial-Before-You Dig (DBYD) underground services record search, scanning of test locations for buried services and surveying of test locations using a GPS;
- Intrusive sampling from 35 test pit locations (25 for the asbestos investigation and ten for areas associated with previous greens and tees). Test pits were excavated using a tracked excavator and terminated in natural soil material. It should be noted that Pits 104 – 107 are no longer within the site boundary;
- Collection of soil samples from all test locations at regular depth intervals based on field observations, upon signs of contamination and at changes in strata;
- Collection of replicate soil samples in zip-lock plastic bags at each depth for the screening of volatile organic compounds (VOC) with a photoionisation detector (PID);
- Logging of encountered soil material and pertinent field information;
- Field screening of soil samples for asbestos with reference to National Environmental Protection Council, national Environmental Protection (Assessment of Site Contamination) Measure (the 'NEPM', 1999, as amended 2013);
- Where potential asbestos containing material (PACM) fragments were encountered during test pitting (i.e. incidental finds of PACM fragments in test pit spoil and/or ground surface), noting of fragment location and collection of PACM samples for laboratory analysis for the presence of asbestos;

- Backfilling of test pits and compaction using the excavator;
- Laboratory analysis of collected soil samples at a National Association of testing Authorities (NATA) accredited laboratory for a range of the following contaminants of potential concern (CoPC):
  - Metals/metalloids (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc);
  - Polycyclic aromatic hydrocarbons (PAH);
  - Total recoverable hydrocarbons (TRH);
  - Benzene, toluene, ethylbenzene and xylene (BTEX);
  - Organochlorine pesticides (OCP) and organophosphorus pesticides (OPP);
  - Polychlorinated biphenyls (PCB); and
  - Asbestos fines and fibrous asbestos (AF/FA) (asbestos 500 mL samples) and bonded asbestos in materials.
- Preparation of this targeted DSI report, including a Data Quality Assessment, an updated conceptual site model (CSM), a discussion of the methods and results of the investigation, an assessment of the risk to the proposed development from contamination, advice on the type and potential extent of contamination and a statement on the site suitability and/or need for further assessment/remediation.

The results of the field screening of samples indicated that asbestos was identified in the 10 L soil samples collected from Pits 102, 116, 117, 119, 120, 121, 123 and 124, and the asbestos was identified as being bonded ACM. The results of the laboratory analysis of soil samples (500 mL) submitted for asbestos in soil (AF/FA) indicated that no asbestos fibres were reported in all samples submitted for analysis. Calculated concentrations of bonded ACM were reported exceeding the Health Screening Level-A (residential - including primary school sites) in samples collected from Pits 102 and 116.

The analytical results indicated that bonded asbestos was identified within the material samples collected from test pit spoil from Pits 102, 116 and 117. Material sample (M113) was collected from the ground surface of the south-eastern portion (see Drawing 1, Appendix A) of the site and was also submitted for laboratory analysis. The materials submitted for analysis comprised fibre cement material, with either, one or more of chrysotile, amosite and crocidolite fibre types being identified in the material. The presence of asbestos on the ground surface exceeds the adopted Health Screening Level-A

The analytical results for tested soil samples were all within the adopted health-based (i.e. HIL-A/HSL-A/B) and ecological (i.e. EIL/ESL) criteria and management limits for primary school land use.

All soil results for TRH, BTEX, PAH, OCP, OPP and PCB were below the laboratory's practical quantitation limit (PQL) except for aldrin and dieldrin in samples Pit 127/0.1 m (0.1 mg/kg) and Pit 130/0.1 m (0.1 mg/kg) but were below the adopted SAC. Total chlordane in samples Pit 127/0.1 m (0.6 mg/kg) and Pit 130/0.1 m (0.7 mg/kg) were above the PQL but below the adopted SAC. All soil results for metals were above the PQL except for arsenic, cadmium and mercury, but below the adopted site criteria.

It should be noted that a calculation of the 95%$UCL_{average}$ using the ProUCL statistical software package was undertaken for zinc and total chlordane from DP (2021a) results and the targeted DSI results. The 95%$UCL_{average}$ was then compared to the adopted assessment criteria. The 95%$UCL_{average}$ for zinc and chlordane across the site was calculated as being below the assessment criteria (HIL-A of 50 mg/kg for

total chlordane and EIL of 470 mg/kg for zinc). The outputs from the ProUCL software are presented in Appendix I.

Based on the results of the targeted DSI, it is considered that the site is not currently suitable for the proposed use as a school, due to the presence of asbestos in topsoil fill material present within the south-eastern portion of the site. Further analysis of past pesticide use and presence of metals/metalloids within the topsoil fill indicated that there is a low risk for metal/metalloids and pesticide contamination, however, it is considered that fill associated with the tees and greens should be managed/remediated appropriately.

It is therefore recommended that a Remediation Action Plan (RAP) should be developed to address contamination at the site. The RAP will provide strategies for:

- Assessing the data available to determine areas of environmental concern (AEC) requiring remediation;
- Remediation of the AEC;
- Management of waste including asbestos impacts in soil and tees and greens materials;
- Management of excavations and tracking of soil movement within the site and off-site;
- Management of the demolition of current dwellings/structures located within the site;
- Management of imported materials;
- Asbestos and unexpected finds management; and
- Further testing (including validation of identified contamination) as required.

It is considered that following the successful implementation of a RAP, the site will be rendered suitable for the proposed development.

DP also recommends that the following measures are undertaken at the site during any future development works:

- A Construction Environment Management Plan (CEMP) should also be prepared including an 'unexpected finds protocol' which would include an asbestos finds protocol, and implemented during the works (i.e. hydrocarbon staining and/or odours, PACM in other areas of the site etc. be observed during future earthworks);
- Should any fill material (i.e. the tee and green pads on site) be required to be disposed off-site, the material must be assessed in accordance with NSW EPA Waste Classification Guidelines Part 1 Classifying Waste (2014) and assigned a waste classification prior to off-site disposal;
- Care should be taken when handling material (during future site developments) with glass and other potential sharp objects and where practical, anthropogenic materials should be segregated from soil material (i.e. cobbled sized or larger pieces of brick, concrete, large pieces of pipe (terracotta, concrete, PVC, etc.), large amounts of asphalt and steel/metal associated with building rubble. Furthermore, when handling material with potentially sharp objects, correct PPE should be worn, or machines should be used when handling material affected by sharp anthropogenic objects; and
- Should the existing dwellings require demolition, a validation assessment of the underlying soils in the building envelope should be undertaken. One test location per 25 m^2 should be located across

each building envelope. It would be recommended that test locations are excavated 0.5 m into natural material and samples are taken at regular intervals (i.e. near surface/~0.1 m, 0.5 m, 1.0 m and every 0.5 m after or changes in soil strata/signs of contamination (i.e. staining and odorous material). Samples should be tested for bonded asbestos and asbestos fines/friable asbestos (screening 10 L bulk samples and collecting 500 mL samples). Samples should also be taken for chemical analysis for heavy metals, hydrocarbons, pesticides and other HBM contaminants. Validation sampling for underground services containing ACM should be collected at a rate of one per linear 5 m (samples to be taken within the walls and the base of the trench).

Table of Contents

Page

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1. Introduction

This Targeted Detailed Site Investigation (DSI) (contamination) conducted by Douglas Partners Pty Ltd (DP) accompanies an Environmental Impact Statement (EIS) pursuant to Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act) in support of an application for a State Significant Development (SSD No 15788005). The SSDA is for a new education campus at Jindabyne, comprising of a new primary and high school, located at the Jindabyne Sport and Recreation Centre (JSRC).

This report addresses the Secretary's Environmental Assessment Requirements (SEARs), notably:

- Key Issue 19 – Contamination:
    - Assess and quantify any soil and groundwater contamination and demonstrate that the site is suitable for the proposed use in accordance with SEPP 55. This must include the following prepared by certified consultants recognised by the NSW Environment Protection Authority:
    - Targeted Detailed Site Investigation (DSI) where recommended in the Preliminary Site Investigation (PSI) and limited intrusive investigation (contamination).

2. Proposed Development

The proposed development is for the construction of the Jindabyne Education Campus comprising a new primary school and a new high school at Jindabyne (the proposal). The proposal is located within the JSRC located at 207 Barry Way (the site) and will accommodate approximately 925 students with the capacity for expansion in the future.

The new primary school will be located generally in the northern portion of the site whilst the new high school will be to the south of the site. While the schools are inherently separate identities, with separate student entries, opportunities for integration are provided in a central shared plaza with co-located school administration facilities, as identified in Figure 1 below. This outdoor learning space is activated by the school canteen (shared) and separate core facilities including the primary school hall and library, and the high school gym and library, and provides opportunities for shared community use.

The new primary school will provide for a Core 21 school. This will comprise of 20 home base units and 2 support learning units, administration and staff facilities, covered outdoor learning area (COLA), hall, staff and student amenities, out of school care facilities, library and special programs. Landscaped areas include active and passive open space play areas, and a games court.

The new high school will provide for a stream 2 high school. This is to comprise of 20 general/specialised learning spaces and support learning units, administration and staff facilities, covered outdoor learning area (COLA), hall, staff and student amenities, library, an agricultural learning unit. Landscaped areas include active and passive open space play areas, a sports field and multipurpose games courts.

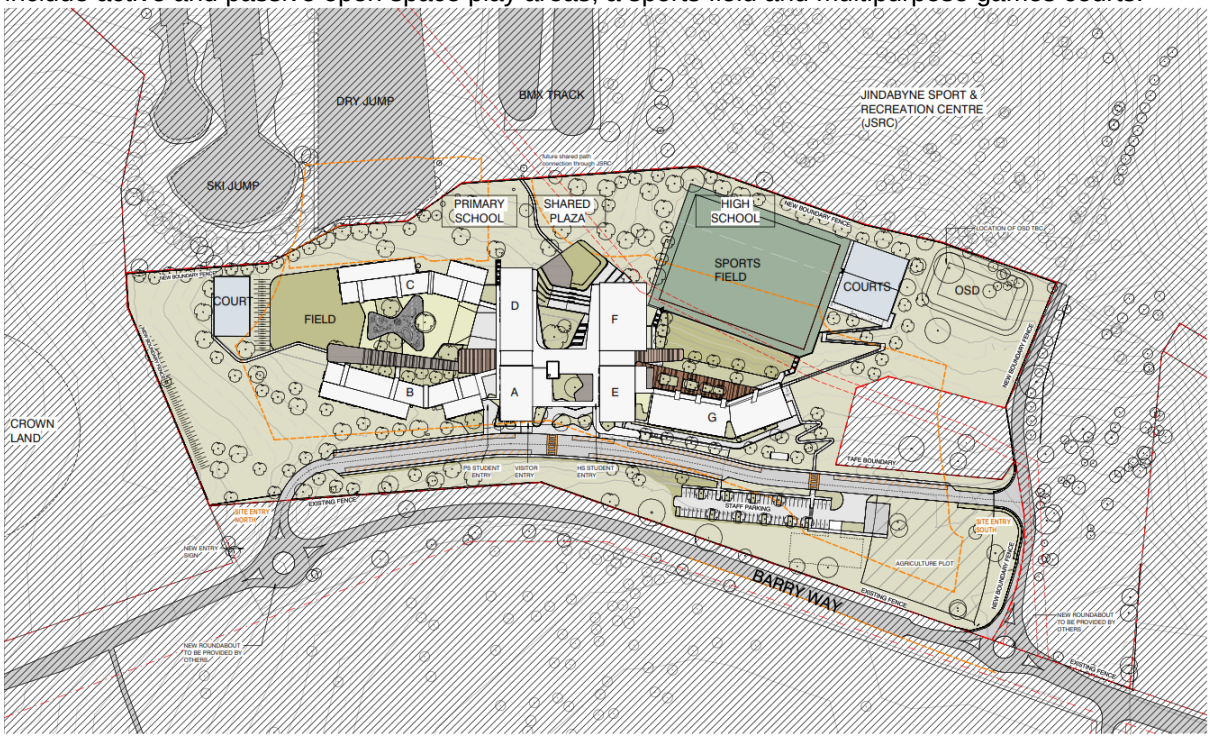


Figure 1 Proposed Site Plan
Source: DJRD

3. Site Information and Description

3.1 Site Identification

Site Address	207 Barry Way, Jindabyne
Legal Description	Part of Lot 101 Deposited Plan 1019527
Area	9.5 ha
Zoning	Zone RU1 Primary Production
Local Council Area	Snowy Monaro Regional Council
Current Use	Vacant (part of a former golf course) and residential land
Surrounding Uses	North – Agriculture East – Vacant and recreational South – Agriculture West – Agriculture/Airport

3.2 Site Description

The site of the proposed new education campus at Jindabyne is located within the western extent of the existing JSRC at 207 Barry Way (101 DP1019527). The site is located within the Snowy Monaro Regional Council local government area and is approximately 2.2 km south of the Jindabyne town Centre. A site aerial is provided in Figure 2.

The site is approximately 9 ha in size, containing a former golf course and three existing workers cottages which were occupied during the construction of the Snowy Hydro Scheme. The majority of the site is undeveloped and contains maintained grasslands and scattered trees. Much of the surrounding land comprises remnant grassland, woodland and agricultural land.

As identified above, the site is within the existing JSRC which is a high performance and community sport centre located directly east of the site. The JSRC has a range of sporting facilities including a synthetic running track, cycling track, netball and tennis courts, fitness and indoor sports centres, and sporting ovals, as well as other services and accommodation facilities. The newly constructed BMX track is located directly east of the site with the new ski jump currently under construction to the northeast.

TAFE NSW have recently lodged a development application for a Connected Learning Centre (CLC) and Mobile Training Unit (MTU) which is proposed to the south of the site. The CLC and MTU will utilise interactive, digitally enabled, flexible, and multipurposed learning environments to provide high-quality training and learning experiences accommodating a maximum of 20-25 students and three teachers.

The surrounding locality is generally rural in character with other land uses also including the Jindabyne Aero Club located to the west of the site on Tinworth Drive, an industrial area to the southwest and the Jindabyne Community recycling centre is located east of the JSRC.

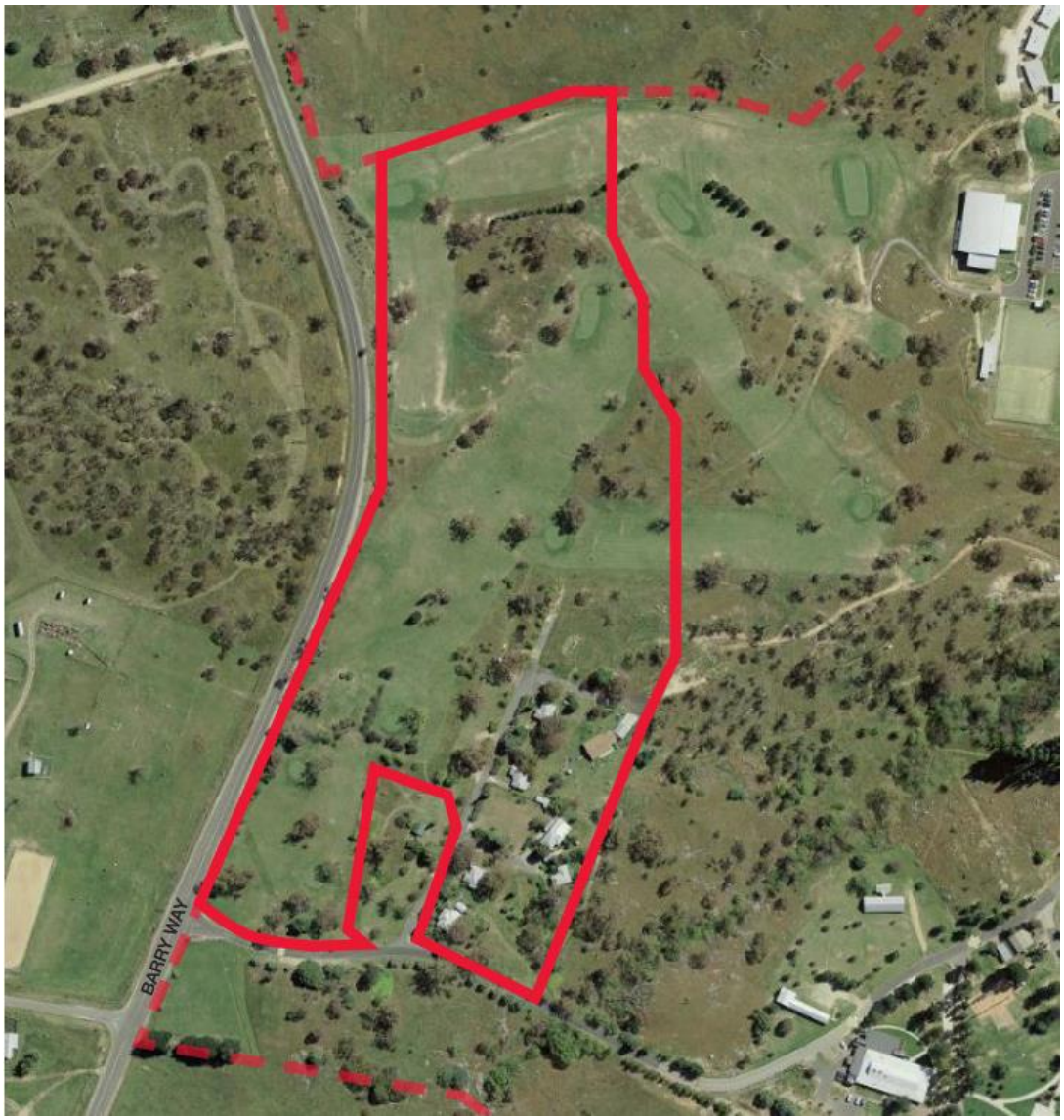


Figure 2: Site aerial – new education campus within the Jindabyne Sport and Recreation Centre.
Source: DJRD

4. General

DP has been engaged by Colliers on behalf of School Infrastructure NSW to revise this DSI undertaken for a new primary and high school in Jindabyne for the site at Part of Lot 101 DP 1019725, Jindabyne (hereinafter referred to as 'the site'). It is understood that a portion of the southern end of the site has now been excluded from the site investigation (see Figure 2) after the intrusive works occurred. It should be noted that the information contained in Sections 1 – 3 of this report has been provided by the client as a Pro-Forma and DP has been required to reproduce these paragraphs in this report. The site location, site features and test locations are shown on Drawing 1 (test pit locations 104 – 107 are now outside of the site boundary) and the site survey on Drawing 2, Appendix A. It should be noted that a

surveyed site boundary has not been provided to DP and the site boundaries shown are approximate only.

The objective of the targeted DSI is to assess the suitability of the site for the proposed development and whether further investigation and/or management or remediation is required.

The investigation was undertaken in general accordance with DP's proposal 103109.04.P.003.Rev0 dated 27 May 2021 and acceptance received from Scott Kneller of Colliers on behalf of NSW Department of Education - School Infrastructure NSW dated 2 June 2021 and subsequent variation 103109.05.P.001.Rev0 dated 25 August 2021 and acceptance received from David Carey of Colliers on behalf of NSW Department of Education - School Infrastructure NSW dated 17 September 2021.

5. Scope of Work

The scope of work conducted by DP comprised the following:

- Review of previous investigations undertaken at the site;
- Review of service plans, completion of a Dial-Before-You Dig (DBYD) underground services record search, scanning of test locations for buried services and surveying of test locations using a GPS;
- Intrusive sampling from 35 test pit locations (25 for the asbestos investigation and ten for areas associated with previous greens and tees). Test pits were excavated using a tracked excavator and terminated in natural soil material. It should be noted that Pits 104 – 107 are no longer within the site boundary;
- Collection of soil samples from all test locations at regular depth intervals based on field observations, upon signs of contamination and at changes in strata;
- Collection of replicate soil samples in zip-lock plastic bags at each depth for the screening of volatile organic compounds (VOC) with a photoionisation detector (PID);
- Logging of encountered soil material and pertinent field information;
- Field screening of soil samples for asbestos with reference to National Environmental Protection Council, national Environmental Protection (Assessment of Site Contamination) Measure (the 'NEPM', 1999, as amended 2013);
- Where potential asbestos containing material (PACM) fragments were encountered during test pitting (i.e. incidental finds of PACM fragments in test pit spoil and/or ground surface), noting of fragment location and collection of PACM samples for laboratory analysis for the presence of asbestos;
- Backfilling of test pits and compaction using the excavator;
- Laboratory analysis of collected soil samples at a National Association of testing Authorities (NATA) accredited laboratory for a range of the following contaminants of potential concern (CoPC):
    - Metals/metalloids (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc);
    - Polycyclic aromatic hydrocarbons (PAH);
    - Total recoverable hydrocarbons (TRH);

- Benzene, toluene, ethylbenzene and xylene (BTEX);
- Organochlorine pesticides (OCP) and organophosphorus pesticides (OPP);
- Polychlorinated biphenyls (PCB); and
- Asbestos fines and fibrous asbestos (AF/FA) (asbestos 500 mL samples) and bonded asbestos in materials.

- Field sampling included a quality assurance/quality control (QA/QC) plan consisting of a minimum of 10% replicate sampling and laboratory analysis, trip blank, trip spike, and appropriate chain of custody procedures and internal laboratory QA/QC testing. It should be noted that discussion of QA/QC decisions are provided in Appendix J.
- Preparation of this targeted DSI report, including a Data Quality Assessment, an updated conceptual site model (CSM), a discussion of the methods and results of the investigation, an assessment of the risk to the proposed development from contamination, advice on the type and potential extent of contamination and a statement on the site suitability and/or need for further assessment/remediation.

6. Environmental Setting

Regional Topography	The area is surrounded by undulating hills to the west and south and Lake Jindabyne and the Snowy River/Snowy River valley are located to the north and east, respectively. Further west and north, steep mountains are located and slope towards the east. Further south and east, high plains are located in the region. The area generally slopes west to east, towards Lake Jindabyne/Snowy River.
Site Topography	The site is undulating with an overall moderate slope from the western boundary of the site at an approximate height of 1,004 m relative to Australian Height Datum (AHD) towards the eastern boundary of the site at an approximate height of 985 m AHD.
Soil Landscape	NA – A search was conducted through the NSW Government eSpade website (https://www.environment.nsw.gov.au/eSpade2WebApp) and eSpade indicated there is no data for soil landscapes within the site.
Geology	GS NSW (1976) indicates that the site is underlain by the Kosciusko Batholith which comprises granodiorite. Two types of intrusive igneous rock are mapped within the site. The south-western corner of the site is mapped as Leesville Granodiorite and the remaining portion of the site is mapped as Jindabyne Tonalite. Fieldwork observations confirmed the presence of intrusive igneous rock across the site (see Section 12.1 and Figure 3 for further detail). .
Acid Sulfate Soils	Reference to the CSIRO's Atlas of Australian Acid Sulfate Soils online mapping portal, (A S R I S - Atlas of Australian Acid Sulfate Soils (csiro.au)) indicates that the site has an extremely low probability of acid sulfate soils to be present.

Surface Water	Lees Creek located approximately 40 m east at the site's nearest point. Lees Creek flows into Lake Jindabyne which is located approximately 1.1 km from the nearest point of the site.
Groundwater	Anticipated groundwater flow direction is inferred to be towards the east to north-east towards Lees Creek and Lake Jindabyne. A search of the publicly available registered groundwater bore database indicated that there are no registered groundwater bores within 1 km of the site.

An extract of the GS NSW map showing the indicated geological units is shown below in Figure 3.

The field investigation has confirmed the presence of granodiorite and tonalite underlying the site.

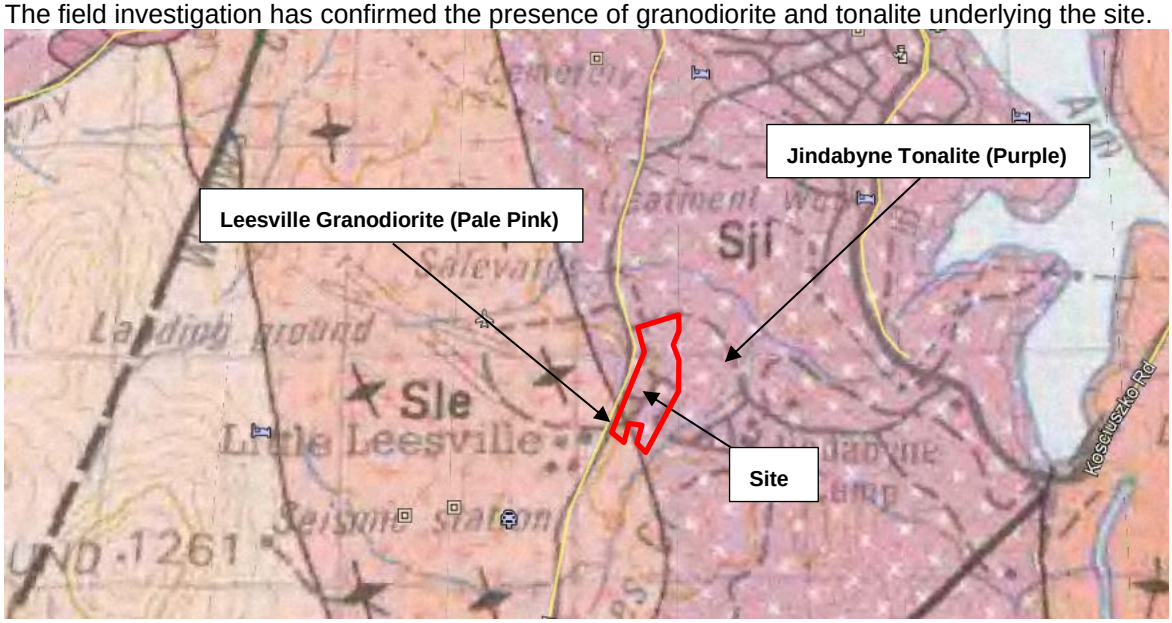


Figure 3: Extract from Geology Map

7. Previous Reports

The following previous reports are relevant to the current investigation:

- DP's *Report on Preliminary Site Investigation for Contamination, Jindabyne Central School, Part of Lot 101 DP 1019725, Jindabyne* DP project 103109.01, dated 24 February 2021 (DP, 2021);
- DP's *Report on Limited Intrusive Investigation (Contamination), Jindabyne Central School, Part of Lot 101 DP 1019725, Jindabyne*, DP project 103109.03, dated 11 June 2021 (DP, 2021a).
- DP's *Report on Preliminary Site Investigation (Contamination) with Limited Sampling, Jindabyne Central School, Part Lot 101 DP 1019725, Jindabyne* (hereinafter referred to as PSI-L), DP project 103109.03, dated July 2021 (DP, 2021b). It should be noted that this report was the result of the consolidation of DP (2021) and DP (2021a) at the request of the client.

7.1 Preliminary Site Investigation (Contamination) with Limited Sampling (2021b)

DP (2021b) was a consolidation of the DP (2021) and DP (2021a) investigations. The investigation comprised a desktop review of available historical and environmental site information, a site walkover and a limited intrusive investigation which comprised the excavation of test pits, laboratory analysis of soils and PACM fragments. It is noted that the limited intrusive investigation detailed herein was primarily driven by geotechnical considerations, with most of the investigation locations targeting the proposed development footprint and was not undertaken to close out the recommendations provided in the PSI-L.

The review of historical aerial photography indicated that residential dwellings had been constructed within the eastern and southern portion of the site prior to 1962 and the majority of the dwellings were subsequently demolished prior to 1979. Several more houses were removed sometime between 2003 and 2018. It was considered highly likely that the dwellings and associated underground services to have contained ACM and potentially other hazardous building materials (HBM). It was further considered likely that residual HBM may be present in this area.

During the site walkover, potential fill areas were observed throughout the PSI site. Historical aerial photographs indicated that the fill areas were likely associated with the construction of the golf course, or the building area along the eastern and south-eastern boundary of the PSI site.

The field work comprised the excavation of 28 test pits (Pits 1 to 27 and 16A). The test pits encountered variable subsurface conditions underlying the site with the principal succession of strata broadly summarised as follows:

- **TOPSOIL/TOPSOIL FILL:** generally stiff to hard, low plasticity sandy clay and medium dense to dense clayey sand, with various amount of gravel and rootlets to depths of between 0.15 m to 0.3 m in all test pits, except Pits 2, 12, 16, 24 and 27. Remnant topsoil (very stiff low plasticity sandy clay) was encountered in Pit 23 between depths of 0.15 m to 0.3 m;

- **FILL:** generally low plasticity to low – medium plasticity, stiff – very stiff to very stiff-hard sandy clay and/or loose to medium dense sandy soils, with various mixture of silt, sand, gravel, rootlets and cobbles, trace building debris, from the ground surface to depths of between 0.15 to 1.5 m in Pits 2, 5, 12, 16, 20, 23, 24, 26 and 27; Pit 24 refused in this stratum at a depth of 1.5 m;

- **NATURAL SOILS:** generally low plasticity to medium – high plasticity, very stiff to hard sandy clay and/or medium dense to dense sandy soils with various mixtures of sand, gravel, trace cobbles and boulders from depths of between 0.15 m to 1.5 m in Pits 1, 4, 7, 8, 10 to 13, 15, 16, 18, 19, 21 to 23, 25 and 16A; Pit 16 terminated in this stratum at the limit of investigation depth of 1.5 m.

- **INTRUSIVE VOLCANICS:** variably very low strength to high - very high strength, highly weathered to slightly weathered granodiorite/tonalite from depths of 0.2 m to 1.5 m to the termination depths of 0.6 m to 3.6 m in all the test pits except Pits 16 and 24.

Non-soil anthropogenic items and building debris were observed in the fill at Pits 2, 16, 24, 25 and 26 and included steel reinforced concrete, fragments of concrete, brick, terracotta pipe, terracotta pots, glass, asphalt and timber.

PACM fragments were observed in fill at Pits 25 (collected as M1) and 26 (collected as M4) and on the surface in the south-eastern portion of the site (collected as M2 and M3). The material samples were submitted to the analytical laboratory for asbestos identification in materials to confirm the presence or absence of asbestos. Asbestos was identified in samples M1 and M2.

Perched groundwater was observed in Pit 20 at 2.2 m depth. No free groundwater was observed during the site investigation in all other test pits.

The analytical results for all contaminants tested in all samples were below the SAC except for zinc in sample Pit25/0.1, reported at a concentration of 550 mg/kg which exceeded the adopted EIL criterion of 500 mg/kg. While it was considered that the exceedance was a marginal exceedance of the adopted SAC, given the limited nature of the intrusive investigation undertaken, it was considered appropriate that further intrusive investigation be undertaken at and near this location.

Chlordane in sample Pit23/0.1, reported at a concentration of 65 mg/kg also exceeded the adopted HIL-A criterion of 50 mg/kg. While this is a marginal exceedance of the adopted SAC, given the limited nature of the intrusive investigation undertaken, it was considered appropriate that further intrusive investigation be undertaken at and near this location

It was further noted that the data set from the investigation was not sufficient to undertake statistical analysis for both these exceedances.

It was considered that the site can be made suitable for the proposed school development subject to recommended further investigation, subsequent further data analysis and subsequent remediation or management if considered necessary based on the findings of the further investigation. It was also considered that a groundwater investigation was considered not necessary at this stage of the investigation. Results from the targeted DSI would determine if a groundwater assessment would be necessary.

8. Preliminary Conceptual Site Model

A conceptual site model (CSM) is a representation of site-related information regarding contamination sources, receptors and exposure pathways between those sources and receptors. The preliminary CSM was prepared as part of DP (2021) and provides the framework for identifying how the site may become contaminated and how potential receptors may be exposed to contamination either in the present or the future i.e. it enables an assessment of the potential source – pathway – receptor linkages (complete pathways).

Potential Sources

Based on the findings of DP(2021) and DP (2021a), the following sources of potential contamination and associated CoPC have been identified.

- S1: Fill: Associated with levelling and development of the golf course, demolition of former residential dwellings on the site and former unsealed roads that were present on the site.
  - Various CoPC and may include metals/metalloids, total recoverable hydrocarbons (TRH), benzene, toluene, ethylbenzene, xylene (BTEX), polycyclic aromatic hydrocarbons (PAH), polychlorinated biphenyls (PCB), organochlorine pesticides (OCP), phenols and asbestos.
- S2: Former and current residential dwellings and underground services dating back to the 1960's
  - CoPC include asbestos, synthetic mineral fibres (SMF), lead (in paint) and PCB.
- S3: Application of pesticides to the golf course.
  - CoPC include metals/metalloids and OCP/OPP.

Potential Receptors

The following potential human receptors have been identified:

- R1: Current site users [recreational];
- R2: Future construction and maintenance workers;
- R3: End users [school – students, teachers and other school employees]; and
- R4: Adjacent site users [recreational and agricultural].

The following potential environmental receptors have been identified:

- R5: Surface water [Lees Creek – Fresh Water];
- R6: Groundwater; and
- R7: Terrestrial ecology.

Potential Pathways

The following potential pathways have been identified:

- P1: Ingestion and dermal contact;
- P2: Inhalation of dust and/or vapours;

- P3: Surface water run-off;
- P4: Lateral migration of groundwater providing base flow to water bodies;
- P5: Leaching of contaminants and vertical migration into groundwater; and
- P6: Contact with terrestrial ecology.

Summary of Potentially Complete Exposure Pathways

A 'source–pathway–receptor' approach has been used to assess the potential risks of harm being caused to human or environmental receptors from contamination sources on or in the vicinity of the site, via exposure pathways (potential complete pathways). The possible pathways between the above sources (S1 to S3) and receptors (R1 to R7) are provided in Table 1.

Table 1: Summary of Potentially Complete Exposure Pathways

Source and CoPC	Transport Pathway	Receptor	Risk Management Action
S1: Undocumented/uncontrolled fill - metals/metalloids, TRH, BTEX, PAH, OCP and asbestos	P1 and P2	R1, R2 and R3	Fill was present across the site. During the site walkover, surface fill, fill pads and potential surface fill and fill pads were observed at various locations within the site (refer to Drawing 1). Zinc in sample Pit25/0.1, reported at a concentration of 550 mg/kg which exceeded the adopted EIL criterion of 500 mg/kg. Further intrusive investigations are recommended to assess the extent of the possible zinc contamination including testing of the soils and groundwater, if a groundwater investigation is considered necessary.
	P2	R4	
	P3 and P5	R5	
	P4	R6	
	P6	R7	
S2: Former and current buildings and underground services, residual hazardous building material – asbestos, SMF, lead (in paint) and PCB	P1, P2 and P3	R1	Former residential dwellings were noted in *Aerial Photograph 1962* along the eastern boundary. Potential former concrete footing structures were also observed during the site walkover along the eastern boundary. Fragments of ACM were identified within the site where previous dwellings were once located.
		R2	
		R3	
	P3, P4 and P5	R4	
	P3 and P4	R5	
	P4 and P5	R6	
	P6	R7	

Source and CoPC	Transport Pathway	Receptor	Risk Management Action
			Further intrusive investigations are recommended to delineate the extent of ACM contamination across the site where former residential dwellings were once present.
S3: Past and Present golf course maintenance practices – metals/metalloids and OCP/OPP	P1, P2 and P3	R1	The site forms part of a former golf course. During the site walkover, former tee-off areas and greens were observed across the site. It is likely that these areas were subjected to past golf course maintenance practices. Chlordane was identified in sample Pit 23/0.1 m, reported at a concentration of 65 mg/kg also exceeded the adopted HIL-A criterion of 50 mg/kg. Further intrusive investigations are recommended to assess possible contamination in other greens and tees within the site and to delineate the extent of contamination around the location of Pit 23.
		R2	
		R3	
	P3, P4 and P5	R4	
	P3 and P4	R5	
	P4 and P5	R6	
	P6	R7	

9. Sampling and Analysis Quality Plan

9.1 Data Quality Objectives (DQO)

The targeted DSI was devised with reference to the seven-step data quality objective process which is provided in Appendix B Schedule B2, NEPC (2013). The DQO process is outlined in Appendix C.

9.2 Soil Sampling Rationale

Based on the CSM and DQO the following sampling rationale was adopted. The sampling rationale did not take into account of the changed site boundary that occurred 9 November 2021, after the fieldwork was undertaken.

The PSI-L (DP, 2021b) indicated there was a low risk of contamination over most of the site within the natural material and fill material (i.e. chemical analysis indicated that contaminants of potential concern were below the adopted site assessment criteria). The DSI was planned to be a targeted DSI to address data gaps from the PSI-L (i.e. within areas of previously located dwellings and delineating contamination

in tees and greens or targeting tees and greens that were considered to not be part of the development footprint at the time of the PSI-L). It should noted that sampling locations were also constrained by existing underground services and existing dwellings.

Although asbestos has been identified as a primary CoPC, it was not considered to be grossly contaminated with asbestos as the area was not associated with uncontrolled/dumped fill with building rubble and the site was not associated with any asbestos industry or landfill activities. The concern for contamination is related to residual hazardous building materials within the footprint of demolished pre-1987 built residential dwellings. It is also anticipated that the topsoil fill in the area of these previous residential footprints would be shallow (topsoil fill up to 0.25 m depth (DP, 2021a)). It was also considered from a geotechnically and aesthetic perspective that the topsoil fill located in the previous residential dwellings area would not be suitable to leave in-situ for the placement of controlled fill or be suitable for on-site reuse. The material would need to be stripped and removed off-site (i.e. remediated).

Therefore, from a conservative standpoint, the topsoil fill material within the area would need to be remediated/removed from site. From a practicably and economic standpoint, DP considered that a single density regime in accordance with the NSW EPA's Sampling Design Guidelines (SDG) was appropriate. The area of the development where previous residential dwellings were located, within the south-eastern portion of the site covers an area of approximately 1.5 hectares and the SDG recommends that for an area of the size of 1.5 ha, 25 sampling locations are required as the minimum number of sampling points for site characterisation as part of a targeted detailed site investigation. As such, the excavation of 25 test pits (Pits 101 to 125) was undertaken in this area for the asbestos component of the investigation. The sample locations targeted the footprints of previous dwellings (i.e. targeted judgmental sampling and keeping underground services constraints in consideration) where it would be likely that residual asbestos could be located or detected in samples sent for laboratory analysis.

It should be noted that even if DP adopted a double sampling regime, data gaps between the test locations would still exist and unobserved ACM would likely be present in this area. Therefore, a remedial action plan (RAP) should address the need to remediate the 1.5 ha area, where previous residential dwellings were located. It should also be noted that this area also reported an EIL criterion exceedance for zinc and, as such, the analysis of metals/metalloids was also undertaken on selected soil samples collected from the 25 test pits within this area.

Based on the images from SIX Maps, the updated proposed school site layout plan and DP's PSI-L (DP, 2021b), ten additional test pits (Pits 126 – 135) were excavated to target the remaining tees and greens including four step-out test pits to delineate the potential pesticide contamination identified in the PSI-L (DP, 2021b), located at Pit 23.

The general sampling methods are described in the field work methodology, included in Appendix D.

10. Site Assessment Criteria

The site assessment criteria (SAC) applied in the current investigation were informed by the Preliminary CSM (Section 7) which identified human receptors to potential contamination on the site. Analytical results have been assessed (as a Tier 1 assessment) against the adopted SAC comprising primarily the investigation and screening levels presented in Schedule B1 of NEPC (2013).

The investigation and screening levels applied in the current investigation comprise levels adopted for the most sensitive land use setting for the site which is residential land use with garden/accessible soil and includes primary schools (Human Investigation/Screening Levels – HIL/HSL-A). DP considers that a HIL/HSL-A is appropriate for the entire site (i.e. including the high school area) because of the proposed agricultural plot (access to gardens) and it is not known whether primary school students will have access to high school areas or not. The derivation of the SAC is included in Appendix E and the adopted SAC are listed on the summary analytical results tables in Appendix G.

11. Results

11.1 Field Work Results

The test pit logs for this assessment are included in Appendix F. The logs recorded the following general sub-surface profile:

- **TOPSOIL FILL:** generally stiff to very stiff, low plasticity sandy clay with various amounts of brick, glass, tile, terracotta and PVC pipe, plastic, PACM fragments, nails, gravel and rootlets to depths of 0.15 m to 0.4 m below ground level (bgl) in all test pits, except Pits 108, 126 to 128 and 130 to 135;

- **NATURAL TOPSOIL:** very stiff, low plasticity sandy clay with rootlets to a depth of 0.2 m bgl encountered in Pit 126;

- **FILL:** generally low plasticity to low – medium plasticity, stiff – very stiff to very stiff-hard sandy clay and/or medium dense sandy soils, with various mixture of silt, sand, gravel, rootlets and cobbles, trace terracotta pipe and brick fragments from the ground surface to depths of 0.2 to 2.5 m bgl in Pits 108, 127, 129 and 130 to 135;

- **NATURAL SOILS:** generally low plasticity to medium plasticity, very stiff to hard sandy clay and/or medium dense to dense clayey sand soils with various mixtures of sand, gravel and trace cobbles (residual soils and extremely weathered granodiorite/tonalite) from depths of 0.15 m – 2.5 m bgl in Pits 101 to 108, 110 to 120, 122 to 132 and 135. Pits 101 to 104, 106 to 108, 110 to 120, 122 to 125, 130 and 131 were terminated in this stratum at the limit of investigation depths of 0.5 m to 2.6 m bgl; and

- **INTRUSIVE VOLCANICS:** variably very low strength to high strength, highly weathered to slightly weathered granodiorite/tonalite from depths of 0.15 m to 0.7 m bgl to the termination depths of 0.5 m to 1.1 m bgl in Pits 109, 121, 126 to 129 and 135.

11.2 Contamination Observations

Observations of potential asbestos contamination within the test locations are summarised in Table 2 below.

Table 2: Contaminant Observations Within Test Pits or Surface

Test Pit/Depth (m) or Observed on Surface	Sample ID	Potential Contaminant Observation
Pit 102/0.1	M102 M103	Potential Bonded ACM fragment – 108 mm x 77 mm x 5 mm Potential Bonded ACM fragment – 122 mm x 93 mm x 5 mm
Pit 116/0.1	M106	Potential Bonded ACM fragment – 90 mm x 57 mm x 5 mm
Pit 117/0.1	M109	Potential Bonded ACM fragment – 66 mm x 50 mm x 5 mm
Surface	M113	Potential Bonded ACM fragment – 97 mm x 75 mm x 6 mm (collected from a pile of potential ACM sheeting)

Potential bonded ACM fragments were collected and submitted for laboratory analysis for asbestos identification.

There were no other apparent signs of visual or olfactory evidence (e.g: staining, discoloration, odours, free phase product etc.) to suggest the presence of contamination within the soils observed in the investigation.

The PID screening indicated that the sub-surface conditions were generally absent of volatile organic compounds (VOC) with all recorded values of less than 1 ppm.

No free groundwater was observed during excavation of test pits. It should be noted that groundwater levels are affected by climatic conditions and soil permeability and will therefore vary with time.

11.3 Sieve Analysis

Bulk soil samples (approximately 10 L) were collected from test pits where fill was present for on-site sieving for the assessment of asbestos. The results of the on-site sieving analysis reported PACM fragments in the following test pits:

- Pit 102 0.1 m bgl – One fragment of bonded PACM (sample M101) in good condition was identified. The fragment was approximately 125 mm x 48 mm x 5 mm and weighed approximately 30.1 g;
- Pit 116 0.1 m bgl – Two fragments of bonded PACM (samples M104 and M105) in good condition were identified. The fragments were approximately 135 mm x 65 mm x 5 mm, 65 mm x 38 mm x 5 mm, respectively and weighed a total of 75.4 g;
- Pit 117 0.1 m bgl – One fragment of bonded PACM (sample M108) in good condition was identified. The fragment was approximately 32 mm x 25 mm x 5 mm and weight approximately 4 g;
- Pit 119 0.1 m bgl – One fragment of bonded PACM (sample M112) in good condition was identified. The fragment was approximately 45 mm x 27 mm x 5 mm and weighed approximately 7.3 g;

- Pit 120 0.1 m bgl – One fragment of bonded PACM (sample M112) in good condition was identified. The fragment was approximately 31 mm x 15 mm x 5 mm and weighed approximately 6.5 g;
- Pit 121 0.1 m bgl – One fragment of bonded PACM (sample M107) in good condition was identified. The fragment was approximately 20 mm x 15 mm x 5 mm and weighed approximately 1.5 g;
- Pit 123 0.1 m bgl – One fragment of bonded PACM (sample M110) in good condition was identified. The fragment was approximately 30 mm x 22 mm x 5 mm and weighed approximately 4 g; and
- Pit 124 0.1 m bgl – One fragment of bonded PACM (sample M111) in good condition was identified. The fragment was approximately 30 mm x 35 mm x 5 mm and weighed approximately 6.5 g.

11.4 Laboratory Analytical Results

The results of laboratory analysis are summarised in the following tables in Appendix G:

- Table G1: Summary of Asbestos Analysis Results (10 L and 500 mL samples);
- Table G2: Summary of Asbestos Analysis Results (observed PACM fragments)
- Table G3: Summary of Results of metals/metalloids, TRH, BTEX, PAH Analysis;
- Table G4: Summary of Results of OCP, OPP, PCB and Asbestos (45 g sample) Analysis; and
- Table G5: Quality Assurance and Quality Control.

The laboratory certificate(s) of analysis together with the chain of custody and sample receipt information is/are provided in Appendix H.

12. Discussion

12.1 Soils

12.1.1 Asbestos (10 L and 500 mL samples) Pits 101 to 125

The results of the field work identified that topsoil fill material is present across most of the south-eastern portion of the site where current and previous residential dwellings are/were located. This area was investigated by Pits 101 to 125. Topsoil fill material was encountered in every test pit, except for Pit 108, where fill was encountered. The depth of topsoil fill material varied across the site from 0.15 m bgl to 0.4 m bgl, the depth of fill within Pit 108 was 0.3 m bgl.

The results of the field screening of samples indicated that asbestos was identified in the 10 L soil samples collected from Pits 102, 116, 117, 119, 120, 121, 123 and 124, and the asbestos was identified as being bonded ACM. Calculated concentrations of bonded ACM were reported exceeding the Health Screening Level-A (residential - including primary school sites) in samples collected from Pits 102 and 116.

The results of the laboratory analysis of soil samples (500 mL) submitted for asbestos in soil (AF/FA) indicated that no asbestos fibres were reported in all samples submitted for analysis.

12.2 Asbestos (Ground Surface and Test Pit Spoil Observations)

The analytical results indicated that bonded asbestos was identified within the material samples collected from test pit spoil from Pits 102, 116 and 117. Material sample (M113) was collected from the ground surface of the south-eastern portion (see Drawing 1, Appendix A) of the site and was also submitted for laboratory analysis. The materials submitted for analysis comprised fibre cement material, with either, one or more of chrysotile, amosite and crocidolite fibre types being identified in the material. The presence of asbestos on the ground surface exceeds the adopted Health Screening Level-A.

Across the current investigation and previous limited intrusive investigation, 62 test pits have been excavated across the entire site and asbestos material in the form of bonded asbestos has been positively identified in nine test pits, with the concentration of asbestos in soil exceeding the adopted Health Screening Level in samples collected from two test pits, and it is noted that bonded ACM has been reported exceeding the Health Screening Level. In addition, many fragments of bonded PACM were found within test pit spoil and along the ground surface of the site. It is reasonable to deduce that given asbestos has been identified widely across the south-eastern portion of the site where previous residential dwellings were once located, unobserved ACM would likely be present in this area. It is considered appropriate that the entire 1.5 ha area where the previous residential dwellings were located will be remediated.

12.2.1 Chemical Analysis

The analytical results for tested soil samples were all within the adopted health-based (i.e. HIL-A/HSL-A/B) and ecological (i.e. EIL/ESL) criteria and management limits for primary school land use.

All soil results for TRH, BTEX, PAH, OCP, OPP and PCB were below the laboratory's practical quantitation limit (PQL) except for aldrin and dieldrin in samples Pit 127/0.1 m (0.1 mg/kg) and Pit 130/0.1 m (0.1 mg/kg) but were below the adopted SAC. Total chlordane in samples Pit 127/0.1 m (0.6 mg/kg) and Pit 130/0.1 m (0.7 mg/kg) were above the PQL but below the adopted SAC. All soil results for metals were above the PQL except for arsenic, cadmium and mercury, but below the adopted site criteria.

DP (2021a) soil results indicated chlordane in sample Pit 23/0.1 m (within a green) at 65 mg/kg was above the HIL-A criteria of 50 mg/kg. Further intrusive work as part of the targeted DSI was undertaken in "step-out" pits adjacent to Pit 23 and within other greens and tees across the site. Pits 127 and 129 were excavated within the green and Pits 126 and 128 were excavated just outside of the green perimeter. Pits 130 to 135 were excavated in other greens and tees noted within the site during the targeted DSI investigation. Soil results indicated that the chlordane results were either below PQL or below the SAC (as mentioned above). The presence of chlordane contamination within the site is considered to be low, however, it is recommended that the fill material associated with the tees and greens should still be remediated (i.e. disposed off-site as waste).

DP (2021a) soil results indicated zinc in sample Pit 25/0.1 m (within the south-eastern portion of the site) at 550 mg/kg was above the EIL value of 500 mg/kg. The soil results for zinc for the targeted DSI

indicated zinc in all samples were below the EIL criteria, furthermore there were no signs of stressed flora and fauna. Therefore, it is considered that zinc is a low-risk contaminant to ecological receptors. Furthermore, the site is being developed and it is likely the topsoil fill material will be removed off-site as it would not be suitable material for geotechnical purposes (i.e. topsoil needs to be stripped before placement of controlled fill or infrastructure).

It should be noted that a calculation of the 95%$UCL_{average}$ using the ProUCL statistical software package was undertaken for zinc and total chlordane from DP (2021a) results and the targeted DSI results. The 95%$UCL_{average}$ was then compared to the adopted assessment criteria. The 95%$UCL_{average}$ for zinc and chlordane across the site was calculated as being below the assessment criteria (HIL-A of 50 mg/kg for total chlordane and EIL of 470 mg/kg for zinc). The outputs from the ProUCL software are presented in Appendix I.

There was no contamination observed within Pits 104 – 107, therefore there is a low risk of off-site contaminants within the area of where Pits 104 – 107 are located (see Drawing 1, Appendix A).

12.3 Aesthetic Observations (Anthropogenic Material)

The topsoil fill material was noted to include building rubble comprising brick, glass, tile, nails, terracotta, PVC pipe and plastic fragments in Pits 102 – 104, 106, 109, 111, 113, 116 – 122, 124 and 129 from depths between 0.15 m to 0.3 m bgl across the south-eastern portion of the site. Trace terracotta pipe and brick fragments were also noted in Pit 131 at a depth of approximately 1.4 m bgl. It should be noted that the building rubble observed was no bigger than cobble sized fragments. However, results from the intrusive investigation confirmed that the topsoil fill from the previous residential dwellings area was not suitable from an aesthetic perspective and the topsoil fill would not be considered suitable for on-site reuse.

12.4 Data Quality Assurance and Quality Control

The data quality assurance and quality control (QA/QC) results are included in Appendix J. Discussion of QA/QC decisions are also provided in Appendix J. Based on the results of the field QA and field and laboratory QC, and evaluation against the data quality indicators (DQI) it is concluded that the field and laboratory test data obtained are reliable and useable for this assessment.

13. Revised Conceptual Site Model

The preliminary CSM in Section 7 has been updated to incorporate the findings of this targeted DSI. Sources of CoPCs, pathways and receptors are considered to remain the same as the ones mentioned in Section 7. This is summarised in Table 3.

Table 3: Updated CSM

Source and CoPC	Transport Pathway	Receptor	Risk Management Action
S1: Undocumented/uncontrolled fill - Metals/metalloids, TRH, BTEX, PAH, OCP and asbestos	P1 and P2	R1, R2 and R3	Fill was identified in the tees and greens during the intrusive work. The results of the laboratory analysis indicated that reported concentrations of contaminants of concern were below the adopted assessment criteria or not detected (asbestos in Pit 131). A groundwater assessment is not considered to be necessary due to the low risk of contamination within the soils and no notable/known storage of hazardous substances within the site. It is considered that the potential for chemical contamination associated with fill at the site is low, however, a construction environmental management plan (CEMP) is recommended to be prepared and implemented during potential future site works, including an 'unexpected finds protocol' (UFP) and asbestos finds protocol to address any CoPC associated with the former tee and green pads or any other fill identified on site. It is also recommended that if on-site fill is to be removed off-site, it needs to be done so in accordance with NSW EPA Waste Classification Guidelines Part 1 Classifying Waste (2014).
	P2	R4	
	P3	R5	
	P6	R7	
S2: Former and current buildings and underground services, residual hazardous building material (within topsoil fill) – asbestos, SMF, lead (in paint) and PCB	P1, P2 and P3	R1	The results of the investigation indicate that asbestos in the form of bonded ACM is present in concentrations above the adopted Health Screening Level across the site. Chemical analysis of soil samples indicated that lead and PCB were either recorded at levels below the adopted site assessment criteria or PQL. DP considers that in its current condition, the site is not suitable for the proposed
		R2	

Source and CoPC	Transport Pathway	Receptor	Risk Management Action
		R3	Jindabyne Central School development and that remediation is required in order to make the site suitable for the proposed use. It is recommended that a remediation action plan (RAP) is prepared to assess remediation options. Options for the management of ACM impacted fill which exceed the relevant land use criteria may include cap and contain (however, the topsoil fill would be considered not be suitable to keep on site from a geotechnical standpoint), remediation of impacted soil and off-site disposal. DP also recommends a hazardous building materials assessment for the existing structures that are potentially planned on being demolished. Should HBM be present in structures that are planned to be demolished, a validation assessment is also recommended within the building footprints once a current structure has been demolished.
	P3, P4 and P5	R4	
	P3	R5	
	P6	R7	
S3: Past and present golf course maintenance practices – metals and OCP/OPP	P1, P2 and P3	R1	The results of the laboratory analysis indicated that reported concentrations of CoPC (metals and pesticides) were below the adopted assessment criteria. It is considered that the potential for chemical contamination associated with greens and tees at the site is low, however, it is recommended that the fill material associated with the tees and greens should be remediated (i.e. removed off-site as waste in accordance with NSW EPA Waste Classification Guidelines Part 1 Classifying Waste (2014)).
		R2	
		R3	
	P3	R4	
	P3	R5	
	P6	R7	

14. Conclusions and Recommendations

This targeted DSI was undertaken to further assess AECs identified during previous works undertaken at the site by DP (2021b). The previous investigation had identified asbestos, metals/metalloids and pesticide use as the primary contaminants of concern, associated with previous residential dwellings located within the south-eastern portion of the site and the former golf course which had comprised the remaining portions of the site.

Based on the results of the targeted DSI, it is considered that the site is not currently suitable for the proposed use as a school, due to the presence of asbestos in topsoil fill material present within the south-eastern portion of the site. Note that as only a single density of investigation as undertaken, that a conservative view of the extent of likely contamination has been made. Further analysis of past pesticide use and presence of metals/metalloids within the topsoil fill indicated that there is a low risk for metal/metalloids and pesticide contamination, however, it is considered that fill associated with the tees and greens should be managed/remediated appropriately. A groundwater investigation is not considered to be necessary due to the low risk of chemical contamination within soils and absence of storage of hazardous substances within the site.

The anthropogenic materials observed are considered to be inert and non-hazardous from a chemical perspective. However, some anthropogenic material including glass, tiles and terracotta pipe have a potential to physically harm future site workers and land users.

Topsoil fill material that includes anthropogenic material also includes ACM and is considered to not be appropriate for on-site reuse.

Fill material (not comprising of topsoil fill) with anthropogenic material may be able to be reused on-site (i.e. in fill below 0.5 m deep) providing that it is geotechnically suitable and any oversized pieces of material are segregated and disposed off-site correctly.

It is therefore recommended that a RAP should be developed to address contamination at the site. The RAP will provide strategies for:

- Assessing the data available to determine areas of environmental concern (AEC) requiring remediation;
- Remediation of the AEC;
- Management of waste including asbestos impacts in soil and tees and greens materials;
- Management of excavations and tracking of soil movement within the site and off-site;
- Management of the demolition of current dwellings/structures located within the site;
- Management of imported materials;
- Asbestos and unexpected finds management; and
- Further testing (including validation of identified contamination) as required.

It is considered that following the successful implementation of a RAP, the site will be rendered suitable for the proposed development.

DP also recommends that the following measures are undertaken at the site during any future development works:

- A Construction Environment Management Plan (CEMP) should also be prepared including an 'unexpected finds protocol' which would include an asbestos finds protocol, and implemented during the works (i.e. hydrocarbon staining and/or odours, PACM in other areas of the site etc. be observed during future earthworks);
- Should any fill material (i.e. the tee and green pads on site) be required to be disposed off-site, the material must be assessed in accordance with NSW EPA Waste Classification Guidelines Part 1 Classifying Waste (2014) and assigned a waste classification prior to off-site disposal;
- Care should be taken when handling material (during future site developments) with glass and other potential sharp objects and where practical, anthropogenic materials should be segregated from soil material (i.e. cobbled sized or larger pieces of brick, concrete, large pieces of pipe (terracotta, concrete, PVC, etc.), large amounts of asphalt and steel/metal associated with building rubble. Furthermore, when handling material with potentially sharp objects, correct PPE should be worn, or machines should be used when handling material affected by sharp anthropogenic objects; and
- Should the existing dwellings require demolition, a validation assessment of the underlying soils in the building envelope should be undertaken. One test location per 25 m^2 should be located across each building envelope. It would be recommended that test locations are excavated 0.5 m into natural material and samples are taken at regular intervals (i.e. near surface/~0.1 m, 0.5 m, 1.0 m and every 0.5 m after or changes in soil strata/signs of contamination (i.e. staining and odorous material). Samples should be tested for bonded asbestos and asbestos fines/friable asbestos (screening 10 L bulk samples and collecting 500 mL samples). Samples should also be taken for chemical analysis for heavy metals, hydrocarbons, pesticides and other HBM contaminants. Validation sampling for underground services containing ACM should be collected at a rate of one per linear 5 m (samples to be taken within the walls and the base of the trench).

15. References

CRC CARE. (2017). *Risk-based Management and Remediation Guidance for Benzo(a)pyrene.* Technical Report no. 39: Cooperative Research Centre for Contamination Assessment and Remediation of the Environment.

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM].* Australian Government Publishing Services Canberra: National Environment Protection Council.

NSW EPA. (1995). *Contaminated Sites, Sampling Design Guidelines.* NSW Environment Protection Authority.

NSW EPA. (2020). *Guidelines for Consultants Reporting on Contaminated Land.* Contaminated Land Guidelines: NSW Environment Protection Authority.

16. Limitations

Douglas Partners (DP) has prepared this report for this project at Part of Lot 101 DP 1019725, Jindabyne in accordance with DP's proposal 103109.04.P.003.Rev0 dated 27 May 2021 and acceptance received from Scott Kneller of Colliers on behalf of NSW Department of Education - School Infrastructure NSW dated 2 June 2021 and subsequent variation 103109.05.P.001.Rev0 dated 25 August 2021 and acceptance received from David Carey of Colliers on behalf of NSW Department of Education - School Infrastructure NSW dated 17 September 2021. The work was carried out under contract ID SINSW01290/20, dated 6 November 2020. This report is provided for the exclusive use of NSW Department of Education - School Infrastructure NSW 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 DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and/or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after DP's field testing has been completed.

DP's advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by DP in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

The assessment of atypical safety hazards arising from this advice is restricted to the environmental components set out in this report and based on known project conditions and stated design advice and assumptions. While some recommendations for safe controls may be provided, detailed 'safety in design' assessment is outside the current scope of this report and requires additional project data and assessment.

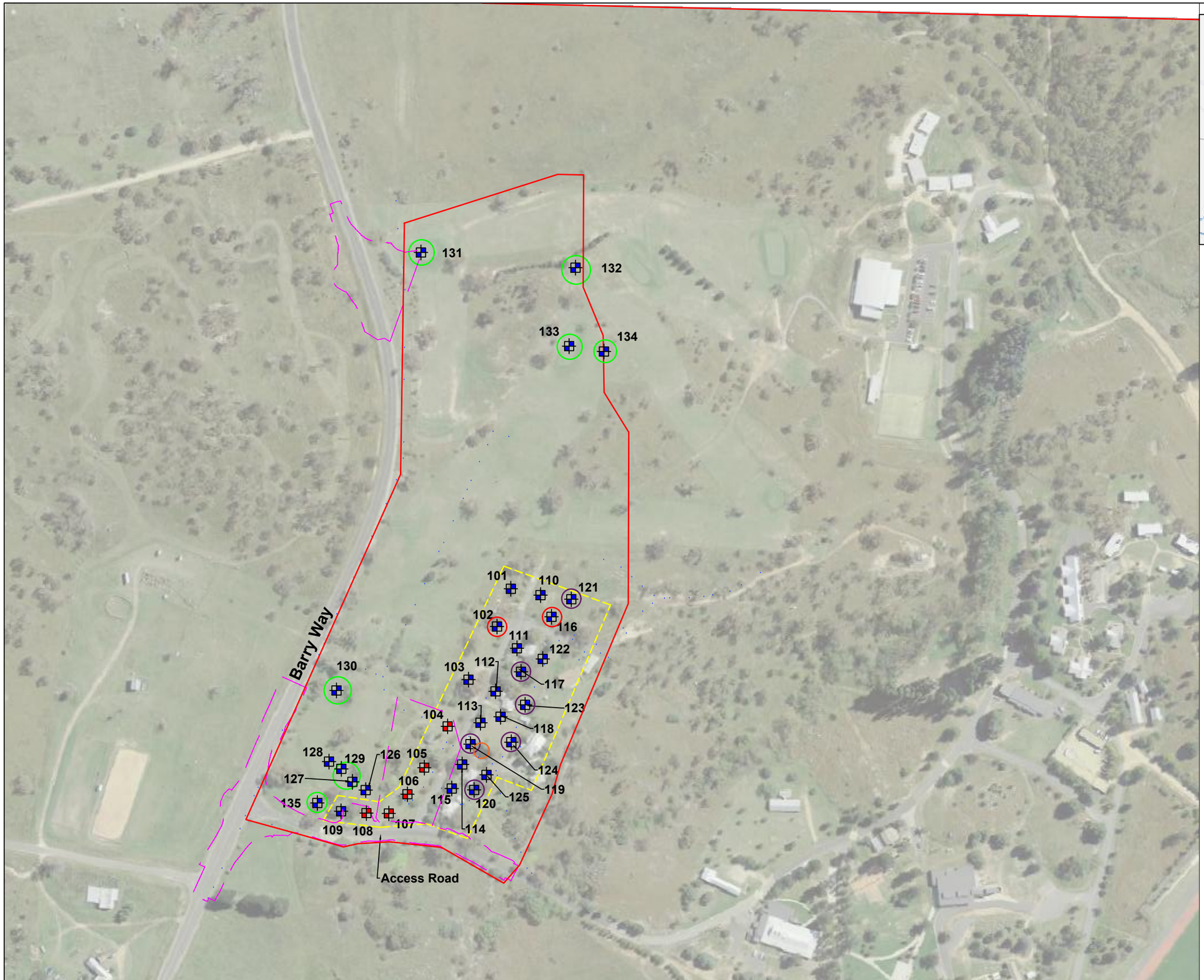
This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation,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

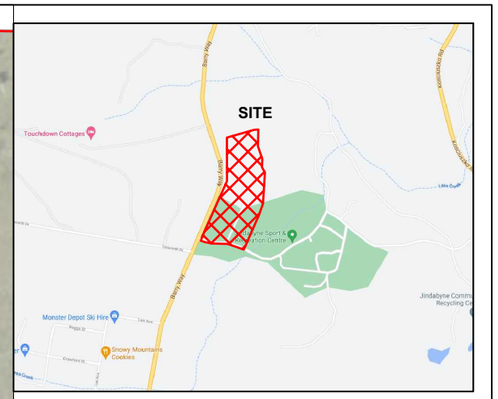
This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

Douglas Partners Pty Ltd

Appendix A

Drawings 1 and 2





Locality Plan

LEGEND

- Approximate Site Boundary
- Approximate Area of Previous and Current Residential Dwellings (also known as south-east portion of the site)
- Approximate Area of Targeted Tee-Off Points and Greens
- Identified ACM on Ground Surface
- Identified ACM within Test Pit and Exceeding Health Screening Levels
- Identified ACM within Test Pit and below Health Screening Levels
- Approximate Test Pit Location
- Approximate Test Pit Location that has now been Excluded from the Investigation due to a Site Boundary Change
- Approximate Boundaries for Areas that are part of a Different Development Application (Roads and TAFE Building) and are not Apart of the Site

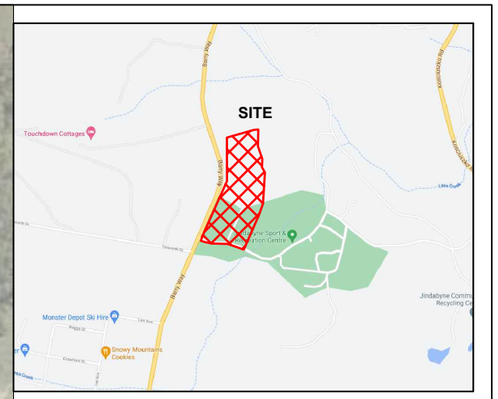
0 30 60 90 120 150

1:3000 @ A3

NOTE: Base drawing from maps.six.nsw.gov.au image extracted 22.06.2021

Douglas Partners
Geotechnics | Environment | Groundwater

CLIENT: School Infrastructure New South Wales	TITLE: **Site Features and Test Location Plan**	PROJECT No: 103109.04
OFFICE: Canberra / DRAWN BY: SDG	**Proposed Jindabyne Central School**	DRAWING No: 1
SCALE: As Shown / DATE: 29.11.2021	**Part Lot 101 DP1019527, Jindabyne**	REVISION: 3



Locality Plan

LEGEND

- Approximate Site Boundary
- Approximate Boundaries for Areas that are part of a Different Development Application (Roads and TAFE Building) and are not Apart of the Site
- 1m Contour Line
- 1m Contour Line

0 30 60 90 120 150

1:3000 @ A3

NOTE:
- Base drawing from C.M.S Surveys Pty Limited, dated 03/06/2021
- A surveyed site boundary has not been proved and as such, the boundary provided is approximate.

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CLIENT: School Infrastructure New South Wales		TITLE: **Survey Plan**	PROJECT No: 103109.04
OFFICE: Canberra	DRAWN BY: SDG	**Proposed Jindabyne Central School**	DRAWING No: 2
SCALE: As Shown	DATE: 29.11.2021	**Part Lot 101 DP1019527, Jindabyne**	REVISION: 3

Appendix B

About This Report

About this Report

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Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Copyright

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;
- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

Appendix C

Data Quality Objectives

Appendix C
Data Quality Objectives
Part of Lot 101 DP 1019725, Jindabyne

C1.0 Data Quality Objectives

The targeted DSI has been devised broadly in accordance with the seven-step data quality objective (DQO) process which is provided in Appendix B, Schedule B2 of NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [the NEPM]* (NEPC, 2013).

Step	Summary
1: State the problem	The objective of the investigation is to confirm the contamination status of the site with respect to the proposed land use. The report is being undertaken as the land is to be developed to a new school. The development is a state significant development and requirements of the regulator, (Department of Planning, Industry and Environmental), require a contamination assessment. A preliminary conceptual site model (CSM) has been prepared (Section 8) for the proposed development. The project team consisted of experienced environmental engineers and scientists working in the roles of Project Principal, Project Reviewer, Project Manager, Field staff.
2: Identify the decisions / goal of the study	Previous investigations identified possible contaminating previous uses which are identified in the CSM (Section 8). The CSM identifies the associated contaminants of potential concern (CoPC) and the likely impacted media. The site assessment criteria (SAC) for each of the CoPC are detailed in Section 10. The decision is to establish whether or not the results fall below the SAC or whether or not the 95% upper confidence limit of the sample population falls below the SAC. On this basis, an assessment of the site's compatibility from a contamination perspective and whether (or not) further assessment and / or remediation will be derived.
3: Identify the information inputs	Inputs to the investigation will be the results of analysis of samples to measure the concentration of CoPC identified in the CSM (Section 8) at the site using NATA accredited laboratories and methods, where possible. The SAC for each of the CoPC are detailed in Section 10. A photoionization detector (PID) was used on-site to screen soils for VOC. PID readings were used to inform sample selection for laboratory analysis.
4: Define the study boundaries	The lateral boundaries of the investigation area are shown on Drawing 1, Appendix A. The vertical boundaries are to the extent of contamination impact as determined from the site history assessment and site observations. The assessment is limited to the timeframe over which the field investigation was undertaken.
5: Develop the analytical approach (or decision rule)	The decision rule is to compare all analytical results with SAC (Section 10, based on NEPC (2013)). Where guideline values are absent, other sources of guideline values accepted by NEPC (2013) shall be adopted where possible. Where a sample result exceeds the adopted criterion, a further site-specific assessment will be made as to the risk posed by the presence of that contaminant(s). Initial comparisons will be with individual results then,

Step	Summary
	where required, summary statistics (including mean, standard deviation and 95% upper confidence limit (UCL) of the arithmetic mean (95% UCL) to assess potential risks posed by the site contamination. Quality control results are to be assessed according to their relative percent difference (RPD) values. For field duplicates, triplicates and laboratory results, RPDs should generally be below 30%; for field blanks and rinsates, results should be at or less than the limits of reporting (NEPC, 2013). The field and laboratory quality assurance assessment is included in Appendix J.
6: Specify the performance or acceptance criteria	Baseline condition: Contaminants at the site and/or statistical analysis of data (in line with NEPC (2013)) exceed human health and environmental SAC and poses a potentially unacceptable risk to receptors (null hypothesis). Alternative condition: Contaminants at the site and statistical analysis of data (in line with NEPC (2013)) complies with human health and environmental SAC and as such, does not pose a potentially unacceptable risk to receptors (alternative hypothesis). Unless conclusive information from the collected data is sufficient to reject the null hypothesis, it is assumed that the baseline condition is true. Uncertainty that may exist due to the above potential decision errors shall be mitigated as follows: • As well as a primary screening exercise, the use of the 95% UCL as per NEPC (2013) may be applied, ie: 95% is the defined confidence level associated with the UCL on the geometric mean for contaminant data. The resultant 95%UCL shall subsequently be screened against the corresponding SAC. • The statistical assessment will only be able to be applied to certain datasets, such as those obtained via systematic sampling. Identification of areas for targeted sampling will be via professional judgement and errors will not be able to have a probability assigned to them.
7: Optimise the design for obtaining data	As the purpose of the sampling program is to assess for potential contamination across the site, the sampling program is reliant on professional judgement to identify and sample the potentially affected areas. Further details regarding the proposed sampling plan are presented in Section 9.

C2.0 References

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM].* Australian Government Publishing Services Canberra: National Environment Protection Council.

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Appendix D

Fieldwork Sampling Methodology

Appendix D
Field Work Methodology
Part of Lot 101 DP 1019725, Jindabyne

D1.0 Guidelines

The following key guidelines were consulted for the field work methodology:

- NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [the NEPM]* (NEPC, 2013).

D2.0 Soil Sampling

Soil sampling is carried out in accordance with DP standard operating procedures. The general sampling and sample management procedures comprise:

- Collect soil samples directly from the excavator bucket at the nominated sample depth;
- Collect near surface samples using the teeth of the excavator bucket to loosen up the upper 0.1 m of soil material. Samples collected by hand (whilst wearing nitrile gloves);;
- Transfer samples in laboratory-prepared glass jars with Teflon lined lids by hand, capping immediately and minimising headspace within the sample jar;
- Collect replicate samples in zip-lock bags for photoionization detection (PID) machine screening;
- Collect ~500 ml samples for FA and AF analysis;
- Collect bulk (~10 L) soil samples for ACM field sieve test;
- Wear a new disposable nitrile glove for each sample point thereby minimising potential for cross-contamination;
- Collect 10% replicate samples for QC purposes. Handfuls of soil were collected from the same area of the surface sample or excavator bucket and distributed evenly between the field sample and replicate sample;
- Label sample containers with individual and unique identification details, including project number, sample location and sample depth (where applicable);
- Place samples into a cooled, insulated and sealed container for transport to the laboratory; and
- Use chain of custody documentation.

D2.1 Field Testing

Field testing is carried out in accordance with DP standard operating procedures. The general sampling and sample management procedures comprise:

PID Field Test

- Calibrate the PID with isobutylene gas at 100 ppm and with fresh air prior to commencement of each successive day's field work;
- Allow the headspace in the PID zip-lock bag samples to equilibrate; and
- Screen using the PID.

Assessment of Subsurface ACM

- Collect at least one bulk (~10 L) soil sample in the topsoil fill from each test pit;
- Weigh each bulk sample;
- Screen each bulk sample through a ≤7 mm aperture sieve;
- Weigh all retrieved potential ACM fragments; and
- Calculate the asbestos concentration (% w/w) in soil as per the procedure described in NEPC (2013).

D3.0 References

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM].* Australian Government Publishing Services Canberra: National Environment Protection Council.

NSW EPA. (2020). *Assessment and Management of Hazardous Ground Gases.* NSW Environment Protection Authority.

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Appendix E

Site Assessment Criteria

Appendix E
Site Assessment Criteria
Part of Lot 101 DP 1019725, Jindabyne

E1.0 Introduction

E1.1 Guidelines

The following key guidelines were consulted for deriving the site assessment criteria (SAC):

- NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [the NEPM]* (NEPC, 2013).
- CRC CARE *Health screening levels for petroleum hydrocarbons in soil and groundwater* (CRC CARE, 2011).

E1.2 General

The SAC applied in the current investigation are informed by the CSM which identified human and environmental receptors to potential contamination at the site. Analytical results are assessed (as a Tier 1 assessment) against the SAC comprising primarily the investigation and screening levels of Schedule B1 of NEPC (2013).

The following inputs are relevant to the selection and/or derivation of the SAC:

- Land use: residential.
    - Corresponding to land use category 'A', residential with garden / accessible soil (home grown produce <10% fruit and vegetable intake, (no poultry)), also includes children's day care centres, preschools and primary schools.
- Soil type: sand/clay.

E2.0 Soils

E2.1 Health Investigation and Screening Levels

The generic health investigation levels (HIL) and health screening levels (HSL) are considered to be appropriate for the assessment of human health risk via all relevant pathways of exposure associated with contamination at the site. The adopted soil HIL and HSL for the contaminants of concern are in Table 1 and Table 2.

Table 1: Health Investigation Levels (mg/kg)

Contaminant	HIL-A
Metals	
Arsenic	100
Cadmium	20
Chromium (VI)	100
Copper	6000
Lead	300
Mercury (inorganic)	40
Nickel	400
Zinc	7400
PAH	
B(a)P TEQ	3
Total PAH	300
OCP	
DDT+DDE+DDD	240
Aldrin and dieldrin	6
Chlordane	50
Endosulfan	270
Endrin	10
Heptachlor	6
HCB	10
Methoxychlor	300
OPP	
Chlorpyrifos	160
PCB	
PCB	1

Table 2: Health Screening Levels (mg/kg)

Contaminant	HSL-A&B	HSL-A&B	HSL-A&B	HSL-A&B
SAND	**0 m to <1 m**	**1 m to <2 m**	**2 m to <4 m**	**4 m+**
Benzene	0.5	0.5	0.5	0.5

Contaminant	HSL-A&B	HSL-A&B	HSL-A&B	HSL-A&B
Toluene	160	220	310	540
Ethylbenzene	55	NL	NL	NL
Xylenes	40	60	95	170
Naphthalene	3	NL	NL	NL
TRH F1	45	70	110	200
TRH F2	110	240	440	NL
SILT	**0 m to <1 m**	**1 m to <2 m**	**2 m to <4 m**	**4 m+**
Benzene	0.6	0.7	1	2
Toluene	390	NL	NL	NL
Ethylbenzene	NL	NL	NL	NL
Xylenes	95	210	NL	NL
Naphthalene	4	NL	NL	NL
TRH F1	40	65	100	190
TRH F2	230	NL	NL	NL
CLAY	**0 m to <1 m**	**1 m to <2 m**	**2 m to <4 m**	**4 m+**
Benzene	0.7	1	2	3
Toluene	480	NL	NL	NL
Ethylbenzene	NL	NL	NL	NL
Xylenes	110	310	NL	NL
Naphthalene	5	NL	NL	NL
TRH F1	50	90	150	290
TRH F2	280	NL	NL	NL

Notes: TRH F1 is TRH C_6-C_{10} minus BTEX

TRH F2 is TRH >C_{10}-C_{16} minus naphthalene

The soil saturation concentration (Csat) is defined as the soil concentration at which the porewater phase cannot dissolve any more of an individual chemical. The soil vapour that is in equilibrium with the porewater will be at its maximum. If the derived soil HSL exceeds Csat, a soil vapour source concentration for a petroleum mixture could not exceed a level that would results in the maximum allowable vapour risk for the given scenario. For these scenarios, no HSL is presented for these chemicals and the HSL is shown as 'not limiting' or 'NL'

The HSL for direct contact derived from CRC CARE (2011) are in Table 3.

Table 3: Health Screening Levels for Direct Contact (mg/kg)

Contaminant	DC HSL-A	DC HSL-IMW
Benzene	100	1100
Toluene	14 000	120 000

Contaminant	DC HSL-A	DC HSL-IMW
Ethylbenzene	4500	85 000
Xylenes	12 000	130 000
Naphthalene	1400	29 000
TRH F1	4400	82 000
TRH F2	3300	62 000
TRH F3	4500	85 000
TRH F4	6300	12 000

Notes: TRH F1 is TRH C_6-C_{10} minus BTEX
TRH F2 is TRH >C_{10}-C_{16} minus naphthalene
IMW intrusive maintenance worker

E2.2 Asbestos in Soil

The HSL for asbestos in soil are based on likely exposure levels for different scenarios published in NEPC (2013) for the following forms of asbestos:

- Bonded asbestos containing material (ACM); and
- Fibrous asbestos and asbestos fines (FA and AF).

The HSL are in Table 4.

Table 4: Health Screening Levels for Asbestos

Form of Asbestos	HSL-A
ACM	0.01%
FA and AF	0.001%
FA and AF and ACM	No visible asbestos for surface soil *

Notes: Surface soils defined as top 10 cm.
* Based on site observations at the sampling points and the analytical results of surface samples.

E2.3 Ecological Investigation Levels

Ecological investigation levels (EIL) and added contaminant limits (ACL), where appropriate, have been derived in NEPC (2013) for arsenic, copper, chromium (III), nickel, lead, zinc, DDT and naphthalene. The adopted EIL, derived using the interactive (excel) calculation spreadsheet on the NEPM toolbox website are shown in Table 6, with inputs into their derivation shown in Table 5.

Table 5: Inputs to the Derivation of the Ecological Investigation Levels

Variable	Input	Rationale

Age of contaminants	"Aged" (>2 years)	Potential historical sources only
pH	6.6	Measured
CEC	9.7 $cmol_c/kg$	Measured
Clay content	14%	Measured
Traffic volumes	low	Regional/rural low traffic area
State / Territory	NSW	

Table 6: Ecological Investigation Levels (mg/kg)

Contaminant	EIL-A-B-C
Metals	
Arsenic	100
Copper	200
Nickel	160
Chromium III	410
Lead	1100
Zinc	470
PAH	
Naphthalene	170
OCP	
DDT	180

E2.4 Ecological Screening Levels

Ecological screening levels (ESL) are used to assess the risk of selected petroleum hydrocarbon compounds, BTEX and benzo(a)pyrene to terrestrial ecosystems. The adopted ESL are shown in Table 7.

Table 7: Ecological Screening Levels (mg/kg)

Contaminant	Soil Type	EIL-A-B-C
Benzene	Coarse	50
Toluene	Coarse	85
Ethylbenzene	Coarse	70
Xylenes	Coarse	105
TRH F1	Coarse/ Fine	180*

Contaminant	Soil Type	EIL-A-B-C
TRH F2	Coarse/ Fine	120*
TRH F3	Coarse	300
TRH F4	Coarse	2800
B(a)P	Coarse	0.7

Notes: ESL are of low reliability except where indicated by * which indicates that the ESL is of moderate reliability
TRH F1 is TRH C_6-C_{10} minus BTEX
TRH F2 is TRH >C_{10}-C_{16} including naphthalene

E2.5 Management Limits

In addition to appropriate consideration and application of the HSL and ESL, there are additional considerations which reflect the nature and properties of petroleum hydrocarbons, including:

- Formation of observable light non-aqueous phase liquids (LNAPL);
- Fire and explosion hazards;
- Effects on buried infrastructure eg: penetration of, or damage to, in-ground services.

The adopted management limits are in Table 8.

Table 8: Management Limits (mg/kg)

Contaminant	Soil Type	ML-A-B-C
TRH F1	Coarse	700
TRH F2	Coarse	1000
TRH F3	Coarse	2500
TRH F4	Coarse	10 000

Notes: TRH F1 is TRH C_6-C_{10} including BTEX
TRH F2 is TRH >C_{10}-C_{16} including naphthalene

E3.0 References

CRC CARE. (2011). *Health screening levels for petroleum hydrocarbons in soil and groundwater.* Parts 1 to 3, Technical Report No. 10: Cooperative Research Centre for Contamination Assessment and Remediation of the Environment.

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM].* Australian Government Publishing Services Canberra: National Environment Protection Council.

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Appendix F

Test Pit Logs

Sampling Methods

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Sampling

Sampling is carried out during drilling or test pitting to allow engineering examination (and laboratory testing where required) of the soil or rock.

Disturbed samples taken during drilling provide information on colour, type, inclusions and, depending upon the degree of disturbance, some information on strength and structure.

Undisturbed samples are taken by pushing a thin-walled sample tube into the soil and withdrawing it to obtain a sample of the soil in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

Test Pits

Test pits are usually excavated with a backhoe or an excavator, allowing close examination of the in-situ soil if it is safe to enter into the pit. The depth of excavation is limited to about 3 m for a backhoe and up to 6 m for a large excavator. A potential disadvantage of this investigation method is the larger area of disturbance to the site.

Large Diameter Augers

Boreholes can be drilled using a rotating plate or short spiral auger, generally 300 mm or larger in diameter commonly mounted on a standard piling rig. The cuttings are returned to the surface at intervals (generally not more than 0.5 m) and are disturbed but usually unchanged in moisture content. Identification of soil strata is generally much more reliable than with continuous spiral flight augers, and is usually supplemented by occasional undisturbed tube samples.

Continuous Spiral Flight Augers

The borehole is advanced using 90-115 mm diameter continuous spiral flight augers which are withdrawn at intervals to allow sampling or in-situ testing. This is a relatively economical means of drilling in clays and sands above the water table. Samples are returned to the surface, or may be collected after withdrawal of the auger flights, but they are disturbed and may be mixed with soils from the sides of the hole. Information from the drilling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively low reliability, due to the remoulding, possible mixing or softening of samples by groundwater.

Non-core Rotary Drilling

The borehole is advanced using a rotary bit, with water or drilling mud being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from the rate of penetration. Where drilling mud is used this can mask the cuttings and reliable identification is only possible from separate sampling such as SPTs.

Continuous Core Drilling

A continuous core sample can be obtained using a diamond tipped core barrel, usually with a 50 mm internal diameter. Provided full core recovery is achieved (which is not always possible in weak rocks and granular soils), this technique provides a very reliable method of investigation.

Standard Penetration Tests

Standard penetration tests (SPT) are used as a means of estimating the density or strength of soils and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289, Methods of Testing Soils for Engineering Purposes - Test 6.3.1.

The test is carried out in a borehole by driving a 50 mm diameter split sample tube under the impact of a 63 kg hammer with a free fall of 760 mm. It is normal for the tube to be driven in three successive 150 mm increments and the 'N' value is taken as the number of blows for the last 300 mm. In dense sands, very hard clays or weak rock, the full 450 mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form.

- In the case where full penetration is obtained with successive blow counts for each 150 mm of, say, 4, 6 and 7 as:

  4,6,7
  N=13

- In the case where the test is discontinued before the full penetration depth, say after 15 blows for the first 150 mm and 30 blows for the next 40 mm as:

  15, 30/40 mm

The results of the SPT tests can be related empirically to the engineering properties of the soils.

Dynamic Cone Penetrometer Tests / Perth Sand Penetrometer Tests

Dynamic penetrometer tests (DCP or PSP) are carried out by driving a steel rod into the ground using a standard weight of hammer falling a specified distance. As the rod penetrates the soil the number of blows required to penetrate each successive 150 mm depth are recorded. Normally there is a depth limitation of 1.2 m, but this may be extended in certain conditions by the use of extension rods. Two types of penetrometer are commonly used.

- Perth sand penetrometer - a 16 mm diameter flat ended rod is driven using a 9 kg hammer dropping 600 mm (AS 1289, Test 6.3.3). This test was developed for testing the density of sands and is mainly used in granular soils and filling.
- Cone penetrometer - a 16 mm diameter rod with a 20 mm diameter cone end is driven using a 9 kg hammer dropping 510 mm (AS 1289, Test 6.3.2). This test was developed initially for pavement subgrade investigations, and correlations of the test results with California Bearing Ratio have been published by various road authorities.

Description and Classification Methods

The methods of description and classification of soils and rocks used in this report are generally based on Australian Standard AS1726:2017, Geotechnical Site Investigations. In general, the descriptions include strength or density, colour, structure, soil or rock type and inclusions.

Soil Types

Soil types are described according to the predominant particle size, qualified by the grading of other particles present:

Type	Particle size (mm)
Boulder	>200
Cobble	63 - 200
Gravel	2.36 - 63
Sand	0.075 - 2.36
Silt	0.002 - 0.075
Clay	<0.002

The sand and gravel sizes can be further subdivided as follows:

Type	Particle size (mm)
Coarse gravel	19 - 63
Medium gravel	6.7 - 19
Fine gravel	2.36 – 6.7
Coarse sand	0.6 - 2.36
Medium sand	0.21 - 0.6
Fine sand	0.075 - 0.21

Definitions of grading terms used are:

- Well graded - a good representation of all particle sizes
- Poorly graded - an excess or deficiency of particular sizes within the specified range
- Uniformly graded - an excess of a particular particle size
- Gap graded - a deficiency of a particular particle size with the range

The proportions of secondary constituents of soils are described as follows:

In fine grained soils (>35% fines)

Term	Proportion of sand or gravel	Example
And	Specify	Clay (60%) and Sand (40%)
Adjective	>30%	Sandy Clay
With	15 – 30%	Clay with sand
Trace	0 - 15%	Clay with trace sand

In coarse grained soils (>65% coarse)
- with clays or silts

Term	Proportion of fines	Example
And	Specify	Sand (70%) and Clay (30%)
Adjective	>12%	Clayey Sand
With	5 - 12%	Sand with clay
Trace	0 - 5%	Sand with trace clay

In coarse grained soils (>65% coarse)
- with coarser fraction

Term	Proportion of coarser fraction	Example
And	Specify	Sand (60%) and Gravel (40%)
Adjective	>30%	Gravelly Sand
With	15 - 30%	Sand with gravel
Trace	0 - 15%	Sand with trace gravel

The presence of cobbles and boulders shall be specifically noted by beginning the description with ‘Mix of Soil and Cobbles/Boulders’ with the word order indicating the dominant first and the proportion of cobbles and boulders described together.

Soil Descriptions

Cohesive Soils

Cohesive soils, such as clays, are classified on the basis of undrained shear strength. The strength may be measured by laboratory testing, or estimated by field tests or engineering examination. The strength terms are defined as follows:

Description	Abbreviation	Undrained shear strength (kPa)
Very soft	VS	<12
Soft	S	12 - 25
Firm	F	25 - 50
Stiff	St	50 - 100
Very stiff	VSt	100 - 200
Hard	H	>200
Friable	Fr	-

Cohesionless Soils

Cohesionless soils, such as clean sands, are classified on the basis of relative density, generally from the results of standard penetration tests (SPT), cone penetration tests (CPT) or dynamic penetrometers (PSP). The relative density terms are given below:

Relative Density	Abbreviation	Density Index (%)
Very loose	VL	<15
Loose	L	15-35
Medium dense	MD	35-65
Dense	D	65-85
Very dense	VD	>85

Soil Origin

It is often difficult to accurately determine the origin of a soil. Soils can generally be classified as:

- Residual soil - derived from in-situ weathering of the underlying rock;
- Extremely weathered material – formed from in-situ weathering of geological formations. Has soil strength but retains the structure or fabric of the parent rock;
- Alluvial soil – deposited by streams and rivers;
- Estuarine soil – deposited in coastal estuaries;
- Marine soil – deposited in a marine environment;
- Lacustrine soil – deposited in freshwater lakes;
- Aeolian soil – carried and deposited by wind;
- Colluvial soil – soil and rock debris transported down slopes by gravity;
- Topsoil – mantle of surface soil, often with high levels of organic material.
- Fill – any material which has been moved by man.

Moisture Condition – Coarse Grained Soils

For coarse grained soils the moisture condition should be described by appearance and feel using the following terms:

- Dry (D) Non-cohesive and free-running.
- Moist (M) Soil feels cool, darkened in colour.
  Soil tends to stick together.
  Sand forms weak ball but breaks easily.
- Wet (W) Soil feels cool, darkened in colour.
  Soil tends to stick together, free water forms when handling.

Moisture Condition – Fine Grained Soils

For fine grained soils the assessment of moisture content is relative to their plastic limit or liquid limit, as follows:

- ‘Moist, dry of plastic limit’ or ‘w <PL’ (i.e. hard and friable or powdery).
- ‘Moist, near plastic limit’ or ‘w ≈ PL (i.e. soil can be moulded at moisture content approximately equal to the plastic limit).
- ‘Moist, wet of plastic limit’ or ‘w >PL’ (i.e. soils usually weakened and free water forms on the hands when handling).
- ‘Wet’ or ‘w ≈LL’ (i.e. near the liquid limit).
- ‘Wet’ or ‘w >LL’ (i.e. wet of the liquid limit).

Rock Strength

Rock strength is defined by the Unconfined Compressive Strength and it refers to the strength of the rock substance and not the strength of the overall rock mass, which may be considerably weaker due to defects.

The Point Load Strength Index $Is_{(50)}$ is commonly used to provide an estimate of the rock strength and site specific correlations should be developed to allow UCS values to be determined. The point load strength test procedure is described by Australian Standard AS4133.4.1-2007. The terms used to describe rock strength are as follows:

Strength Term	Abbreviation	Unconfined Compressive Strength MPa	Point Load Index * $Is_{(50)}$ MPa
Very low	VL	0.6 - 2	0.03 - 0.1
Low	L	2 - 6	0.1 - 0.3
Medium	M	6 - 20	0.3 - 1.0
High	H	20 - 60	1 - 3
Very high	VH	60 - 200	3 - 10
Extremely high	EH	>200	>10

* Assumes a ratio of 20:1 for UCS to $Is_{(50)}$. It should be noted that the UCS to $Is_{(50)}$ ratio varies significantly for different rock types and specific ratios should be determined for each site.

Degree of Weathering

The degree of weathering of rock is classified as follows:

Term	Abbreviation	Description
Residual Soil	RS	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are no longer visible, but the soil has not been significantly transported.
Extremely weathered	XW	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are still visible
Highly weathered	HW	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable. Rock strength is significantly changed by weathering. Some primary minerals have weathered to clay minerals. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores.
Moderately weathered	MW	The whole of the rock material is discoloured , usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable, but shows little or no change of strength from fresh rock.
Slightly weathered	SW	Rock is partially discoloured with staining or bleaching along joints but shows little or no change of strength from fresh rock.
Fresh	FR	No signs of decomposition or staining.
Note: If HW and MW cannot be differentiated use DW (see below)		
Distinctly weathered	DW	Rock strength usually changed by weathering. The rock may be highly discoloured, usually by iron staining. Porosity may be increased by leaching or may be decreased due to deposition of weathered products in pores.

Rock Descriptions

Degree of Fracturing

The following classification applies to the spacing of natural fractures in diamond drill cores. It includes bedding plane partings, joints and other defects, but excludes drilling breaks.

Term	Description
Fragmented	Fragments of <20 mm
Highly Fractured	Core lengths of 20-40 mm with occasional fragments
Fractured	Core lengths of 30-100 mm with occasional shorter and longer sections
Slightly Fractured	Core lengths of 300 mm or longer with occasional sections of 100-300 mm
Unbroken	Core contains very few fractures

Rock Quality Designation

The quality of the cored rock can be measured using the Rock Quality Designation (RQD) index, defined as:

$$\text{RQD \%} = \frac{\text{cumulative length of 'sound' core sections} \geq \text{100 mm long}}{\text{total drilled length of section being assessed}}$$

where 'sound' rock is assessed to be rock of low strength or stronger. The RQD applies only to natural fractures. If the core is broken by drilling or handling (i.e. drilling breaks) then the broken pieces are fitted back together and are not included in the calculation of RQD.

Stratification Spacing

For sedimentary rocks the following terms may be used to describe the spacing of bedding partings:

Term	Separation of Stratification Planes
Thinly laminated	< 6 mm
Laminated	6 mm to 20 mm
Very thinly bedded	20 mm to 60 mm
Thinly bedded	60 mm to 0.2 m
Medium bedded	0.2 m to 0.6 m
Thickly bedded	0.6 m to 2 m
Very thickly bedded	> 2 m

Symbols & Abbreviations

Douglas Partners

Introduction

These notes summarise abbreviations commonly used on borehole logs and test pit reports.

Drilling or Excavation Methods

C	Core drilling
R	Rotary drilling
SFA	Spiral flight augers
NMLC	Diamond core - 52 mm dia
NQ	Diamond core - 47 mm dia
HQ	Diamond core - 63 mm dia
PQ	Diamond core - 81 mm dia

Water

▷	Water seep
▽	Water level

Sampling and Testing

A	Auger sample
B	Bulk sample
D	Disturbed sample
E	Environmental sample
U_{50}	Undisturbed tube sample (50mm)
W	Water sample
pp	Pocket penetrometer (kPa)
PID	Photo ionisation detector
PL	Point load strength Is(50) MPa
S	Standard Penetration Test
V	Shear vane (kPa)

Description of Defects in Rock

The abbreviated descriptions of the defects should be in the following order: Depth, Type, Orientation, Coating, Shape, Roughness and Other. Drilling and handling breaks are not usually included on the logs.

Defect Type

B	Bedding plane
Cs	Clay seam
Cv	Cleavage
Cz	Crushed zone
Ds	Decomposed seam
F	Fault
J	Joint
Lam	Lamination
Pt	Parting
Sz	Sheared Zone
V	Vein

Orientation

The inclination of defects is always measured from the perpendicular to the core axis.

h	horizontal
v	vertical
sh	sub-horizontal
sv	sub-vertical

Coating or Infilling Term

cln	clean
co	coating
he	healed
inf	infilled
stn	stained
ti	tight
vn	veneer

Coating Descriptor

ca	calcite
cbs	carbonaceous
cly	clay
fe	iron oxide
mn	manganese
slt	silty

Shape

cu	curved
ir	irregular
pl	planar
st	stepped
un	undulating

Roughness

po	polished
ro	rough
sl	slickensided
sm	smooth
vr	very rough

Other

fg	fragmented
bnd	band
qtz	quartz

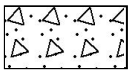
Symbols & Abbreviations

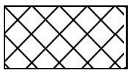
Graphic Symbols for Soil and Rock

General

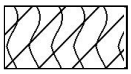

Asphalt

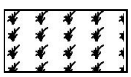

Road base

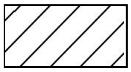

Concrete

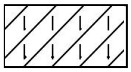

Filling

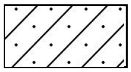
Soils


Topsoil

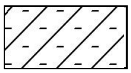

Peat

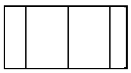

Clay

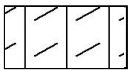

Silty clay

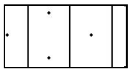

Sandy clay

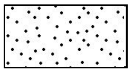

Gravelly clay

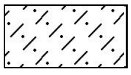

Shaly clay

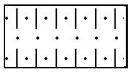

Silt


Clayey silt


Sandy silt

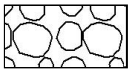

Sand

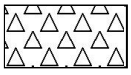

Clayey sand


Silty sand


Gravel

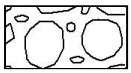

Sandy gravel


Cobbles, boulders

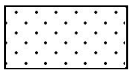

Talus

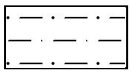
Sedimentary Rocks

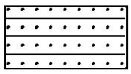

Boulder conglomerate

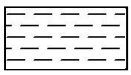

Conglomerate


Conglomeratic sandstone

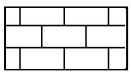

Sandstone


Siltstone

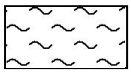

Laminite

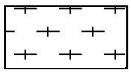

Mudstone, claystone, shale

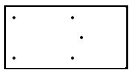

Coal


Limestone

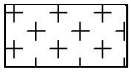
Metamorphic Rocks

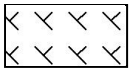

Slate, phyllite, schist

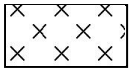

Gneiss

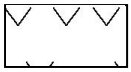

Quartzite

Igneous Rocks


Granite


Dolerite, basalt, andesite


Dacite, epidote


Tuff, breccia


Porphyry

TEST PIT LOG

CLIENT: School Infrastructure NSW
PROJECT: Geotechnical & Contamination Investigations
LOCATION: Part Lot 101 DP1019527, Jindabyne

SURFACE LEVEL: 997 AHD
EASTING: 644413
NORTHING: 5967048

PIT No: 101
PROJECT No: 103109.04
DATE: 16/6/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
997		TOPSOIL FILL/Gravelly CLAY (CL): low plasticity, brown, gravel up to 60mm in size, with fine to coarse grained sand and rootlets, trace cobbles up to 100mm in size, moist, w~PL, very stiff, TOPSOIL FILL		E	0.1		PID<1ppm		
	0.3	Sandy CLAY (CL): low plasticity, grey-brown, fine to coarse grained sand, trace gravel up to 40mm in size, moist, w~PL, very stiff, residual		E	0.4		PID<1ppm		
	0.5	Pit discontinued at 0.5m -limit of investigation							
996	1								1
995	2								2

5 10 15 20

RIG: KOBELCO SK55SRX mini excavator fitted with 450mm wide toothed bucket **LOGGED:** SDG **SURVEY DATUM:** MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon.

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: School Infrastructure NSW
PROJECT: Geotechnical & Contamination Investigations
LOCATION: Part Lot 101 DP1019527, Jindabyne

SURFACE LEVEL: 997 AHD
EASTING: 644395
NORTHING: 5967015

PIT No: 102
PROJECT No: 103109.04
DATE: 16/6/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
997		TOPSOIL FILL/Sandy CLAY (CL): low plasticity, brown, fine to coarse grained sand, with rootlets, trace gravel up to 300mm in size, three PACM fragments (M101, M102, M103), moist, w~PL, stiff to very stiff, TOPSOIL FILL		E	0.1		PID<1ppm M101-M103		
	0.25	Clayey SAND (SC): fine to coarse grained, grey-brown, trace gravel up to 20mm in size, moist, medium dense, residual		E	0.4		PID<1ppm		
	0.5	Pit discontinued at 0.5m -limit of investigation							
996	1								1
995	2								2

Dynamic Penetrometer Test (blows per mm): 5, 10, 15, 20

RIG: KOBELCO SK55SRX mini excavator fitted with 450mm wide toothed bucket **LOGGED:** SDG **SURVEY DATUM:** MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon.

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: School Infrastructure NSW
PROJECT: Geotechnical & Contamination Investigations
LOCATION: Part Lot 101 DP1019527, Jindabyne

SURFACE LEVEL: 998 AHD
EASTING: 644379
NORTHING: 5966986

PIT No: 103
PROJECT No: 103109.04
DATE: 16/6/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
998	0.15	TOPSOIL FILL/Sandy CLAY (CL): low plasticity, brown, fine to coarse grained sand, with rootlets, trace glass and rubber pieces and gravel up to 300mm in size, moist, w~PL, stiff to very stiff, TOPSOIL FILL		E	0.1		PID<1ppm		
		Sandy CLAY (CL/CI): low to medium plasticity, dark orange-brown, fine to coarse grained sand, moist, w~PL, stiff to very stiff, extremely weathered tonalite		E	0.3		PID<1ppm		
	0.5	Pit discontinued at 0.5m -limit of investigation							
997	1								1
996	2								2

Dynamic Penetrometer Test (blows per mm): 5, 10, 15, 20

RIG: KOBELCO SK55SRX mini excavator fitted with 450mm wide toothed bucket **LOGGED:** SDG **SURVEY DATUM:** MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon.

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: School Infrastructure NSW
PROJECT: Geotechnical & Contamination Investigations
LOCATION: Part Lot 101 DP1019527, Jindabyne

SURFACE LEVEL: 998 AHD
EASTING: 644365
NORTHING: 5966948

PIT No: 104
PROJECT No: 103109.04
DATE: 17/6/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
998	0.15	TOPSOIL FILL/Sandy CLAY (CL): low plasticity, dark brown, fine to coarse grained sand, with rootlets, trace gravel up to 40mm in size, screws and nails, moist, w~PL, stiff to very stiff, TOPSOIL FILL		E	0.1		PID<1ppm		
	0.5	Sandy CLAY (CL): low plasticity, dark yellow-brown, fine to coarse grained sand, with rootlets, moist to dry, w<PL, very stiff, residual		E	0.3		PID<1ppm		
997	1	Pit discontinued at 0.5m -limit of investigation							1
996	2								2

Dynamic Penetrometer Test (blows per mm): 5, 10, 15, 20

RIG: KOBELCO SK55SRX mini excavator fitted with 450mm wide toothed bucket **LOGGED:** SDG **SURVEY DATUM:** MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon.

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: School Infrastructure NSW
PROJECT: Geotechnical & Contamination Investigations
LOCATION: Part Lot 101 DP1019527, Jindabyne

SURFACE LEVEL: 999 AHD
EASTING: 644347
NORTHING: 5966913

PIT No: 105
PROJECT No: 103109.04
DATE: 17/6/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
999		TOPSOIL/Sandy CLAY (CL): low plasticity, dark brown, fine to coarse grained sand, with rootlets, moist, w~PL, stiff to very stiff, TOPSOIL		E	0.1		PID<1ppm		
	0.2	Sandy CLAY (CL): low plasticity, dark yellow-brown, fine to coarse grained sand, moist to dry, w<PL, very stiff, residual		E	0.3		PID<1ppm		
	0.4	TONALITE: medium to coarse grained, orange-brown, dry to moist, very low strength, highly weathered, slightly fractured							
	0.6	Pit discontinued at 0.6m -limit of investigation							
998	1								1
997	2								2

Dynamic Penetrometer Test (blows per mm): 5, 10, 15, 20

RIG: KOBELCO SK55SRX mini excavator fitted with 450mm wide toothed bucket **LOGGED:** SDG **SURVEY DATUM:** MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon.

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: School Infrastructure NSW
PROJECT: Geotechnical & Contamination Investigations
LOCATION: Part Lot 101 DP1019527, Jindabyne

SURFACE LEVEL: 998 AHD
EASTING: 644339
NORTHING: 5966894

PIT No: 106
PROJECT No: 103109.04
DATE: 17/6/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
998	0.2	TOPSOIL FILL/Sandy CLAY (CL): low plasticity, dark brown, fine to coarse grained sand, with glass, terracotta fragments, trace gravel up to 60mm in size, moist, w~PL, stiff to very stiff, TOPSOIL FILL		E	0.1		PID<1ppm		
	0.35	Sandy CLAY (CL): low plasticity, dark grey, fine to coarse grained sand, with rootlets, moist, w~PL, stiff to very stiff, residual							
	0.6	Clayey SAND (SC): fine to coarse grained, pale orange-brown, low plasticity clay, trace gravel up to 60mm in size, moist, medium dense, extremely weathered tonalite		E	0.4		PID<1ppm		
		Pit discontinued at 0.6m -limit of investigation							
997	1								1
996	2								2

Dynamic Penetrometer Test (blows per mm): 5, 10, 15, 20

RIG: KOBELCO SK55SRX mini excavator fitted with 450mm wide toothed bucket **LOGGED:** SDG **SURVEY DATUM:** MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon.

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: School Infrastructure NSW
PROJECT: Geotechnical & Contamination Investigations
LOCATION: Part Lot 101 DP1019527, Jindabyne

SURFACE LEVEL: 999 AHD
EASTING: 644325
NORTHING: 5966882

PIT No: 107
PROJECT No: 103109.04
DATE: 17/6/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
999		TOPSOIL FILL/Sandy CLAY (CL): low plasticity, dark brown, fine to coarse grained sand, with rootlets, trace gravel up to 40mm in size, moist to dry, w<PL, very stiff, TOPSOIL FILL		E	0.1		PID<1ppm		
	0.3	Sandy CLAY (CL/CI): low to medium plasticity, orange-brown, fine to coarse grained sand, trace cobbles up to 150mm in size, moist to dry, w<PL, very stiff, residual		E	0.4		PID<1ppm		
	0.6	Pit discontinued at 0.6m -limit of investigation							
998	1								1
997	2								2

Dynamic Penetrometer Test (blows per mm): 5, 10, 15, 20

RIG: KOBELCO SK55SRX mini excavator fitted with 450mm wide toothed bucket **LOGGED:** SDG **SURVEY DATUM:** MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon.

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: School Infrastructure NSW
PROJECT: Geotechnical & Contamination Investigations
LOCATION: Part Lot 101 DP1019527, Jindabyne

SURFACE LEVEL: 1001 AHD
EASTING: 644305
NORTHING: 5966879

PIT No: 108
PROJECT No: 103109.04
DATE: 17/6/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
1001	0.3	FILL/Clayey SAND (SC): fine to coarse grained, brown, with gravel up to 60mm in size and cobbles up to 100mm in size, moist, medium dense to loose, FILL (appeared to be reworked natural material)		E	0.1		PID<1ppm		
	0.6	Sandy CLAY (CL): low plasticity, pale orange-brown, fine to coarse grained sand, moist to dry, w<PL, very stiff, residual		E	0.4		PID<1ppm		
1000	1	Pit discontinued at 0.6m -limit of investigation							
999	2								

RIG: KOBELCO SK55SRX mini excavator fitted with 450mm wide toothed bucket **LOGGED:** SDG **SURVEY DATUM:** MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon.

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: School Infrastructure NSW
PROJECT: Geotechnical & Contamination Investigations
LOCATION: Part Lot 101 DP1019527, Jindabyne

SURFACE LEVEL: 1002 AHD
EASTING: 644283
NORTHING: 5966879

PIT No: 109
PROJECT No: 103109.04
DATE: 17/6/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
1002	0.15	TOPSOIL FILL/Sandy CLAY (CL): low plasticity, brown, fine to coarse grained sand, with rootlets and gravel up to 60mm in size, trace plastic and glass fragments, moist to dry, w<PL, very stiff, TOPSOIL FILL		E	0.1		PID<1ppm		
		GRANODIORITE: medium to coarse grained, orange-brown, dry to moist, very low strength, highly weathered, slightly fractured		E	0.4		PID<1ppm		
	0.5	Pit discontinued at 0.5m -limit of investigation							
1001	1								1
1000	2								2

RIG: KOBELCO SK55SRX mini excavator fitted with 450mm wide toothed bucket **LOGGED:** SDG **SURVEY DATUM:** MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon.

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: School Infrastructure NSW
PROJECT: Geotechnical & Contamination Investigations
LOCATION: Part Lot 101 DP1019527, Jindabyne

SURFACE LEVEL: 995 AHD
EASTING: 644435
NORTHING: 5967043

PIT No: 110
PROJECT No: 103109.04
DATE: 16/6/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
995	0.2	TOPSOIL FILL/Sandy CLAY (CL): low plasticity, brown, fine to coarse grained sand, with rootlets, moist, w~PL, stiff to very stiff, TOPSOIL FILL		E	0.1		PID<1ppm		
	0.5	Sandy CLAY (CI): medium plasticity, dark yellow-brown, fine to coarse grained sand, moist, w~PL, very stiff, extremely weathered tonalite		E	0.4		PID<1ppm		
994	1	Pit discontinued at 0.5m -limit of investigation							
993	2								

Dynamic Penetrometer Test (blows per mm): 5, 10, 15, 20

RIG: KOBELCO SK55SRX mini excavator fitted with 450mm wide toothed bucket **LOGGED:** SDG **SURVEY DATUM:** MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon.

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: School Infrastructure NSW
PROJECT: Geotechnical & Contamination Investigations
LOCATION: Part Lot 101 DP1019527, Jindabyne

SURFACE LEVEL: 996 AHD
EASTING: 644420
NORTHING: 5967010

PIT No: 111
PROJECT No: 103109.04
DATE: 16/6/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
996	0.15	TOPSOIL FILL/Sandy CLAY (CL): low plasticity, brown, fine to coarse grained sand, with rootlets, trace PVC pipe and gravel up to 20mm in size, moist, w~PL, stiff to very stiff, TOPSOIL FILL		E	0.1		PID<1ppm		
		Sandy CLAY (CI): medium plasticity, dark yellow-brown, fine to coarse grained sand, moist, w~PL, very stiff, extremely weathered tonalite		E	0.4		PID<1ppm		
	0.5	Pit discontinued at 0.5m -limit of investigation							
995	1								1
994	2								2

Dynamic Penetrometer Test (blows per mm): 5, 10, 15, 20

RIG: KOBELCO SK55SRX mini excavator fitted with 450mm wide toothed bucket **LOGGED:** SDG **SURVEY DATUM:** MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon.

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: School Infrastructure NSW
PROJECT: Geotechnical & Contamination Investigations
LOCATION: Part Lot 101 DP1019527, Jindabyne

SURFACE LEVEL: 996 AHD
EASTING: 644403
NORTHING: 5966970

PIT No: 112
PROJECT No: 103109.04
DATE: 16/6/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
996		TOPSOIL FILL/Sandy CLAY (CL): low plasticity, dark brown, fine to coarse grained sand, with gravel up to 60mm in size and rootlets, moist, w~PL, stiff to very stiff, TOPSOIL FILL		E	0.1		PID<1ppm		
	0.3	Sandy CLAY (CI): medium plasticity, dark yellow-brown, fine to coarse grained sand, moist, w~PL, very stiff, extremely weathered tonalite		E	0.5		PID<1ppm		
	0.6	Pit discontinued at 0.6m -limit of investigation							
995	1								1
994	2								2

5 10 15 20

RIG: KOBELCO SK55SRX mini excavator fitted with 450mm wide toothed bucket **LOGGED:** SDG **SURVEY DATUM:** MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon.

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: School Infrastructure NSW
PROJECT: Geotechnical & Contamination Investigations
LOCATION: Part Lot 101 DP1019527, Jindabyne

SURFACE LEVEL: 996 AHD
EASTING: 644390
NORTHING: 5966944

PIT No: 113
PROJECT No: 103109.04
DATE: 16/6/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
996	0.2	TOPSOIL FILL/Sandy CLAY (CL): low plasticity, dark brown, fine to coarse grained sand, with rootlets, trace glass, brick fragments and nails, moist, w~PL, stiff to very stiff, TOPSOIL FILL		E	0.1		PID<1ppm		
	0.6	Sandy CLAY (CI): medium plasticity, dark yellow-brown, fine to coarse grained sand, moist, w~PL, very stiff, extremely weathered tonalite		E	0.4		PID<1ppm		
995	1	Pit discontinued at 0.6m -limit of investigation							
994	2								

Dynamic Penetrometer Test (blows per mm): 5, 10, 15, 20

RIG: KOBELCO SK55SRX mini excavator fitted with 450mm wide toothed bucket **LOGGED:** SDG **SURVEY DATUM:** MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon.

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: School Infrastructure NSW
PROJECT: Geotechnical & Contamination Investigations
LOCATION: Part Lot 101 DP1019527, Jindabyne

SURFACE LEVEL: 996 AHD
EASTING: 644378
NORTHING: 5966918

PIT No: 114
PROJECT No: 103109.04
DATE: 17/6/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
996	0.0	TOPSOIL FILL/Sandy CLAY (CL): low plasticity, dark brown, fine to coarse grained sand, with rootlets, gravel up to 60mm in size, cobbles up to 150mm in size, moist, w~PL, stiff to very stiff, TOPSOIL FILL		E	0.1		PID<1ppm		
	0.3	Sandy CLAY (CI): medium plasticity, orange-brown, fine to coarse grained sand, moist to dry, w<PL, very stiff, extremely weathered tonalite		E	0.4		PID<1ppm		
	0.6	Pit discontinued at 0.6m -limit of investigation							
995	1								1
994	2								2

Dynamic Penetrometer Test (blows per mm): 5, 10, 15, 20

RIG: KOBELCO SK55SRX mini excavator fitted with 450mm wide toothed bucket **LOGGED:** SDG **SURVEY DATUM:** MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon.

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: School Infrastructure NSW
PROJECT: Geotechnical & Contamination Investigations
LOCATION: Part Lot 101 DP1019527, Jindabyne

SURFACE LEVEL: 997 AHD
EASTING: 644367
NORTHING: 5966895

PIT No: 115
PROJECT No: 103109.04
DATE: 17/6/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
997		TOPSOIL/Sandy CLAY (CL): low plasticity, dark brown, fine to coarse grained sand, moist, w~PL, stiff to very stiff, TOPSOIL		E	0.1		PID<1ppm		
	0.3	Sandy CLAY (CI): medium plasticity, pale orange-brown, fine to coarse grained sand, moist to dry, w<PL, very stiff, extremely weathered tonalite		E	0.4		PID<1ppm		
	0.5	Pit discontinued at 0.5m -limit of investigation							
996	1								1
995	2								2

RIG: KOBELCO SK55SRX mini excavator fitted with 450mm wide toothed bucket **LOGGED:** SDG **SURVEY DATUM:** MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon.

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: School Infrastructure NSW
PROJECT: Geotechnical & Contamination Investigations
LOCATION: Part Lot 101 DP1019527, Jindabyne

SURFACE LEVEL: 994 AHD
EASTING: 644440
NORTHING: 5967029

PIT No: 116
PROJECT No: 103109.04
DATE: 16/6/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
994	0.2	TOPSOIL FILL/Sandy CLAY (CL): low plasticity, brown and orange-brown, fine to coarse grained sand, with rootlets, glass fragments, three PACM fragments (M104, M105, M106), trace gravel up to 60mm in size and boulders up to 300mm in size, moist, w~PL, stiff to very stiff, TOPSOIL FILL		E	0.1		PID<1ppm M104, M105, M106		
		Sandy CLAY (CI): medium plasticity, dark yellow-brown, fine to coarse grained sand, moist, w~PL, very stiff, extremely weathered tonalite							
	0.5	Pit discontinued at 0.5m -limit of investigation		E	0.5		PID<1ppm		
993	1								1
992	2								2

Dynamic Penetrometer Test (blows per mm): 5, 10, 15, 20

RIG: KOBELCO SK55SRX mini excavator fitted with 450mm wide toothed bucket **LOGGED:** SDG **SURVEY DATUM:** MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon.

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: School Infrastructure NSW
PROJECT: Geotechnical & Contamination Investigations
LOCATION: Part Lot 101 DP1019527, Jindabyne

SURFACE LEVEL: 995 AHD
EASTING: 644420
NORTHING: 5966991

PIT No: 117
PROJECT No: 103109.04
DATE: 16/6/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
995		TOPSOIL FILL/Sandy CLAY (CL): low plasticity, dark brown, fine to coarse grained sand, with rootlets and gravel up to 50mm in size, trace plastic, two PACM fragments (M108, M109), moist, w~PL, stiff to very stiff, TOPSOIL FILL		E	0.1		PID<1ppm M108, M109		
	0.3	Sandy CLAY (CI): medium plasticity, pale grey-brown, fine to coarse grained sand, moist to dry, w<PL, very stiff, extremely weathered tonalite							
	0.5	Pit discontinued at 0.5m -limit of investigation		E	0.5		PID<1ppm		
994	1								1
993	2								2

RIG: KOBELCO SK55SRX mini excavator fitted with 450mm wide toothed bucket **LOGGED:** SDG **SURVEY DATUM:** MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon.

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: School Infrastructure NSW
PROJECT: Geotechnical & Contamination Investigations
LOCATION: Part Lot 101 DP1019527, Jindabyne

SURFACE LEVEL: 995 AHD
EASTING: 644407
NORTHING: 5966951

PIT No: 118
PROJECT No: 103109.04
DATE: 16/6/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
995	0.2	TOPSOIL FILL/Sandy CLAY (CL): low plasticity, dark brown, fine to coarse grained sand, with gravel up to 60mm in size and rootlets, trace brick and tile fragments, moist, w~PL, stiff to very stiff, TOPSOIL FILL		E	0.1		PID<1ppm		
	0.5	Sandy CLAY (CL): low plasticity, orange-brown, fine to coarse grained sand, trace gravel up to 40mm in size, moist to dry, w<PL, very stiff, residual		E	0.3		PID<1ppm		
994	1	Pit discontinued at 0.5m -limit of investigation							
993	2								

Dynamic Penetrometer Test (blows per mm): 5, 10, 15, 20

RIG: KOBELCO SK55SRX mini excavator fitted with 450mm wide toothed bucket **LOGGED:** SDG **SURVEY DATUM:** MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon.

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: School Infrastructure NSW
PROJECT: Geotechnical & Contamination Investigations
LOCATION: Part Lot 101 DP1019527, Jindabyne

SURFACE LEVEL: 995 AHD
EASTING: 644396
NORTHING: 5966930

PIT No: 119
PROJECT No: 103109.04
DATE: 17/6/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
995	0.2	TOPSOIL FILL/Sandy CLAY (CL): low plasticity, brown, fine to coarse grained sand, with gravel up to 60mm in size, trace brick concrete, glass, plastic fragments, one PACM fragment (M112), moist to dry, w~PL, very stiff, TOPSOIL FILL		E	0.1		PID<1ppm M112		
	0.6	Clayey SAND (SC): fine to coarse grained, orange-brown, low plasticity clay, moist, medium dense, extremely weathered tonalite		E	0.4		PID<1ppm		
		Pit discontinued at 0.6m -limit of investigation							
994	1								1
993	2								2

Dynamic Penetrometer Test (blows per mm): 5, 10, 15, 20

RIG: KOBELCO SK55SRX mini excavator fitted with 450mm wide toothed bucket **LOGGED:** SDG **SURVEY DATUM:** MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon.

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: School Infrastructure NSW
PROJECT: Geotechnical & Contamination Investigations
LOCATION: Part Lot 101 DP1019527, Jindabyne

SURFACE LEVEL: 996 AHD
EASTING: 644382
NORTHING: 5966897

PIT No: 120
PROJECT No: 103109.04
DATE: 17/6/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
996		TOPSOIL FILL/Sandy CLAY (CL): low plasticity, dark brown, fine to coarse grained sand, with rootlets and gravel up to 60mm in size, trace glass fragments, two PACM fragments (M114, M115), moist, w~PL, stiff to very stiff, TOPSOIL FILL		E	0.1		PID<1ppm M114, M115		
	0.25	Sandy CLAY (CI): medium plasticity, orange-brown, fine to coarse grained sand, moist to dry, w<PL, very stiff, extremely weathered tonalite		E	0.4		PID<1ppm		
	0.5	Pit discontinued at 0.5m -limit of investigation							
995	1								1
994	2								2

5 10 15 20

RIG: KOBELCO SK55SRX mini excavator fitted with 450mm wide toothed bucket **LOGGED:** SDG **SURVEY DATUM:** MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon.

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: School Infrastructure NSW
PROJECT: Geotechnical & Contamination Investigations
LOCATION: Part Lot 101 DP1019527, Jindabyne

SURFACE LEVEL: 993 AHD
EASTING: 644453
NORTHING: 5967035

PIT No: 121
PROJECT No: 103109.04
DATE: 16/6/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
993	0.2	TOPSOIL FILL/Sandy CLAY (CL): low plasticity, brown, fine to coarse grained sand, with gravel up to 50mm in size, trace glass and brick fragments, one PACM fragment (M107), moist, w~PL, stiff to very stiff, TOPSOIL FILL		E	0.1		PID<1ppm M107		
	0.5	TONALITE: medium to coarse grained, orange-brown, dry, very low strength, highly weathered, slightly fractured to fractured		E	0.4		PID<1ppm		
992	1	Pit discontinued at 0.5m -limit of investigation							
991	2								

RIG: KOBELCO SK55SRX mini excavator fitted with 450mm wide toothed bucket **LOGGED:** SDG **SURVEY DATUM:** MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon.

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: School Infrastructure NSW
PROJECT: Geotechnical & Contamination Investigations
LOCATION: Part Lot 101 DP1019527, Jindabyne

SURFACE LEVEL: 993 AHD
EASTING: 644434
NORTHING: 5967006

PIT No: 122
PROJECT No: 103109.04
DATE: 16/6/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
993		TOPSOIL FILL/Sandy CLAY (CL): low plasticity, brown, fine to coarse grained sand, with rootlets, trace PVC pipe and gravel up to 20mm in size, moist, w~PL, stiff to very stiff, TOPSOIL FILL		E	0.1		PID<1ppm		
	0.15	Sandy CLAY (CL): low plasticity, pale brown, fine to coarse grained sand, moist, w~PL, very stiff, residual		E	0.3		PID<1ppm		
	0.4	Sandy CLAY (CI): medium plasticity, orange-brown, fine to coarse grained sand, moist, w~PL, very stiff, extremely weathered tonalite							
	0.6	Pit discontinued at 0.6m -limit of investigation							
992	1								1
991	2								2

Dynamic Penetrometer Test (blows per mm): 5, 10, 15, 20

RIG: KOBELCO SK55SRX mini excavator fitted with 450mm wide toothed bucket **LOGGED:** SDG **SURVEY DATUM:** MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon.

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: School Infrastructure NSW
PROJECT: Geotechnical & Contamination Investigations
LOCATION: Part Lot 101 DP1019527, Jindabyne

SURFACE LEVEL: 994 AHD
EASTING: 644423
NORTHING: 5966969

PIT No: 123
PROJECT No: 103109.04
DATE: 16/6/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
994		TOPSOIL/Sandy CLAY (CL): low plasticity, dark brown, with rootlets, one PACM fragment (M110) on surface, moist, w~PL, stiff to very stiff, TOPSOIL		E	0.1		PID<1ppm R101		
	0.4	Sandy CLAY (CL): low plasticity, pale brown, fine to coarse grained sand, trace gravel up to 60mm in size, moist to dry, w<PL, very stiff, residual		E	0.5		PID<1ppm		
	0.6	Pit discontinued at 0.6m -limit of investigation							
993	1								1
992	2								2

Dynamic Penetrometer Test (blows per mm): 5, 10, 15, 20

RIG: KOBELCO SK55SRX mini excavator fitted with 450mm wide toothed bucket **LOGGED:** SDG **SURVEY DATUM:** MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon.

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: School Infrastructure NSW
PROJECT: Geotechnical & Contamination Investigations
LOCATION: Part Lot 101 DP1019527, Jindabyne

SURFACE LEVEL: 994 AHD
EASTING: 644411
NORTHING: 5966937

PIT No: 124
PROJECT No: 103109.04
DATE: 16/6/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
994	0.15	TOPSOIL FILL/Sandy CLAY (CL): low plasticity, dark brown, fine to coarse grained sand, with rootlets and fragments of plastic, brick, tile, glass, one PACM fragment (M111), moist, w~PL, stiff to very stiff, TOPSOIL FILL		E	0.1		PID<1ppm M111		
		Sandy CLAY (CL): low plasticity, pale orange-brown, fine to coarse grained sand, with gravel up to 60mm in size and cobbles up to 100mm in size, moist, w~PL, stiff to very stiff, extremely weathered tonalite		E	0.3		PID<1ppm		
	0.5	Pit discontinued at 0.5m -limit of investigation							
993	1								1
992	2								2

RIG: KOBELCO SK55SRX mini excavator fitted with 450mm wide toothed bucket **LOGGED:** SDG **SURVEY DATUM:** MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon.

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: School Infrastructure NSW
PROJECT: Geotechnical & Contamination Investigations
LOCATION: Part Lot 101 DP1019527, Jindabyne

SURFACE LEVEL: 995 AHD
EASTING: 644398
NORTHING: 5966907

PIT No: 125
PROJECT No: 103109.04
DATE: 17/6/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
995	0.15	TOPSOIL FILL/Sandy CLAY (CL): low plasticity, dark brown, fine to coarse grained sand, with rootlets and gravel up to 60mm in size, moist, w~PL, stiff to very stiff, TOPSOIL FILL		E	0.1		PID<1ppm		
	0.4	Sandy CLAY (CL): low plasticity, dark brown, orange mottle, fine to coarse grained sand, with rootlets and roots, moist to dry, w<PL, very stiff, possible colluvial		E	0.3		PID<1ppm		
	0.6	Clayey SAND (SC): fine to coarse grained, pale orange-brown, low plasticity clay, moist to dry, medium dense, possible colluvial or extremely weathered tonalite							
994	1	Pit discontinued at 0.6m -limit of investigation							
993	2								

Dynamic Penetrometer Test (blows per mm): 5, 10, 15, 20

RIG: KOBELCO SK55SRX mini excavator fitted with 450mm wide toothed bucket **LOGGED:** SDG **SURVEY DATUM:** MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon.

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: School Infrastructure NSW
PROJECT: Geotechnical & Contamination Investigations
LOCATION: Part Lot 101 DP1019527, Jindabyne

SURFACE LEVEL: 1002 AHD
EASTING: 644285
NORTHING: 5966908

PIT No: 126
PROJECT No: 103109.04
DATE: 17/6/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
1002	0.2	TOPSOIL/Sandy CLAY (CL): low plasticity, brown, fine to coarse grained sand, with rootlets, moist to dry, w<PL, very stiff, TOPSOIL		E	0.1		PID<1ppm		
	0.6	Clayey SAND (SC): fine to coarse grained, pale orange-brown, low to medium plasticity clay, moist, medium dense, extremely weathered granodiorite		E	0.5		PID<1ppm		
1001	1.0	GRANODIORITE: medium to coarse grained, pale yellow-brown/orange-brown, dry to moist, low to medium strength, highly to moderately weathered, slightly fractured, with some very low strength seams		E	1.0		PID<1ppm		
		Pit discontinued at 1.0m -limit of investigation							
1000									

Dynamic Penetrometer Test (blows per mm): 5, 10, 15, 20

RIG: KOBELCO SK55SRX mini excavator fitted with 450mm wide toothed bucket **LOGGED:** SDG **SURVEY DATUM:** MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon.

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: School Infrastructure NSW
PROJECT: Geotechnical & Contamination Investigations
LOCATION: Part Lot 101 DP1019527, Jindabyne

SURFACE LEVEL: 1002 AHD
EASTING: 644289
NORTHING: 5966900

PIT No: 127
PROJECT No: 103109.04
DATE: 17/6/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
1002	0.2	FILL/SAND (SP): poorly graded, fine grained, orange-brown, with rootlets, moist to dry, medium dense, FILL		E	0.1		PID<1ppm		
	0.6	Sandy CLAY (CL/CI): low to medium plasticity, dark brown, fine to coarse grained sand, trace rootlets, moist to dry, w<PL, very stiff, residual		E	0.5		PID<1ppm		
1001	1	GRANODIORITE: medium to coarse grained, dark orange-brown, dry to moist, low to medium strength, highly to moderately weathered, fractured		E	1.0		PID<1ppm		1
	1.1	Pit discontinued at 1.1m -limit of investigation							
1000	2								2

Dynamic Penetrometer Test (blows per mm): 5, 10, 15, 20

RIG: KOBELCO SK55SRX mini excavator fitted with 450mm wide toothed bucket **LOGGED:** SDG **SURVEY DATUM:** MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon.

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: School Infrastructure NSW
PROJECT: Geotechnical & Contamination Investigations
LOCATION: Part Lot 101 DP1019527, Jindabyne

SURFACE LEVEL: 1002 AHD
EASTING: 644293
NORTHING: 5966896

PIT No: 128
PROJECT No: 103109.04
DATE: 17/6/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
1002		FILL/SAND (SP): poorly graded, fine grained, orange-brown, with rootlets, moist to dry, medium dense, FILL		E	0.1		PID<1ppm		
	0.25	Sandy CLAY (CL/CI): low to medium plasticity, orange-brown, fine to coarse grained sand, trace rootlets, moist to dry, w<PL, very stiff, residual		E	0.5		PID<1ppm		
	0.7	GRANODIORITE: medium to coarse grained, dark orange-brown, moist to dry, very low strength, highly weathered, slightly fractured, with some extremely low strength, extremely weathered seams (Sandy CLAY)		E	1.0		PID<1ppm		
1001	1								1
	1.1	Pit discontinued at 1.1m -limit of investigation							
1000	2								2

Dynamic Penetrometer Test (blows per mm): 5, 10, 15, 20

RIG: KOBELCO SK55SRX mini excavator fitted with 450mm wide toothed bucket **LOGGED:** SDG **SURVEY DATUM:** MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon.

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: School Infrastructure NSW
PROJECT: Geotechnical & Contamination Investigations
LOCATION: Part Lot 101 DP1019527, Jindabyne

SURFACE LEVEL: 1003 AHD
EASTING: 644280
NORTHING: 5966909

PIT No: 129
PROJECT No: 103109.04
DATE: 17/6/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
1003		TOPSOIL FILL/Sandy CLAY (CL): low plasticity, dark brown, fine to coarse grained sand, with rootlets, trace glass and plastic fragments, moist, w~PL, stiff to very stiff, TOPSOIL FILL		E	0.1		PID<1ppm		
	0.2	Sandy CLAY (CL): low plasticity, orange-brown, fine to coarse grained sand, trace gravel up to 20mm in size, moist to dry, w<PL, very stiff, residual		E	0.5		PID<1ppm		
	0.7	GRANODIORITE: medium to coarse grained, dark orange-brown, dry to moist, very low to low strength, highly weathered, slightly fractured		E	1.0		PID<1ppm		
1002	1								1
	1.1	Pit discontinued at 1.1m -limit of investigation							
1001	2								2

RIG: KOBELCO SK55SRX mini excavator fitted with 450mm wide toothed bucket **LOGGED:** SDG **SURVEY DATUM:** MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon.

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
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TEST PIT LOG

CLIENT: School Infrastructure NSW
PROJECT: Geotechnical & Contamination Investigations
LOCATION: Part Lot 101 DP1019527, Jindabyne

SURFACE LEVEL: 1005 AHD
EASTING: 644278
NORTHING: 5966968

PIT No: 130
PROJECT No: 103109.04
DATE: 17/6/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
1005		FILL/SAND (SP): poorly graded, fine grained, orange-brown, with rootlets, moist to dry, medium dense, FILL		E	0.1		PID<1ppm R103		
	0.25	Sandy CLAY (CL): low plasticity, dark brown/brown, fine to medium grained sand, with rootlets, moist to dry, w<PL, very stiff, residual		E	0.5		PID<1ppm		
	0.6	Sandy CLAY (CL/CI): low to medium plasticity, orange-brown, fine to coarse grained, moist, w~PL, stiff to very stiff, extremely weathered granodiorite							
1004	1 1.0	Pit discontinued at 1.0m -limit of investigation		E	1.0		PID<1ppm		1
1003	2								2

Dynamic Penetrometer Test (blows per mm): 5, 10, 15, 20

RIG: KOBELCO SK55SRX mini excavator fitted with 450mm wide toothed bucket **LOGGED:** SDG **SURVEY DATUM:** MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon.

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: School Infrastructure NSW
PROJECT: Geotechnical & Contamination Investigations
LOCATION: Part Lot 101 DP1019527, Jindabyne

SURFACE LEVEL: 990 AHD
EASTING: 664347
NORTHING: 5967317

PIT No: 131
PROJECT No: 103109.04
DATE: 17/6/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
990		FILL/SAND (SP): poorly graded, fine grained, orange-brown, with rootlets, moist to dry, medium dense, FILL		E	0.1		PID<1ppm		
	0.3	FILL/Clayey SAND (SC): fine to coarse grained, orange-brown, low plasticity, moist, medium dense, FILL		E	0.5		PID<1ppm		
	0.7	FILL/Sandy CLAY (CL): low plasticity, brown, fine to coarse grained sand, trace gravel up to 20mm in size, moist to dry, w<PL, very stiff, FILL							
989	1			E	1.0		PID<1ppm		1
	1.4	FILL/Sandy CLAY (CL): low plasticity, dark grey, fine to coarse grained sand, trace brick and terracotta pipe fragments, moist, w~PL, stiff to very stiff, FILL -from 1.6m, trace gravel up to 60mm in size and boulders up to 300mm in size		E	1.5		PID<1ppm		
988	2			E	2.0		PID<1ppm		2
	2.5	Clayey SAND (SC): fine to medium grained, grey, low plasticity clay, trace gravel up to 60mm in size, moist, medium dense, possible alluvial							
	2.6	Pit discontinued at 2.6m -limit of investigation		E	2.6		PID<1ppm		

RIG: KOBELCO SK55SRX mini excavator fitted with 450mm wide toothed bucket **LOGGED:** SDG **SURVEY DATUM:** MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon.

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

TEST PIT LOG

CLIENT: School Infrastructure NSW
PROJECT: Geotechnical & Contamination Investigations
LOCATION: Part Lot 101 DP1019527, Jindabyne

SURFACE LEVEL: 995 AHD
EASTING: 644474
NORTHING: 5967292

PIT No: 132
PROJECT No: 103109.04
DATE: 17/6/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
995		FILL/Sandy CLAY (CL): low plasticity, dark brown, fine to coarse grained sand, with gravel up to 30mm in size, moist, w~PL, stiff to very stiff, FILL		E	0.1		PID<1ppm		
				E	0.5		PID<1ppm		
	0.7	Silty SAND (SM): fine to coarse grained, pale brown, low plasticity silt, dry to moist, medium dense, colluvial							
994	1 1.0	Pit discontinued at 1.0m -limit of investigation		E	1.0		PID<1ppm		1
993	2								2

5 10 15 20

RIG: KOBELCO SK55SRX mini excavator fitted with 450mm wide toothed bucket **LOGGED:** SDG **SURVEY DATUM:** MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon.

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: School Infrastructure NSW
PROJECT: Geotechnical & Contamination Investigations
LOCATION: Part Lot 101 DP1019527, Jindabyne

SURFACE LEVEL: 991 AHD
EASTING: 644458
NORTHING: 5967233

PIT No: 133
PROJECT No: 103109.04
DATE: 17/6/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
991		FILL/Gravelly SAND (SW): well graded, fine to coarse grained, brown, gravel up to 60mm in size, trace cobbles, moist, medium dense, FILL		E	0.1		PID<1ppm		
				E	0.5		PID<1ppm		
	0.6	TONALITE: medium to coarse grained, grey, dry to moist, medium to high strength, slightly weathered, fractured							
990	1 1.0	Pit discontinued at 1.0m -limit of investigation		E	1.0		PID<1ppm		1
989	2								2

Dynamic Penetrometer Test (blows per mm): 5, 10, 15, 20

RIG: KOBELCO SK55SRX mini excavator fitted with 450mm wide toothed bucket **LOGGED:** SDG **SURVEY DATUM:** MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon.

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
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TEST PIT LOG

CLIENT: School Infrastructure NSW
PROJECT: Geotechnical & Contamination Investigations
LOCATION: Part Lot 101 DP1019527, Jindabyne

SURFACE LEVEL: 990 AHD
EASTING: 644491
NORTHING: 5967237

PIT No: 134
PROJECT No: 103109.04
DATE: 17/6/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
990		FILL/Clayey SAND (SC): fine to coarse grained, brown, low plasticity clay, with rootlets, gravel up to 60mm in size, cobbles up to 100mm in size, trace boulders up to 300mm in size, moist, medium dense, FILL		E	0.1		PID<1ppm		
				E	0.5		PID<1ppm		
	0.7								
989	1	Clayey SAND (SC): fine to coarse grained, pale brown, low plasticity clay, dry to moist, medium dense, possible colluvial		E	1.0		PID<1ppm		1
	1.1	Pit discontinued at 1.1m -limit of investigation							
988	2								2

Dynamic Penetrometer Test (blows per mm): 5, 10, 15, 20

RIG: KOBELCO SK55SRX mini excavator fitted with 450mm wide toothed bucket **LOGGED:** SDG **SURVEY DATUM:** MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon.

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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TEST PIT LOG

CLIENT: School Infrastructure NSW
PROJECT: Geotechnical & Contamination Investigations
LOCATION: Part Lot 101 DP1019527, Jindabyne

SURFACE LEVEL: 1003 AHD
EASTING: 644265
NORTHING: 5966879

PIT No: 135
PROJECT No: 103109.04
DATE: 17/6/2021
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per mm)
1003		TOPSOIL/Sandy CLAY (CL): low plasticity, dark brown, fine to coarse grained sand, with rootlets, moist, w~PL, stiff to very stiff, TOPSOIL/POSSIBLE TOPSOIL FILL		E	0.1		PID<1ppm		
	0.15	GRANODIORITE: medium to coarse grained, orange-brown and grey-brown, dry to moist, very low to low strength, highly weathered, with some medium to high strength, moderately to slightly weathered seams/corestones, fractured		E	0.5		PID<1ppm		
	0.6	Pit discontinued at 0.6m -refusal							
1002	1								1
1001	2								2

Dynamic Penetrometer Test (blows per mm): 5, 10, 15, 20

RIG: KOBELCO SK55SRX mini excavator fitted with 450mm wide toothed bucket **LOGGED:** SDG **SURVEY DATUM:** MGA94 Zone 55

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Surface levels and coordinates are approximate only and must not be relied upon.

☐ Sand Penetrometer AS1289.6.3.3
☐ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Appendix G

Summary of Laboratory Results (Tables G1 – G5)

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TABLE G1
SUMMARY OF BULK SOIL SAMPLING AND ANALYTICAL RESULTS - ASBESTOS

Sample Number	Depth (m)	Weight of 10 Litre Bulk Sample (kg)	Number of fragments > 7mm	Condition of Fragments (good/poor)	Size range of Fragment (mm)	Weight of Screened ACM (g)	Concentration of asbestos in ACM in soil (% w/w)*	Weight of 500mL Sample (g)	Asbestos ID in Soil	Weight of asbestos in ACM> 7mm	Concentration of asbestos in ACM >7mm in soil (%w/w)	Weight of asbestos in AF or FA (g)**	Concentration of asbestos in FA and AF in soil ACM (% w/w)
HSL for Asbestos in soil							0.010				0.010		0.001
Pit 101	0.1	15.485	0	-	-	-	<0.001	599.08	ND	-	-	-	-
Pit 102	0.1	15.817	1	Good	125x48x5	30.1	0.029	601.4	ND	-	-	-	-
Pit 103	0.1	17.101	0	-	-	-	<0.001	496.84	ND	-	-	-	-
Pit 104	0.1	18.085	0	-	-	-	<0.001	579.29	ND	-	-	-	-
Pit 105	0.1	15.292	0	-	-	-	<0.001	543.99	ND	-	-	-	-
Pit 106	0.1	16.484	0	-	-	-	<0.001	621.29	ND	-	-	-	-
Pit 107	0.1	14.786	0	-	-	-	<0.001	602.62	ND	-	-	-	-
Pit 108	0.1	15.079	0	-	-	-	<0.001	432.37	ND	-	-	-	-
Pit 109	0.1	19.36	0	-	-	-	<0.001	629.04	ND	-	-	-	-
Pit 110	0.1	17.423	0	-	-	-	<0.001	588.21	ND	-	-	-	-
Pit 111	0.1	16.393	0	-	-	-	<0.001	689.11	ND	-	-	-	-
Pit 112	0.1	14.651	0	-	-	-	<0.001	699.82	ND	-	-	-	-
Pit 113	0.1	16.581	0	-	-	-	<0.001	508.47	ND	-	-	-	-
Pit 114	0.1	14.761	0	-	-	-	<0.001	478.09	ND	-	-	-	-
Pit 115	0.1	14.385	0	-	-	-	<0.001	549.77	ND	-	-	-	-
Pit 116	0.1	15.488	2	Good	(65-135)x(38-57)x5	75.4	0.073	643.05	ND	-	-	-	-
Pit 117	0.1	13.934	1	Good	32x25x5	4	0.004	438.48	ND	-	-	-	-
Pit 118	0.1	14.999	0	-	-	-	<0.001	452.05	ND	-	-	-	-
Pit 119	0.1	16.691	1	Good	45x27x5	7.3	0.007	616.81	ND	-	-	-	-
Pit 120	0.1	17.057	1	Good	31x15x5	6.5	0.006	493.49	ND	-	-	-	-
Pit 121	0.1	17.121	1	Good	20x15x5	1.5	0.001	556.84	ND	-	-	-	-
Pit 122	0.1	17.78	0	-	-	-	<0.001	663.69	ND	-	-	-	-
Pit 123	0.1	13.871	1	Good	30x22x5	4	0.004	519.24	ND	-	-	-	-
Pit 124	0.1	17.815	1	Good	30x35x5	6.5	0.005	559.6	ND	-	-	-	-
Pit 125	0.1	16.6234	0	-	-	-	<0.001	553.52	ND	-	-	-	-

Notes:

HSL for Asbestos in soil	Table 7 of Schedule B(1), NEPC (2013) for residential land use
*	Based on % w/w asbestos in soil assuming 15% asbestos in ACM
**	Based on the weight of asbestos in FA and AF as calculated by Envirolab. Values excludes calculated weight of bonded ACM greater than > 7mm in samples
ND	Not detected

Table G2: Summary of Laboratory Results – Asbestos in Materials

			Asbestos ID in Material	Comments
Sample ID	Depth (m) or Ground Surface (GS)	Sampled Date	-	-
M101	0.1	16/06/2021	**D**	Chrysotile and amosite asbestos detected
M102	0.1	16/06/2021	**D**	Chrysotile and amosite asbestos detected
M103	0.1	16/06/2021	**D**	Chrysotile and amosite asbestos detected
M104	0.1	16/06/2021	**D**	Chrysotile and amosite asbestos detected
M105	0.1	16/06/2021	**D**	Chrysotile and amosite asbestos detected
M106	0.1	16/06/2021	**D**	Chrysotile and amosite asbestos detected
M107	GS	16/06/2021	**D**	Chrysotile, amosite, and crocidolite asbestos detected
M108	0.1	16/06/2021	**D**	Chrysotile, amosite, and crocidolite asbestos detected
M109	0.1	16/06/2021	**D**	Chrysotile and amosite asbestos detected
M110	0.1	16/06/2021	**D**	Chrysotile, amosite, and crocidolite asbestos detected
M111	0.1	16/06/2021	**D**	Chrysotile, amosite, and crocidolite asbestos detected
M112	0.1	16/06/2021	**D**	Chrysotile and amosite asbestos detected
M113	GS	16/06/2021	**D**	Chrysotile asbestos detected
M114	0.1	17/06/2021	**D**	Chrysotile and amosite asbestos detected

Notes:

D	Asbestos detected
NAD	No Asbestos detected

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Table G3: Summary of Laboratory Results – Metals, TRH, BTEX, PAH

			Metals								TRH						BTEX				PAH			
			Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	TRH C6 - C10	TRH >C10-C16	F1 ((C6-C10)-BTEX)	F2 (>C10-C16 less Naphthalene)	F3 (>C16-C34)	F4 (>C34-C40)	Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene [b]	Benzo(a)pyrene (BaP)	Benzo(a)pyrene TEQ	Total PAHs
		PQL	4	0.4	1	1	1	0.1	1	1	25	50	25	50	100	100	0.2	0.5	1	1	1	0.05	0.5	0.05
Sample ID	Depth	Sample Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Pit 101/0.1	0 - 0.1 m	16/06/2021	<4	<0.4	21	13	15	<0.1	10	37	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
			100 100	20 -	100 410	6000 200	300 1100	40 -	400 160	7400 470	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -
Pit 102/0.1	0 - 0.1 m	16/06/2021	<4	<0.4	16	10	15	<0.1	7	33	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
			100 100	20 -	100 410	6000 200	300 1100	40 -	400 160	7400 470	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -
Pit 103/0.1	0 - 0.1 m	16/06/2021	<4	<0.4	17	28	71	<0.1	8	94	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
			100 100	20 -	100 410	6000 200	300 1100	40 -	400 160	7400 470	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -
Pit 104/0.1	0 - 0.1 m	16/06/2021	<4	<0.4	17	9	10	<0.1	8	31	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
			100 100	20 -	100 410	6000 200	300 1100	40 -	400 160	7400 470	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -
Pit 105/0.1	0 - 0.1 m	17/06/2021	<4	<0.4	20	12	32	<0.1	10	62	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
			100 100	20 -	100 410	6000 200	300 1100	40 -	400 160	7400 470	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -
Pit 106/0.1	0 - 0.1 m	17/06/2021	<4	<0.4	20	11	96	<0.1	9	130	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
			100 100	20 -	100 410	6000 200	300 1100	40 -	400 160	7400 470	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -
R102	0 - 0.1 m	17/06/2021	<4	<0.4	20	11	110	<0.1	9	120	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
			100 100	20 -	100 410	6000 200	300 1100	40 -	400 160	7400 470	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -
Pit 107/0.1	0 - 0.1 m	17/06/2021	<4	<0.4	24	17	18	<0.1	11	58	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
			100 100	20 -	100 410	6000 200	300 1100	40 -	400 160	7400 470	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -
Pit 108/0.1	0 - 0.1 m	17/06/2021	<4	<0.4	14	14	9	<0.1	6	41	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
			100 100	20 -	100 450	6000 200	300 1100	40 -	400 160	7400 470	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -
Pit 109/0.1	0 - 0.1 m	17/06/2021	<4	<0.4	27	10	23	<0.1	12	53	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
			100 100	20 -	100 450	6000 200	300 1100	40 -	400 160	7400 470	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -
Pit 110/0.1	0 - 0.1 m	16/06/2021	<4	<0.4	15	9	20	<0.1	8	34	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
			100 100	20 -	100 450	6000 200	300 1100	40 -	400 160	7400 470	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -
Pit 111/0.1	0 - 0.1 m	16/06/2021	<4	<0.4	19	19	43	<0.1	9	74	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
			100 100	20 -	100 450	6000 200	300 1100	40 -	400 160	7400 470	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -
Pit 112/0.1	0 - 0.1 m	16/06/2021	<4	<0.4	40	17	34	<0.1	10	95	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
			100 100	20 -	100 450	6000 200	300 1100	40 -	400 160	7400 470	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -
Pit 113/0.1	0 - 0.1 m	16/06/2021	<4	0.4	19	21	22	<0.1	9	300	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
			100 100	20 -	100 450	6000 200	300 1100	40 -	400 160	7400 470	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -
Pit 114/0.1	0 - 0.1 m	17/06/2021	<4	<0.4	64	15	23	<0.1	8	94	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
			100 100	20 -	100 450	6000 200	300 1100	40 -	400 160	7400 470	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -
Pit 115/0.1	0 - 0.1 m	17/06/2021	<4	<0.4	30	24	23	<0.1	9	66	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
			100 100	20 -	100 450	6000 200	300 1100	40 -	400 160	7400 470	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -
Pit 116/0.1	0 - 0.1 m	16/06/2021	<4	<0.4	15	8	10	<0.1	6	28	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
			100 100	20 -	100 450	6000 200	300 1100	40 -	400 160	7400 470	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -
Pit 117/0.1	0 - 0.1 m	16/06/2021	<4	<0.4	17	22	22	<0.1	7	120	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
			100 100	20 -	100 450	6000 200	300 1100	40 -	400 160	7400 470	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -
Pit 118/0.1	0 - 0.1 m	16/06/2021	<4	<0.4	20	18	16	<0.1	9	100	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
			100 100	20 -	100 450	6000 200	300 1100	40 -	400 160	7400 470	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -
Pit 119/0.1	0 - 0.1 m	16/06/2021	6	<0.4	12	38	19	<0.1	10	60	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
			100 100	20 -	100 450	6000 200	300 1100	40 -	400 160	7400 470	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -
Pit 120/0.1	0 - 0.1 m	17/06/2021	<4	<0.4	23	14	21	<0.1	10	82	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
			100 100	20 -	100 450	6000 200	300 1100	40 -	400 160	7400 470	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -
Pit 121/0.1	0 - 0.1 m	16/06/2021	<4	<0.4	21	12	26	<0.1	8	95	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
			100 100	20 -	100 450	6000 200	300 1100	40 -	400 160	7400 470	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -
Pit 122/0.1	0 - 0.1 m	16/06/2021	<4	<0.4	18	11	10	<0.1	8	86	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
			100 100	20 -	100 450	6000 200	300 1100	40 -	400 160	7400 470	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -
Pit 123/0.1	0 - 0.1 m	16/06/2021	<4	<0.4	20	15	18	<0.1	9	140	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
			100 100	20 -	100 450	6000 200	300 1100	40 -	400 160	7400 470	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -
R101	0 - 0.1 m	16/06/2021	<4	<0.4	20	16	18	<0.1	8	110	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
			100 100	20 -	100 450	6000 200	300 1100	40 -	400 160	7400 470	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -
Pit 124/0.1	0 - 0.1 m	16/06/2021	<4	<0.4	14	16	48	<0.1	7	190	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
			100 100	20 -	100 450	6000 200	300 1100	40 -	400 160	7400 470	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -

Table G3: Summary of Laboratory Results – Metals, TRH, BTEX, PAH Continued

Pit 125/0.1	0 - 0.1 m	17/06/2021	<4	<0.4	24	14	23	<0.1	8	89	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
			100 100	20 -	100 450	6000 200	300 1100	40 -	400 160	7400 470	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -
Pit 126/0.1	0 - 0.1 m	17/06/2021	<4	<0.4	17	12	15	<0.1	8	53	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
			100 100	20 -	100 450	6000 200	300 1100	40 -	400 160	7400 470	- -	- 120	45 180	110 -	- 300	- 2800	0.5 50	160 85	55 70	40 105	3 170	- 0.7	3 -	300 -
Pit 127/0.1	0 - 0.1 m	17/06/2021	<4	<0.4	11	13	7	<0.1	4	91	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT

			100	100	20	-	100	450	6000	200	300	1100	40	-	400	160	7400	470	-	-	-	120	45	180	110	-	-	300	-	2800	0.5	50	160	85	55	70	40	105	NT		-	0.7	3	-	300	-
Pit 128/0.1	0 - 0.1 m	17/06/2021	<4		<0.4		20		12		22		<0.1		9		180		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT	
			100	100	20	-	100	450	6000	200	300	1100	40	-	400	160	7400	470	-	-	-	120	45	180	110	-	-	300	-	2800	0.5	50	160	85	55	70	40	105	3	170	-	0.7	3	-	300	-
Pit 129/0.1	0 - 0.1 m	17/06/2021	<4		<0.4		24		17		36		<0.1		11		130		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT	
			100	100	20	-	100	450	6000	200	300	1100	40	-	400	160	7400	470	-	-	-	120	45	180	110	-	-	300	-	2800	0.5	50	160	85	55	70	40	105	3	170	-	0.7	3	-	300	-
Pit 130/0.1	0 - 0.1 m	17/06/2021	<4		<0.4		14		8		6		0.1		4		52		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT	
			100	100	20	-	100	450	6000	200	300	1100	40	-	400	160	7400	470	-	-	-	120	45	180	110	-	-	300	-	2800	0.5	50	160	85	55	70	40	105	3	170	-	0.7	3	-	300	-
R103	0 - 0.1 m	17/06/2021	<4		<0.4		16		11		7		0.1		5		57		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT	
			100	100	20	-	100	450	6000	200	300	1100	40	-	400	160	7400	470	-	-	-	120	45	180	110	-	-	300	-	2800	0.5	50	160	85	55	70	40	105	3	170	-	0.7	3	-	300	-
Pit 131/0.1	0 - 0.1 m	17/06/2021	<4		<0.4		16		9		5		<0.1		7		24		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT	
			100	100	20	-	100	450	6000	200	300	1100	40	-	400	160	7400	470	-	-	-	120	45	180	110	-	-	300	-	2800	0.5	50	160	85	55	70	40	105	3	170	-	0.7	3	-	300	-
Pit 131/1.5	1.5 m	17/06/2021	<4		<0.4		11		17		26		<0.1		5		37		<25		<50		<25		<50		<100		<100		<0.2		<0.5		<1		<1		<1		<0.05		<0.5		<0.05	
			100	100	20	-	100	450	6000	200	300	1100	40	-	400	160	7400	470	-	-	-	120	70	180	240	-	-	300	-	2800	0.5	50	220	85	NL	70	60	105	NL	170	-	0.7	3	-	300	-
Pit 132/0.1	0 - 0.1 m	17/06/2021	<4		<0.4		10		22		16		<0.1		4		25		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT	
			100	100	20	-	100	450	6000	200	300	1100	40	-	400	160	7400	470	-	-	-	120	45	180	110	-	-	300	-	2800	0.5	50	160	85	55	70	40	105	3	170	-	0.7	3	-	300	-
Pit 133/0.1	0 - 0.1 m	17/06/2021	<4		<0.4		26		13		15		<0.1		13		40		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT	
			100	100	20	-	100	450	6000	200	300	1100	40	-	400	160	7400	470	-	-	-	120	45	180	110	-	-	300	-	2800	0.5	50	160	85	55	70	40	105	3	170	-	0.7	3	-	300	-
Pit 134/0.1	0 - 0.1 m	17/06/2021	<4		<0.4		10		7		5		<0.1		4		36		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT	
			100	100	20	-	100	450	6000	200	300	1100	40	-	400	160	7400	470	-	-	-	120	45	180	110	-	-	300	-	2800	0.5	50	160	85	55	70	40	105	3	170	-	0.7	3	-	300	-
Pit 135/0.1	0 - 0.1 m	17/06/2021	<4		<0.4		25		16		38		<0.1		11		73		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT		NT	
			100	100	20	-	100	450	6000	200	300	1100	40	-	400	160	7400	470	-	-	-	120	45	180	110	-	-	300	-	2800	0.5	50	160	85	55	70	40	105	3	170	-	0.7	3	-	300	-

Lab result	
HIL/HSL value	EIL/ESL value

HIL/HSL exceedance EIL/ESL exceedance HIL/HSL and EIL/ESL exceedance ML exceedance ML and HIL/HSL or EIL/ESL exceedance

Indicates that asbestos has been detected by the lab, refer to the lab report **Blue** = DC exceedance HSL 0-<1 Exceedance

Bold = Lab detections - = Not tested or No HIL/HSL/EIL/ESL (as applicable) or Not applicable NL = Non limiting AD = Asbestos detected NAD = No Asbestos detected

HIL = Health investigation level HSL = Health screening level (excluding DC) EIL = Ecological investigation level ESL = Ecological screening level ML = Management Limit DC = Direct Contact HSL

Notes:

a QA/QC replicate of sample listed directly below the primary sample

b Reported naphthalene laboratory result obtained from BTEXN suite

c Criteria applies to DDT only

Site Assessment Criteria (SAC):

Refer to the SAC section of report for information of SAC sources and rationale. Summary information as follows:

SAC based on generic land use thresholds for Residential A with garden/accessible soil

HIL A	Residential / Low - High Density (NEPC, 2013)
HSL A/B	Residential / Low - High Density (vapour intrusion) (NEPC, 2013)
DC HSL A	Direct contact HSL A Residential (Low density) (direct contact) (CRC CARE, 2011)
EIL/ESL UR/POS	Urban Residential and Public Open Space (NEPC, 2013)
ML R/P/POS	Residential, Parkland and Public Open Space (NEPC, 2013)

Douglas Partners
Geotechnics / Environment / Groundwater

Table G4: Summary of Laboratory Results – OCP, OPP, PCB, Asbestos

			OCP											OPP	PCB	Asbestos		
			DDD	DDT+DDE+DDD [c]	DDE	DDT	Aldrin & Dieldrin	Total Chlordane	Endrin	Total Endosulfan	Heptachlor	Hexachlorobenzene	Methoxychlor	Chlorpyriphos	Total PCB	Asbestos ID in soil >0.1g/kg	Trace Analysis	Asbestos (50 g)
		PQL	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1			
Tees and Greens																		
Sample ID	Depth	Sample Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	-	-	-
Pit 126/0.1	0 - 0.1 m	17/06/2021	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NT	-	-	-
			- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	1 -			
Pit 127/0.1	0 - 0.1 m	17/06/2021	<0.1	<0.1	<0.1	<0.1	0.1	0.6	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NT	-	-	-
			- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	1 -			
Pit 128/0.1	0 - 0.1 m	17/06/2021	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NT	-	-	-
			- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	1 -			
Pit 129/0.1	0 - 0.1 m	17/06/2021	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NT	-	-	-
			- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	1 -			
Pit 130/0.1	0 - 0.1 m	17/06/2021	<0.1	<0.1	<0.1	<0.1	0.1	0.7	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NT	-	-	-
			- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	1 -			
R103	0 - 0.1 m	17/06/2021	<0.1	<0.1	<0.1	<0.1	0.2	0.9	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NT	-	-	-
			- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	1 -			
Pit 131/0.1	0 - 0.1 m	17/06/2021	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NT	-	-	-
			- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	1 -			
Pit 131/1.5	1.5 m	17/06/2021	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NAD	NAD	NAD
			- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	1 -			
Pit 132/0.1	0 - 0.1 m	17/06/2021	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NT	-	-	-
			- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	1 -			
Pit 133/0.1	0 - 0.1 m	17/06/2021	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NT	-	-	-
			- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	1 -			
Pit 134/0.1	0 - 0.1 m	17/06/2021	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NT	-	-	-
			- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	1 -			
Pit 135/0.1	0 - 0.1 m	17/06/2021	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NT	-	-	-
			- -	240 180	- -	- 180	6 -	50 -	10 -	270 -	6 -	10 -	300 -	160 -	1 -			

Lab result

HIL/HSL value EIL/ESL value

HIL/HSL exceedance EIL/ESL exceedance HIL/HSL and EIL/ESL exceedance ML exceedance ML and HIL/HSL or EIL/ESL exceedance

Indicates that asbestos has been detected by the lab, refer to the lab report **Blue** = DC exceedance HSL 0-<1 Exceedance

Bold = Lab detections - = Not tested or No HIL/HSL/EIL/ESL (as applicable) or Not applicable NL = Non limiting AD = Asbestos detected NAD = No Asbestos detected

HIL = Health investigation level HSL = Health screening level (excluding DC) EIL = Ecological investigation level ESL = Ecological screening level ML = Management Limit DC = Direct Contact HSL

Notes:

a QA/QC replicate of sample listed directly below the primary sample

b Reported naphthalene laboratory result obtained from BTEXN suite

c Criteria applies to DDT only

Site Assessment Criteria (SAC):

Refer to the SAC section of report for information of SAC sources and rationale. Summary information as follows:

SAC based on generic land use thresholds for Residential A with garden/accessible soil

HIL A	Residential / Low - High Density (NEPC, 2013)
HSL A/B	Residential / Low - High Density (vapour intrusion) (NEPC, 2013)
DC HSL A	Direct contact HSL A Residential (Low density) (direct contact) (CRC CARE, 2011)
EIL/ESL UR/POS	Urban Residential and Public Open Space (NEPC, 2013)
ML R/P/POS	Residential, Parkland and Public Open Space (NEPC, 2013)

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Table G5: Relative Percentage Difference Results – Intra-laboratory Replicates

			Metals								TRH						BTEX				PAH				OCP										OPP	PCB
			Arsenic	Cadmium	Total Chromium	Copper	Lead	Mercury (inorganic)	Nickel	Zinc	TRH C6 - C10	TRH >C10-C16	F1 ((C6-C10)-BTEX)	F2 (>C10-C16 less Naphthalene)	F3 (>C16-C34)	F4 (>C34-C40)	Benzene	Toluene	Ethylbenzene	Total Xylenes	Naphthalene [b]	Benzo(a)pyrene (BaP)	Benzo(a)pyrene TEQ	Total PAHs	DDD	DDT+DDE+DDD [c]	DDE	DDT	Aldrin & Dieldrin	Total Chlordane	Endrin	Total Endosulfan	Heptachlor	Hexachlorobenzene	Methoxychlor	Chlorpyriphos	Total PCB
Sample ID	Depth	Sample Date	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
R102	0 - 0.1 m	17/06/2021	<4	<0.4	20	11	110	<0.1	9	120	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Pit 106/0.1	0 - 0.1 m	17/06/2021	<4	<0.4	20	11	96	<0.1	9	130	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
		Difference	0	0	0	0	14	0	0	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		RPD	0%	0%	0%	0%	14%	0%	0%	8%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
R101	0 - 0.1 m	16/06/2021	<4	<0.4	20	16	18	<0.1	8	110	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
Pit 123/0.1	0 - 0.1 m	16/06/2021	<4	<0.4	20	15	18	<0.1	9	140	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
		Difference	0	0	0	1	0	0	1	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		RPD	0%	0%	0%	6%	0%	0%	12%	24%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
R103	0 - 0.1 m	17/06/2021	<4	<0.4	16	11	7	0.1	5	57	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	<0.1	<0.1	<0.1	<0.1	0.2	0.9	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NT
Pit 130/0.1	0 - 0.1 m	17/06/2021	<4	<0.4	14	8	6	0.1	4	52	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	<0.1	<0.1	<0.1	<0.1	0.1	0.7	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NT
		Difference	0	0	2	3	1	0	1	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0.1	0.2	0	0	0	0	0	0	-
		RPD	0%	0%	13%	**32%**	15%	0%	22%	9%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%	0%	0%	0%	**67%**	25%	0%	0%	0%	0%	0%	0%	-

Appendix H

Chain of Custody
Sample Receipt Advice
Laboratory Certificates

Douglas Partners
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CHAIN OF CUSTODY DESPATCH SHEET

22/6/21
LA rec'd 17-00

Project No:	3109.04	**Suburb:**	Jindabyne	**To:**	EnviroLab
Project Name:	Jindabyne	**Order Number**	155114		
Project Manager	Shannon Goodsell	**Sampler:**	SDG	**Attn:**	Aileen Hie
Emails:	nnon.goodsell@douglaspartners.con			**Phone:**	612 9910 6200
Date Required:	Standard ☐			**Email:**	Ahie@envirolab.com.au
Prior Storage:	☐ Fridge	Do samples contain 'potential' HBM?	Yes ☐	(If YES, then handle, transport and store in accordance with FPM HAZID)	

Sample ID	Lab ID	Date Sampled	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	Analytes: Heavy Metals	OCP/OCP	Comb. 6a	NEMP asbestos ID 500mL	Asbestos in material ID	Hold				Notes/preservation
Pit 101/0.1	1	16/06/21	S	G/P	X			X						
Pit 101/0.4	2	16/06/21	S	G/P						X				
Pit 102/0.1	3	16/06/21	S	G/P	X			X						
Pit 102/0.4	4	16/06/21	S	G/P						X				
Pit 103/0.1	5	16/06/21	S	G/P	X			X						
Pit 103/0.3	6	16/06/21	S	G/P						X				
Pit 104/0.1	7	16/06/21	S	G/P	X			X						
Pit 104/0.3	8	17/06/21	S	G/P						X				
Pit 105/0.1	9	17/06/21	S	G/P	X			X						
Pit 105/0.3	10	17/06/21	S	G/P						X				
Pit 106/0.1	11	17/06/21	S	G/P	X			X						
Pit 106/0.4	12	17/06/21	S	G/P						X				
Pit 107/0.1	13	17/06/21	S	G/P	X			X						
Pit 107/0.4	14	17/06/21	S	G/P						X				
Pit 108/0.1	15	17/06/21	S	G/P	X			X						
PQL (S) mg/kg														**ANZECC PQLs req'd for all water analytes** ☐

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200
Job No: 272326
Date Received: 22.6.21
Time Received: 1600
Received By:
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No:

Total number of samples in container:	**Relinquished by:** SDG	**Transported to laboratory by:**	FedEx
Send Results to: Douglas Partners Pty Ltd	**Address**	**Phone:**	**Fax:**
Signed:	**Received by:**	**Date & Time:**	22/6/21

272326

Douglas Partners
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CHAIN OF CUSTODY DESPATCH SHEET

Project No:	3109.04	**Suburb:**	Jindabyne	**To:**	EnviroLab
Project Name:	Jindabyne	**Order Number**	155114		
Project Manager	Shannon Goodsell	**Sampler:**	SDG	**Attn:**	Aileen Hie
Emails:	nnon.goodsell@douglaspartners.con			**Phone:**	612 9910 6200
Date Required:	Standard ☐			**Email:**	Ahie@envirolab.com.au
Prior Storage:	☐ Fridge	Do samples contain 'potential' HBM?	Yes ☐	(If YES, then handle, transport and store in accordance with FPM HAZID)	

Sample ID	Lab ID	Sampling Date	Sample Type (S - soil W - water)	Container Type (G - glass P - plastic)	Analytes: Heavy Metals	OCP/OCP	Comb. 6a	NEMP asbestos ID 500mL	Asbestos in material ID	Hold				Notes/preservation
Pit 108/0.4	16	17/06/21	S	G/P						X				
Pit 109/0.1	17	17/06/21	S	G/P	X			X						
Pit 109/0.4	18	17/06/21	S	G/P						X				
Pit 110/0.1	19	16/06/21	S	G/P	X			X						
Pit 110/0.4	20	16/06/21	S	G/P						X				
Pit 111/0.1	21	16/06/21	S	G/P	X			X						
Pit 111/0.4	22	16/06/21	S	G/P						X				
Pit 112/0.1	23	16/06/21	S	G/P	X			X						
Pit 112/0.5	24	16/06/21	S	G/P						X				
Pit 113/0.1	25	16/06/21	S	G/P	X			X						
Pit 113/0.4	26	16/06/21	S	G/P						X				
Pit 114/0.1	27	17/06/21	S	G/P	X			X						
Pit 114/0.4	28	17/06/21	S	G/P						X				
Pit 115/0.1	29	17/06/21	S	G/P	X			X						
Pit 115/0.4	30	17/06/21	S	G/P						X				
PQL (S) mg/kg													**ANZECC PQLs req'd for all water analytes** ☐	

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No:

Total number of samples in container:	**Relinquished by:** SDG	**Transported to laboratory by:**	FedEx
Send Results to: Douglas Partners Pty Ltd	**Address**	**Phone:**	**Fax:**
Signed:	**Received by:**	**Date & Time:**	22-6-21 11:00

Douglas Partners
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CHAIN OF CUSTODY DESPATCH SHEET

COC 17-00

Project No:	3109.04	**Suburb:**	Jindabyne	**To:**	EnviroLab
Project Name:	Jindabyne	**Order Number**	155114		
Project Manager	Shannon Goodsell	**Sampler:**	SDG	**Attn:**	Aileen Hie
Emails:	nnon.goodsell@douglaspartners.con			**Phone:**	612 9910 6200
Date Required:	Standard ☐			**Email:**	Ahie@envirolab.com.au
Prior Storage:	☐ Fridge	Do samples contain 'potential' HBM?	Yes ☐	(If YES, then handle, transport and store in accordance with FPM HAZID)	

Sample ID	Lab ID	Sampling Date	Sample Type: S - soil W - water	Container Type: G - glass P - plastic	Analytes: Heavy Metals	OCP/OCP	Comb. 6a	NEMP asbestos ID 500mL	Asbestos in material ID	Hold				Notes/preservation
Pit 116/0.1	31	16/06/21	S	G/P	X			X						
Pit 116/0.5	32	16/06/21	S	G/P						X				
Pit 117/0.1	33	16/06/21	S	G/P	X			X						
Pit 117/0.5	34	16/06/21	S	G/P						X				
Pit 118/0.1	35	16/06/21	S	G/P	X			X						
Pit 118/0.3	36	16/06/21	S	G/P						X				
Pit 119/0.1	37	16/06/21	S	G/P	X			X						
Pit 119/0.4	38	16/06/21	S	G/P						X				
Pit 120/0.1	39	17/06/21	S	G/P	X			X						
Pit 120/0.4	40	17/06/21	S	G/P						X				
Pit 121/0.1	41	16/06/21	S	G/P	X			X						
Pit 121/0.4	42	16/06/21	S	G/P						X				
Pit 122/0.1	43	16/06/21	S	G/P	X			X						
Pit 122/0.3	44	16/06/21	S	G/P						X				
Pit 123/0.1	45	16/06/21	S	G/P	X			X						
PQL (S) mg/kg														**ANZECC PQLs req'd for all water analytes** ☐

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No:

Total number of samples in container: **Relinquished by:** SDG **Transported to laboratory by:** FedEx

Send Results to: Douglas Partners Pty Ltd **Address** **Phone:** **Fax:**

Signed: **Received by:** **Date & Time:** 22-6-21

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 277326
Date Received: 22/6/21
Time Received: 11-00
Received By:
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Douglas Partners
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CHAIN OF CUSTODY DESPATCH SHEET

272326

Project No:	3109.04	**Suburb:**	Jindabyne	**To:**	EnviroLab
Project Name:	Jindabyne	**Order Number**	155114		
Project Manager	Shannon Goodsell	**Sampler:**	SDG	**Attn:**	Aileen Hie
Emails:	nnon.goodsell@douglaspartners.con			**Phone:**	612 9910 6200
Date Required:	Standard ☐			**Email:**	Ahie@envirolab.com.au
Prior Storage:	☐ Fridge	Do samples contain 'potential' HBM?	Yes ☐	(If YES, then handle, transport and store in accordance with FPM HAZID)	

Sample ID	Lab ID	Sampling Date	Sample Type (S - soil W - water)	Container Type (G - glass P - plastic)	Analytes: Heavy Metals	OCP/OCP	Comb. 6a	NEMP asbestos ID 500mL	Asbestos in material ID	Hold				Notes/preservation
Pit 123/0.5	46	16/06/21	S	G/P						X				
Pit 124/0.1	47	16/06/21	S	G/P	X			X						
Pit 124/0.3	48	16/06/21	S	G/P						X				
Pit 125/0.1	49	17/06/21	S	G/P	X			X						
Pit 125/0.3	50	17/06/21	S	G/P						X				
Pit 126/0.1	51	17/06/21	S	G/P	X	X		X						
Pit 126/0.5	52	17/06/21	S	G/P						X				
Pit 126/1.0	53	17/06/21	S	G/P						X				
Pit 127/0.1	54	17/06/21	S	G/P	X	X								
Pit 127/0.5	55	17/06/21	S	G/P						X				
Pit 127/1.0	56	17/06/21	S	G/P						X				
Pit 128/0.1	57	17/06/21	S	G/P	X	X								
Pit 128/0.5	58	17/06/21	S	G/P						X				
Pit 128/1.0	59	17/06/21	S	G/P						X				
Pit 129/0.1	60	17/06/21	S	G/P	X	X								
PQL (S) mg/kg													**ANZECC PQLs req'd for all water analytes** ☐	

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No:

Total number of samples in container:	**Relinquished by:** SDG	**Transported to laboratory by:**	FedEx
Send Results to: Douglas Partners Pty Ltd	**Address**	**Phone:**	**Fax:**
Signed:	**Received by:**	**Date & Time:**	23.6.21

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CHAIN OF CUSTODY DESPATCH SHEET

2722326

Project No:	3109.04	**Suburb:**	Jindabyne	**To:**	EnviroLab
Project Name:	Jindabyne	**Order Number**	155114		
Project Manager	Shannon Goodsell	**Sampler:**	SDG	**Attn:**	Aileen Hie
Emails:	nnon.goodsell@douglaspartners.con			**Phone:**	612 9910 6200
Date Required:	Standard ☐			**Email:**	Ahie@envirolab.com.au
Prior Storage:	☐ Fridge	Do samples contain 'potential' HBM?	Yes ☐	(If YES, then handle, transport and store in accordance with FPM HAZID)	

Sample ID	Lab ID	Sampling Date	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	Analytes: Heavy Metals	OCP/OCP	Comb. 6a	NEMP asbestos ID 500mL	Asbestos in material ID	Hold				Notes/preservation
Pit 129/0.5	61	17/06/21	S	G/P						X				
Pit 129/1.0	62	17/06/21	S	G/P						X				
Pit 130/0.1	63	17/06/21	S	G/P	X	X								
Pit 130/0.5	64	17/06/21	S	G/P						X				
Pit 130/1.0	65	17/06/21	S	G/P						X				
Pit 131/0.1	66	17/06/21	S	G/P	X	X								
Pit 131/0.5	67	17/06/21	S	G/P						X				
Pit 131/1.0	68	17/06/21	S	G/P										
Pit 131/1.5	69	17/06/21	S	G/P			X							
Pit 131/2.0	70	17/06/21	S	G/P						X				
Pit 131/2.6	71	17/06/21	S	G/P						X				
Pit 132/0.1	72	17/06/21	S	G/P	X	X								
Pit 132/0.5	73	17/06/21	S	G/P						X				
Pit 132/1.0	74	17/06/21	S	G/P						X				
Pit 133/0.1	75	17/06/21	S	G/P	X	X								
PQL (S) mg/kg													**ANZECC PQLs req'd for all water analytes** ☐	

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No:

Total number of samples in container:	**Relinquished by:** SDG	**Transported to laboratory by:**	FedEx
Send Results to: Douglas Partners Pty Ltd	**Address**	**Phone:**	**Fax:**
Signed:	**Received by:**	**Date & Time:**	22-6-21

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CHAIN OF CUSTODY DESPATCH SHEET

272326

Project No:	3109.04	**Suburb:**	Jindabyne	**To:**	EnviroLab
Project Name:	Jindabyne	**Order Number**	155114		
Project Manager	Shannon Goodsell	**Sampler:**	SDG	**Attn:**	Aileen Hie
Emails:	nnon.goodsell@douglaspartners.con			**Phone:**	612 9910 6200
Date Required:	Standard ☐			**Email:**	Ahie@envirolab.com.au
Prior Storage:	☐ Fridge	Do samples contain 'potential' HBM?	Yes ☐	(If YES, then handle, transport and store in accordance with FPM HAZID)	

Sample ID	Lab ID	Sampling Date	Sample Type (S - soil W - water)	Container Type (G - glass P - plastic)	Analytes: Heavy Metals	OCP/OCP	Comb. 6a	NEMP asbestos ID 500mL	Asbestos in material ID	Hold				Notes/preservation
Pit 133/0.5	76	17/06/21	S	G/P						X				
Pit 133/1.0	77	17/06/21	S	G/P						X				
Pit 134/0.1	78	17/06/21	S	G/P	X	X								
Pit 134/0.5	79	17/06/21	S	G/P						X				
Pit 134/1.0	80	17/06/21	S	G/P						X				
Pit 135/0.1	81	17/06/21	S	G/P	X	X								
Pit 135/0.5	82	17/06/21	S	G/P						X				
Pit 135/1.0	—	17/06/21	S	G/P						X				
M101	83	16/06/21	M	P					X					
M102	84	16/06/21	M	P					X					
M103	85	16/06/21	M	P					X					
M104	86	16/06/21	M	P					X					
M105	87	16/06/21	M	P					X					
M106	88	16/06/21	M	P					X					
M107	89	16/06/21	M	P					X					
PQL (S) mg/kg													**ANZECC PQLs req'd for all water analytes** ☐	

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No:

Total number of samples in container:	**Relinquished by:** SDG	**Transported to laboratory by:**	FedEx
Send Results to: Douglas Partners Pty Ltd	**Address**	**Phone:**	**Fax:**
Signed:	**Received by:**	**Date & Time:**	22.6.21

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CHAIN OF CUSTODY DESPATCH SHEET

Project No:	3109.04	**Suburb:**	Jindabyne	**To:**	EnviroLab
Project Name:	Jindabyne	**Order Number**	155114		
Project Manager	Shannon Goodsell	**Sampler:**	SDG	**Attn:**	Aileen Hie
Emails:	nnon.goodsell@douglaspartners.con			**Phone:**	612 9910 6200
Date Required:	Standard ☐			**Email:**	Ahie@envirolab.com.au
Prior Storage:	☐ Fridge	Do samples contain 'potential' HBM?	Yes ☐	(If YES, then handle, transport and store in accordance with FPM HAZID)	

Sample ID	Lab ID	Sampling Date	Sample Type (S - soil W - water)	Container Type (G - glass P - plastic)	Analytes: Heavy Metals	OCP/OCP	Comb. 6a	NEMP asbe	Asbestos in material ID	Hold				Notes/preservation
M108	90	16/06/21	M	P					X					
M109	91	16/06/21	M	P					X					
M110	92	16/06/21	M	P					X					
M111	93	16/06/21	M	P					X					
M112	94	16/06/21	M	P					X					
M113	95	16/06/21	M	P					X					
M114	96	17/06/21	M	P					X					
M115	—	17/06/21	M	P					X					
R101	97	16/06/21	S	G	X									
R102	98	17/06/21	S	G	X									
R103	99	17/06/21	S	G	X	X								
PQL (S) mg/kg													**ANZECC PQLs req'd for all water analytes** ☐	

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No:

Total number of samples in container:	**Relinquished by:** SDG	**Transported to laboratory by:**	FedEx
Send Results to: Douglas Partners Pty Ltd	**Address**	**Phone:**	**Fax:**
Signed:	**Received by:** ELS	**Date & Time:**	22-6-21

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

SAMPLE RECEIPT ADVICE

Client Details

Client	Douglas Partners Canberra
Attention	Shannon Goodsell

Sample Login Details

Your reference	3109.04, Jindabyne
Envirolab Reference	272326
Date Sample Received	22/06/2021
Date Instructions Received	22/06/2021
Date Results Expected to be Reported	30/06/2021

Sample Condition

Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	99 Soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	11
Cooling Method	Ice
Sampling Date Provided	YES

Comments

Nil

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	**Phone: 02 9910 6200**
Fax: 02 9910 6201	**Fax: 02 9910 6201**
Email: ahie@envirolab.com.au	**Email: jhurst@envirolab.com.au**

Analysis Underway, details on the following page:

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides in Soil	PCBsin Soil	Acid Extractable metalsin soil	Asbestos ID - soils NEPM	Asbestos ID - materials	Asbestos ID - soils	On Hold
Pit 101/0.1							✓	✓			
Pit 101/0.4											✓
Pit 102/0.1							✓	✓			
Pit 102/0.4											✓
Pit 103/0.1							✓	✓			
Pit 103/0.3											✓
Pit 104/0.1							✓	✓			
Pit 104/0.3											✓
Pit 105/0.1							✓	✓			
Pit 105/0.3											✓
Pit 106/0.1							✓	✓			
Pit 106/0.4											✓
Pit 107/0.1							✓	✓			
Pit 107/0.4											✓
Pit 108/0.1							✓	✓			
Pit 108/0.4											✓
Pit 109/0.1							✓	✓			
Pit 109/0.4											✓
Pit 110/0.1							✓	✓			
Pit 110/0.4											✓
Pit 111/0.1							✓	✓			
Pit 111/0.4											✓
Pit 112/0.1							✓	✓			
Pit 112/0.5											✓
Pit 113/0.1							✓	✓			
Pit 113/0.4											✓
Pit 114/0.1							✓	✓			
Pit 114/0.4											✓
Pit 115/0.1							✓	✓			
Pit 115/0.4											✓
Pit 116/0.1							✓	✓			
Pit 116/0.5											✓

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides in Soil	PCBsin Soil	Acid Extractable metalsin soil	Asbestos ID - soils NEPM	Asbestos ID - materials	Asbestos ID - soils	On Hold
Pit 117/0.1							✓	✓			
Pit 117/0.5											✓
Pit 118/0.1							✓	✓			
Pit 118/0.3											✓
Pit 119/0.1							✓	✓			
Pit 119/0.4											✓
Pit 120/0.1							✓	✓			
Pit 120/0.4											✓
Pit 121/0.1							✓	✓			
Pit 121/0.4											✓
Pit 122/0.1							✓	✓			
Pit 122/0.3											✓
Pit 123/0.1							✓	✓			
Pit 123/0.5											✓
Pit 124/0.1							✓	✓			
Pit 124/0.3											✓
Pit 125/0.1							✓	✓			
Pit 125/0.3											✓
Pit 126/0.1				✓	✓		✓				
Pit 126/0.5											✓
Pit 126/1.0											✓
Pit 127/0.1				✓	✓		✓				
Pit 127/0.5											✓
Pit 127/1.0											✓
Pit 128/0.1				✓	✓		✓				
Pit 128/0.5											✓
Pit 128/1.0											✓
Pit 129/0.1				✓	✓		✓				
Pit 129/0.5											✓
Pit 129/1.0											✓
Pit 130/0.1				✓	✓		✓				
Pit 130/0.5											✓

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Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides in Soil	PCBsin Soil	Acid Extractable metalsin soil	Asbestos ID - soils NEPM	Asbestos ID - materials	Asbestos ID - soils	On Hold
Pit 130/1.0											✓
Pit 131/0.1				✓	✓		✓				
Pit 131/0.5											✓
Pit 131/1.0											✓
Pit 131/1.5	✓	✓	✓	✓	✓	✓	✓			✓	
Pit 131/2.0											✓
Pit 131/2.6											✓
Pit 132/0.1				✓	✓		✓				
Pit 132/0.5											✓
Pit 132/1.0											✓
Pit 133/0.1				✓	✓		✓				
Pit 133/0.5											✓
Pit 133/1.0											✓
Pit 134/0.1				✓	✓		✓				
Pit 134/0.5											✓
Pit 134/1.0											✓
Pit 135/0.1				✓	✓		✓				
Pit 135/0.5											✓
M101									✓		
M102									✓		
M103									✓		
M104									✓		
M105									✓		
M106									✓		
M107									✓		
M108									✓		
M109									✓		
M110									✓		
M111									✓		
M112									✓		
M113									✓		
M114									✓		

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Sample ID	vTRH(C6-C10)/BTEXN in Soil	svTRH (C10-C40) in Soil	PAHs in Soil	Organochlorine Pesticides in soil	Organophosphorus Pesticides in Soil	PCBsin Soil	Acid Extractable metalsin soil	Asbestos ID - soils NEPM	Asbestos ID - materials	Asbestos ID - soils	On Hold
R101							✓				
R102							✓				
R103				✓	✓		✓				

The '✓' indicates the testing you have requested. **THIS IS NOT A REPORT OF THE RESULTS.**

Additional Info

Sample storage - Waters are routinely disposed of approximately 1 month and soils approximately 2 months from receipt.
Requests for longer term sample storage must be received in writing.
Please contact the laboratory immediately if observed settled sediment present in water samples is to be included in the extraction and/or analysis (exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS analysis where solids are included by default.
TAT for Micro is dependent on incubation. This varies from 3 to 6 days.

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CERTIFICATE OF ANALYSIS 272326

Client Details

Client	Douglas Partners Canberra
Attention	Shannon Goodsell
Address	Unit 2, 73 Sheppard St,, HUME, ACT, 2620

Sample Details

Your Reference	**103109.04, Jindabyne**
Number of Samples	99 Soil
Date samples received	22/06/2021
Date completed instructions received	22/06/2021

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details

Date results requested by	30/06/2021
Date of Issue	13/07/2021
Reissue Details	This report replaces R00 created on 30/06/2021 due to: Project ID Amended (Client Request)

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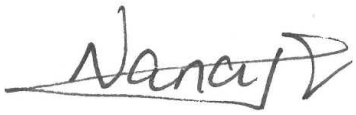
Asbestos Approved By
Analysed by Asbestos Approved Identifier: Nyovan Moonean, Panika Wongchanda
Authorised by Asbestos Approved Signatory: Lucy Zhu

Results Approved By
Dragana Tomas, Senior Chemist
Giovanni Agosti, Group Technical Manager
Lucy Zhu, Asbestos Supervisor
Steven Luong, Organics Supervisor

Authorised By



Nancy Zhang, Laboratory Manager

vTRH(C6-C10)/BTEXN in Soil		
Our Reference		272326-69
Your Reference	UNITS	Pit 131/1.5
Date Sampled		17/06/2021
Type of sample		Soil
Date extracted	-	24/06/2021
Date analysed	-	25/06/2021
TRH C_6 - C_9	mg/kg	<25
TRH C_6 - C_{10}	mg/kg	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25
Benzene	mg/kg	<0.2
Toluene	mg/kg	<0.5
Ethylbenzene	mg/kg	<1
m+p-xylene	mg/kg	<2
o-Xylene	mg/kg	<1
naphthalene	mg/kg	<1
Total +ve Xylenes	mg/kg	<3
Surrogate aaa-Trifluorotoluene	%	97

svTRH (C10-C40) in Soil		
Our Reference		272326-69
Your Reference	UNITS	Pit 131/1.5
Date Sampled		17/06/2021
Type of sample		Soil
Date extracted	-	24/06/2021
Date analysed	-	24/06/2021
TRH C_{10} - C_{14}	mg/kg	<50
TRH C_{15} - C_{28}	mg/kg	<100
TRH C_{29} - C_{36}	mg/kg	<100
TRH >C_{10} -C_{16}	mg/kg	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50
TRH >C_{16} -C_{34}	mg/kg	<100
TRH >C_{34} -C_{40}	mg/kg	<100
Total +ve TRH (>C10-C40)	mg/kg	<50
Surrogate o-Terphenyl	%	75

PAHs in Soil		
Our Reference		272326-69
Your Reference	UNITS	Pit 131/1.5
Date Sampled		17/06/2021
Type of sample		Soil
Date extracted	-	24/06/2021
Date analysed	-	25/06/2021
Naphthalene	mg/kg	<0.1
Acenaphthylene	mg/kg	<0.1
Acenaphthene	mg/kg	<0.1
Fluorene	mg/kg	<0.1
Phenanthrene	mg/kg	<0.1
Anthracene	mg/kg	<0.1
Fluoranthene	mg/kg	<0.1
Pyrene	mg/kg	<0.1
Benzo(a)anthracene	mg/kg	<0.1
Chrysene	mg/kg	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2
Benzo(a)pyrene	mg/kg	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1
Total +ve PAH's	mg/kg	<0.05
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5
Surrogate p-Terphenyl-d14	%	136

Organochlorine Pesticides in soil						
Our Reference		272326-51	272326-54	272326-57	272326-60	272326-63
Your Reference	UNITS	Pit 126/0.1	Pit 127/0.1	Pit 128/0.1	Pit 129/0.1	Pit 130/0.1
Date Sampled		17/06/2021	17/06/2021	17/06/2021	17/06/2021	17/06/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	24/06/2021	24/06/2021	24/06/2021	24/06/2021	24/06/2021
Date analysed	-	25/06/2021	25/06/2021	25/06/2021	25/06/2021	25/06/2021
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	0.1	<0.1	<0.1	0.1
Heptachlor Epoxide	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	0.3	<0.1	<0.1	0.4
alpha-chlordane	mg/kg	<0.1	0.3	<0.1	<0.1	0.3
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	103	106	107	108	105

Organochlorine Pesticides in soil						
Our Reference		272326-66	272326-69	272326-72	272326-75	272326-78
Your Reference	UNITS	Pit 131/0.1	Pit 131/1.5	Pit 132/0.1	Pit 133/0.1	Pit 134/0.1
Date Sampled		17/06/2021	17/06/2021	17/06/2021	17/06/2021	17/06/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	24/06/2021	24/06/2021	24/06/2021	24/06/2021	24/06/2021
Date analysed	-	25/06/2021	25/06/2021	25/06/2021	25/06/2021	25/06/2021
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	107	108	106	109	107

Organochlorine Pesticides in soil			
Our Reference		272326-81	272326-99
Your Reference	UNITS	Pit 135/0.1	R103
Date Sampled		17/06/2021	17/06/2021
Type of sample		Soil	Soil
Date extracted	-	24/06/2021	24/06/2021
Date analysed	-	25/06/2021	25/06/2021
alpha-BHC	mg/kg	<0.1	<0.1
HCB	mg/kg	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1
Aldrin	mg/kg	<0.1	0.2
Heptachlor Epoxide	mg/kg	<0.1	0.1
gamma-Chlordane	mg/kg	<0.1	0.5
alpha-chlordane	mg/kg	<0.1	0.4
Endosulfan I	mg/kg	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1
Surrogate TCMX	%	105	103

Organophosphorus Pesticides in Soil						
Our Reference		272326-51	272326-54	272326-57	272326-60	272326-63
Your Reference	UNITS	Pit 126/0.1	Pit 127/0.1	Pit 128/0.1	Pit 129/0.1	Pit 130/0.1
Date Sampled		17/06/2021	17/06/2021	17/06/2021	17/06/2021	17/06/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	24/06/2021	24/06/2021	24/06/2021	24/06/2021	24/06/2021
Date analysed	-	25/06/2021	25/06/2021	25/06/2021	25/06/2021	25/06/2021
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	103	106	107	108	105

Organophosphorus Pesticides in Soil						
Our Reference		272326-66	272326-69	272326-72	272326-75	272326-78
Your Reference	UNITS	Pit 131/0.1	Pit 131/1.5	Pit 132/0.1	Pit 133/0.1	Pit 134/0.1
Date Sampled		17/06/2021	17/06/2021	17/06/2021	17/06/2021	17/06/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	24/06/2021	24/06/2021	24/06/2021	24/06/2021	24/06/2021
Date analysed	-	25/06/2021	25/06/2021	25/06/2021	25/06/2021	25/06/2021
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	107	108	106	109	107

Organophosphorus Pesticides in Soil			
Our Reference		272326-81	272326-99
Your Reference	UNITS	Pit 135/0.1	R103
Date Sampled		17/06/2021	17/06/2021
Type of sample		Soil	Soil
Date extracted	-	24/06/2021	24/06/2021
Date analysed	-	25/06/2021	25/06/2021
Dichlorvos	mg/kg	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1
Surrogate TCMX	%	105	103

PCBs in Soil		
Our Reference		272326-69
Your Reference	UNITS	Pit 131/1.5
Date Sampled		17/06/2021
Type of sample		Soil
Date extracted	-	24/06/2021
Date analysed	-	25/06/2021
Aroclor 1016	mg/kg	<0.1
Aroclor 1221	mg/kg	<0.1
Aroclor 1232	mg/kg	<0.1
Aroclor 1242	mg/kg	<0.1
Aroclor 1248	mg/kg	<0.1
Aroclor 1254	mg/kg	<0.1
Aroclor 1260	mg/kg	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1
Surrogate TCMX	%	108

Acid Extractable metals in soil						
Our Reference		272326-1	272326-3	272326-5	272326-7	272326-9
Your Reference	UNITS	Pit 101/0.1	Pit 102/0.1	Pit 103/0.1	Pit 104/0.1	Pit 105/0.1
Date Sampled		16/06/2021	16/06/2021	16/06/2021	16/06/2021	17/06/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	24/06/2021	24/06/2021	24/06/2021	24/06/2021	24/06/2021
Date analysed	-	25/06/2021	25/06/2021	25/06/2021	25/06/2021	25/06/2021
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	21	16	17	17	20
Copper	mg/kg	13	10	28	9	12
Lead	mg/kg	15	15	71	10	32
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	10	7	8	8	10
Zinc	mg/kg	37	33	94	31	62

Acid Extractable metals in soil						
Our Reference		272326-11	272326-13	272326-15	272326-17	272326-19
Your Reference	UNITS	Pit 106/0.1	Pit 107/0.1	Pit 108/0.1	Pit 109/0.1	Pit 110/0.1
Date Sampled		17/06/2021	17/06/2021	17/06/2021	17/06/2021	16/06/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	24/06/2021	24/06/2021	24/06/2021	24/06/2021	24/06/2021
Date analysed	-	25/06/2021	25/06/2021	25/06/2021	25/06/2021	25/06/2021
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	20	24	14	27	15
Copper	mg/kg	11	17	14	10	9
Lead	mg/kg	96	18	9	23	20
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	9	11	6	12	8
Zinc	mg/kg	130	58	41	53	34

Acid Extractable metals in soil						
Our Reference		272326-21	272326-23	272326-25	272326-27	272326-29
Your Reference	UNITS	Pit 111/0.1	Pit 112/0.1	Pit 113/0.1	Pit 114/0.1	Pit 115/0.1
Date Sampled		16/06/2021	16/06/2021	16/06/2021	17/06/2021	17/06/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	24/06/2021	24/06/2021	24/06/2021	24/06/2021	24/06/2021
Date analysed	-	25/06/2021	25/06/2021	25/06/2021	25/06/2021	25/06/2021
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	0.4	<0.4	<0.4
Chromium	mg/kg	19	40	19	64	30
Copper	mg/kg	19	17	21	15	24
Lead	mg/kg	43	34	22	23	23
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	9	10	9	8	9
Zinc	mg/kg	74	95	300	94	66

Acid Extractable metals in soil						
Our Reference		272326-31	272326-33	272326-35	272326-37	272326-39
Your Reference	UNITS	Pit 116/0.1	Pit 117/0.1	Pit 118/0.1	Pit 119/0.1	Pit 120/0.1
Date Sampled		16/06/2021	16/06/2021	16/06/2021	16/06/2021	17/06/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	24/06/2021	24/06/2021	24/06/2021	24/06/2021	24/06/2021
Date analysed	-	25/06/2021	25/06/2021	25/06/2021	25/06/2021	25/06/2021
Arsenic	mg/kg	<4	<4	<4	6	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	15	17	20	12	23
Copper	mg/kg	8	22	18	38	14
Lead	mg/kg	10	22	16	19	21
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	6	7	9	10	10
Zinc	mg/kg	28	120	100	60	82

Acid Extractable metals in soil						
Our Reference		272326-41	272326-43	272326-45	272326-47	272326-49
Your Reference	UNITS	Pit 121/0.1	Pit 122/0.1	Pit 123/0.1	Pit 124/0.1	Pit 125/0.1
Date Sampled		16/06/2021	16/06/2021	16/06/2021	16/06/2021	17/06/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	24/06/2021	24/06/2021	24/06/2021	24/06/2021	24/06/2021
Date analysed	-	25/06/2021	25/06/2021	25/06/2021	25/06/2021	25/06/2021
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	21	18	20	14	24
Copper	mg/kg	12	11	15	16	14
Lead	mg/kg	26	10	18	48	23
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	8	8	9	7	8
Zinc	mg/kg	95	86	140	190	89

Acid Extractable metals in soil						
Our Reference		272326-51	272326-54	272326-57	272326-60	272326-63
Your Reference	UNITS	Pit 126/0.1	Pit 127/0.1	Pit 128/0.1	Pit 129/0.1	Pit 130/0.1
Date Sampled		17/06/2021	17/06/2021	17/06/2021	17/06/2021	17/06/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	24/06/2021	24/06/2021	24/06/2021	24/06/2021	24/06/2021
Date analysed	-	25/06/2021	25/06/2021	25/06/2021	25/06/2021	25/06/2021
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	17	11	20	24	14
Copper	mg/kg	12	13	12	17	8
Lead	mg/kg	15	7	22	36	6
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	0.1
Nickel	mg/kg	8	4	9	11	4
Zinc	mg/kg	53	91	180	130	52

Acid Extractable metals in soil						
Our Reference		272326-66	272326-69	272326-72	272326-75	272326-78
Your Reference	UNITS	Pit 131/0.1	Pit 131/1.5	Pit 132/0.1	Pit 133/0.1	Pit 134/0.1
Date Sampled		17/06/2021	17/06/2021	17/06/2021	17/06/2021	17/06/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	24/06/2021	24/06/2021	24/06/2021	24/06/2021	24/06/2021
Date analysed	-	25/06/2021	25/06/2021	25/06/2021	25/06/2021	25/06/2021
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	16	11	10	26	10
Copper	mg/kg	9	17	22	13	7
Lead	mg/kg	5	26	16	15	5
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	7	5	4	13	4
Zinc	mg/kg	24	37	25	40	36

Acid Extractable metals in soil						
Our Reference		272326-81	272326-97	272326-98	272326-99	272326-100
Your Reference	UNITS	Pit 135/0.1	R101	R102	R103	Pit 106/0.1 - [TRIPLICATE]
Date Sampled		17/06/2021	16/06/2021	17/06/2021	17/06/2021	17/06/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	24/06/2021	24/06/2021	24/06/2021	24/06/2021	24/06/2021
Date analysed	-	25/06/2021	25/06/2021	25/06/2021	25/06/2021	25/06/2021
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	25	20	20	16	20
Copper	mg/kg	16	16	11	11	11
Lead	mg/kg	38	18	110	7	53
Mercury	mg/kg	<0.1	<0.1	<0.1	0.1	<0.1
Nickel	mg/kg	11	8	9	5	9
Zinc	mg/kg	73	110	120	57	96

Moisture						
Our Reference		272326-1	272326-3	272326-5	272326-7	272326-9
Your Reference	UNITS	Pit 101/0.1	Pit 102/0.1	Pit 103/0.1	Pit 104/0.1	Pit 105/0.1
Date Sampled		16/06/2021	16/06/2021	16/06/2021	16/06/2021	17/06/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	24/06/2021	24/06/2021	24/06/2021	24/06/2021	24/06/2021
Date analysed	-	25/06/2021	25/06/2021	25/06/2021	25/06/2021	25/06/2021
Moisture	%	13	17	15	12	15

Moisture						
Our Reference		272326-11	272326-13	272326-15	272326-17	272326-19
Your Reference	UNITS	Pit 106/0.1	Pit 107/0.1	Pit 108/0.1	Pit 109/0.1	Pit 110/0.1
Date Sampled		17/06/2021	17/06/2021	17/06/2021	17/06/2021	16/06/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	24/06/2021	24/06/2021	24/06/2021	24/06/2021	24/06/2021
Date analysed	-	25/06/2021	25/06/2021	25/06/2021	25/06/2021	25/06/2021
Moisture	%	15	13	17	14	20

Moisture						
Our Reference		272326-21	272326-23	272326-25	272326-27	272326-29
Your Reference	UNITS	Pit 111/0.1	Pit 112/0.1	Pit 113/0.1	Pit 114/0.1	Pit 115/0.1
Date Sampled		16/06/2021	16/06/2021	16/06/2021	17/06/2021	17/06/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	24/06/2021	24/06/2021	24/06/2021	24/06/2021	24/06/2021
Date analysed	-	25/06/2021	25/06/2021	25/06/2021	25/06/2021	25/06/2021
Moisture	%	19	40	24	16	15

Moisture						
Our Reference		272326-31	272326-33	272326-35	272326-37	272326-39
Your Reference	UNITS	Pit 116/0.1	Pit 117/0.1	Pit 118/0.1	Pit 119/0.1	Pit 120/0.1
Date Sampled		16/06/2021	16/06/2021	16/06/2021	16/06/2021	17/06/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	24/06/2021	24/06/2021	24/06/2021	24/06/2021	24/06/2021
Date analysed	-	25/06/2021	25/06/2021	25/06/2021	25/06/2021	25/06/2021
Moisture	%	14	14	18	9.9	15

Moisture						
Our Reference		272326-41	272326-43	272326-45	272326-47	272326-49
Your Reference	UNITS	Pit 121/0.1	Pit 122/0.1	Pit 123/0.1	Pit 124/0.1	Pit 125/0.1
Date Sampled		16/06/2021	16/06/2021	16/06/2021	16/06/2021	17/06/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	24/06/2021	24/06/2021	24/06/2021	24/06/2021	24/06/2021
Date analysed	-	25/06/2021	25/06/2021	25/06/2021	25/06/2021	25/06/2021
Moisture	%	16	15	16	14	13

Moisture						
Our Reference		272326-51	272326-54	272326-57	272326-60	272326-63
Your Reference	UNITS	Pit 126/0.1	Pit 127/0.1	Pit 128/0.1	Pit 129/0.1	Pit 130/0.1
Date Sampled		17/06/2021	17/06/2021	17/06/2021	17/06/2021	17/06/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	24/06/2021	24/06/2021	24/06/2021	24/06/2021	24/06/2021
Date analysed	-	25/06/2021	25/06/2021	25/06/2021	25/06/2021	25/06/2021
Moisture	%	14	9.9	14	14	7.3

Moisture						
Our Reference		272326-66	272326-69	272326-72	272326-75	272326-78
Your Reference	UNITS	Pit 131/0.1	Pit 131/1.5	Pit 132/0.1	Pit 133/0.1	Pit 134/0.1
Date Sampled		17/06/2021	17/06/2021	17/06/2021	17/06/2021	17/06/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	24/06/2021	24/06/2021	24/06/2021	24/06/2021	24/06/2021
Date analysed	-	25/06/2021	25/06/2021	25/06/2021	25/06/2021	25/06/2021
Moisture	%	10	21	14	10	12

Moisture					
Our Reference		272326-81	272326-97	272326-98	272326-99
Your Reference	UNITS	Pit 135/0.1	R101	R102	R103
Date Sampled		17/06/2021	16/06/2021	17/06/2021	17/06/2021
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	24/06/2021	24/06/2021	24/06/2021	24/06/2021
Date analysed	-	25/06/2021	25/06/2021	25/06/2021	25/06/2021
Moisture	%	13	18	14	11

Asbestos ID - soils NEPM						
Our Reference		272326-1	272326-3	272326-5	272326-7	272326-9
Your Reference	UNITS	Pit 101/0.1	Pit 102/0.1	Pit 103/0.1	Pit 104/0.1	Pit 105/0.1
Date Sampled		16/06/2021	16/06/2021	16/06/2021	16/06/2021	17/06/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	29/06/2021	29/06/2021	29/06/2021	29/06/2021	29/06/2021
Sample mass tested	g	599.08	601.4	496.84	579.29	543.99
Sample Description	-	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–	–	–
FA and AF Estimation*	g	–	–	–	–	–
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001	<0.001

Asbestos ID - soils NEPM						
Our Reference		272326-11	272326-13	272326-15	272326-17	272326-19
Your Reference	UNITS	Pit 106/0.1	Pit 107/0.1	Pit 108/0.1	Pit 109/0.1	Pit 110/0.1
Date Sampled		17/06/2021	17/06/2021	17/06/2021	17/06/2021	16/06/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	29/06/2021	29/06/2021	29/06/2021	29/06/2021	29/06/2021
Sample mass tested	g	621.29	602.62	432.37	629.04	588.21
Sample Description	-	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–	–	–
FA and AF Estimation*	g	–	–	–	–	–
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001	<0.001

Asbestos ID - soils NEPM						
Our Reference		272326-21	272326-23	272326-25	272326-27	272326-29
Your Reference	UNITS	Pit 111/0.1	Pit 112/0.1	Pit 113/0.1	Pit 114/0.1	Pit 115/0.1
Date Sampled		16/06/2021	16/06/2021	16/06/2021	17/06/2021	17/06/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	29/06/2021	29/06/2021	29/06/2021	29/06/2021	29/06/2021
Sample mass tested	g	689.11	699.82	508.47	478.09	549.77
Sample Description	-	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–	–	–
FA and AF Estimation*	g	–	–	–	–	–
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001	<0.001

Asbestos ID - soils NEPM						
Our Reference		272326-31	272326-33	272326-35	272326-37	272326-39
Your Reference	UNITS	Pit 116/0.1	Pit 117/0.1	Pit 118/0.1	Pit 119/0.1	Pit 120/0.1
Date Sampled		16/06/2021	16/06/2021	16/06/2021	16/06/2021	17/06/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	29/06/2021	29/06/2021	29/06/2021	29/06/2021	29/06/2021
Sample mass tested	g	643.05	438.48	452.05	616.81	493.49
Sample Description	-	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–	–	–
FA and AF Estimation*	g	–	–	–	–	–
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001	<0.001

Asbestos ID - soils NEPM						
Our Reference		272326-41	272326-43	272326-45	272326-47	272326-49
Your Reference	UNITS	Pit 121/0.1	Pit 122/0.1	Pit 123/0.1	Pit 124/0.1	Pit 125/0.1
Date Sampled		16/06/2021	16/06/2021	16/06/2021	16/06/2021	17/06/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	29/06/2021	29/06/2021	29/06/2021	29/06/2021	29/06/2021
Sample mass tested	g	556.84	663.69	519.24	559.6	553.52
Sample Description	-	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos[#1]	g/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected	No visible asbestos detected
ACM >7mm Estimation*	g	–	–	–	–	–
FA and AF Estimation*	g	–	–	–	–	–
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001	<0.001

Asbestos ID - materials						
Our Reference		272326-83	272326-84	272326-85	272326-86	272326-87
Your Reference	UNITS	M101	M102	M103	M104	M105
Date Sampled		16/06/2021	16/06/2021	16/06/2021	16/06/2021	16/06/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	29/06/2021	29/06/2021	29/06/2021	29/06/2021	29/06/2021
Mass / Dimension of Sample	-	125x48x5mm	108x77x5mm	122x93x5mm	135x57x5mm	65x38x5mm
Sample Description	-	Grey fibre cement material	Grey fibre cement material	Grey fibre cement material	Grey fibre cement material	Grey fibre cement material
Asbestos ID in materials	-	Chrysotile asbestos detected Amosite asbestos detected	Chrysotile asbestos detected Amosite asbestos detected	Chrysotile asbestos detected Amosite asbestos detected	Chrysotile asbestos detected Amosite asbestos detected	Chrysotile asbestos detected Amosite asbestos detected
Trace Analysis	-	[NT]	[NT]	[NT]	[NT]	[NT]

Asbestos ID - materials						
Our Reference		272326-88	272326-89	272326-90	272326-91	272326-92
Your Reference	UNITS	M106	M107	M108	M109	M110
Date Sampled		16/06/2021	16/06/2021	16/06/2021	16/06/2021	16/06/2021
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	29/06/2021	29/06/2021	29/06/2021	29/06/2021	29/06/2021
Mass / Dimension of Sample	-	90x57x5mm	20x15x5mm	32x25x5mm	66x50x5mm	30x22x5mm
Sample Description	-	Grey fibre cement material	Grey fibre cement material	Grey fibre cement material	Grey fibre cement material	Grey fibre cement material
Asbestos ID in materials	-	Chrysotile asbestos detected Amosite asbestos detected	Chrysotile asbestos detected Amosite asbestos detected Crocidolite asbestos detected	Chrysotile asbestos detected Amosite asbestos detected Crocidolite asbestos detected	Chrysotile asbestos detected Amosite asbestos detected	Chrysotile asbestos detected Amosite asbestos detected Crocidolite asbestos detected
Trace Analysis	-	[NT]	[NT]	[NT]	[NT]	[NT]

Asbestos ID - materials					
Our Reference		272326-93	272326-94	272326-95	272326-96
Your Reference	UNITS	M111	M112	M113	M114
Date Sampled		16/06/2021	16/06/2021	16/06/2021	17/06/2021
Type of sample		Soil	Soil	Soil	Soil
Date analysed	-	29/06/2021	29/06/2021	29/06/2021	29/06/2021
Mass / Dimension of Sample	-	35x30x5mm	45x27x5mm	97x75x6mm	31x15x5mm
Sample Description	-	Grey fibre cement material	Grey fibre cement material	Beige fibre cement material	Grey fibre cement material
Asbestos ID in materials	-	Chrysotile asbestos detected Amosite asbestos detected Crocidolite asbestos detected	Chrysotile asbestos detected Amosite asbestos detected	Chrysotile asbestos detected	Chrysotile asbestos detected Amosite asbestos detected
Trace Analysis	-	[NT]	[NT]	[NT]	[NT]

Asbestos ID - soils		
Our Reference		272326-69
Your Reference	UNITS	Pit 131/1.5
Date Sampled		17/06/2021
Type of sample		Soil
Date analysed	-	30/06/2021
Sample mass tested	g	Approx. 45g
Sample Description	-	Brown coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
ASB-001	Asbestos ID - Identification of asbestos in soil samples using Polarised Light Microscopy and Dispersion Staining Techniques. Minimum 500mL soil sample was analysed as recommended by "National Environment Protection (Assessment of site contamination) Measure, Schedule B1 and "The Guidelines from the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia - May 2009" with a reporting limit of 0.1g/kg (0.01% w/w) as per Australian Standard AS4964-2004. Results reported denoted with * are outside our scope of NATA accreditation. **NOTE** #1 Total Asbestos g/kg was analysed and reported as per Australian Standard AS4964 (This is the sum of ACM >7mm, <7mm and FA/AF) **NOTE** #2 The screening level of 0.001% w/w asbestos in soil for FA and AF only applies where the FA and AF are able to be quantified by gravimetric procedures. This screening level is not applicable to free fibres. Estimation = Estimated asbestos weight Results reported with "--" is equivalent to no visible asbestos identified using Polarised Light microscopy and Dispersion Staining Techniques.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.

Method ID	Methodology Summary
Org-021	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.
Org-022	Determination of VOCs sampled onto coconut shell charcoal sorbent tubes, that can be desorbed using carbon disulphide, and analysed by GC-MS.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS/GC-MSMS.
Org-022/025	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-MS/GC-MSMS. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-022/025	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'EQ PQL'values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'EQ zero'values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'EQ half PQL'values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-023	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			24/06/2021	69	24/06/2021	24/06/2021		24/06/2021	[NT]
Date analysed	-			25/06/2021	69	25/06/2021	25/06/2021		25/06/2021	[NT]
TRH C_6 - C_9	mg/kg	25	Org-023	<25	69	<25	<25	0	107	[NT]
TRH C_6 - C_{10}	mg/kg	25	Org-023	<25	69	<25	<25	0	107	[NT]
Benzene	mg/kg	0.2	Org-023	<0.2	69	<0.2	<0.2	0	114	[NT]
Toluene	mg/kg	0.5	Org-023	<0.5	69	<0.5	<0.5	0	103	[NT]
Ethylbenzene	mg/kg	1	Org-023	<1	69	<1	<1	0	103	[NT]
m+p-xylene	mg/kg	2	Org-023	<2	69	<2	<2	0	108	[NT]
o-Xylene	mg/kg	1	Org-023	<1	69	<1	<1	0	109	[NT]
naphthalene	mg/kg	1	Org-023	<1	69	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	118	69	97	98	1	108	[NT]

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			24/06/2021	69	24/06/2021	24/06/2021		24/06/2021	[NT]
Date analysed	-			24/06/2021	69	24/06/2021	24/06/2021		24/06/2021	[NT]
TRH C_{10} - C_{14}	mg/kg	50	Org-020	<50	69	<50	<50	0	125	[NT]
TRH C_{15} - C_{28}	mg/kg	100	Org-020	<100	69	<100	<100	0	111	[NT]
TRH C_{29} - C_{36}	mg/kg	100	Org-020	<100	69	<100	<100	0	83	[NT]
TRH >C_{10} -C_{16}	mg/kg	50	Org-020	<50	69	<50	<50	0	125	[NT]
TRH >C_{16} -C_{34}	mg/kg	100	Org-020	<100	69	<100	<100	0	111	[NT]
TRH >C_{34} -C_{40}	mg/kg	100	Org-020	<100	69	<100	<100	0	83	[NT]
Surrogate o-Terphenyl	%		Org-020	76	69	75	82	9	104	[NT]

QUALITY CONTROL: PAHs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			24/06/2021	69	24/06/2021	24/06/2021		24/06/2021	[NT]
Date analysed	-			25/06/2021	69	25/06/2021	25/06/2021		25/06/2021	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	69	<0.1	<0.1	0	112	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	69	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	69	<0.1	<0.1	0	94	[NT]
Fluorene	mg/kg	0.1	Org-022/025	<0.1	69	<0.1	<0.1	0	100	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	69	<0.1	<0.1	0	117	[NT]
Anthracene	mg/kg	0.1	Org-022/025	<0.1	69	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	69	<0.1	<0.1	0	91	[NT]
Pyrene	mg/kg	0.1	Org-022/025	<0.1	69	<0.1	<0.1	0	93	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	69	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	69	<0.1	<0.1	0	69	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	69	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	69	<0.05	<0.05	0	107	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	69	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	69	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	69	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	127	69	136	131	4	129	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			24/06/2021	51	24/06/2021	24/06/2021		24/06/2021	[NT]
Date analysed	-			25/06/2021	51	25/06/2021	25/06/2021		25/06/2021	[NT]
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	51	<0.1	<0.1	0	111	[NT]
HCB	mg/kg	0.1	Org-022/025	<0.1	51	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	<0.1	51	<0.1	<0.1	0	106	[NT]
gamma-BHC	mg/kg	0.1	Org-022/025	<0.1	51	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	<0.1	51	<0.1	<0.1	0	103	[NT]
delta-BHC	mg/kg	0.1	Org-022/025	<0.1	51	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	<0.1	51	<0.1	<0.1	0	106	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	51	<0.1	<0.1	0	114	[NT]
gamma-Chlordane	mg/kg	0.1	Org-022/025	<0.1	51	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	<0.1	51	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	<0.1	51	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	<0.1	51	<0.1	<0.1	0	106	[NT]
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	51	<0.1	<0.1	0	115	[NT]
Endrin	mg/kg	0.1	Org-022/025	<0.1	51	<0.1	<0.1	0	113	[NT]
Endosulfan II	mg/kg	0.1	Org-022/025	<0.1	51	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	<0.1	51	<0.1	<0.1	0	108	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-022/025	<0.1	51	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	<0.1	51	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	<0.1	51	<0.1	<0.1	0	99	[NT]
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	51	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	108	51	103	105	2	109	[NT]

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	69	24/06/2021	24/06/2021		[NT]	[NT]
Date analysed	-			[NT]	69	25/06/2021	25/06/2021		[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-022/025	[NT]	69	<0.1	<0.1	0	[NT]	[NT]
HCB	mg/kg	0.1	Org-022/025	[NT]	69	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	[NT]	69	<0.1	<0.1	0	[NT]	[NT]
gamma-BHC	mg/kg	0.1	Org-022/025	[NT]	69	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	[NT]	69	<0.1	<0.1	0	[NT]	[NT]
delta-BHC	mg/kg	0.1	Org-022/025	[NT]	69	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	[NT]	69	<0.1	<0.1	0	[NT]	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	[NT]	69	<0.1	<0.1	0	[NT]	[NT]
gamma-Chlordane	mg/kg	0.1	Org-022/025	[NT]	69	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	[NT]	69	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	[NT]	69	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	[NT]	69	<0.1	<0.1	0	[NT]	[NT]
Dieldrin	mg/kg	0.1	Org-022/025	[NT]	69	<0.1	<0.1	0	[NT]	[NT]
Endrin	mg/kg	0.1	Org-022/025	[NT]	69	<0.1	<0.1	0	[NT]	[NT]
Endosulfan II	mg/kg	0.1	Org-022/025	[NT]	69	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	[NT]	69	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-022/025	[NT]	69	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	[NT]	69	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	[NT]	69	<0.1	<0.1	0	[NT]	[NT]
Methoxychlor	mg/kg	0.1	Org-022/025	[NT]	69	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	69	108	112	4	[NT]	[NT]

QUALITY CONTROL: Organophosphorus Pesticides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			24/06/2021	51	24/06/2021	24/06/2021		24/06/2021	[NT]
Date analysed	-			25/06/2021	51	25/06/2021	25/06/2021		25/06/2021	[NT]
Dichlorvos	mg/kg	0.1	Org-022/025	<0.1	51	<0.1	<0.1	0	102	[NT]
Dimethoate	mg/kg	0.1	Org-022/025	<0.1	51	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	<0.1	51	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	<0.1	51	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	<0.1	51	<0.1	<0.1	0	105	[NT]
Fenitrothion	mg/kg	0.1	Org-022/025	<0.1	51	<0.1	<0.1	0	95	[NT]
Malathion	mg/kg	0.1	Org-022/025	<0.1	51	<0.1	<0.1	0	114	[NT]
Chlorpyriphos	mg/kg	0.1	Org-022/025	<0.1	51	<0.1	<0.1	0	111	[NT]
Parathion	mg/kg	0.1	Org-022/025	<0.1	51	<0.1	<0.1	0	92	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-022	<0.1	51	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	<0.1	51	<0.1	<0.1	0	89	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	<0.1	51	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	108	51	103	105	2	109	[NT]

QUALITY CONTROL: Organophosphorus Pesticides in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	69	24/06/2021	24/06/2021		[NT]	[NT]
Date analysed	-			[NT]	69	25/06/2021	25/06/2021		[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-022/025	[NT]	69	<0.1	<0.1	0	[NT]	[NT]
Dimethoate	mg/kg	0.1	Org-022/025	[NT]	69	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	[NT]	69	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	[NT]	69	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	[NT]	69	<0.1	<0.1	0	[NT]	[NT]
Fenitrothion	mg/kg	0.1	Org-022/025	[NT]	69	<0.1	<0.1	0	[NT]	[NT]
Malathion	mg/kg	0.1	Org-022/025	[NT]	69	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos	mg/kg	0.1	Org-022/025	[NT]	69	<0.1	<0.1	0	[NT]	[NT]
Parathion	mg/kg	0.1	Org-022/025	[NT]	69	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-022	[NT]	69	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	[NT]	69	<0.1	<0.1	0	[NT]	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	[NT]	69	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	69	108	112	4	[NT]	[NT]

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			24/06/2021	69	24/06/2021	24/06/2021		24/06/2021	[NT]
Date analysed	-			25/06/2021	69	25/06/2021	25/06/2021		25/06/2021	[NT]
Aroclor 1016	mg/kg	0.1	Org-021	<0.1	69	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	<0.1	69	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	<0.1	69	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	<0.1	69	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	<0.1	69	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	<0.1	69	<0.1	<0.1	0	120	[NT]
Aroclor 1260	mg/kg	0.1	Org-021	<0.1	69	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	108	69	108	112	4	109	[NT]

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	272326-3
Date prepared	-			24/06/2021	1	24/06/2021	24/06/2021		24/06/2021	24/06/2021
Date analysed	-			25/06/2021	1	25/06/2021	25/06/2021		25/06/2021	25/06/2021
Arsenic	mg/kg	4	Metals-020	<4	1	<4	<4	0	97	93
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	<0.4	<0.4	0	94	84
Chromium	mg/kg	1	Metals-020	<1	1	21	20	5	100	94
Copper	mg/kg	1	Metals-020	<1	1	13	13	0	102	122
Lead	mg/kg	1	Metals-020	<1	1	15	16	6	98	87
Mercury	mg/kg	0.1	Metals-021	<0.1	1	<0.1	<0.1	0	97	95
Nickel	mg/kg	1	Metals-020	<1	1	10	10	0	96	88
Zinc	mg/kg	1	Metals-020	<1	1	37	39	5	75	83

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-2	272326-23
Date prepared	-			[NT]	11	24/06/2021	24/06/2021		24/06/2021	24/06/2021
Date analysed	-			[NT]	11	25/06/2021	25/06/2021		25/06/2021	25/06/2021
Arsenic	mg/kg	4	Metals-020	[NT]	11	<4	<4	0	96	88
Cadmium	mg/kg	0.4	Metals-020	[NT]	11	<0.4	<0.4	0	91	79
Chromium	mg/kg	1	Metals-020	[NT]	11	20	20	0	100	79
Copper	mg/kg	1	Metals-020	[NT]	11	11	11	0	102	104
Lead	mg/kg	1	Metals-020	[NT]	11	96	56	53	96	86
Mercury	mg/kg	0.1	Metals-021	[NT]	11	<0.1	<0.1	0	97	92
Nickel	mg/kg	1	Metals-020	[NT]	11	9	9	0	94	85
Zinc	mg/kg	1	Metals-020	[NT]	11	130	99	27	89	83

QUALITY CONTROL: Acid Extractable metals in soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	21	24/06/2021	24/06/2021		[NT]	[NT]
Date analysed	-			[NT]	21	25/06/2021	25/06/2021		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	21	<4	<4	0	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	21	<0.4	<0.4	0	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	21	19	18	5	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	21	19	18	5	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	21	43	45	5	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	21	<0.1	<0.1	0	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	21	9	8	12	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	21	74	70	6	[NT]	[NT]

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	51	24/06/2021	24/06/2021		[NT]	[NT]
Date analysed	-			[NT]	51	25/06/2021	25/06/2021		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	51	<4	<4	0	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	51	<0.4	<0.4	0	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	51	17	16	6	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	51	12	11	9	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	51	15	14	7	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	51	<0.1	<0.1	0	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	51	8	7	13	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	51	53	49	8	[NT]	[NT]

QUALITY CONTROL: Acid Extractable metals in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date prepared	-			[NT]	69	24/06/2021	24/06/2021		[NT]	[NT]
Date analysed	-			[NT]	69	25/06/2021	25/06/2021		[NT]	[NT]
Arsenic	mg/kg	4	Metals-020	[NT]	69	<4	<4	0	[NT]	[NT]
Cadmium	mg/kg	0.4	Metals-020	[NT]	69	<0.4	<0.4	0	[NT]	[NT]
Chromium	mg/kg	1	Metals-020	[NT]	69	11	11	0	[NT]	[NT]
Copper	mg/kg	1	Metals-020	[NT]	69	17	17	0	[NT]	[NT]
Lead	mg/kg	1	Metals-020	[NT]	69	26	19	31	[NT]	[NT]
Mercury	mg/kg	0.1	Metals-021	[NT]	69	<0.1	<0.1	0	[NT]	[NT]
Nickel	mg/kg	1	Metals-020	[NT]	69	5	5	0	[NT]	[NT]
Zinc	mg/kg	1	Metals-020	[NT]	69	37	44	17	[NT]	[NT]

Result Definitions

NT	Not tested
NA	Test not required
INS	Insufficient sample for this test
PQL	Practical Quantitation Limit
<	Less than
>	Greater than
RPD	Relative Percent Difference
LCS	Laboratory Control Sample
NS	Not specified
NEPM	National Environmental Protection Measure
NR	Not Reported

Quality Control Definitions

Blank	This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate	This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike	A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample)	This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike	Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Australian Drinking Water Guidelines recommend that Thermotolerant Coliform, Faecal Enterococci, & E.Coli levels are less than 1cfu/100mL. The recommended maximums are taken from "Australian Drinking Water Guidelines", published by NHMRC & ARMC 2011.

The recommended maximums for analytes in urine are taken from “2018 TLVs and BEIs”, as published by ACGIH (where available). Limit provided for Nickel is a precautionary guideline as per Position Paper prepared by AIOH Exposure Standards Committee, 2016.

Guideline limits for Rinse Water Quality reported as per analytical requirements and specifications of AS 4187, Amdt 2 2019, Table 7.2

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% – see ELN-P05 QA/QC tables for details; <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals (not SPOCAS); 60-140% for organics/SPOCAS (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC and/or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, total recoverable metals and PFAS where solids are included by default.

Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Report Comments

Acid Extractable Metals in Soil: The laboratory RPD acceptance criteria has been exceeded for 272326-11 for Pb. Therefore a triplicate result has been issued as laboratory sample number 272326-100.

Asbestos-ID in soil: NEPM
This report is consistent with the reporting recommendations in the National Environment Protection (Assessment of Site Contamination) Measure, Schedule B1, May 2013. This is reported outside our scope of NATA accreditation.

Asbestos: A portion of the supplied sample was sub-sampled for asbestos analysis according to Envirolab procedures.
We cannot guarantee that this sub-sample is indicative of the entire sample.
Envirolab recommends supplying 40-50g of sample in its own container.
Note: Sample 272326-69 was sub-sampled from a jar provided by the client.

Ming To

From: Nick Sarlamis
Sent: Tuesday, 13 July 2021 11:10 AM
To: Ming To
Subject: FW: Results for Registration 272326 3109.04, Jindabyne

Categories: Additional

Ref: 272326-A.
TAT: 1 day
Due: 14/07/2021 MT

Ming,

A job please
Thanks

From: Shannon Goodsell <Shannon.Goodsell@douglaspartners.com.au>
Sent: Tuesday, 13 July 2021 9:50 AM
To: Nick Sarlamis <NSarlamis@envirolab.com.au>
Subject: RE: Results for Registration 272326 3109.04, Jindabyne

Hi Nick,

Could we please have our reference number on the lab report and SRA amended to 103109.04

And if it is not too late, could I please have samples Pit 101/0.4 (2) and sample Pit 125/0.3 (50) tested for Clay content, pH and CEC with a turnaround time of 24hrs.

Thank you

Shannon Goodsell | Environmental Scientist
Douglas Partners Pty Ltd | ABN 75 053 980 117 | www.douglaspartners.com.au
Unit 2 73 Sheppard Street Hume ACT 2620 | PO Box 1487 Fyshwick ACT 2609
P: 02 6260 2788 | M: 0407 636 645 | E: Shannon.Goodsell@douglaspartners.com.au

To find information on our COVID-19 measures, please visit douglaspartners.com.au/news/covid-19

From: Nick Sarlamis <NSarlamis@envirolab.com.au>
Sent: Wednesday, 30 June 2021 4:06 PM
To: Shannon Goodsell <Shannon.Goodsell@douglaspartners.com.au>
Subject: Results for Registration 272326 3109.04, Jindabyne

Please refer to attached for:
a copy of the Certificate of Analysis
a copy of the COC/paperwork received from you

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
customerservice@envirolab.com.au
www.envirolab.com.au

CERTIFICATE OF ANALYSIS 272326-A

Client Details

Client	Douglas Partners Canberra
Attention	Shannon Goodsell
Address	Unit 2, 73 Sheppard St,, HUME, ACT, 2620

Sample Details

Your Reference	**103109.04, Jindabyne**
Number of Samples	additional analyses
Date samples received	22/06/2021
Date completed instructions received	14/07/2021

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.

Samples were analysed as received from the client. Results relate specifically to the samples as received.

Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

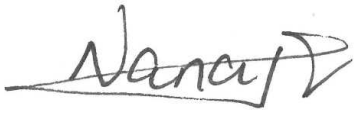
Date results requested by	14/07/2021
Date of Issue	15/07/2021

NATA Accreditation Number 2901. This document shall not be reproduced except in full.

Accredited for compliance with ISO/IEC 17025 - Testing. **Tests not covered by NATA are denoted with ***

Results Approved By
Diego Bigolin, Team Leader, Inorganics
Hannah Nguyen, Senior Chemist

Authorised By



Nancy Zhang, Laboratory Manager

Misc Inorg - Soil			
Our Reference		272326-A-2	272326-A-50
Your Reference	UNITS	Pit 101/0.4	Pit 125/0.3
Date Sampled		16/06/2021	17/06/2021
Type of sample		Soil	Soil
Date prepared	-	14/07/2021	14/07/2021
Date analysed	-	14/07/2021	14/07/2021
pH 1:5 soil:water	pH Units	6.2	7.0

Clay 50-120g			
Our Reference		272326-A-2	272326-A-50
Your Reference	UNITS	Pit 101/0.4	Pit 125/0.3
Date Sampled		16/06/2021	17/06/2021
Type of sample		Soil	Soil
Date prepared	-	13/07/2021	13/07/2021
Date analysed	-	14/07/2021	14/07/2021
Clay in soils <2µm	% (w/w)	14	14

CEC			
Our Reference		272326-A-2	272326-A-50
Your Reference	UNITS	Pit 101/0.4	Pit 125/0.3
Date Sampled		16/06/2021	17/06/2021
Type of sample		Soil	Soil
Date prepared	-	14/07/2021	14/07/2021
Date analysed	-	14/07/2021	14/07/2021
Exchangeable Ca	meq/100g	5.0	12
Exchangeable K	meq/100g	0.2	0.2
Exchangeable Mg	meq/100g	1.1	0.98
Exchangeable Na	meq/100g	<0.1	<0.1
Cation Exchange Capacity	meq/100g	6.3	13

Method ID	Methodology Summary
AS1289.3.6.3	Determination Particle Size Analysis using AS1289.3.6.3 and AS1289.3.6.1 and in house method INORG-107. Clay fraction at <2µm reported.
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Metals-020	Determination of exchangeable cations and cation exchange capacity in soils using 1M Ammonium Chloride exchange and ICP-AES analytical finish.

QUALITY CONTROL: Misc Inorg - Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			14/07/2021	[NT]	[NT]	[NT]	[NT]	14/07/2021	[NT]
Date analysed	-			14/07/2021	[NT]	[NT]	[NT]	[NT]	14/07/2021	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	[NT]	[NT]	[NT]	[NT]	101	[NT]

QUALITY CONTROL: CEC						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			14/07/2021	2	14/07/2021	14/07/2021		14/07/2021	[NT]
Date analysed	-			14/07/2021	2	14/07/2021	14/07/2021		14/07/2021	[NT]
Exchangeable Ca	meq/100g	0.1	Metals-020	<0.1	2	5.0	4.1	20	117	[NT]
Exchangeable K	meq/100g	0.1	Metals-020	<0.1	2	0.2	0.2	0	120	[NT]
Exchangeable Mg	meq/100g	0.1	Metals-020	<0.1	2	1.1	0.87	23	115	[NT]
Exchangeable Na	meq/100g	0.1	Metals-020	<0.1	2	<0.1	<0.1	0	108	[NT]

Result Definitions

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PQL	Practical Quantitation Limit
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Samples for Microbiological analysis (not Amoeba forms) received outside of the 2-8°C temperature range do not meet the ideal cooling conditions as stated in AS2031-2012.

Appendix I

ProUCL Results

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.120/07/2021 11:30:56 AM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Chlordane

General Statistics

Total Number of Observations	52	Number of Distinct Observations	6
Number of Detects	5	Number of Non-Detects	47
Number of Distinct Detects	5	Number of Distinct Non-Detects	1
Minimum Detect	0.4	Minimum Non-Detect	0.1
Maximum Detect	65	Maximum Non-Detect	0.1
Variance Detects	828.2	Percent Non-Detects	90.38%
Mean Detects	13.52	SD Detects	28.78
Median Detects	0.7	CV Detects	2.129
Skewness Detects	2.236	Kurtosis Detects	4.999
Mean of Logged Detects	0.457	SD of Logged Detects	2.099

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.558	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.469	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	1.39	KM Standard Error of Mean	1.381
KM SD	8.908	95% KM (BCA) UCL	3.894
95% KM (t) UCL	3.704	95% KM (Percentile Bootstrap) UCL	3.883
95% KM (z) UCL	3.662	95% KM Bootstrap t UCL	77.98
90% KM Chebyshev UCL	5.534	95% KM Chebyshev UCL	7.411
97.5% KM Chebyshev UCL	10.02	99% KM Chebyshev UCL	15.13

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.092	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.737	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.474	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.379	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.318	k star (bias corrected MLE)	0.261
Theta hat (MLE)	42.5	Theta star (bias corrected MLE)	51.89
nu hat (MLE)	3.181	nu star (bias corrected)	2.606
Mean (detects)	13.52		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

58					Minimum	0.01					Mean	1.309
59					Maximum	65					Median	0.01
60					SD	9.007					CV	6.881
61					k hat (MLE)	0.172					k star (bias corrected MLE)	0.175
62					Theta hat (MLE)	7.624					Theta star (bias corrected MLE)	7.497
63					nu hat (MLE)	17.86					nu star (bias corrected)	18.16
64					Adjusted Level of Significance (β)	0.0454						
65					Approximate Chi Square Value (18.16, α)	9.506					Adjusted Chi Square Value (18.16, β)	9.327
66					95% Gamma Approximate UCL (use when n>=50)	2.501					95% Gamma Adjusted UCL (use when n<50)	2.549
67												
68					**Estimates of Gamma Parameters using KM Estimates**							
69					Mean (KM)	1.39					SD (KM)	8.908
70					Variance (KM)	79.36					SE of Mean (KM)	1.381
71					k hat (KM)	0.0244					k star (KM)	0.0358
72					nu hat (KM)	2.533					nu star (KM)	3.721
73					theta hat (KM)	57.08					theta star (KM)	38.87
74					80% gamma percentile (KM)	0.044					90% gamma percentile (KM)	1.217
75					95% gamma percentile (KM)	6.213					99% gamma percentile (KM)	34.1
76												
77					**Gamma Kaplan-Meier (KM) Statistics**							
78					Approximate Chi Square Value (3.72, α)	0.615					Adjusted Chi Square Value (3.72, β)	0.582
79					95% Gamma Approximate KM-UCL (use when n>=50)	8.418					95% Gamma Adjusted KM-UCL (use when n<50)	8.893
80												
81					**Lognormal GOF Test on Detected Observations Only**							
82					Shapiro Wilk Test Statistic	0.688					**Shapiro Wilk GOF Test**	
83					5% Shapiro Wilk Critical Value	0.762					Detected Data Not Lognormal at 5% Significance Level	
84					Lilliefors Test Statistic	0.406					**Lilliefors GOF Test**	
85					5% Lilliefors Critical Value	0.343					Detected Data Not Lognormal at 5% Significance Level	
86					**Detected Data Not Lognormal at 5% Significance Level**							
87												
88					**Lognormal ROS Statistics Using Imputed Non-Detects**							
89					Mean in Original Scale	1.303					Mean in Log Scale	-10.51
90					SD in Original Scale	9.008					SD in Log Scale	6.134
91					95% t UCL (assumes normality of ROS data)	3.396					95% Percentile Bootstrap UCL	3.792
92					95% BCA Bootstrap UCL	5.086					95% Bootstrap t UCL	93.91
93					95% H-UCL (Log ROS)	19447067						
94												
95					**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**							
96					KM Mean (logged)	-2.037					KM Geo Mean	0.13
97					KM SD (logged)	1					95% Critical H Value (KM-Log)	2.312
98					KM Standard Error of Mean (logged)	0.155					95% H-UCL (KM -Log)	0.297
99					KM SD (logged)	1					95% Critical H Value (KM-Log)	2.312
100					KM Standard Error of Mean (logged)	0.155						
101												
102					**DL/2 Statistics**							
103					**DL/2 Normal**						**DL/2 Log-Transformed**	
104					Mean in Original Scale	1.345					Mean in Log Scale	-2.664
105					SD in Original Scale	9.002					SD in Log Scale	1.184
106					95% t UCL (Assumes normality)	3.437					95% H-Stat UCL	0.214
107					**DL/2 is not a recommended method, provided for comparisons and historical reasons**							
108												
109					**Nonparametric Distribution Free UCL Statistics**							
110					**Data do not follow a Discernible Distribution at 5% Significance Level**							
111												
112					**Suggested UCL to Use**							
113					95% KM (Chebyshev) UCL	7.411						
114												

	A	B	C	D	E	F	G	H	I	J	K	L
115	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
116	Recommendations are based upon data size, data distribution, and skewness.											
117	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
118	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
119												

UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.120/07/2021 11:33:47 AM
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Zinc

General Statistics

Total Number of Observations	68	Number of Distinct Observations	49
		Number of Missing Observations	0
Minimum	21	Mean	75.81
Maximum	550	Median	52.5
SD	78.45	Std. Error of Mean	9.514
Coefficient of Variation	1.035	Skewness	4.018

Normal GOF Test

Shapiro Wilk Test Statistic	0.596	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.242	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.107	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	91.68	95% Adjusted-CLT UCL (Chen-1995)	96.41
		95% Modified-t UCL (Johnson-1978)	92.45

Gamma GOF Test

A-D Test Statistic	2.82	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.763	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.147	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.109	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.051	k star (bias corrected MLE)	1.97
Theta hat (MLE)	36.96	Theta star (bias corrected MLE)	38.48
nu hat (MLE)	278.9	nu star (bias corrected)	268
MLE Mean (bias corrected)	75.81	MLE Sd (bias corrected)	54.01
		Approximate Chi Square Value (0.05)	231.1
Adjusted Level of Significance	0.0465	Adjusted Chi Square Value	230.3

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	87.92	95% Adjusted Gamma UCL (use when n<50)	88.2

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.929	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	8.0507E-4	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.135	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.107	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

58	**Lognormal Statistics**											
59	Minimum of Logged Data					3.045	Mean of logged Data					4.065
60	Maximum of Logged Data					6.31	SD of logged Data					0.653
61												
62	**Assuming Lognormal Distribution**											
63	95% H-UCL					84.45	90% Chebyshev (MVUE) UCL					90.42
64	95% Chebyshev (MVUE) UCL					98.83	97.5% Chebyshev (MVUE) UCL					110.5
65	99% Chebyshev (MVUE) UCL					133.4						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data do not follow a Discernible Distribution (0.05)**											
69												
70	**Nonparametric Distribution Free UCLs**											
71	95% CLT UCL					91.46	95% Jackknife UCL					91.68
72	95% Standard Bootstrap UCL					91.19	95% Bootstrap-t UCL					103.4
73	95% Hall's Bootstrap UCL					115.1	95% Percentile Bootstrap UCL					91.87
74	95% BCA Bootstrap UCL					98.29						
75	90% Chebyshev(Mean, Sd) UCL					104.3	95% Chebyshev(Mean, Sd) UCL					117.3
76	97.5% Chebyshev(Mean, Sd) UCL					135.2	99% Chebyshev(Mean, Sd) UCL					170.5
77												
78	**Suggested UCL to Use**											
79	95% Chebyshev (Mean, Sd) UCL					117.3						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	Recommendations are based upon data size, data distribution, and skewness.											
83	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
84	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
85												

Appendix J

Quality Assurance and Quality Control

Appendix J
Data Quality Assurance and Quality Control
Part of Lot 101 DP 1019725, Jindabyne

J1.0 Field and Laboratory Data Quality Assurance and Quality Control

The field and laboratory data quality assurance and quality control (QA/QC) procedures and results are summarised in the following Table 1. Reference should be made to the field work methodology and the laboratory results / certificates of analysis for further details. The relative percentage difference (RPD) results, along with the other filed QC samples are included in the summary results tables.

DP considered the need for inter-laboratory duplicate samples to be analysed, however at the time of preparing the proposal fee, DP did not anticipate that the site would be audited or that the investigation would be conducted through a regulatory authority. It should be noted that the potential for gross contamination associated with contaminants zinc (one exceedance in EIL in DP (2021b)) and chlordane (one exceedance in HIL in DP (2021b)) is low and these contaminants are considered to not be highly mobile or volatile. It should also be noted that it is not common practise to collect duplicates for asbestos samples, therefore, DP considered it appropriate to only submit intra-laboratory duplicates for analysis at the time for this T-DSI.

As discussed in Appendix L of DP (2021b), the chemical analysis of primary samples indicated that there was a low risk of contamination within the site and therefore, the need for trip blanks and trip spikes was considered unnecessary. This T-DSI did not allow for trip-blanks and spikes as the likelihood of gross contamination was low and the primary cause of contamination within the site was bonded ACM.

Table 1: Field and Laboratory Quality Control

Item	Evaluation / Acceptance Criteria	Compliance
Analytical laboratories used	National Association of Testing Authorities (NATA) accreditation	C
Holding times	Various based on type of analysis	C
Intra-laboratory replicates	10% of primary samples; <30% RPD	PC
Laboratory / Reagent Blanks	1 per batch; <PQL	C
Matrix Spikes	1 per lab batch; 70-130% recovery (inorganics); 60-140% recovery (organics)	C
Surrogate Spikes	All organics analysis; 70-130% recovery (inorganics); 60-140% recovery (organics)	C
Control Samples	1 per lab batch; 70-130% recovery (inorganics); 60-140% recovery (organics)	C

Standard Operating Procedures (SOP)	Adopting SOP for all aspects of the sampling field work	C

Notes:
C = compliance; PC = partial compliance; NC = non-compliance

The RPD results were all within the acceptable range, with the exception of those indicated in Table G5. The exceedances are not, however, considered to be of concern given that:

- Soil replicates, rather than homogenised soil duplicates, were used to minimise the risk of possible volatile loss, hence greater variability can be expected;
- The majority of RPDs within a replicate pair being within the acceptable limits; and
- All other QA/QC parameters met the Data Quality Indicators (DQIs).

In summary, the QC data is determined to be of sufficient quality to be considered acceptable for the assessment.

J2.0 Data Quality Indicators

The reliability of field procedures and analytical results was assessed against the following data quality indicators (DQIs) as outlined in NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [the NEPM]* (NEPC, 2013):

- Completeness: a measure of the amount of usable data from a data collection activity;
- Comparability: the confidence (qualitative) that data may be considered to be equivalent for each sampling and analytical event;
- Representativeness: the confidence (qualitative) of data representativeness of media present on-site;
- Precision: a measure of variability or reproducibility of data; and
- Accuracy: a measure of closeness of the data to the 'true' value.

Table 2: Data Quality Indicators

Data Quality Indicator	Method(s) of Achievement
Completeness	Systematic and selected target locations sampled.
	Preparation of test pit logs, sample location plan and chain of custody records.
	Laboratory sample receipt information received confirming receipt of samples intact and appropriateness of the chain of custody.
	Samples analysed for contaminants of potential concern (CoPC) identified in the Conceptual Site Model (CSM).
	Completion of chain of custody (COC) documentation.
	NATA accredited laboratory results certificates provided by the laboratory.
	Satisfactory frequency and results for field and laboratory quality control (QC) samples as discussed in Section 1.
Comparability	Using appropriate techniques for sample recovery, storage and transportation, which were the same for the duration of the project.
	Experienced sampler(s) used.
	Use of NATA registered laboratories, with test methods the same or similar between laboratories.
	Satisfactory results for field and laboratory QC samples.
Representativeness	Target media sampled.
	Sample numbers recovered and analysed are considered to be representative of the target media and complying with DQOs.
	Samples were extracted and analysed within holding times.
	Samples were analysed in accordance with the COC.
Precision	Field staff followed standard operating procedures.
	Acceptable RPD between original samples and replicates.
	Satisfactory results for all other field and laboratory QC samples.
Accuracy	Field staff followed standard operating procedures.
	Satisfactory results for all field and laboratory QC samples.

Based on the above, it is considered that the DQIs have been generally complied with.

J3.0 Conclusion

Based on the results of the field QA and field and laboratory QC, and evaluation against the DQIs it is concluded that the field and laboratory test data obtained are reliable and useable for this assessment.

J4.0 References

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM].* Australian Government Publishing Services Canberra: National Environment Protection Council.

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