HEALTH INFRASTRUCTURE

# Review of Environmental Factors –Glen Innes Hospital Upgrade (Demolition)

Prepared by GeoLINK

Version Number 4



# **HI Planning Document Control**

Version	Date	Author	Description	Reviewed by	Approved by
12	XX	XXX	REF Template Revision	XX	XX

# Declaration

This Review of Environmental Factors (REF) has been prepared for NSW Health Infrastructure (HI) and assesses the potential environmental impacts which could arise from demolition of the Old Nurses Quarters at Glen Innes Hospital located at 85 Taylor Street, Glen Innes.

This REF has been prepared in accordance with the relevant provisions of *the Environmental Planning and Assessment Act 1979* (EP&A Act), *the Environmental Planning and Assessment Regulation 2021* (EP&A Regulation) and State Environmental Planning Policy (Transport and Infrastructure) 2021 (TISEPP).

This REF provides a true and fair review of the activity in relation to its likely impact on the environment. It addresses to the fullest extent possible, all the factors listed in section 171(2) of the EP&A Regulation and the *Commonwealth Environmental Protection and Biodiversity Conservation Act* 1999 (EPBC ACT).

Based upon the information presented in this REF, it is concluded that, subject to adopting the recommended mitigation measures, it is unlikely there would be any significant environmental impacts associated with the activity. Consequently, an *Environmental Impact Statement* (EIS) is not required.

Declaration			
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Date:	05 September 2022		

# **Document Management, Tracking and Revision History**

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Α	Detail Survey (Rev. 2)	Monteath & Powys	30.05.2022
В	Sec.10.7(2) Certificate Sec.10.7(5) Certificate	Glen Innes Severn Council	05.05.2022 28.04.2022
С	Asbestos/Hazmat Investigation Report	Southern Asbestos Consultancy Pty Ltd	23.07.22
D	AHIMS Web Service Search NSW Heritage Search EPBC Act Protected Matters Report DECCW Site & Notice Details	NSW Government NSW Government Australian Government State Government	12.08.2022 17.08.2022 03.08.2022 17.08.2022
E	Construction and Operational Noise and Vibration Impact Assessment	Muller Acoustic Consulting	17.08.2022
F	Asbestos Register	Practical Environmental Solutions	18.05.2020
G	Preliminary Arboricultural Assessment	Wade Ryan Contracting	27.06.2022
н	Original Drawings 1950	NT Architect	Undated, Contract No. 277/47
I	Demolition Plan	Fulton Trotter Architects	2.08.2022 Rev:03
J	Mitigation Measures	GeoLINK	19.08.2022
К	Statement of Heritage Impact – Extract	OzArk Environment & Heritage	August 2022
L	Geotechnical Investigation	JK Geotechnics Pty Ltd	19.08.2022
М	Preliminary (Stage 1) Site Investigation	JK Environments Pty Ltd	19.08.2022
N	Communications & Engagement Register	Health Infrastructure	30.08.2022

# **Abbreviations**

Abbreviation	Description
AEC	Area of Environmental Concern
AHD	Australian Height Datum
AHIP	Aboriginal Heritage Impact Permit
AHIMs	Aboriginal Heritage Information Management System BC Regulation
AMG	Australian Map Grid
BC Act 2016	Biodiversity Conservation Act 2016
BC Act 2017	Biodiversity Conservation Act 2017
BC Regulation	Biodiversity Conservation Regulation 2017
BAM	Biodiversity Assessment Method
CA	Certifying Authority
CE	Chief Executive
CM Act	Coastal Management Act 2016
СМР	Construction Management Plan
CWC	Connecting with Country
CRA	Conservation Risk Assessment
DPC	Department of Premier and Cabinet
DPE	Department of Planning and Environment
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EES	Environment, Energy and Science
EPA	Environment Protection Authority
EP&A Act	Environmental Planning and Assessment Act 1979
EP&A Regulation	Environmental Planning and Assessment Regulation 2021
EPBC Act (Cwth)	Environment Protection and Biodiversity Conservation Act 1999
EPI	Environmental Planning Instrument
EPL	Environment Protection License
FM Act	Fisheries Management Act 1994
На	Hectares
HHIMS	Historic Heritage Information Management System
Н	Health Infrastructure
LEP	Local Environmental Plan
LGA	Local Government Area
MPS	Multipurpose Service
MNES	Matters of National Environmental Significance
NPW Act	National Parks and Wildlife Act 1974
NPW Regulation	National Parks and Wildlife Regulation 2009
NPWS	National Parks and Wildlife Service (part of EES)

Abbreviation	Description
NT Act (Cth)	Commonwealth Native Title Act 1993
OEH	(Former) Office of Environment and Heritage
РСМР	Preliminary Construction Management Plan
Planning Systems SEPP	State Environmental Planning Policy (Planning Systems) 2021
POEO Act	Protection of the Environment Operations Act 1997
Proponent	NSW Health Infrastructure
REF	Review of Environmental Factors
RF Act	Rural Fires Act 1997
RFS	Rural Fire Service
Resilience and Hazards SEPP	State Environmental Planning Policy (Resilience and Hazards) 2021
SEPP	State Environmental Planning Policy
SIS	Species Impact Statement
TISEPP	State Environmental Planning Policy (Transport and Infrastructure) 2021
WM Act	Water Management Act 2000

# **Executive Summary**

This Review of Environmental Factors (REF) has been prepared by GeoLINK on behalf of NSW Health Infrastructure (HI) for the determination of the proposed development under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

NSW Health and Health Infrastructure (HI) proposes to upgrade the Glen Innes District Hospital, located at 85 Taylor Street, Glen Innes. The upgrade will be undertaken in stages.

This REF is for Stage 1: Enabling Works: Demolition of the Old Nurses Quarters. The Old Nurses Quarters contains asbestos and has been condemned as it is not fit for repurposing. The activity will comprise the establishment of a secure, fenced site area and vehicular access, demolition, and disposal of all demolished materials. The building, including footings and services, to a nominated point, are to be removed. The works footprint will be made safe after demolition and the demolition contractor is to obtain an asbestos clearance certificate to certify that all asbestos has been appropriately removed from the site. Further testing for contamination within the construction works area and any required remediation of soil will be undertaken as part of the Main Works Stage.

### Need for the Proposal

Glen Innes Hospital provides a range of services to the community of the Glen Innes Severn Local Government Area (LGA) and the broader region. Services provided include acute medical and surgical, maternity, emergency and subacute services, ambulatory care, allied and oral health, mental health, child and family services.

The Glen Innes Hospital Upgrade is dedicated to upgrading or replacing aging infrastructure to support contemporary models of care and workforce efficiencies. Other upgrade priorities for the site include improved communications connectivity, integration of services, demolition of the existing condemned building (old nurses accommodation building) and construction of a new single storey clinical services building.

The Glen Innes Hospital Upgrade project was identified and had funding commitments of \$20M confirmed in the 2020/21 State Government budget. This was further augmented in February 2022 with an additional \$30M. The Project has a total allocated budget valued at \$50M.

The Old Nurse's Quarters has been condemned and unused for many years. The demolition of the three-storey building will enable a completely new facility to be erected on the south-western corner of the site, with connection to the existing hospital for support services.

## **Proposal Objectives**

The primary objective of the Proposal is to complete enabling works in preparation for the future Glen Innes Hospital upgrade which will provide improved health services for regional and rural NSW. Secondary objectives for the development of the site include:

- · Minimise impacts on ongoing operations of the hospital;
- Minimise impacts on occupiers, visitors and general public within and adjacent to the site;
- Minimising impacts on adjoining properties;
- Minimising impacts on heritage items; and
- Minimising impacts from hazardous materials associated with asbestos.

## Options Considered

The preferred option is demolition of the Old Nurses Quarters, which would facilitate the construction of a new building and for Community Health works to be included as part of the initial project. It would also facilitate the retention of the existing Medical Records and Maintenance Shed Building.

As outlined in the Master Plan Report for the Glen Innes Hospital Upgrade (May 2022) other options were considered, with the option described in this REF determined to be the most feasible.

#### Site Details

The proposed activity is located on land described as Lot 2 DP1208729 No. 85 Taylor Street, Glen Innes.

## Planning Approval Pathway

Section 4.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) states that if an environmental planning instrument (EPI) provides that development may be carried out without the need for development consent, a person may carry the development out, in accordance with the EPI, on land to which the provision applies. However, the environmental assessment of the development is required under Part 5 of the Act.

State Environmental Planning Policy (Transport and Infrastructure) 2021 (TISEPP) aims to facilitate the effective delivery of infrastructure across the State. Division 10 of TISEPP outlines the approval requirements for health service facilities.

Section 2.61(1) of TISEPP enables the demolition of buildings carried out for the purposes of a health services facility to be carried out by or on behalf of a public authority, without consent, on any land provided the development is carried out within the boundaries of an existing health services facility.

The project, however, becomes an 'activity' for the purposes of Part 5 of EP&A Act and is subject to an environmental assessment (Review of Environmental Factors). The development is considered an 'activity' in accordance with Clause 5.1 of the *EP&A Act* because the development involves erection of a building and carrying out of work by HI and NSW Ambulance (public authority).

#### Statutory Consultation

Pursuant to Section 2.62(1) of TISEPP there is no requirement to notify any public authority or adjoining land-owner of the proposed Activity.

#### Environmental Impacts

This REF provides an assessment of the proposed Activity. It considers to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the proposed Activity as is required under the EP&A Act. The REF also sets out the commitments made by HI to manage and minimise potential impacts arising from the Activity. The REF finds an Environmental Impact Statement (EIS) is not required and this REF is an adequate level of impact assessment.

The proposed Activity will predominantly result in environmental impacts that are either negligible or low. The most notable potential environmental impact relates to short-term impacts associated with the demolition works, impacts on an adjoining heritage item and the handling of potential hazardous materials.

The Activity is the first stage in the upgrade of the Glen Innes Hospital which will provide improved health services for the region. In effect the Activity will be perceived positively by the local community as it is necessary to facilitate a long-term positive impact on health service delivery within the community.

#### Justification and Conclusion

Based on the identification of potential issues, and an assessment of the nature and extent of the impacts of the proposed development, it is determined that:

- The extent and nature of potential impacts will not have significant adverse effects on the locality, community and the environment.
- Potential impacts can be appropriately mitigated or managed to ensure that there is minimal effect on the locality and community.
- From an analysis of the environmental impacts associated with the proposed Activity, it has been determined that preparation of an EIS is not required.
- The proposed Activity will not have any effect on matters of national significance and approval of the activity under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* is not required.
- There are no separate approvals, authorisations or notifications required in relation to the proposed Activity prior to determination under Part 5 of the EP&A Act or under any other Acts.

It is recommended that HI approve the proposed Activity in accordance with Part 5 of the EP&A Act and subject to adoption and implementation of matters outlined in Section 6.

# 1. Introduction

NSW Health Infrastructure (HI) propose to demolish the Old Nurses Quarters (the Activity) at the Glen Innes Hospital located at 85 Taylor Street, Glen Innes (the site) as part of their delivery of infrastructure solutions and services to support the healthcare needs of the NSW communities.

This Review of Environmental Factors (REF) has been prepared by GeoLINK on behalf of HI to determine the environmental impacts of the proposed Activity at the Glen Innes Hospital. For the purposes of these works, HI is the proponent and the determining authority under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The purpose of this REF is to describe the Activity, to document the likely impacts of the Activity on the environment and to detail protective measures to be implemented to mitigate impacts.

The description of the proposed Activity and associated environmental impacts have been undertaken in the context of section 171(2) of the Environmental Planning and Assessment Regulation 2021 (EP&A Regulation) and the Australian Government's *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act).

The assessment contained within the REF has been prepared having regard to:

- whether the proposed Activity is likely to have a significant impact on the environment and therefore the necessity for an EIS to be prepared and approval to be sought from the Minister for Planning and Homes under Part 5.1 of the EP&A Act; and
- the potential for the Activity to significantly impact Matters of National Environmental Significance (MNES) on Commonwealth land and the need to make a referral to the Australian Government Department of Environment and Energy for a decision by the Commonwealth Minister for the Environment on whether assessment and approval is required under the EPBC Act.

The REF helps to fulfil the requirements of section 5.5 of the EP&A Act, which requires that HI examine, and take into account to the fullest extent possible, all matters affecting, or likely to affect, the environment by reason of the proposed Activity.

# **1.1 Proposal Need and Alternatives**

In order to facilitate the construction works required for the upgrade of the Glen Innes Hospital, the demolition of the Old Nurses Quarters (currently derelict) is required as an enabling works package.

# 2. Site Analysis and Description

# 2.1 The Site and Locality

The Glen Innes Hospital Upgrade is located within the grounds of the existing Glen Innes Hospital on land described as Lot 2 DP 1208729 (the site), 85 Taylor Street, Glen Innes. A Site Locality Plan is provided at **Illustration** 1 and a Site Context Plan is provided at **Illustration 2**.

Glen Innes is situated on the Northern Tablelands in the New England region of New South Wales, approximately 100 km north of Armidale, 150 km west of Grafton and 600 km north of Sydney. It is within the Glen Innes Severn Local Government Area (LGA). The Traditional land-owners for the Glen Innes region are the Ngoorabul/Ngarabal people. The Local Aboriginal Land Council area is Glen Innes Local Aboriginal Land Council. NSW Health is the landowner.

Lot 2 DP1208729 has an area of approximately 31,500m<sup>2</sup>. The Hospital site is located approximately 1.5 km northwest of the Glen Innes Central Business District (CBD).

The demolition site is in the south-western corner of the lot, fronting Ferguson and Macquarie Streets.

# 2.2 Existing & Surrounding Development

Apart from the north-eastern corner of the property, over time the site has been built up with hospital related buildings, carpark areas and connecting internal pathways and driveways. Originally established in 1876, in subsequent years the Glen Innes Hospital has had numerous additional facilities constructed on the site, until the current main hospital facilities were constructed between 1951 and 1956.

**Figure 1** below has been reproduced from the Master Plan 2022. It shows the existing buildings currently on the site, including adjoining Lot 1 DP1208729 to the east, which contains a local heritage item (G106 Old Hospital/Museum). The building to be demolished is identified as G108. In conjunction with the NSW Government, Health Infrastructure are proposing to construct a new ambulance station in the north-eastern corner of the site. As part of the ambulance station development, the Hospital property (Lot 2) is to be subdivided to create a public purpose allotment with an area of 3384m<sup>2</sup>. As a result of the subdivision the remaining area of the Hospital property will be 2.778 ha.

## Figure 1: Site Plan



(Source: Master Plan 2022, REF additions in red)

The Old Nurse's Quarters is a three-storey brick building with a basement level that previously provided accommodation for nurses. **Figure 2** below shows the Old Nurses Quarters, and also part of the Maintenance Building (G107) to its north and Old Maintenance Building to the east (G104).

## Figure 2: Old Nurses Quarters



(source: Master Plan 2022)

The site (Lot 2 DP1208729) is heritage listed as a local heritage item under the Glen Innes LEP 2012. However, the listing is associated with an original 19<sup>th</sup> century hospital building, which is located on a separate adjoining lot east of the Old Nurses Quarters (Lot 1 DP1208729). The heritage listed buildings are currently in use as the Land of the Beardies Museum, operated by the Glen Innes and District Historical Society.

Other than the adjoining museum, the surrounding land uses are primarily general residential and health services (zoned R1 General Residential). Parkland/recreational areas (zoned RE1 Public Recreation) are located further east of the hospital site. Streets fronting the demolition site consist of residential properties.

The entire site, including the separate museum property, is bound by public roads on all four sides. The main access to the hospital is provided from Taylor Street to the north, with service and staff access available from Macquarie and Ferguson Streets (Ferguson Street becomes the Gwydir Highway in the western outskirts of Glen Innes). A fourth separate, existing access directly to the Old Nurses Quarters is available off Macquarie and will be used as temporary access to the work site for the Activity.

# 2.3 Existing Services

Existing services are available to the hospital site including electrical (overhead powerlines), water and sewer, stormwater and telecommunications. Most of these have been disconnected from the Old Nurses Quarters. A detail survey is attached as **Appendix A**.

# 2.4 Other Site Elements

The hospital grounds feature manicured lawn with scattered trees planted throughout. A Preliminary Arboricultural Assessment has identified that it is likely that ten (10) trees in proximity to the demolition site will need to be removed.

The project site is level and located in the south-western corner, which is the highest point in the property. The hospital grounds fall away from the Activity area to the north-eastern corner from a height of around 1,065 m AHD to a low of around 1,055 m AHD (8.2%).

The nearest watercourse is Rocky Ponds Creek, approximately 130 m east of the development site.

The site is not identified as bushfire or flood prone. There are no other environmental constraints, such as acid sulfate soils, drinking water catchment or biodiversity.

# 2.5 Site Considerations and Constraints

Section 10.7 Planning Certificate No's 396/21-22 and 409/21-22 dated 28 April and 5 May 2022 identify that the site is located within the R1 General Residential zone under Glen Innes Severn Council Local Environmental Plan 2012, and are provided at **Appendix B**.

## Table 1: Section 10.7 Planning Constraints

Affectation	Yes	No
Critical habitat		✓
Conservation area		✓
Item of environmental heritage	$\checkmark$	
Affected by section 38 or 39 of the Coastal Management Act 2016 (CM Act)		✓
Proclaimed to be in a mine subsidence district		$\checkmark$
Affected by a road widening or road realignment		✓
Affected by a planning agreement		$\checkmark$
Affected by a policy that restricts development of land due to the likelihood of landslip		✓
Affected by bushfire, tidal inundation, subsidence, acid sulphate or any other risk		$\checkmark$
Affected by any acquisition of land provision		✓
Biodiversity certified land or subject to any bio-banking agreement or property vegetation plan		✓
Significantly contaminated		✓
Subject to flood related development controls		✓
List other relevant constraints		n/a





Planning Approval Pathway Report - Glen Innes Hospital Redevelopment 4275-1002

Information shown is for illustrative purposes only Drawn by: AB Checked by: ERA Reviewed by: SJW Source of base data: OpenStreet Map Date: 5/07/2022



0 50 Meters



# Site Context - Illustration 2.2

Information shown is for illustrative purposes only Drawn by: AB Checked by: ERA Reviewed by: SJW Source of base data: Google Earth Date: 5/07/2022

# 3. Proposed Activity

# 3.1 **Proposal Overview**

The Activity is the demolition of the Old Nurses Quarters, including footings and services. It will involve the establishment of a secure fenced site area and access, demolition and disposal of all demolished materials.

# 3.1.1 **Proposed Activity**

The demolition elements outlined in the Principal's Project Requirements (PPR) includes the Old Nurses Quarters, adjacent trees and nearby paths leading to the Quarters. The PPR outlines the following extent of works:

- 1. Establishment, securing and maintenance of the site area.
- 2. Demolition/stripping out of Old Nurses Quarters including façade, internals, structure (on-ground, inground and foundations).
- 3. Removal of identified trees adjacent to the building.
- 4. Protection of retained work and adjacent trees/structures.
- 5. Removal and disposal of all demolished materials including payment of all disposal costs.
- 6. Temporary supports.
- 7. Recycle all suitable demolished materials.
- 8. Termination and/ or diversion of services on the Site.
- 9. Obtaining of licences and approvals.
- 10. Observance of statutory requirements.
- 11. Obtaining all clearance and completion certificates.
- 12. Site boundary fence to be retained on site at completion of works.

Demolition works will also include the disconnection, where required, and removal of any existing services.

Asbestos Containing Materials have been identified throughout the building and, along with any other hazardous materials, will be handled, managed, and disposed of according to applicable regulations and EPA waste protocols.

Access to the site will be via an existing entry adjacent to the building on Macquarie Street. A temporary site compound will be established onsite. **Figure 3** shows the demolition area and includes the location of the access and site amenities. A larger version is provided at **Appendix C**.

### Figure 3: Demolition Plan – Old Nurses Quarters





(source: Fulton Trotter Architects)

## 3.1.1.1 Tree Removal and Landscaping

There are twenty-one (21) trees within the project area. Within this area eleven (11) trees will be retained, while ten (10) trees have been identified as warranting removal due to their proximity to the worksite and/or poor health and low amenity value.

# 3.2 **Proposal Need, Options and Alternatives**

# 3.2.1 Strategic Justification

The Glen Innes Hospital Upgrade is part of an ongoing program of major health capital projects by Health Infrastructure and the NSW Government to improve health care throughout New South Wales. The upgrade of the Glen Innes Hospital will provide improved health services for the Hunter New England community. As an enabling works package, the demolition of the Old Nurses Quarters is the first stage in that project.

# 3.2.2 Alternatives and Options

A number of options were initially considered in relation to the upgrade of the Glen Innes Hospital. As outlined in the Master Plan Report, all preliminary options were considered in an extensive stakeholder consultation process.

The Old Nurses Quarters has not been used for twenty years as there are issues relating to compliance with the Building Code of Australia. It is in poor condition and has been subject to water leaks and a previous fire in the building. There are also significant amounts of Asbestos Containing Materials throughout the building. It has been identified as being unfit for use associated with the hospital and incapable of meeting current standards required for health facilities.

During a series of workshops two preferred options were identified, Options 4 and 5. Option 5 was ultimately determined to be the preferred option based on a number of factors, notably that this option would facilitate the provision of all services required by the Clinical Services Plan and also include Community Health facilities within the identified budget. The demolition of the condemned Old Nurses Quarters is Stage 1 of Option 5, which will enable the

construction of a purpose-built facility that will integrate with existing facilities, and respond to, and contribute to, its surroundings.

# 3.3 Construction Activities

The works are short term (Months).

Table 2:         Project Timeframes and Construction Activities		
Construction activity	Description	
Commencement Date	Works will be aligned with construction of the new Ambulance Station scheduled to commence in October 2022 and be completed mid 2023. Exact date of commencement to be confirmed.	
Work Duration/Methodology	The works is expected to take approximately 8 weeks.	
	The general works methodology would involve:	
	site establishment and preparation	
	<ul> <li>progressive demolition of building and removal of waste from site</li> </ul>	
	site clean-up and reinstatement.	
Work Hours and Duration/Construction	Works will be undertaken during standard hours as per the Interim Construction Noise Guideline:	
	Monday to Friday: 7:00 am to 6:00 pm	
	• Saturday: 8:00 am to 1:00 pm	
	Sunday and Public Holidays: No work	
Ancillary Facilities	An onsite site compound to be utilised for/during demolition works will be established adjacent the building along the Macquarie Street frontage (and likely will be utilised throughout the redevelopment of the site).	
Plant Equipment	The main plant likely to be used for the works would include:	
	• Trucks;	
	• Crane;	
	• Excavator;	
	Handheld power and battery-operated tools;	
	Dump trucks; and	
	Other small equipment.	
Earthworks	No significant earthworks are required. Minor excavation will be required to remove the footings of the existing hospital building. Any clean excess spoil (soil) will be used within landscaping treatments throughout the site or removed from the site and disposed of appropriately.	
Source and Quantity of Materials	Any required materials will be sourced locally from licensed quarries and operators. All materials will be certified uncontaminated and environmentally safe.	
Traffic Management and Access	Access to the site during works will be via an existing entry adjacent the Old Nurses Quarters on Macquarie Street. Construction traffic management will be undertaken in accordance with an approved Construction Environmental Management Plan.	

# 3.4 **Operational Activities**

The Activity does not involve any Operational Activities. As part of the management of the project, the principal contractor will be responsible for liaison with all relevant stakeholders to ensure that any disruption to the ongoing operations of hospital services is minimised. A temporary site access will be maintained off Macquarie Street and all work sites will be kept clear to ensure that the ongoing operations of the hospital are not interrupted, particularly in relation to the existing Ambulance access road from Ferguson Street.

# 4. Statutory Framework

# 4.1 Planning Approval Pathway

Section 4.1 of the EP&A Act states that if an EPI provides that development may be carried out without the need for development consent, a person may carry the development out, in accordance with the EPI, on land to which the provision applies. However, the environmental assessment of the development is required under Part 5 of the Act.

State Environmental Planning Policy (Transport and Infrastructure) 2021 (TISEPP) aims to facilitate the effective delivery of infrastructure across the State. Division 10 of the TISEPP outlines the approval requirements for health service facilities. A "hospital" is defined as a health service facility under this division.

The site is zoned R1 General Residential under the *Glen Innes Severn Local Environmental Plan 2012*. The R1 zone is a prescribed zone under the TISEPP. Regardless, section 2.61(1)(c) of the TISEPP permits the following works without consent, provided that it is carried out by or on behalf of a public authority, on any land, and provided the development is carried out within the boundaries of an existing health services facility: *"demolition of buildings carried out for the purposes of a health services facility"*.

The demolition of the Old Nurses Quarters is within the grounds of the Glen Innes Hospital and will enable the construction of a new hospital building. It is being carried out on behalf of Health Infrastructure and NSW Health

Therefore, the proposal is considered an 'activity' for the purposes of Part 5 of the EP&A Act and is subject to an environmental assessment (REF). The proposal is considered an 'activity' in accordance with section 5.1 of the EP&A Act because the development involves the carrying out of a work. The development is also not any act, matter or thing for which development consent under Part 4 is required, is not prohibited under an environmental planning instrument, and is not exempt development.

TISEPP consultation is discussed within section 6 of this REF.

#### Table 3: Description of proposed activities

Division and Section within TISEPP	Description of Works
Section 2.61(1)(c)	The proposed Activity is for the demolition of an existing building, which may be carried out by or on behalf of a public authority without consent on any land if the development is carried out within the boundaries of an existing health services facility.

# 4.2 Environmental Protection and Biodiversity Conservation Act 1999

Pursuant to the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), any action that has, or is likely to have, a significant impact on matters of national environmental significance (MNES) or other aspects of the environment, such as on commonwealth land, may progress only with approval of the Commonwealth Minister for the Environment under Part 9 of the EPBC Act.

An EPBC Act Protected Matters search was undertaken on 3 August 2022 to identify records of threatened species recorded within a 1 km x 1 km search area centred on the site (refer to **Appendix D**). Results indicate 11 migratory species and 29 threatened species have been recorded within the search area and potential habitat occurs for three Threatened Ecological Communities.

The Activity site is an existing building located within the previously cleared, maintained grounds of an existing hospital. The tree removal required will not constitute loss of habitat. Due to the nature and scope of the proposed works, the Activity would have negligible impacts on biodiversity. The Activity is unlikely to have a significant impact on any threatened species or communities listed under the BC Act, EPBC Act or FM Act.

The provisions of the EPBC Act do not affect the proposal as it is not development that takes place on or affects Commonwealth land or waters. Further, it is not development carried out by a Commonwealth agency, nor does the proposed development affect any matters of national significance. An assessment against the EPBC Act checklist is provided below.

#### Table 4: EPBC Checklist Consideration Yes/No The activity will not have any significant impact on a declared World Heritage Property? No The activity will not have any significant impact on a National Heritage place? No The activity will not have any significant impact on a declared Ramsar wetland? No The activity will not have any significant impact on Commonwealth listed threatened species or endangered community? No The activity will not have any significant impact on listed migratory species? No The activity does not involve nuclear actions? No The activity will not have any significant impact on Commonwealth marine areas? No The activity will not have any significant impact on Commonwealth land? No The activity does not relate to a water resource, a coal seam gas development or large coal mining development? No

# 4.3 Environmental Planning and Assessment Act 1979

# 4.3.1 Duty to Consider Environmental Impact

Part 5 of the EP&A Act applies to activities that are permissible without consent and are generally carried out by a public authority. Activities under Part 5 of the EP&A Act are assessed and determined by a public authority, referred to as the determining authority. Health Infrastructure is a public authority and is the proponent and determining authority for the proposed works.

For the purpose of satisfying the objects of the EP&A Act relating to the protection and enhancement of the environment, a determining authority, in its consideration of an activity shall, notwithstanding any other provisions of the Act or the provisions of any other Act or of any instrument made under the EP&A Act or any other Act, examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity (refer to sub-section 1 of section 5.5 of the EP&A Act).

Section 171 of the EP&A Regulation defines the factors which must be considered when assessing the likely impact of an activity on the environment under Part 5 of the EP&A Act. Section 7.1 specifically responds to the factors for consideration under section 171.

Table 5 below demonstrates the effect of the proposed Activity on the matters listed for consideration in sub-section 3 of section 5.5 of the EP&A Act.

#### Table 5: Matters for consideration under Sub-Section 3, Section 5.5 of the EP&A Act

Matter for Consideration	Impacts of Activity
Sub-section 3:	
Without limiting subsection 1, a determining authority shall consider the effect of any activity on any wilderness area (within the meaning of the <i>Wilderness Act</i> 1087) in the	The land is not a wilderness area.
locality in which the activity is intended to be carried on.	

Note: If a biobanking statement has been issued in respect of a development under Part 7A of the *Threatened Species Conservation Act 1995*, the determining authority is not required to consider the impact of the activity on biodiversity values.

# 4.4 Environmental Planning and Assessment Regulation 2021

Section 171(2) of the EP&A Regulation provides a list of factors that must be taken into account for an environmental assessment under Part 5 of the EP&A Act. These requirements are considered at section 6.1 of this REF.

# 4.5 Other NSW Legislation

The following table lists any additional legislation that is required to be considered if it is applicable to the proposed activity.

Legislation	Comment	Relevant? Yes/No
State Legislation		
Rural Fires Act 1997	Is the site identified on the Bushfire Prone Land Map No	No
Biodiversity Conservation Act 2016	Does the site contain any critical habitat, threatened species or ecological population or community?	No Refer Section 6.2.9
	Part 7 of the <i>Biodiversity Conservation Act 2016</i> (BC Act) sets out the requirements for biodiversity assessment and approvals under the EP&A Act. For the purposes of Part 5 of the EP&A Act, an activity is to be regarded as likely to significantly affect the environment if it is expected to significantly affect threatened species.	
	The proposed Activity occurs on a developed, suburban site and will not affect important vegetation or habitat. It will not have a significant impact upon any threatened species, ecological communities, or populations such that a viable local population will be placed at risk of extinction.	
	An EPBC Act Protected Matters Report is attached as part of Appendix D.	
Water Management Act 2000	Are the works within 40 metres of a watercourse? No. Rocky Ponds Creek is the nearest watercourse and is more than 100 m southeast of the Activity site.	No Refer Section 6.2.5
Contaminated Land Management Act	Is the site listed on the register of contaminated sites?	Yes
1997	A search of the NSW Environmental Protection Authority (EPA) contaminated land data base was undertaken for the Glen Innes area. The closest site is located over 200 m from the Activity site and noted with an 'EHC Act Revocation Notice' and 'Section 36 EHC Act Order'. The site would not have an impact on the Activity. A copy of the search is attached as <b>Appendix D</b> .	Refer Section 6.2.13
	Works are for demolition and will not disturb soil. The handling of asbestos containing material will be by an accredited contractor in accordance with EPA requirements. A mitigation measure requires an unexpected finds procedure be implemented as part of the project.	
Heritage Act 1977	Any impacts on local or state or national heritage? If any assessment provided, note where.	Yes Refer Section 6.2.8
	The <i>NSW Heritage Act 1977</i> provides for the conservation of items of environmental heritage in NSW. The Act defines heritage as items or places that are of State and/or local heritage significance and includes: places, buildings, works, relics, moveable objects, and precincts. As part of NSW heritage protection and management, the Act establishes a register including an inventory and list to protect the listed items.	
	The Beardies Museum (former hospital complex) on adjoining Lot 1 is included as a Local heritage item in Schedule 5 of the Glen Innes Severn LEP 2012 (Item No. 1076). However, it is not listed on the State heritage register and no part of the Activity site is State listed. The nearest State listed item is the Glen Innes Railway Station Group (I123) approximately 600 m south-west of the site in Ferguson Street. The proposed Activity will not affect the heritage significance of the site.	
	The Old Nurses Quarters is a 1950s brick building with a corrugated roof and is not heritage listed. Its potential heritage significance has been considered and is addressed in <b>Section 6.2.8.</b>	
	The archaeological provisions of the <i>NSW Heritage Act</i> 1977 are applicable, however, as all "relics" are protected under the NSW Heritage Act, regardless of whether or not the place is listed as a heritage item at a local, State or national level. Should any unexpected relics be disturbed during excavation of the site they must be managed under the archaeological provisions of the NSW Heritage Act.	
	Searches of the State Heritage Register were undertaken for the activity on 23/06/2022 refer to <b>Appendix D</b> .	

### Table 6: Other Possible Legislative Requirements

# Review of Environmental Factors: Glen Innes Hospital Upgrade (Demolition)

Legislation	Comment	Relevant? Yes/No
Roads Act 1993	Any works to a public road, or pumping of water onto a public road, or involve the connection of a road to a classified road?	Yes
	Section 138 of the NSW Roads Act requires that all activities undertaken within Council's road reserve be approved by Council prior to the activities being undertaken. Health Infrastructure will need to obtain a Section 138 Approval for works within the road reserve/connection of any new driveways.	
Protection of the Environment Operations Act 1997	There are no Protection of the Environment Policies (PEPs) that are relevant to the activity. No licenses will be required pursuant to the <i>Protection of the Environment Operations Act 1997.</i> HI and/ or contractors working on behalf of HI are required to notify OEH when a 'pollution incident' occurs that is likely to impact upon the environment.	No
	It is an offence to negligently dispose of waste in a manner that harms the environment. Waste will be managed in accordance with the Waste <i>Avoidance and Resource Recovery Act 2001.</i> The activity will aim to reduce the environmental impact of dumping waste and include mechanisms to recover resources and reduce the production of waste where possible.	
	Any hazardous materials will be handled, managed, and disposed in accordance with EPA protocols.	
National Parks and Wildlife Act 1974	The National Parks and Wildlife Act 1974 (NPW Act) provides for the legal protection and management of Aboriginal sites within NSW. The key principles of the Act in relation to Aboriginal heritage are the prevention of unnecessary or unwarranted destruction of Aboriginal objects, and the active protection and conservation of objects which are of high cultural significance. It is an offence to knowingly disturb an Aboriginal object, irrespective of its nature or significance, without the prior consent of the relevant Director-General. Given the activity affects suburban land that has been disturbed as part of the historical use associated with the hospital, the potential for undiscovered Aboriginal heritage items would be very low and unexpected. However, to limit any potential impact on any unknown Aboriginal sites or objects, mitigation and management measures are proposed in this REF to provide the necessary safeguards. AHIMS search was undertaken on 23/06/2022 for the site and there are no registered items within the site (refer to <b>Appendix D</b> )	Yes Refer Section .6.2.7
Local Government Act 1993	Various activities (e.g. water, sewer, stormwater connections, amongst other things) generally require the approval of Council under Section 68 of the <i>Local Government Act 1993</i> . However, pursuant to Section 69 (Crown exemption from approval to do things incidental to erection or demolition of building) of the <i>Local Government Act 1993</i> , Section 68 does not require the Crown, or a person prescribed by the regulations to obtain the approval of a council to do anything that is incidental to the erection or demolition of building of the <i>Local Government Act 1993</i> , Section 68 does not require the Crown, or a person prescribed by the regulations to obtain the approval of a council to do anything that is incidental to the erection or demolition of the demolities of a council to do anything that is incidental to the erection or demolition of the demolities of the definition of the demolities of the demonstrated of the demolities of the de	Yes
State Legislation Planning Policies		
State Environmental Planning Policy	Chanter 2 Vegetation in non-rural areas	Ves
(Biodiversity and Conservation) 2021	This SEPP applies (as applicable) to clearing vegetation in non-rural areas of the State, including environmental zones, not associated with a Development Application. Section 2.7 outlines clearing that does not require authority under this Policy, including:	
	(1) A permit or approval to clear vegetation is not required under this Chapter if it is clearing of a kind that is authorised under the <i>Local Land Services Act 2013</i> (Clearing authorised under other legislation) section 600 or under Part 5B (Private native forestry).	
	On this basis and Clause 60O of the <i>Local Land Services Act 2013</i> (LLS Act), and given the Proposal is a Part 5 Activity, any vegetation clearing is authorised by way of compliance with that part of the EP&A Act and authority under the Vegetation SEPP is not required.	
	Chapter 4 - Koala habitat protection 2021	Yes
	Chapter 4 of the BCSEPP aims to encourage the conservation and management of areas of natural vegetation that provide habitat for koalas to support a permanent free-living population over their present range and reverse the current trend of koala population decline. It applies when Councils assess development applications within all local government	

Legislation	Comment	Relevant? Yes/No
	areas (LGAs) listed under Schedule 2, which includes Glen Innes Severn Shire.	
	Although this SEPP does not technically apply to the Part 5 Approval Pathway under the EP&A Act, Koala habitat and associated protections have been considered in the context of assessing the potential environmental impacts of the proposed Activity to the fullest extent possible, in order to fulfill the requirements of Part 5.	
	The proposed Activity will occur within managed land in an urban area. The trees to be removed are not Koala feed trees. There would be no impact to Koala feed trees or Koala habitat as a result of the Activity.	
State Environmental Planning Policy	Contamination, hazardous materials/development coastal management	Yes
(Resilience and Hazards) 2021	Chapter 4 Remediation of land The shiretive of Chapter 4 of the DUCEDD is to provide for a Chate wide	
	planning approach to the remediation of contaminated land. It aims to promote the remediation of contaminated land for the purpose of reducing the risk of harm to human health or any other aspect of the environment. Chapter 4 applies to rezoning and development applications for development requiring consent.	
	The Activity does not require development consent pursuant to provisions of TISEPP. As the proposed development does not involve a change of use and does not involve a development application, the provisions of Section 4.6 of the RHSEPP are not triggered. However, HI must still consider the potential for the land to be contaminated and make a determination of suitability of the land for its intended use.	
	Under Section 4.5.1 of the Managing Land Contamination Planning Guidelines SEPP 55–Remediation of Land (1998), remediation is a Part 5 activity when:	
	<ul> <li>it is carried out ancillary to an activity under Part 5, for example, development which does not require consent under Part 4, and which requires an approval from a public authority, or</li> </ul>	
	<ul> <li>it is in category 2 (without consent) under SEPP 55 and an approval from a public authority is required.</li> </ul>	
	Furthermore, Section 4.16(3) of Chapter 4 outlines that if a provision of another State environmental planning policy or of a regional environmental plan, whether made before or after this Chapter, permits a remediation work without development consent, a requirement in this Policy to obtain development consent to carry out the work does not prevail over that provision.	
	On this basis, any proposed/required remediation work described in this REF is ancillary to the Activity under Part 5 of the EP&A Act, which is principally for a health services facility which is permitted as development without consent pursuant to ISEPP.	
	An Asbestos/Hazmat Investigation Report undertaken in July 2022 identified Asbestos Containing Material throughout the building and provides measures to address the handling and removal of hazardous materials. The findings of the report and potential impacts associated with hazardous materials and contamination are discussed further in <b>Section 6.2.13</b> .	
State Environmental Planning Policy (Transport and Infrastructure) 2021	The proposed Activity is for the demolition of the Old Nurses Quarters to enable the construction of a new building within the Glen Innes Hospital grounds.	Yes
	Division 10 of the TISEPP outlines the approval requirements for health services facilities. A "hospital" is defined as a health services facility under this division.	
	Section 2.61 permits the "demolition of buildings carried out for the purposes of a health services facility" to be carried out by or on behalf of a public authority without consent, on any land if the development is carried out within the boundaries of an existing health services facility:	
	The project is therefore compliant with Section 2.61(1)(c) of TISEPP.	
Glen Innes Severn Local Environmental Plan 2012		
Zone	The site is zoned R1 General Residential. Objectives of the R1 zone include:	Yes

## Review of Environmental Factors: Glen Innes Hospital Upgrade (Demolition)

Legislation	Comment	Relevant? Yes/No
	To provide for the housing needs of the community.	
	<ul> <li>To provide for a variety of housing types and densities.</li> </ul>	
	• To enable other land uses that provide facilities or services to meet the day to day needs of residents.	
	The Activity represents the provision of ongoing health services (health infrastructure) for the community and is therefore consistent with the R1 zone objectives presented above.	
Heritage	Clause 5.10: The Activity site is listed as being of local heritage significance in Schedule 5 of the Glen Innes Severn LEP 2012 (I076). The listing, however, relates to buildings associated with the former Hospital (Beardies Museum).	Yes
	Matters relating to heritage are addressed in <b>section 6.2.9</b> . Considerations have concluded that the proposed Activity is acceptable and would not adversely impact the heritage significance of nearby heritage items or potential heritage items. (Refer <b>Section 6.2.9</b> ).	
Flood planning	Clause 5.21: The site is not flood prone.	No
Drinking water catchments	Clause 7.2: The site is not mapped drinking water catchments.	No
Essential services	Clause 7.3: All services are available to the property. Existing services to the building will be removed.	Yes



(source: ePlanning Spatial Viewer)

# 5. Consultation

Consultation requirements are established through Part 2.2 Division 1 and Division 10 section 2.62(2) of the TISEPP.

Section 2.10 *Consultation with councils*—development with impacts on council-related infrastructure or services requires written notification of intent to Council to carry out the development. The demolition will not have significant impact on Council infrastructure.

Section 2.11 *Consultation with councils—development with impacts on local heritage* requires written notification of intent to Council to carry out the development for works that is likely to affect the heritage significance of a local heritage item, or of a heritage conservation area in a way that is more than minor or inconsequential. The heritage assessment prepared demonstrates that the proposal will not have a significant impact on any heritage item on the site.

The Activity does not trigger any further consultation requirements under Division 1 of TISEPP.

Section 2.62(1) of the TISEPP applies to development carried out by or on behalf of a public authority under section 2.61(1) *"other than section 2.61(1)(b) or <u>(c)</u>".* Section 2.61(1)(c) is the *"demolition of buildings carried out for the purposes of a health services facility".* 

There is, therefore, no requirement under the TISEPP to notify the development to public authorities or occupiers of adjoining land.

The proposed hospital redevelopment, including the demolition of the redundant building, has been reported in local media outlets and via press releases and has been in the public realm for some time.

User engagement as part of the master planning phase for the upgrade of the Glen Innes Hospital has been vigorous, involving numerous stakeholder groups including hospital staff, the local MP, community health services, Aboriginal health workers, the Aboriginal Land Council, members of the community and Council. Further consultation will occur as part of the ongoing preparations for the future development of the site.

A copy of Health Infrastructures Communications & Engagement Register is attached as **Appendix N**. This register outlines communication with and enquiries from various community groups, health services, community members, Council etc.

# 6. Environmental Impact Assessment

# 6.1 Environmental Planning and Assessment Regulation 2021 – Assessment Considerations

The relevant assessment considerations under Section 171(2) of the EP&A Regulation are provided below.

Table 7:         Summary of Environm	ental Factors Reviewed in Relation to the Activity		
Relevant Consideration	Response/Assessment	Positiv	ve/Negative
a) Any environmental impact on a community	Environmental impacts in the vicinity of the work site as a result of the demolition are generally minor / temporary and can be appropriately		✓
	minimised by the imposition of appropriate mitigation measures.	Nil	
	Hazardous materials will be handled and removed in accordance with EPA protocols to prevent impacts on hospital staff, patients or the general public.	+ve	
	The Activity will enable an area of the hospital currently not utilised to be redeveloped as a functioning part of the hospital which, in the long-term will contribute in a positive fashion to the ongoing provision of health services to the community.		
(b) Transformation of a locality	The Activity will alter the visual appearance of the site. The building to be demolished is mostly visible to adjoining residences and as a derelict	-ve	✓
	building, is not considered to contribute to the amenity in a positive faching. Overall, the site will still be identifiable in relation to the benefited	Nil	
		+ve	
(c) Any environmental impact on the	Environmental impacts associated with the Activity are generally minor and of temporary duration	-ve	$\checkmark$
	Ten trees are recommended to be removed. There is no important	Nil	
	vegetation or habitat onsite; none of the trees are heritage listed. A full assessment of environmental impacts, including ecology and water quality, is contained in <b>Section 6.2</b> . Any environmental impacts will be minimal and will be subject to appropriate mitigation measures.	+ve	
d) Any reduction of the aesthetic, recreational, scientific or other environmental quality or	Visual impact from the Activity will be minimised by the retention of existing vegetation and by management of the worksite. The Activity will not impact heritage items in the locality.	-ve	✓
value of a locality.		Nil	
		+ve	
e) Any effect on locality, place or building	No. The Activity will not adversely impact the heritage significance of any heritage items (refer <b>Section 6.2.8</b> )	-ve	
archaeological, architectural, cultural, historical scientific or social significance or	Based on the Due Diligence Code of Practice for the Protection of Aboriginal Objects (DECCW 2010) there is very low probability of Aboriginal objects occurring in the Activity Area (refer <b>Section 6.2.7</b> ).	Nil	$\checkmark$
other special value for present or future generations.		+ve	
(f) Any impact on the habitat of protected	The Activity site is within the maintained grounds of an existing hospital complex and is not identified as important vegetation or habitat (refer <b>Section 6.2.9</b> )	-ve	
fauna (within the meaning of the <i>National Parks and Wildlife Act</i> 1974)		Nil	✓
(g) Any endangering of any species of animal,	As above. The site is unlikely to include habitat utilised by any threatened species.	-ve	
plant or other form of life, whether living on land, in water or in the air		Nil	✓
		+ve	
(h) Any long term impacts on the environment	Impacts associated with the Activity will be temporary and managed	-ve	
	through the imposition of mitigation measures (e.g. noise, visual, air quality).		
	Permanent variation to the man-made environment as a result of the proposed Activity would be low impact (i.e. visual) and not detrimental or unreasonable in the locality. Long term impacts on the natural environment will be negligible. These matters are discussed in further detail in <b>Section 6</b> .	+ve	~

Relevant Consideration	Response/Assessment	Positiv	e/Negative
(i) Any degradation of the quality of the environment	No.		
	Erosion control measures will be implemented on site to minimise soil erosion.	Nil	✓
		+ve	
j) Any risk of safety of the environment	No.	-ve	
	Mitigation measures will be implemented to minimise any potential impact from contamination.	Nil	$\checkmark$
		+ve	
(k) Any reduction in the range of beneficial	No.	-ve	✓
uses of the environment	The Activity will enable the site to be utilised as part of the hospital operations.	Nil	
		+ve	
(I) Any pollution of the environment	Appropriate mitigation measures will be incorporated to minimise any	-ve	
	contamination).	Nil	✓
		+ve	
(m) Any environmental problems associated	No.	-ve	
with the disposal of waste	Refer <b>Section 6.2.12</b> . Safeguards will be implemented during construction works to minimise potential waste impacts during construction.	Nil	✓
	Any hazardous materials will be disposed of at a licenced facility and in accordance with EPA protocol.	+ve	
n) Any increased demanded on resources	As part of the Activity, suitable materials will be sorted and identified for recycling. Impacts associated with the consumption of natural resources through the	-ve	✓
become, in short supply		Nil	
	use of machinery would be minimal (refer <b>Section 6.2.15</b> ).		
(o) Any cumulative environmental effects with	No. Refer Section 6.2.15.	-ve	
other existing or likely future activities.		Nil	$\checkmark$
		+ve	
(p) Any impact on coastal processes and	No. The site is not in the Coastal Zone as identified in the <i>Coastal Management Act 2016</i> .	-ve	
projected climate change conditions.		Nil	✓
		+ve	
q) Applicable local strategic planning	The NSW Government has committed major expenditure towards the	-ve	✓
statements, regional strategic plans or district strategic plans made under the Act, Division 3.1	upgrade of numerous hospitals throughout NSW and the delivery of high quality, improved services for the State. The proposed Activity, and future		
	upgrade of the hospital, is part of this Government program. Glen Innes is identified as a Strategic Centre in the New England North West Regional Plan 2036. The project is consistent with directions in the Plan relating to health care.	+ve	
	The proposed Activity is also consistent with the relevant Strategic Directions of the Glen Innes Severn Land Use Strategy 2010.		

# 6.2 Identification of Issues

# 6.2.1 Traffic, Access and Parking

Questions to consider	Yes	No
Will the works affect traffic or access on any local or regional roads?		✓
Will the works disrupt access to private properties?		✓
Are there likely to be any difficulties associated with site access?		√

Questions to consider	Yes	No
Are the works located in an area that may be highly sensitive to movement of vehicles or machinery to and from the work site (i.e. schools, quiet streets)?		√
Will full or partial road closures be required?		√
Will the proposal result in a loss of onsite car parking?		√
Is there onsite parking for construction workers?	✓	

## **Existing Environment**

The Activity is located within a level area in the hospital grounds, at the corner of Macquarie and Ferguson Streets. The rest of the hospital site slopes gently down towards the north-east corner. The site fronts Ferguson Street, a twolaned road with wide verges, line-marking and kerb and gutter, which is one of the main streets in Glen Innes (categorised as the Gwydir Highway west of Glen Innes). Macquarie Street is a local road which runs north-south to Taylor Street. Traffic speed restrictions adjacent to the site are signposted at 50 km/h. All surrounding streets are straight lengths in a grid-like formation. Properties fronting the site residential.

A Construction and Operational Noise and Vibration Impact Assessment (**Appendix E**) noted that a review of annual average daily traffic volumes from the Transport for NSW traffic volume viewer (station ID: 91447) identified that the Gwydir Highway (i.e. Ferguson Street) carries approximately 450 vehicles per day. The site provides adequate parking supply for the expected demolition traffic generation. Furthermore, the surrounding road network operates with a good Level of Service, with ample spare capacity to handle any minor increases in traffic due to the proposed works.

As there will be no increase in staffing numbers or changes to health services being provided as a result of the activity, no impacts on the surrounding road network are anticipated. In addition to this, the carriage widths of 14m in Ferguson Street, 15m in Macquarie Street and 21m in Taylor Street allow for sufficient width to manage vehicle turning movements with deceleration and acceleration lanes.

Currently, there are three main access points to the hospital; a primary entry off Taylor Street to the north and Service and Staff entries off Macquarie and Ferguson Streets. There is also an existing bitumen sealed driveway servicing the Old Nurses Quarters in Macquarie Street, which will be retained for use as a separate temporary site access for demolition traffic. This driveway is located approximately 44 m south of the nearest intersection (Macquarie and Ferguson Streets) and 55 m south of the staff access off Macquarie Street.

The Beardies Museum has its own separate parking areas and a driveway off West Avenue, plus access via the service/staff entry in Ferguson Street. The proposed Ambulance station will have two new access points off Taylor Street and West Avenue.

There are no footpaths fronting the project site. No proposed road or footpath closures are required.

## Impact Assessment Traffic

There is likely to be a temporary and minor increase in the volume of daily traffic and parking demand during the Activity. This increase would result from vehicle movements associated with demolition crews and the transportation of machinery and waste materials. However, the additional traffic will be temporary and will not be significant. It is therefore unlikely to have no more than minor impacts on the local traffic network, or to disrupt existing traffic and pedestrian movements for patients, visitors and staff within and immediately around the site.

The establishment of a temporary site access off Macquarie Street, which would have lower traffic volume than Ferguson Street/Gwydir Highway, will reduce the potential for traffic conflict in Ferguson Street and will not impact the function of the existing entries to the hospital. The temporary site access will also enable demolition traffic to park in open areas surrounding the Old Nurses Quarters, minimising potential impacts on available street parking and also parking areas utilised by service vehicles and hospital staff. The existing parking areas will remain in place during the demolition works. The Construction Environmental Management Plan will include provisions to manage car parking and access requirements during the demolition period.

Demolition traffic arrival and departure peaks are likely to be outside normal commuter peak hours and therefore are not likely to impact on the operation of the broader local road network, given that background traffic flows are significantly lower than during peak periods.

There is potential that demolition related traffic may result in minor damage to the local road formation as a result of heavy vehicle traffic entering and exiting the site. As required by the Principal's Project Requirements (PPR), a Dilapidation Report is to be prepared by the contractor regarding potential damage as a result of demolition works, which is to include roads, kerbs and verges adjacent to the site.

Vehicles transporting waste or other materials that may produce dust would be covered during transportation.

It is anticipated that any temporary impacts associated with the activity will be minor and confined to the site or its immediate surrounds. The broader community is unlikely to experience adverse impacts in relation to traffic and parking.

### **Mitigation Measures**

With respect to traffic generated by the works the following mitigation measures are to be implemented:

- A Construction Traffic Management Plan shall be prepared by the demolition contractor and shall include, but not be limited to, the following for all demolition activities:
  - traffic control plan(s)
  - driver code of conduct
  - vehicle routes
  - number of trucks
  - hours of operation
  - access arrangements
  - traffic control measures
- Appropriate signage will be erected, and details will be confirmed by appropriate Project personnel responsible for site safety during the development.
- The erection of short-term directional signage providing direction to staff, patients, and visitors regarding any changes to site traffic and access arrangements. Any such signage should be erected at the entry to the site and intermittently as required to ensure appropriate site management.
- Where necessary, the establishment of appropriate temporary parking areas for demolition work vehicles, visitors, staff and patients.
- Appropriate traffic control and management measures to ensure the safe movement of vehicles, into and around the site.
- · Regard to public safety will be maintained at all times.
- Neighbouring residents are to be informed in writing at least two weeks prior with respect to any changes to
  pedestrian movements and parking restrictions associated with the development.
- Public roads and access points will not be obstructed by any materials, vehicles, refuse skips or the like, under any circumstances.

# 6.2.2 Noise and Vibration

Questions to consider	Yes	No
Are there residential properties or other sensitive land uses or areas that may be affected by noise from the proposal during construction? (i.e. schools, nursing homes, residential areas or native fauna populations)?	$\checkmark$	
Will any receivers be affected by noise for greater than three weeks?	$\checkmark$	
Are there sensitive land uses or areas that may be affected by noise from the proposal during operation?	n/a	
Will the works be undertaken outside of standard working hours?		$\checkmark$
Will the works result in vibration being experienced by any surrounding properties or infrastructure?		$\checkmark$

Questions to consider	Yes	No
Are there residential properties or other sensitive land uses or areas that may be affected by noise from the proposal during construction? (i.e. schools, nursing homes, residential areas or native fauna populations)?	$\checkmark$	

## Existing Environment

The Glen Innes District Hospital is an existing hospital campus located at 85 Taylor Street, Glen Innes. The Activity involves the demolition of the Old Nurses Quarters in the southwest corner of the site.

A Construction and Operational Noise and Vibration Impact Assessment was undertaken by Muller Acoustic Consulting (MAC) in July 2022. The assessment describes the noise environment surrounding the hospital as *"typical of a suburban environment, with dominant noise sources including road traffic noise and environmental noise (birds, wind in trees)."* It also confirmed the following:

- The investigation area comprises predominantly residential properties, with the nearest residential receivers located approximately 45 m of the project boundary.
- The closest non-residential receivers are:
  - the Glen Innes and District Historical Society (passive recreation) approximately 50 m east of the project site;
  - the Glen Innes District Tennis Association (active recreation) approximately 130 m east of the project site;
  - the Church of Holy Trinity (place of worship) approximately 140 m southeast of the project site; and
  - a commercial receiver approximately 90 m southwest of the project site.
- In addition to the above noise sensitive receivers surrounding the Activity, the Assessment also investigated noise and vibration impacts on other Hospital buildings within the site.

#### **Impact Assessment**

A copy of the Noise and Vibration Impact Assessment is attached as **Appendix E.** The Assessment addresses the potential construction noise and vibration impacts of both the demolition works and construction works for a future hospital building, as well as potential operational impacts to residential receivers of the future hospital building. Issues relevant to the demolition only project are discussed further below.

#### Noise

It is anticipated that construction would be undertaken primarily during standard constructions hours (7am – 6pm Monday to Friday, 8am – 1pm Saturday, no construction Sunday/Public Holidays).

#### Residential/Non-residential Receivers

The construction noise assessment demonstrated that noise from the project is anticipated to exceed the Noise Management Levels (NML) at *residential* receivers adjacent to the project site during each of the construction scenarios during standard construction hours. It is anticipated that construction noise levels would remain below the relevant NMLs for *non-residential* receivers during each of the construction activities.

Analysis of potential noise impacts demonstrated that during demolition works, up to 220 residential receivers within approximately 630 m of the project site may experience noise levels above the relevant NML for standard construction hours.

Similarly, during earthworks, up to 60 residential receivers within approximately 340 m of the project site are predicted to experience noise levels above the standard hours NML, while up to 60 receivers within 310 m of the project site and 65 receivers within 475 m of the project site are predicted to experience noise levels above the standard hours NML during site preparation works and general construction works respectively.

Measures were provided to minimise the impacts of construction noise on nearby sensitive receivers and are included as mitigation measures in this REF.

#### **Existing Hospital Buildings**

The Assessment also considered potential noise and vibration impacts to existing hospital buildings. Construction works would occur within approximately 70 m of Building G101 (Hospital) and 25 m of Building G102 (laundry). It

determined that internal noise levels for hospital spaces adjacent the southern façade of Building G102 would potentially exceed design sound levels. However, the laundry building does not comprise a 'sensitive space' (i.e. hospital wards, operating theatre). (Note: The Maintenance Shed/Records Building (G107) and Old Maintenance Building (G107) are closer but are not 'sensitive spaces'). Regardless, the Assessment advises that where works might impact on sensitive spaces, consultation with Hospital administrators should be undertaken to schedule works around critical hospital activities.

Traffic associated with the demolition project is anticipated to be minimal and to not pose additional impacts from road traffic noise, particularly considering the existing traffic volumes on the Ferguson Street/Gwydir Highway.

### Vibration

Machinery used during the Activity are likely to include an excavator, excavator hammer, front end loader/telehandler, tipper truck, Genset and Grinder/Impact Wrench. The items of plant with the greatest potential for vibration were identified as hydraulic hammers used during the demolition or vibratory rollers during earthworks (likely prior to construction works).

#### Residential Receivers

The review of safe working distances for vibration intensive equipment indicated that construction vibration levels would potentially exceed the criteria for *human comfort* for receivers immediately adjacent to the project site. Vibration levels are anticipated to remain below the *cosmetic damage criteria* for all **residential receivers**. Where a vibratory roller in excess of 6 tonnes or a large hydraulic hammer is utilised, vibration levels would be likely to exceed the *human response criteria at nearby residential receiver* locations. Once the final vibratory plant has been selected a review of minimum offset distances should be conducted.

### Sensitive Receivers (Heritage Item)

Construction vibration levels would remain below the **cosmetic damage criterion for sensitive structures**. However, where vibration intensive work is planned to occur close to Beardies Museum, minimum offset distances should be reviewed following selection of final plant. Where works are proposed to occur within the minimum safe working distance and there is a risk of exceedance of the cosmetic damage objective, a different construction method with lower source vibration levels should be used where feasible and reasonable, or, vibration monitoring should be undertaken at the commencement and throughout the works.

#### Existing Hospital Buildings

As noted previously, construction works would occur within approximately 70 m of Building G101 (Hospital) and 25 m of Building G102 (laundry). In relation to potential impacts from vibration on hospital buildings it determined that, where demolition works involve a vibratory roller or large hydraulic hammer, "vibration impacts may exceed the cosmetic damage criteria for sensitive items." A review of minimum offset distances should be conducted once the final vibratory plant has been selected and different methods implemented where feasible and reasonable (discussed further in **Section 6.2.8** 

To minimise potential vibration impacts on nearby properties the Assessment recommends that, prior to works commencing, a detailed Construction Noise and Vibration Management Plan (CNVMP) should be prepared, that identifies the type of noise generating works anticipated as part of the demolition proposal, and also the type of machinery to be used. Other mitigation measures outlined in the Assessment include a review of minimum offset distances for vibration intensive work close to the Museum and the consideration of alternative construction methods with lower source vibration levels, and vibration monitoring.

In addition to the recommended review of sensitive receivers with regard to noise management and the abovementioned CNVMP, Table 11 of the Assessment provides a list of potential Standard Mitigation Measures which would be deployed during the proposed works. These include pre-construction/site induction procedures, worksite planning, site practices, notification/complaints handling, construction method, equipment maintenance, work scheduling and physical methods.

#### **Mitigation Measure**

To minimise noise and vibration impacts on nearby sensitive receivers, the following noise and vibration controls would be implemented:

- The following work hours are proposed:
  - Monday to Friday: 7am to 6pm.

- Saturday: 8am to 1pm.
- Sundays and Public Holidays: No excavation or demolition works.

Noise control measures are to be implemented during these hours following consultation and engagement with the community. High noise level works should be scheduled to not occur during shoulder periods of the recommended standard hours - i.e. 7 am to 8 am and 5 pm to 6 pm.

- The Standard Mitigation Measures outlined in Table 11 of the Construction and Operational Noise and Vibration Impact Assessment, Muller Acoustic Consulting (July 2022) are to be implemented before and during the Activity.
- Prior to commencement of the Activity, a detailed Construction Noise and Vibration Management Plan will be prepared as part of the environmental management plan for the Activity. The plan will identify all feasible and reasonable management measures to minimise noise and vibration impacts on nearby sensitive receivers.
- Prior to commencement of the Activity, a review of sensitive spaces should be undertaken. Where noise from the
  Activity may impact on sensitive spaces, consultation should be undertaken with the administrators of the hospital to
  schedule works around critical activities. To prevent vibration levels exceeding the human response criteria at
  nearby residential receiver locations and/or cosmetic damage criteria for sensitive items (i.e. heritage listed
  museum), once the final vibratory plant has been selected a review of minimum offset distances is to be conducted.
  Where works are proposed to occur within the minimum safe working distance and there is a risk of exceedance of
  the cosmetic damage objective, a different construction method with lower source vibration levels should be used
  where feasible and reasonable, or, vibration monitoring should be undertaken at the commencement and throughout
  the works.

Furthermore, where vibration intensive work is planned to occur in close proximity to Beardies Museum, minimum offset distances are to be reviewed following selection of final plant.

# 6.2.3 Air Quality and Energy

Questions to consider	Yes	No
Could the works result in dust generation?	$\checkmark$	
Could the works generate odours (during construction or operation)	$\checkmark$	
Will the works involve the use of fuel-driven heavy machinery or equipment?	$\checkmark$	
Are the works located in an area or adjacent to land uses (e.g. schools, nursing homes) that may be highly sensitive to dust, odours, or emissions?	✓	

## **Existing Environment**

The Activity is located in a general residential area and within the grounds of the Glen Innes District Hospital. The site fronts a Local Road and is surrounded by healthcare, heritage and residential buildings as well as recreational areas. The local air quality is generally good. Potential airborne particles within the locality would be restricted to vehicle emissions.

The Old Nurses Quarters was constructed in the 1950's. Hazardous building materials were used for construction purposes during this period. The material can pose a potential air contamination source during demolition.

#### **Impact Assessment**

Dust and exhaust emissions

During the short-term demolition works, the Activity has potential to generate dust and may cumulatively contribute to generating exhaust emissions locally through:

- Excavation resulting in dust generation;
- Exhaust emissions from machinery and associated transportation; and
- Material blown from the site during high winds.

Dust generation during the proposed demolition works is likely but would be minimal and limited to the immediate vicinity of the work area. Mobilisation of dust during construction works pose risks to worker and public safety.

Notwithstanding these risks, significant quantities of dust or exhaust fumes are unlikely, especially with effective implementation of appropriate safeguards and mitigation measures.

### Asbestos

The three storey Old Nurses Quarters was constructed in the 1950's and is a brick structure with concrete floors and timber framed roof with asbestos corrugated roof sheeting. An Asbestos/Hazmat Investigation Report undertaken in July 2022 included the Old Nurses Quarters (refer **Section 6.2.13**).

The Hazmat Investigation (**Appendix F**) identified numerous areas throughout the building that contained asbestos. The report also included recommendations relating to the handling and removal of the asbestos containing materials (ACM) which are included as mitigation measures in **Section 6.2.13**.

### Traffic

Additional traffic generated during works is not expected to be significant, being limited to vehicles and trucks associated with the demolition, and therefore it is not anticipated to affect local air quality.

#### Greenhouse gas emissions

The Activity would contribute to greenhouse gas emissions to a minor extent via the emissions from construction equipment and traffic, as well as the consumption of materials requiring carbon emissions. Given the scale of the works however, the influence on greenhouse gas emissions would be negligible. However, it is appropriate to implement measures that can reduce or minimise such effects.

### **Mitigation Measures**

The following mitigation measures would be implemented to manage impacts relating to air quality and energy:

- Recommendations from the Asbestos/Hazmat Investigation Report by Southern Asbestos Consultancy Pty Ltd dated July 2022 are to be implemented as part of the Activity:
  - No materials will be burnt on site.
  - Vehicles transporting waste or other materials that may produce dust will be covered during transportation.
  - Vehicles, machinery and equipment will be maintained in accordance with manufacturer's specifications in order to meet the requirements of the *Protection of the Environment Operations Act 1997* and associated regulations.
  - Vehicles and equipment will be switched off when not operating.
  - Debris and waste will be immediately collected into appropriate storage facilities and removed from the site as soon as practical to ensure light-weight material is not dispersed by wind gusts.
  - Stockpiles and exposed soils will be covered or dampened to reduce incidence of air dispersal.
  - Appropriate practices are to be in place to minimise dust that could be dispersed during excavation.
  - New fixtures and fittings would meet relevant energy efficiency standards.

# 6.2.4 Soils and Geology

Questions to consider	Yes	No
Will the works require land disturbance?	✓	
Are the works within a landslip area?		✓
Are the works within an area of high erosion potential?		✓
Could the works disturb any natural cliff features, rock outcrops or rock shelves?		✓
Will the works result in permanent changes to surface slope or topography?		✓
Are there acid sulphate soils within or immediately adjacent to the boundaries of the work area? And could the works result in the disturbance of acid sulphate soils?		√
Are the works within an area affected by salinity?		$\checkmark$

Questions to consider	Yes	No
Is there potential for the works to encounter any contaminated material?	✓	

## **Existing Environment**

Based on the NSW Government eSPADE, the site is not mapped as being prone to acid sulphate soil, furthermore the Glen Innes landscape does not present acid sulphate soils.

A Geotechnical Investigation under by JK Geotechnics in August 2022 noted that the 1:250,000 Geological Map of Grafton indicates that the site is underlain by Tertiary age Maybole Volcanics comprising basalts.

The soil landscape comprises Vertosols (soils containing a high content of expansive clay minerals) with the soil landscape principally comprising valley plains with dark 'cracking' clays. The subsurface profile is expected to comprise residual clays overlying basalt bedrock at shallow to moderate depth. The drillers log information from the registered bores within a 500 m radius of the site typically identified sandy or gravelly clay soils overlying basalt bedrock from depths of about 3.5 m and 9.0 m. Standing water levels in the bores ranged between 3.0m and 5.0m depth.

Asbestos Containing Materials have been identified throughout the building. The site has also been identified as containing areas of concern in relation potential soil contamination.

#### Impact Assessment

Minimal excavation is required for the demolition, being generally limited to the removal of existing foundations and footings. Potential site contamination associated with asbestos and/or other hazardous materials are addressed in **Section 6.2.13**.

To minimise impacts from erosion an Erosion and Sediment Control Plan will be required as part of the Construction Environmental Management Plan.

Mitigation Measures, including spills and unexpected finds procedures, the appropriate handling and removal of asbestos in accordance with relevant protocol, and the management of potential contaminated soil, are included in **Section 6.2.13**. A Licenced Asbestos Assessor will also be required to conduct a clearance inspection at the completion of works and determine if soil samples are required for clearance certificate.

#### **Mitigation Measures**

The following mitigation measures would be implemented to manage impacts relating to soil, erosion and sedimentation:

- An Erosion and Sediment Control Plan is required to be prepared prior to works commencing and will form part of the Construction Environmental Management Plan for the Activity.
- Erosion and sediment controls would be implemented in accordance with the Landcom/ Department of Housing Managing Urban Stormwater, Soils and Construction Guidelines (the Blue Book) and ensure any water diversion or control outlets associated with the site compound/ stockpile do not result in scouring.
- Works would only commence once all erosion and sediment controls have been established. The controls would be maintained in place until the works are complete, and all exposed erodible materials are stable.
- Erosion and sedimentation controls would be checked and maintained (including clearing of sediment from behind barriers) on a regular basis (including after any precipitation events) and records kept and provided on request.
- Disturbance of natural sediments and vegetation would be minimised.

## 6.2.5 Hydrology, Flooding and Water Quality

Questions to consider	Yes	No
Are the works located near a natural watercourse?		$\checkmark$
Are the works located within a floodplain?		√
Will the works intercept groundwater?		√

Questions to consider	Yes	No
Will a licence under the Water Act 1912 or the Water Management Act 2000 be required?		✓

## **Existing Environment**

There are no natural drainage lines or watercourses within or near the site. Rocky Ponds Creek, located downgradient to the east in Anzac Park is approximately 130 m from the site. The Section 10.7 Planning Certificate states the land is not flood prone and is not subject to flood related development controls.

The PSI undertaken by JK Environments in August 2022 (refer Appendix M) identifies that the regional aquifer on-site and in the areas immediately surrounding the site includes porous, extensive aquifers of low to moderate productivity. The following was also confirmed:

- A total of 74 registered bores within the report buffer of 2,000m.
- The nearest bore was approximately 140 m northwest of the site, used stock and domestic purposes.
- The majority were registered for monitoring or domestic purposes (the closest was approximately 555 m upgradient of the site).
- A number of bores were registered for water supply in the area, the closest being approximately 410 m to the south and cross gradient of the site. The nearest presumed downgradient water supply bore was over 1,000 m northeast of the site.
- The drillers log information from the closest registered bores typically identified sandy clay soil to depths of 3.5-4mBGL, underlain by basalt bedrock. Standing water levels (SWLs) in the bores ranged from 3.0mBGL to 5.0mBGL.

Subsurface conditions at the site likely consist of relatively low permeability (residual) soils overlying shallow bedrock. Groundwater is utilised as a resource in the areas surrounding the site, primarily for stock watering. Use of groundwater is not proposed as part of the development.

In relation to Council's Drinking Water Management System, under normal operating conditions the Glen Innes drinking water supply system's primary water sources are Beardy Waters Weir and Red Range Road Bore. The Red Range Road bore draws water from 56 m and 85 m below ground.

In consideration of local topography and the surrounding land features, JKE anticipate groundwater to flow towards the east (however, this has not been confirmed).

#### **Impact Assessment**

Potential impacts to hydrology, flooding and water quality that could arise from the Activity generally relate to the disturbance of soil and chemical spills during works that may enter the public stormwater system and potentially make their way into natural waterways. Works associated with demolition are generally of a minor scale with minimal impact. A spill kit will be on-site as a precaution in the event of any potential spills.

In relation to Rocky Ponds Creek, the PSI noted that the creek is located approximately 210 m east of the site at its closest point, while the closest down-gradient section is located approximately 365 m north-east of the site. The site location and regional topography indicates that excess surface water flows have the potential to enter the Rocky Ponds Creek, which is therefore a 'potential receptor'.

In accordance with the above findings, excess surface water or overland flow would be expected to flow towards the east. Onsite or stormwater services located within Hospital grounds would be expected to be connected to the regional stormwater infrastructure and ultimately discharge into Rocky Pond Creek to the east.

The Activity will not affect a wetland, groundwater aquifer or natural water drainage pattern. There are no flood constraints that impact the development as proposed.

In relation to potential impacts on the nearest natural waterbody, Rocky Ponds Creek adequate erosion and sediment control measures will be put in place in accordance with the Blue Book to prevent any materials entering the public stormwater system.
#### **Mitigation Measures**

The following mitigation measure would be implemented to manage impacts relating to hydrology, flooding and water quality:

- The erosion and sediment control measures for the site will be implemented during construction. The design of these measures is to be in accordance with the Landcom "Blue Book". These will include:
  - A sediment fence.
  - Temporary access to site with shaker pad.
  - An indicative stockpile area with sediment fence around it during construction.
  - Geotextile inlet pit filters or sandbags to be placed around existing stormwater pits.

# 6.2.6 Visual Amenity

Questions to consider	Yes	No
Are the works visible from residential properties, or other land uses that may be sensitive to visual impacts?	~	
Will the works be visible from the public domain?	~	
Are the works located in areas of high scenic value?		✓
Will the works involve night work requiring lighting?		✓

#### **Existing Environment**

The Activity site is visible from surrounding streets and residences. Its appearance is generally consistent with a regional hospital, featuring a number of hospital buildings of various ages and construction, open space and carparking areas. Surrounding development is residential in nature. Other than the heritage listed former hospital currently used as a museum/historical society, there are no other heritage items in the vicinity of the site.

The poor condition and likely demolition of the building has been in the public sphere for some time, with media reports and local MP announcements from 2019, and there appears to be general support from the community.

A Preliminary Arboricultural Assessment identified twenty-one (21) trees in the project area and determined that the demolition of the Old Nurses Quarters and construction of a future Hospital building "impacts primarily small trees and shrubs with little significance". The Assessment identified ten (10) trees as warranting removal and eleven (11) trees suitable for retention. Of the ten trees to be retained five (5) along the border of Ferguson and Macquarie Streets were categorised as 'significant trees' suitable for retention, subject to recommended protection measures.

### Figure 5: Ferguson Street approaching from East



#### (source: Google Street View)

#### Figure 6: Ferguson Street approaching from West:



(source: Google Street View)

Figure 7: Ferguson Street directly adjacent:



#### Figure 8: View south from Taylor/Macquaries Street Intersection



#### (source: Google Street View)

#### Figure 9: Macquarie Street, directly adjacent



(source: Google Street View)

#### **Impact Assessment**

The three storey Old Nurses Quarters is located on the corner of Ferguson and Macquarie Streets in the highest part of the Hospital Grounds. The site slopes gently away from the project area towards the lower section located in northeast corner of the hospital site.

The principal view corridors towards the site are obtained along Ferguson and Macquarie Streets. The building is visible from approximately 100 m east along Ferguson Street, although partially obscured by vegetation. From the west it is obscured by houses until approaching the intersection with Macquarie Street where it is quite prominent in the landscape. From the north, it is visible from the intersection with Taylor and Macquarie Streets, however as you approach the site the building's appearance is visibly softened by surrounding vegetation and street plantings. It is primarily visible from the residences immediately adjoining the site, although the building is setback from the street and partially screened by existing vegetation.

Permanent visual changes as a result of the Activity includes the removal of the existing building and vegetation and minor ground disturbance. Visual impacts in the immediate vicinity of the site during demolition works will be minor and short-term (the presence of construction staff and plant and equipment). The retention of significant trees and shrubs in the project site will lessen any visual impact and continue to partially the screen site from adjoining residences and approaching traffic. Furthermore, it is noted that the future construction of a purpose-built hospital facility is likely to

consider and reflect existing design elements and views surrounding the site and, together with landscaping, is likely to improve visual amenity in the area long-term.

Overall, while some minor visual impacts will be likely during the demolition project, these impacts will be temporary. The removal of the building would be permanent but is not anticipated to be adverse or to the detriment of visual amenity in the local area. The demolition area would be cleaned up and restored to a suitable standard at the completion of work.

Heritage related matters are addressed in **Section 6.2.7**. There will be no effect on the appearance or curtilage of adjoining heritage, subject to the monitoring and review of works relating to potential vibration impacts.

Standard measures to mitigate any potential visual impacts during works on the site can be included in the Construction Environmental Management Plan.

#### **Mitigation Measures**

- A Construction Environmental Management Plan is to be prepared prior to commencement of works.
- The work site is to be kept clean and orderly. All waste would be removed from the site at completion of works.
- The areas where demolition occurs is to be cleaned up and restored to a suitable standard following the removal of the structure.

# 6.2.7 Aboriginal Heritage

Questions to consider	Yes	No
Will the activity disturb the ground surface or any culturally modified trees?	✓	
Are there any known items of Aboriginal heritage located in the works area or in the vicinity of the works area (e.g. previous studies or reports from related projects)?		✓
Are there any other sources of information that indicate Aboriginal objects are likely to be present in the area (e.g. previous studies or reports from related projects)?		✓
Will the works occur in the location of one or more of these landscape features and is on land not previously disturbed?		✓
Within 200m of waters.		
Located within a sand dune system.		
<ul> <li>Located on a ridge top, ridge line or headland.</li> </ul>		
<ul> <li>Located within 200m below, or above a cliff face.</li> </ul>		
Within 20m of, or in a cave, rock shelter or a cave mouth		
If Aboriginal objects or landscape features are present, can impacts be avoided?		n/a
If the above steps indicate that there remains a risk of harm or disturbance, has a desktop assessment and visual inspection been undertaken?		n/a
Is the activity likely to affect wild resources or access to these resources, which are used or valued by the Aboriginal community?		✓
Is the activity likely to affect the cultural value or significance of the site?		$\checkmark$

#### **Existing Environment**

The Activity is located within a residential area within a site that has been historically cleared and associated with the hospital use. The development area meets the definition of disturbed land as defined under the Due Diligence Code of Practice for the Protection of Aboriginal Objects (DECCW 2010).

The Traditional owners of Glen Innes are the Ngoorabul/Ngarabal people. The Activity is located within the Glen Innes Local Aboriginal Land Council (LALC) area. An Aboriginal Heritage Information Management System (AHIMS) search was undertaken for the site 12 August 2022 (**Appendix D**). Search results indicate that there are no Aboriginal sites recorded in or near the site.

#### Impact Assessment

Based on the above information and with consideration of the Due Diligence Code of Practice for the Protection of Aboriginal Objects (DECCW 2010) there is very low probability of Aboriginal objects occurring in the Activity area. An

overview of the application of the Due Diligence Code of Practice for the Protection of Aboriginal Objects is presented at **Table 8** below.

1 4510 0.		
Step		Comment
1	Will the activity disturb the ground surface? Disturbed land is defined under the code as: Land is disturbed if it has been the subject of a human activity that has changed the land's surface, being changes that remain clear and observable. Examples include ploughing, construction of rural infrastructure (such as dams and fences), construction of roads, trails and tracks (including fire trails and tracks and walking tracks), clearing vegetation, construction of buildings and the erection of other structures, construction or installation of utilities and other similar services (such as above or below ground electrical infrastructure, water or sewerage pipelines, stormwater drainage and other similar infrastructure) and construction of earthworks.	Yes. The activity includes the demolition of an existing hospital building within the site of the Glen Innes Hospital. Some minor earthworks will be required. The land has historically been associated with the hospital use and is defined as Disturbed land. The proposal will not affect any culturally modified trees.
2a	AHIMS database	An AHIMS search was undertaken for the activity. The results of the AHIMS search determined that there are no known Aboriginal cultural heritage items within the activity area.
2b	Is the activity: - Within 200m of waters - Located within a sand dune system - Located on a ridge top, ridge line or headland - Located within 200m below, or above a cliff face - Within 20m of, or in a cave, rock shelter or a cave mouth - On land that is not disturbed land. If, after completing steps 2a and 2b, it is reasonable to conclude that there are no known Aboriginal objects or a low probability of objects occurring in the area of the proposed activity, you can proceed with caution without applying for an AHIP.	The development area does not include any culturally significant landscape features. As detailed in Step 1, the development area is consistent with the definition of disturbed land under the code.
3	Can you avoid harm to the object or disturbance of the landscape feature	This step only applies if the activity is on land that is not disturbed land or contains known Aboriginal objects.
4	Desktop assessment and visual inspection	Only applies if the activity is on land that is not disturbed land or contains known Aboriginal objects.
5	Further investigations and impact assessment	If after a detailed investigation and impact assessment has been undertaken and determined that harm would occur to Aboriginal objects then an AHIP application must be made. Only applies if the activity is on land that is not disturbed land or contains known Aboriginal objects.

## Table 8: Due Diligence Code of Practice for the Protection of Aboriginal Objects

#### **Mitigation Measures**

The following mitigation measures would be implemented to manage impacts relating to Aboriginal Heritage:

- · All personnel working on site would receive induction on their responsibilities under the NPW Act; and
- If Aboriginal cultural material is identified on site, a Stop Work Procedure will be followed, which includes:
  - Works will cease immediately.
  - A temporary exclusion zone established.
  - CVC project manager and Local Aboriginal Land Council will be contacted immediately.
  - Heritage NSW contacted immediately.

# 6.2.8 Non-Aboriginal Heritage

Questions to consider	Yes	No
Are there any heritage items listed on the following registers within or in the vicinity of the work area? NSW heritage database (includes section 170 and local items) Commonwealth EPBC heritage list?	~	
Will works occur in areas that may have archaeological remains?	$\checkmark$	
Is the demolition of any heritage occurring?		$\checkmark$

#### **Existing Environment**

#### Figure 10: Glen Innes Severn LEP 2012 Heritage Map



(Source: ePlanning Spatial Viewer)

No. 85 Taylor Street is listed as a local heritage item in Schedule 5 the Glen Innes Severn LEP 2012 (refer SHI-1076 above). It is not listed as a heritage item on the State Heritage Register. Figure 10 shows other listed items in the vicinity of the hospital grounds. It is not located in a Conservation Area.

The heritage listing relates to the Land of the Beardies Museum (former hospital complex) located east of the site on Lot 1 DP1208729. It is a local heritage item, but not a State listed item.

The project site is located within a predominantly residential area of Glen Innes. Buildings in the immediate vicinity of the Hospital range in date from the Federation period to the Mid-Twentieth Century and are predominantly one storey in height and constructed of timber weatherboard. Twenty-one (21) trees surround the project site. The hospital site is bordered on all sides by local roads.

The Old Nurses Quarters was built in the early 1950s and is a three storey, solid brickwork building with cantilevered balconies. Previously used for nurse's accommodation and education functions, it has been condemned, unused and earmarked for demolition for many years. Asbestos containing materials have been identified throughout the building.

The main hospital building was built in 1954 and is an example of mid-century modernist architecture that over time, has been modified and added to. Neither the Old Nurses Quarters or the current Glen Innes Hospital building, built in the same era and of a similar construction, are described in any statutory heritage register. Neither building are identified as historically significant buildings. The heritage listed buildings are located in the hospital site's southeastern portion in association with the Beardies Museum.

There are no heritage listed properties immediately adjacent the project site.

#### Figure 11: Aerial view proximity of Main Buildings Site



(source: Heritage Impact Statement, Ambulance Station, Glen Innes District Hospital, 2022)

#### Impact Assessment

#### Impact on Heritage Items in the Vicinity

Health Infrastructure commissioned a Statement of Heritage Impact (SHI) prepared by Ozark Environment and Heritage in relation to the redevelopment of the Glen Innes Hospital and includes an assessment of the demolition of the old Nurse's Quarters Building. A copy of the SHI is attached as **Appendix K**. The aim of this SHI was to assess all potential impacts of the proposed hospital development on the locally listed heritage items and surrounds.

The SHI provided an assessment of the entire site and noted that, the hospital grounds are predominantly built up with hospital related buildings and the original hospital which has been converted to a museum. The historic Hospital Building (Beardies Museum) is west of the demolition site fronting West Avenue.

The nearest heritage items to the hospital are: (refer Figure 10 above):

- House, 129 Macquarie Street, Glen Innes (I144)
- House, 130 Macquarie Street, Glen Innes (I145)
- Veness Park, East Avenue, Glen Innes (1073)

There are no heritage items directly fronting the project site. Veness Park (1073) is approximately 200 m east and downhill of the Old Nurses Quarters and the dwellings approximately 180 m north. The Old Nurses Quarters are located in the highest part of the Hospital Grounds, which slopes gently away from the project site to the north-east corner. The Old Nurses Quarters are not visible from the abovementioned heritage properties.

Views from heritage items in the surrounding area will not be affected by the proposed demolition proposal. Individual items will continue to be read and understood as good examples of their type and their heritage significance will not be affected. The project will not affect any of these heritage items.

#### Impact on Adjoining Heritage Item – Beardies Museum (former hospital)

#### Figure 1 reproduced:



The heritage listed buildings are mostly located on a separate lot directly adjoining the Hospital and east of the project site. The façade of the main Museum building fronts West Avenue, away from the project site and is separated by a buffer of approximately 50 m (to the rear of the museum), while the façade is almost 100 m from the project site. All of the buildings within the complex face away from the project site. Internal views to the Old Nurses Quarters are partially screened by existing vegetation or other buildings.

The closest buildings to the demolition site are (as identified in the Master Plan):

- GI04 Old Maintenance Building/Old Spanish Flu Clinic: Separation distances approximately 30 m. Single storey brick building between the main museum building and the Old Nurses Quarters (G108), previously part of the original hospital and part of the heritage listing for the site.
- GI05 Storage Shed: Separation distance approximately 50 m. Small, single storey storage facility behind the museum and part of listing.
- GI03 Mortuary: Separation distance approximately 30 m. Single storey modern, brick building to the rear of the museum that houses the current mortuary facilities. Not part of listing.
- GI07 Maintenance Sheds and Records: Approximately 20 m. Modern, single storey steel storage shed housing maintenance workshops, stores and records. Not part of listing.

There are no heritage implications regarding the two modern, unlisted buildings; G103 and G107. The two heritage items are considered in the overall considerations for the heritage listed former hospital.

The proposed works are located away from the historically significant buildings associated with the Museum. Works will be confined to the footprint of the demolition. The temporary site access and amenities will be located along Macquarie Street and will not conflict or affect the adjoining heritage item. There will be no impact on the curtilage of the heritage listed buildings.

#### Impact on Heritage Significance of Old Nurses Quarters

The SHI for the redevelopment of the Glen Innes Hospital (Refer **Appendix K**) assessed the heritage significance of the Old Nurses' Quarters. It noted that the building was constructed in 1954 and opened in June 1955. The building was also known as 'Crommelin House' in honour of Beatrice Crommelin, who was matron of the hospital from 1910 to 1945. It is a disused three-storey brick building with cantilevered balconies designed for accommodation and education functions . The original form of the building was for two storeys with the provision for a third (Fraser 2012: 63).

The SHI found that the Old Nurses Quarters does not meet the criteria for heritage listing. The existing three-storey Old Nurses' Quarters does not interact with the view to the Land of the Beardies Museum from its key eastern vantage point from West Avenue. The removal of this structure will not have a negative impact on the heritage values associated with the Land of the Beardies (former hospital complex) heritage item. Further it found that the there are no constraints from a heritage perspective related to the demolition of the Nurses' Quarters. This structure may be demolished without further investigation and the record of the building in this report is considered sufficient to record the structure. While not considered likely given the disturbed nature of the site and its location with the hospital grounds, an archaeological finds process is included as a mitigation measure.

#### **Potential Impacts from Vibration**

The SHI also addressed the risk of harm the Land of the Beardies (former hospital complex) resulting from vibration and noise impacts associated with the demolition of the Old Nurses Quarters. The Construction and Operational Noise and Vibration Impact Assessment undertaken in July 2022 found that where vibration intensive works are to be undertaken in close proximity to the adjacent Beardies Museum, vibration levels would potentially exceed the cosmetic damage criteria for heritage structures. To minimise any potential impacts from vibration resulting from the demolition works, the Assessment required that once the selection of final plant was confirmed, where vibration intensive work was planned to occur close to the Beardies Museum, minimum offset distances should be reviewed. Where works are proposed to occur within the minimum safe working distance and there is a risk of exceedance of the cosmetic damage objective, a different construction method with lower source vibration levels should be used where feasible and reasonable, or, vibration monitoring should be undertaken at the commencement and throughout the works.

Subject to the implementation of suitable mitigation measures requiring a review of minimum offset distances once final plant has been confirmed and, where necessary different construction methods or vibration monitoring, there will be no impact on the heritage listed former hospital complex as a result of construction works.

#### Figure 12: View on Macquarie Street, approaching from the west



(source: Google street-view)

#### Tree Removal

The ten (10) trees identified as being suitable for removal are not part of any heritage listing. Maintained areas of open space and eleven trees that are proposed to be retained will, in conjunction with any future landscaping, continue to contribute to the visual amenity of the site and partially screen the site from the museum.

In summary, subject to the implementation of suitable mitigation measures, the proposed Activity will not affect the setting or fabric of any heritage items in the vicinity of the site for the following reasons:

- Subject to mitigation measures, the demolition of the Old Nurses Quarters will not affect the adjoining heritage-listed former hospital site;
- The Activity will not affect the setting or curtilage of any heritage items in the vicinity of the site, nor views to or from the adjoining heritage site;
- The Old Nurses Quarters does not meet any of the Assessment of Significance criteria in relation to potential heritage significance;
- The use of the site as a health services facility will remain intact and the site will continue to be read as a hospital site; and
- Sufficient vegetation screening will be maintained around the project site.

Overall, there would be no significant adverse or detrimental impact to heritage values and the proposed mitigation measures adequately address the impact of demolition. The proposed activity is considered to be acceptable from a heritage perspective.

The proposal fulfils the objectives for works within the vicinity of heritage items as set out by the Glen Innes Severn LEP 2012 and the Glen Innes Severn DCP 2014.

#### **Mitigation Measures**

The following mitigation measures are to be implemented to prevent and manage any potential impacts from vibration on an adjoining heritage item, or as a result of an unexpected find, and to record and commemorate social significance associated with the Old Nurse Quarters:

The stop work provision should be applied in line with the requirements of the NSW Heritage Act 1977 if any
unexpected archaeological find, both historical and Aboriginal, be exposed during construction and earthworks. An
appropriately qualified heritage professional and an archaeologist should be engaged to assess the finds and advise
on their management.

 Once the selection of final plant is confirmed and where vibration intensive work is planned to occur close to the heritage listed buildings relating to adjoining Lot 1 DP1208729, minimum offset distances should be reviewed. Where works are proposed to occur within the minimum safe working distance and there is a risk of exceedance of the cosmetic damage objective, a different construction method with lower source vibration levels should be used where feasible and reasonable, or, vibration monitoring should be undertaken at the commencement and throughout the works.

# 6.2.9 Ecology

Questions to consider	Yes	No
Could the works affect any <i>Environmental Protection and Biodiversity Conservation Act 1999 (Cth)</i> listed threatened species, ecological community or migratory species?		$\checkmark$
Is it likely that the activity will have a significant impact in accordance with the Biodiversity <i>Conservation Act</i> (2016)? In order to determine if there is a significant impact, the REF report must address the relevant requirements of Section 7.2 of the BC Act:		✓
<ul> <li>Section 7.2 (a) – Test for significant impact in accordance with section 7.3 of the BC Act.</li> <li>Section 7.2 (c) – it is carried out in a declared area of outstanding biodiversity value.</li> </ul>		
Could the works affect a National Park or reserve administered by EES?		$\checkmark$
Is there any important vegetation or habitat (i.e. Biodiversity and Conservation SEPP) within or adjacent to the work area?		$\checkmark$
Could the works impact on any aquatic flora or habitat (i.e. seagrasses, mangroves)?		$\checkmark$
Are there any noxious or environmental weeds present within the work area?		$\checkmark$
Will clearing of native vegetation be required?		$\checkmark$

### **Existing Environment**

The site is a suburban land parcel and is not identified as biodiversity certified land. The Hospital site consists of a range of buildings, carparks and open space areas. There are scattered trees across the site of various ages and conditions, all of which are considered amenity plantings. None are considered to be 'remnant trees'. The site has a significant collection of large and aged exotic tree species, some of which are of considerable heritage value (though not listed).

An EPBC Act Protected Matters Report undertaken on 3 August 2022 identified habitat for three threatened ecological communities and 29 threatened species (9 flora and 20 fauna species) within 1 km of the site (refer **Appendix D**).

A Preliminary Arboricultural Assessment for the Hospital site identified a total of 58 trees and shrubs across the site. All trees were assessed and graded for their retention value over the entire hospital grounds, resulting in ten (10) trees across the grounds being identified as significant with long life expectancy. Of those ten significant trees, five (5) were identified to be in the vicinity of the Old Nurses Quarters. The figure below is an extract from the Assessment and shows the location of the trees in the project area.

There are no trees identified as being of national, state or local heritage significance. A copy of the Preliminary Arboricultural Assessment by Wade Ryan Contracting, 27 June 2022 is attached as **Appendix G**.

### Figure 13: Significant trees which may be impacted by demolition



(source: Arboricultural Assessment 27.06.2022)

#### **Impact Assessment**

As a result of the Assessment, it was found that the proposed demolition of the Old Nurses Quarters and future Hospital building construction "impacts primarily small trees and shrubs with little significance". Five significant trees (Dark Green pin) were identified along the border of Ferguson and Macquarie Streets (50, 44, 43, 41, 39). While these trees are likely to be affected by the demolition and future construction processes, they are sufficiently distanced from the work site to be suitable to be retained, subject to recommended protection measures. The Assessment notes that *"retention of these trees should be considered as a priority unless there is a compelling reason to remove any; noting that replacement of such trees is in the order of 50 or more years".* 

Overall, twenty-one (21) trees are identified in the Activity area. The Assessment ranks eleven (11) trees as being suitable for retention and ten (10) as warranting removal (primarily due to proximity to the worksite and/or poor condition or low amenity value). Details of all the trees near the worksite and their retention rating is provided below.

Table 9:	Summary of Tree Evaluation
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RATING	SPECIES
Retain Priority (Dark Green)	Total: 5
Tree Significance, High or Very High. • Strong positive amenity	Tree 39, 41, 43, 50: Himalayan cedar (Cedrus deodara)
and/or other values – normally long life expectancy.	Tree 44: Monterey cypress (Cupressus macrocarpa)
Replacement very long term 50 - 100 years or more • Removal would be very difficult to justify	(Note: Trees 39, 41, 43 & 44 form part of line of 4 large aged significant trees on Ferguson Street boundary)
Retain (Light Green)	Total: 1

RATING	SPECIES
• Tree significance moderate or high • Positive Amenity values and/or other values with longer life expectancy • Replacement long term 30 - 80 years. • Removal would be difficult to justify.	Tree 37: Himalayan cedar <i>(Cedrus deodara)</i>
Retain if possible (Yellow)	Total: 5
• Tree with some positive landscape, amenity or other values • In fair to good condition with some useful remaining life. • OR a younger semi mature tree in Excellent or good condition with long life expectancy or expected contribution. • However if the impost on the development of retention is very high or the development impact on the tree is high then removal or replacement can be considered a valid decision. • On balance of considerations the tree is worth retaining.	Tree 40, 42: Cotoneaster species Tree 45: Chinese photinia <i>(Photinia serratifolia)</i> Tree 48: Cootamundra wattle <i>(Acacia baileyana)</i> Tree 51: Maidenhair tree <i>(Ginkgo biloba)</i> <i>(Note: Trees 40, 42 are shrubs within canopy boundary of two significant</i> <i>trees - do not remove unless joining large trees are removed)</i>
Remove (Orange)	Total:5
• The tree is normally in poor condition with short useful life expectancy, or • Structurally unsound to a point not worth effort of ameliorating. OR • A small tree where the impost of retention is not justified. It would easily be replaced in 0-7 years. • At this point a new tree is normally considered a better long term option.	Tree 32: Camelia species Tree 34, 46: Silver birch ( <i>Betula pendula</i> ) Tree 47: Hackberry ( <i>Celtis occidentalis</i> ) Tree 49: Holly ( <i>Ilex species</i> ) ( <i>Note: Trees 46, 47 direct conflict with Activity - cannot be retained in demolition</i> ) ( <i>Note: Tree 32, low or nil significance. Reason: Can be replaced in short term, Tree 34, low or nil significance. Reason: Poor condition and</i> <i>Tree 49, significance fair. Reason: Poor condition.</i> )
Remove Priority (Red) An insignificant tree (shrub) - very small or • the tree is in very poor condition or a weed species or • structurally very poor or short useful life expectancy • a replacement tree/s is a far better option	Total: 5 Tree 33, 35, 36: Silver birch <i>(Betula pendula)</i> Tree 38: Pencil Pine <i>(Cupressus sempervirens)</i> Tree 52: Conifer species

#### (source: Preliminary Arboricultural Assessment 27.06.2022)

As part of the general recommendations, the Assessment notes that a full Arboricultural Impact Assessment will be required when the final plan is determined. It also recommends additional plantings to offset trees/shrubs removed. Planning for additional landscaping would be included as part of the design process for the new building and not in association with the demolition. Therefore, at this stage, offset planting is not included in any mitigation measures of the REF.

The trees proposed to be removed are considered to have been planted as landscaping within the site and, except for the Wattle species, are not native. The species proposed to be removed do not provide important habitat for any threatened fauna or represent threatened flora or communities listed under the *Biodiversity Conservation Act 2016* or *Environment Protection and Biodiversity Conservation Act 1999*. The Activity will not impact biodiversity. None of the vegetation proposed to be removed is considered to be of conservation significance or part of a cultural landscape value.

The retention of a number of mature trees and shrubs within the site will maintain existing nesting, shelter and food opportunities for flora and fauna within the area.

#### **Mitigation Measures**

The following mitigation measures would be implemented to prevent impacts trees adjoining the development area:

- Trees identified for retention will be protected during demolition works in accordance with the Preliminary Arboricultural Assessment prepared by Wade Ryan Contracting (27 June 2022).
- Demolition and construction site access and egress plans should evaluate impacts on trees, particularly trees with high or moderate significance.

## 6.2.10 Bushfire

Questions to consider	Yes	No
Are the works located on bushfire prone land?		√

Questions to consider	Yes	No
Do the works include bushfire hazard reduction work?		$\checkmark$
Is the work consistent with a bush fire risk management plan within the meaning of the <i>Rural Fires Act</i> 1997 (RF Act) that applies to the area or locality in which the activity is proposed to be carried out?		n/a

#### **Existing environment**

The site is not identified as bushfire prone land. There are no significant stands of vegetation near the activity.

#### **Impact Assessment**

The Section 10.7 Planning Certificate issued by Glen Innes Severn Council indicates that the site is not bushfire prone land.

#### **Mitigation Measures**

No mitigation measures are required.

# 6.2.11 Land Uses and Services

Questions to consider	Yes	No
Will the works result in a loss of, or permanent disruption of an existing land use?		$\checkmark$
Will the works involve the installation of structures or services that may be perceived as objectionable or nuisance?		✓
Will the works impact on, or be in the vicinity of other services?	√	

#### **Impact Assessment**

The Activity is for the demolition of an existing building at the Glen Innes Hospital, which is the first stage in the upgrade of the overall hospital which will enable the construction of a new building to accommodate a range of services.

The Principal's Project Requirements note that initial investigations indicate that all services (other than stormwater) have been decommissioned and disconnected from the building. However, the Contractor will need to confirm these conditions and identify, disconnect, and remove all redundant services.

To minimise any potential disruption to hospital services the primary contractors will need to liaise with relevant hospital staff.

While there may be minor impacts during the demolition works, these will be temporary. The existing land use will continue on the site and it is not expected that the Activity will be perceived as objectionable or a nuisance.

#### **Mitigation Measures**

The following mitigation measures would be implemented to manage impacts relating to Land Uses and Services:

- Any potential services interruptions shall be communicated to the relevant services authorities to enable flow on notifications to any affected services customers.
- The primary contractor is to liaise with Hospital staff in relation to any work identified as being a potential disruption to the ongoing operations of the Glen Innes Hospital, including access by Staff, support services, and visitors.

## 6.2.12 Waste Generation

Questions to consider	Yes	No
Will the works result in the generation of non-hazardous waste?	$\checkmark$	
Will the works result in the generation of hazardous waste?	✓	
Will the works result in the generation of wastewater requiring off-site disposal?		$\checkmark$

#### **Impact Assessment**

The Activity is the demolition of an existing building and infrastructure. Materials removed as part of the demolition will be sorted and stacked for recycling or disposal to a licenced waste facility.

Works will be undertaken to ensure minimal impacts are generated from waste material produced on-site by ensuring that all waste is collected and disposed of or recycled in accordance with legislative waste disposal protocols and Environment Protection Authority guidelines. No materials will be used in a manner that poses a risk to public safety.

A Construction Waste Management Plan will be prepared by the appointed contractor and will provide a framework to reduce waste directed to landfill. Where possible, materials would be recycled. All remaining waste would be disposed of at a licenced waste facility.

As discussed in **Section 6.2.13**, a hazardous materials survey has identified that the building contains hazardous materials, including Asbestos Containing Materials. Any hazardous materials would be handled, managed, transported, and disposed of according to applicable regulations, including Work Health and Safety (WH&S) and EPA waste protocols.

#### **Mitigation Measures**

The mitigation measures to prevent adverse impacts in relation to generated waste will include:

- A Construction Waste Management Plan is to be prepared and is to detail the framework to reduce waste directed to landfill.
- Any Asbestos removal must be undertaken by appropriately licenced contractors.
- Any hazardous materials would be handled, managed, transported, and disposed of according to applicable regulations, including WH&S and EPA waste protocols.
- Any waste or materials that are transported off-site shall be transported to an approved waste management facility, in accordance with the requirements of the *Protection of the Environment Operations Act 1997*.
- Evidence of waste disposal such as weighbridge dockets and invoices shall be retained.
- Demolition waste shall be stored within the site and not within public areas such as footpaths, public and/ or road reserves.
- Adequate measures shall be implemented to prevent litter from being blown from the site.
- The working areas will accommodate bins and other waste storage structures as required.
- At the completion of demolition works the development site shall be left clear of waste and debris.

# 6.2.13 Hazardous Materials and Contamination

Questions to consider	Yes	No
Is there potential for the works to encounter any contaminated material?	~	
Will the works involve the disturbance or removal of asbestos?	$\checkmark$	
Is the work site located on land that is known to be or is potentially contaminated?	~	
Will the works require a Hazardous Materials Assessment?	✓	
Is a Remediation Action Plan required?		$\checkmark$
Is the work category 2 works under Resilience and Hazards SEPP?		$\checkmark$

#### **Existing Environment**

Based on the NSW Government eSPADE, the site is not mapped as being prone to acid sulphate soil, furthermore the Glen Innes landscape does not present acid sulphate soils.

An Asbestos Register for the Glen Innes District Hospital was undertaken in May 2020. A copy of the Asbestos Register, prepared by Practical Environmental Solutions, is attached as **Appendix F**. The Register describes the Old Nurses Quarters as follows:

"Built in the early 1950s, a three-storey construction built of solid brickwork and concrete floors, timber framed roof with asbestos corrugated roof sheeting. There is friable asbestos debris throughout the subfloor and ceiling of this building. Do not enter unless under controlled conditions."

It is therefore very likely that hazardous building materials will be encountered and disturbed during the proposed demolition works. Asbestos poses a risk to human health when asbestos fibres are made airborne and inhaled.

#### **Impact Assessment**

The original plans for the building are attached as **Appendix G**. These plans show pad footings and a concrete slab. Demolition of the structure is not likely to affect depths below 1 m. To manage and minimise impacts from any potentially contaminating materials during earthworks, an unexpected finds procedure is included as a mitigation measure, which will require work to stop, and a suitably qualified contaminated land consultant to be engaged.

Although earthworks are minor, mitigation measures are also included to minimise and manage potential impacts arising as a result of pollutants off machinery, such as diesel, unleaded petrol, machinery oils and lubricants.

#### Asbestos

An Asbestos/Hazmat Investigation Report for the Old Nurses Quarters was undertaken in July 2022 by Southern Asbestos Consultancy Pty Ltd (refer to **Appendix C**). The purpose of the investigation was to identify any Asbestos, SMF (Synthetic Mineral Fibres), PCB (polychlorinated biphenyls), ODS's (ozone-depleting substances) and Lead Paint present within the building. The Hazmat investigation included the building and the exterior and identified the following:

- Out of seventeen (17) samples of possible asbestos containing materials, ten (10) returned Positive to Asbestos.
- Asbestos containing materials were identified throughout the building and also outside (pavers, drain pipes, water proofing etc).
- Samples of paint taken throughout the building to identify Lead Paint were recorded as < 0.01%.
- SMF Insulation batts were identified throughout areas of space. within the water tanks in the ceiling space, pipe insulation and exhaust flue.
- No ODS's were observed.
- No PCBs were identified.

The complete list of findings is included in the report. The report also includes nine (9) recommendations relating to the handling and removal of the identified Asbestos Containing Materials which are included as mitigation measures below. Any hazardous materials would be handled, managed, and disposed of according to applicable regulations and EPA waste protocols.

#### Site Contamination

JK Environments (JKE) undertook a Preliminary (Stage 1) Site Investigation (PSI) for the hospital upgrade in August 2022. The PSI included a review of historical information and sampling from six (6) boreholes and two (2) test-pits (refer figure 6.11 below). The following areas of concern (AEC) were identified:

- Fill material;
- Use of pesticides;
- Hazardous building materials; and
- Historical firefighting activity.

The PSI advised as follows:

"The PSI identified fill at most locations. Asbestos in ACM concentration in the fill profile from BH4 (0-0.1m) was above the human health SAC. Nickel was encountered within the in the fill samples BH2 (0-0.1m), BH4 (0-0.1m) and in the duplicate for the fill sample TP1 (0-0.1m) at concentrations marginally above the ecological SAC [Site Assessment Criteria]."

#### Figure 14 Location of boreholes and testkit



(source: Preliminary (Stage 1) Site Investigation (PSI) - August 2022)

Based on the findings of the investigation, JKE concluded that the site can be made suitable for the proposed future upgrade of the hospital. However, some remediation will be required, and to establish the extent of remediation, a Detailed Site Investigation (DSI) and associated Remedial Action Plan will be required. JKE advised that *"based on the preliminary data and the asbestos contamination, at this stage we consider that the site could be made suitable via relatively straight-forward remediation processes such as 'excavation / disposal' in 'cut' areas and 'cap and contain' in <i>"fill" areas"*. This additional remediation investigations are proposed to be undertaken once the demolition has occurred and as part of the next Stage (Main Works). Recommendations regarding the above were provided and are included as mitigation measures below.

#### **Mitigation Measures**

The following mitigation measures would be implemented to manage impacts relating to hazardous materials and contamination:

- Storage and handling of material shall be in accordance with AS1940 The Storage and Handling of Flammable and Combustible Liquids, SafeWork NSW Code of Practice Managing Risks of Hazardous Chemicals at Workplaces, *Protection of the Environment Operations Act 1997* and *Work Health and Safety Act and Regulations 2011*.
- A spill containment kit would be available at all times. All personnel would be made aware of the location of the kit and trained in its effective deployment.
- Any hazardous materials would be handled, managed, transported, and disposed of according to applicable regulations, including WH&S and EPA waste protocols.
- In the event that any unexpected conditions are encountered during earthworks (e.g. underground storage tanks, stained or odorous soils, fibre cement fragments, etc), all work should cease in that section of the site and an environmental consultant should be engaged to inspect the site and address the issue.

- Any hazardous materials would be handled, managed, transported, and disposed of according to applicable regulations, including WH&S and EPA waste protocols.
- The following recommendations from the Asbestos/Hazmat Investigation Report dated July 2022 are to be implemented as part of the Activity:
  - The friable asbestos containing materials are to be removed by a Class A (friable) Licensed Asbestos Removal Contractor (LARC).
  - Licenced Asbestos Assessor (LAA) to be present/on site prior to and during asbestos removal works to inspect asbestos removal zones and asbestos removal process each day for safety and in accordance with the relevant legislation, to assess & sign off SWMS, to assess any unexpected finds or issues related to removal procedures.
  - Asbestos fibre air monitoring must be undertaken during asbestos removal works and clearance air monitoring within containment enclosures following friable asbestos removal works.
  - Once the asbestos containing materials have been removed, a Licenced Asbestos Assessor (LAA) will be required to conduct a clearance inspection following completion of the removal works for an Asbestos Clearance Certification to be issued.
  - Subfloor: Following asbestos containing materials removal, a Licenced Asbestos Assessor (LAA) will be required to conduct a clearance inspection following completion of the removal works. The LAA to access if soil samples are required for clearance certificate.
  - The asbestos removal contractor (LARC) should ensure appropriate controls are in place during the works, including barricades/warning tape or fencing, warning signage and dust suppression (e.g. a fine mist water spray, or PVA-mix spray). Negative air containment enclosures to be inspected by an LAA prior to removal works of Friable asbestos containing materials.
  - All workers entering asbestos removal zones of the site are to wear appropriate Personal Protective Equipment (PPE) (e.g. disposable coveralls (Asbestos rated P5), half-face respirators (fitted with P2 rated filters) at all times during asbestos-related work activities.
  - All asbestos contaminated materials/waste is to be transported from site for disposal at a landfill facility licensed to accept asbestos waste.
  - All asbestos removal works must be undertaken in accordance with the relevant legislation for the site by a licensed asbestos removal contractor. All works should be conducted as per relevant legislation 'Work Health & Safety Regulation (2017)' and the 'Code of Practice: How to Safely Remove Asbestos (2017)'.
  - SMF insulating materials identified throughout the building are to be removed by persons suitably experienced in handling and disposing of SMF insulation.
- An asbestos clearance certificate must be obtained by the demolition contractor to certify that all asbestos has been appropriately removed from the site.
- As part of the Main Works Stage the following must be completed:
  - Undertake a Detailed (Stage 2) Site Investigation (DSI) to address the data gaps identified in Section 10.4 of the Preliminary (Stage 1) Investigation as part of the Main Works environmental assessment.

Note: As not all areas of the hospital are being redeveloped, the extent of 'the site' for the DSI needs to be confirmed to limit the DSI to broadly capture the proposed development footprint; and

- Following completion of the DSI, prepare and implement a Remediation Action Plan (RAP) to document the remediation and validation requirements for the site; and
- Upon the completion of remediation works, validate the remediation works and prepare a Validation Assessment report.

# 6.2.14 Community Impact / Social Impact

Questions to consider	Yes	No
Is the activity likely to affect community services or infrastructure?		$\checkmark$
Does the activity affect sites of importance to local or the broader community for their recreational or other values or access to these sites?		$\checkmark$
Is the activity likely to affect economic factors, including employment numbers or industry value?		$\checkmark$
Is the activity likely to have an impact on the safety of the community?		$\checkmark$
Will the activity affect the visual or scenic landscape? This should include consideration of any permanent or temporary signage.		✓
Is the activity likely to cause noise, pollution, visual impact, loss of privacy, glare or overshadowing to members of the community, particularly adjoining landowners?		$\checkmark$

#### Impact Assessment

Overall, the upgrade of the Glen Innes Hospital will provide improved health services to the community of Glen Innes and surrounding areas that will benefit patients, staff, hospital stakeholders and the wider community.

As noted previously, the Old Nurses Quarters building is derelict, and its demolition has been noted in media reports for some time with general support from the community. The proposed demolition will enable future hospital works which will improve the overall function of the hospital and provide improved and ongoing health benefits to the community. Heritage values are addressed in **Section 6.2.8**. The site will still be used for the purposes of health facilities.

Some temporary minor amenity impacts resulting from the Activity including noise, visual change and air quality may be experienced by adjoining residents, but overall, the demolition and consequent new building represents a benefit to the community. Environmental issues associated with potential contamination, erosion control, traffic, and waste management have been addressed throughout Section 6 and found to be satisfactory. Where necessary, the implementation of appropriate mitigation measures, including the requirement for a Construction Environmental Management Plan, have been proposed.

Overall, it is considered that the benefit of demolishing the redundant building and redeveloping the site will outweigh any potential impacts.

#### **Mitigation Measures**

No mitigation measures are required.

# 6.2.15 Cumulative Impact

Questions to consider	Yes	No
Has there been any other development approved within 500m of the site?	~	
Will there be significant impacts (for example, including but not limited to, construction traffic impacts) from other development approved or currently under construction within 500m of the site?		$\checkmark$

#### **Existing Environment**

The Glen Innes District Hospital is located in proximity to the Glen Innes CBD, recreational, residential, industrial and mixed-use zones.

#### Impact Assessment

The scale of the Activity is not considered significant and presents minimal environmental impacts that can be adequately addressed via safeguards outlined within this REF.

It is expected that the Activity could add to a number of common cumulative impacts, including generation of greenhouse gas emissions (e.g. through operation of vehicles and equipment). However, given the scale and nature of the Activity, any impact would be minimal. Furthermore, the environmental management measures identified within this

REF and the choice of methodology for completion of the project aim to minimise the extent to which the Activity contributes to cumulative adverse environmental impacts.

A review of DPIE's major projects register and Glen Innes Council's website found no recently lodged or approved significant developments within proximity to the site that would result in significant implications in regard to traffic, infrastructure services, amenity and/or environmental impacts when considered in-light of the proposed ambulance station.

Health Infrastructure propose to build a new Ambulance Station in the north-east corner of the hospital site. However given the specifics of each project, and considering their location, distance, service requirements and separate access points, even if proceeding simultaneously, the two projects are not likely to affect each other or adjoining uses, (including the ongoing operation of the hospital or museum) or cause disruptions or conflict within the general community.

Given the absence of any significant local projects, there is no potential that the Activity will affect any major approvals or local projects. The cumulative impacts of undertaking the Activity in the context of the local region is therefore considered low.

### **Mitigation Measures**

The following safeguards will be implemented in order to manage potential cumulative impacts:

- Health Infrastructure and project staff shall monitor DPIE's major projects register and Glen Innes Severn Council's Development Application tracker for any significant developments that may occur locally and with potential to coincide with the Activity period.
- Where required, project staff will undertake pre-works review and liaison with other development sites to co-ordinate works and minimise impacts (e.g. delivery times, parking).

# 7. Summary of Mitigation Measure

Mitigation measures are to be implemented for the proposal to reduce impacts on the environment. The mitigation measures are provided at **Appendix J.** 

# 7.1 Summary of Impacts

Based on the identification of potential issues, and an assessment of the nature and extent of the impacts of the Activity, it is determined that:

- The extent and nature of potential impacts are low and will not have significant adverse effects on the locality, community and the environment;
- Potential impacts can be appropriately mitigated or managed to ensure that there is minimal effect on the locality, community; and
- Given the above, it is determined that an EIS is not required for the proposed Activity.

# 8. Justification and Conclusion

The proposed demolition of the Old Nurses Quarters at 85 Taylor Street, Glen Innes (Glen Innes Hospital) is subject to assessment under Part 5 of the EP&A Act. The REF has examined and taken into account to the fullest extent possible all matters affecting, or likely to affect, the environment by reason of the proposed Activity.

As discussed in detail in this report, the Activity will not result in any significant or long-term impact. The potential impacts identified can be reasonably mitigated and where necessary, managed through the adoption of suitable site practices and adherence to accepted industry standards.

As outlined in this REF, the proposed Activity can be justified on the following grounds:

- It responds to an existing need within the community;
- It generally complies with, or is consistent with all relevant legislation, plans and policies;
- It has minimal environmental impacts; and
- · Adequate mitigation measures have been proposed to address these impacts.

The environmental impacts of the Activity are not likely to be significant and therefore it is not necessary for an EIS to be prepared and approval to be sought for the Activity from the Minister for Planning and Homes under Part 5.1 of the EP&A Act. On this basis, it is recommended that HI determine the proposed Activity in accordance with Part 5 of the EP&A Act and subject to the adoption and implementation of mitigation measures identified within this report.



#### LINE TYPES

BENOTES GAS MAIN (DBTD)
 DENOTES SEWER MAIN (DBTD)
 DENOTES SEWER MAIN (DBTD)
 DENOTES WATER MAIN (DBTD)
 DENOTES DRAINAGE (DBYD)

P

#### NOTE

DBYD SEWER, STORMWATER & WATER HAS NOT BEEN RECEIVED FROM GLEN INNES SEVERN COUNCIL. THIS WILL BE UPDATED ONCE IT IS RECEIVED.

- -THE ORIGIN OF CO-ORDINATES IS SSM 63454 MGA CO-ORDINATES E 377259.480 N 6710196.548 (GDA 2020) (ZONE 56) -SOURCE OF CO-ORDINATES: SCIMS DATE 11 (2020)
- 2. ALL REDUCED LEVELS ARE ON AUSTRALIAN HEIGHT DATUM (A.H.D)
  - -ORIGIN OF LEVELS SSM 63454. RL1062.61 -SOURCE OF REDUCED LEVELS: SCIMS -DATE OF REDUCED LEVELS 11/03/2022
- 4. MGA AND ISG CO-ORDINATE SYSTEMS ARE BASED ON A MATHEMATICAL EARTH MODEL AND SUBJECT TO VARIABLE SCALE FACTORS. DISTANCES CALCULATED FROM CO-ORDINATES MAY VARY SIGNIFICANTLY FROM GROUND MEASUREMENTS. IF FURTHER CLARIFICATION IS REQUIRED CONTACT MONTEATH AND POWYS.

- PLEASE NOTE ROOF RIDGE AND ROOF GUTTER LINES ARE INCOMPLETE IN SOME LOCALISED AREAS ON BUILDINGS GIOI, GIO2, AND GIO4. THIS IS DUE TO OBSTRUCTIONS ON SITE AT THE TIME OF SURVEY OR NO VISUAL LINE OF SITE, WHICH IS NEEDED FOR THE LASER SCANNING SURVEY.
- PLEASE NOTE THAT THE NORTHERN FACADE OF BUILDING GIO1 WAS COVERED IN SCAFFOLDING AT THE TIME OF SURVEY. THIS MAY CREATE DATA SHADOWS IN SOME AREAS AND EFFECT THE FINAL SURVEY DELIVERABLES.
- 3. ONLY VISIBLE SERVICES HAVE BEEN LOCATED BY SURVEY.
- NOT ALL SERVICE INFORMATION MAY BE SHOWN DUE TO UNAVAILABILITY OF SERVICE PLANS OR CURRENT INFORMATION.
- INDEPENDENT ENQUIRIES FOR UP-TO-DATE SERVICE LOCATIONS THROUGH THE RELEVANT AUTHORITIES MUST BE UNDERTAKEN PRIOR TO COMMENCEMENT OF ANY WORKS/EXCAVATION. EXACT SERVICE POSITIONS SHOULD BE ESTABLISHED BY APPROPRIATE MEANS. WE RECOMMEND PROFESSIONAL SERVICE LOCATORS.
- SURVEY COMPLETED USING LASER SCANNING METHOD. LASER SCANNING IS A LINE OF SIGHT TOOL, ANY OBSTRUCTIONS ON SITE WILL APPEAR WITHIN THE POINT CLOUD. MONTEATH AND POWYS CAN UNDERTAKE ADDITIONAL DATA EXTRACTION, DETAIL SURVEY, OR 3D MODELLING BASED ON THE POINT CLOUD AT ANY TIME UPON REQUEST.
- COLUMN SYMBOL SIZE DOES NOT DENOTE COLUMN DIAMETER, AND IS DIAGRAMMATICAL ONLY THE BOUNDARIES SHOWN ON THIS PLAN ARE BASED ON OUR FIELD SURVEY. TO FORMALISE THESE DIMENSIONS, WE WOULD RECOMMEND THE PREPARATION OF A REDEFINITION PLAN, SUTABLE FOR LODGEMENT AND REGISTRATION WITH NSW LAND REGISTRY SERVICES.
- THIS PLAN SHOULD NOT BE USED FOR BUILDING WORKS CLOSE TO OR ON THE BOUNDARY, OR TO PROSCRIBED SET-BACKS WITHOUT FURTHER SURVEY INVESTIGATION.
- 10. CRITICAL LEVELS (E.G. FLOOR LEVELS) AND CRITICAL LOCATIONS (E.G. STRUCTURES) THAT HAVE NOT BEEN SHOWN MUST BE VERIFIED BY FURTHER SURVEY PRIOR TO FINAL DESIGN.
- 11. NO EXCAVATIONS HAVE BEEN MADE TO DETERMINE THE EXTENT TO WHICH ANY SUBJECT WALLS, FOUNDATIONS OR FOOTINGS MAY ENCROACH UPON ADJOINING LAND.
- 12. NO EXCAVATIONS HAVE BEEN MADE TO DETERMINE THE EXTENT TO WHICH ANY ADJOINING WALLS, FOUNDATIONS OR FOOTINGS MAY ENCROACH UPON SUBJECT LAND.
- ALL TREE DIMENSIONS, HEIGHT (H), CANOPY (C) AND TRUNK DIAMETER (D) HAVE BEEN ESTIMATED. IF ACCURATE DIMENSIONS ARE REQUIRED FOR DESIGN PURPOSES, FURTHER SURVEY SHOULD BE REQUESTED.
- 14. CONTOURS SHOWN DEPICT THE TOPOGRAPHY. CONTOURS DO NOT REPRESENT THE EXACT LEVEL AT ANY PARTICULAR POINT, EXCEPT AT SPOT LEVELS SHOWN.
- 15. THIS PLAN MUST REMAIN UNALTERED AS ISSUED BY MONTEATH & POWYS. ALTERING ANY PART OF THIS PLAN DESTROYS THE INTEGRITY OF THE PLAN. ANY REVISIONS REQUESTED MUST BE ISSUED BY MONTEATH & POWYS.
- THESE NOTES ARE AN INTEGRAL PART OF THIS PLAN. REPRODUCTION OF THIS PLAN OR OF ANY PART OF THIS PLAN, WITHOUT THESE NOTES BEING INCLUDED IN FULL, WILL RENDER THE INFORMATION SHOWN ON SUCH REPRODUCTION INVALID AND NOT SUITABLE FOR USE.

DIAL BEFORE YOU DIG www.1100.com.au	0 10 20 30 REDUCTION RATIO - 1:500 (A1) REDUCTION RATIO - 1:1000 (A3)	40 50m
HEALTH INFRASTRU	Sheet No.	
DETAIL SURVEY OF LOT 2 C GLEN INNES HOSPITAL No.85 TAYLOR STREET, GI	Revision	
6C_02 Ref No: 22/0056	Date: 30/05/2022	<b>_</b>

























**GLEN INNES SEVERN COUNCIL** 

PO Box 61, Glen Innes, 2370 Ph: 02 6730 2350

# PLANNING CERTIFICATE

# Issued under Section 10.7(2) of the <u>Environmental Planning and Assessment Act 1979</u>, as amended

APPLICANT D	APPLICANT DETAILS CERTIFICATE DETAIL		DETAILS	
Geolink PO Box 1466 COFFS HARBOUR NSW 2450		Certificate Number:	409/21-22	
		Certificate Date:	5 May 2022	
PROPERTY D	ETAILS	Your Reference:	GEO3730	
Property Details:	85 Taylor Street Glen Innes	Fee:	\$53.00	
Legal Description:	Lot 2 DP1208729	Receipt Number:	125964	
1 Names of relevant planning instruments and DCPs				
(1) The name of each environmental planning instrument that applies to the carrying out of development on the land.				
Glen Innes Severn Local Environmental Plan 2012 – Gazetted 14 September 2012. For a list of all State Environmental Planning Policies applicable to this land refer to Annexure 1.				
(2) The name of each proposed environmental planning instrument that will apply to the carrying out of development on the land and that is or has been the subject of community consultation or on public exhibition under the Act (unless the Director-General has notified the Council that the making of the proposed instrument has been deferred indefinitely or has not been approved).				
There are no current draft planning proposals for the Glen Innes Severn local government area.				

(3) The name of each development control plan that applies to the carrying out of development on the land.

Glen Innes Severn Development Control Plan 2014.

**Please Note**: A full copy of the Glen Innes Severn Development Control Plan 2014 is available from Council, or alternatively is available from Council's website – www.gisc.nsw.gov.au.

(4) In this clause, proposed environmental planning instrument includes a planning proposal for a LEP or a draft environmental planning instrument.

There are no current draft planning proposals for the Glen Innes Severn local government area.

#### 2 Zoning and land use under relevant LEPs

For each local environmental planning instrument or proposed instrument referred to in clause 1 (other than a SEPP or proposed SEPP).

the identity of the zone, whether by reference to a name (such as "Residential Zone" or "Heritage (a) Area") or by reference to a number (such as "Zone No 2 (a)"),

Current Zone under Glen Innes Severn Local Environmental Plan 2012:

#### Zone R1 General Residential **Objectives of zone**

- To provide for the housing needs of the community.
- To provide for a variety of housing types and densities.
- To enable other land uses that provide facilities or services to meet the day to day needs of residents.
- (b) the purposes for which the instrument provides that development may be carried out within the zone without the need for development consent,

Environmental protection works; Home-based child care; Home occupations

the purposes for which the instrument provides that development may not be carried out within (C) the zone except with development consent,

Attached dwellings: Boarding houses: Building identification signs: Business identification signs: Child care centres; Community facilities; Dwelling houses; Group homes; Home industries; Hostels; Multi dwelling housing; Neighbourhood shops; Places of public worship; Plant nurseries; Residential flat buildings; Respite day care centres; Roads; Semi-detached dwellings; Seniors housing; Shop top housing; Waste or resource transfer stations; Any other development not specified in item 2 or 4

- the purposes for which the instrument provides that development is prohibited within the zone, (d) Agriculture; Air transport facilities; Airstrips; Amusement centres; Animal boarding or training establishments; Backpackers' accommodation; Biosolids treatment facilities; Boat building and repair facilities; Boat launching ramps; Boat sheds; Car parks; Cemeteries; Charter and tourism boating facilities; Commercial premises; Correctional centres; Crematoria; Depots; Eco-tourist facilities; Electricity generating works; Entertainment facilities; Extractive industries; Farm buildings; Farm stay accommodation; Forestry; Freight transport facilities; Function centres; Heavy industrial storage establishments; Helipads; Highway service centres; Industrial retail outlets; Industrial training facilities; Industries; Jetties; Marinas; Mooring pens; Moorings; Mortuaries; Open cut mining; Passenger transport facilities; Public administration buildings; Recreation facilities (major); Registered clubs; Research stations; Restricted premises; Rural industries; Rural workers' dwellings; Service stations; Sewage treatment systems; Sex services premises; Signage; Storage premises; Transport depots; Truck depots; Vehicle body repair workshops; Vehicle repair stations; Veterinary hospitals; Warehouse or distribution centres; Waste or resource management facilities; Water recreation structures; Water recycling facilities; Water treatment facilities; Wholesale supplies
- (e) whether any development standards applying to the land fix minimum land dimensions for the erection of a dwelling-house on the land and, if so, the minimum land dimensions so fixed,

The development standards applying to minimum lot size are listed in the Glen Innes Severn Local Environmental Plan 2012. Clause 4.1 – Minimum subdivision lot size applies to any land shown on the Lot Size Map.

The land to which this certificate applies is shown on the Lot Size Map as having a minimum lot size of 450m<sup>2</sup>.

#### (f) whether the land includes or comprises critical habitat,

No, however the property may be affected by other threatened species matters. Separate enquiries should be made to the Department of Environment, Climate Change and Water.

# (g) whether the land is in a conservation area (however described),

#### No

(h) whether an item of environmental heritage (however described) is situated on the land.

Yes – This land shown is adjoining a parcel on the Heritage Map and is listed in Schedule 5 under the *Glen Innes Severn Local Environmental Plan 2012* as being in an item of environmental heritage being the Land of the Beardies Museum (formerly Hospital complex) being Lot 1 DP1208729

**Please Note:** A full copy of the Glen Innes Severn Local Environmental Plan 2012 (as amended) is available from Council, or alternatively is available from the NSW Government's legislation website –

http://www.legislation.nsw.gov.au/ or Council's web site - www.gisc.nsw.gov.au

Applicants should refer to the Glen Innes Severn Local Environmental Plan 2012 and the Glen Innes Severn Development Control Plan 2008 for further details of local development controls applicable to the property.

# 2A Zoning and land use under State Environmental Planning Policy (Sydney Region Growth Centres) 2006

To the extent that the land is within any zone (however described) under:

- (a) Part 3 of the State Environmental Planning Policy (Sydney Region Growth Centres) 2006 (the SEPP), or
- (b) A Precinct Plan (within the meaning of the 2006 SEPP), or
- (c) A proposed Precinct Plan that is or has been the subject of community consultation or on public exhibition under the Act,

The particulars referred to in clause 2(a)-(h) in relation to that land (with a reference to "the instrument" in any of those paragraphs being read as a reference to part 3 of the 2006 SEPP, or the Precinct Plan or proposed Precinct Plan, as the case requires).

Not applicable to this property.

# 3 Complying development

- (1) Whether or not the land is land on which complying development may be carried out under each of the codes for complying development because of the provisions of clauses 1.17A (c) and (d) and 1.19 of that Policy of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.
- (2) If complying development may not be carried out on that land because of the provisions of clauses 1.17A (c) and (d) and 1.19 of that Policy, the reasons why it may not be carried out under that clause.

The State Environmental Planning Policy (Exempt and Complying Development Codes) Clause 1.17A and Clause 1.19 Considerations

Complying development under the *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008*, **may not** be carried out on the land as the land is subject to one or more of the following categories as identified in either clause 1.17A or 1.19 of that Policy: **Clause 1.17A** 

3. Land that comprises, or on which there is, an item of environmental heritage that:

(ii) is an item of environmental heritage in an environmental planning instrument,

#### General Housing Code

Complying development under the General Housing Code **may not** be carried out on the land as the land is affected by specific land exemptions as identified in clause 1.17A and clause 1.19 of *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.*
#### **Rural Housing Code**

Complying development under the Rural Housing Code **may not** be carried out on the land as the land is not in a specified zone RU1, RU3 and R5.

#### Housing Alterations Code

Complying development under the Housing Alterations Code **may not** be carried out on the land as the land is affected by specific land exemptions as identified in clause 1.17A and clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

#### General Development Code

Complying development under the General Development Code **may not** be carried out on the land as the land is affected by specific land exemptions as identified in clause 1.17A and clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

#### Commercial and Industrial Code

Complying development under the General Commercial and Industrial Code **may not** be carried out on the land as the land is affected by specific land exemptions as identified in clause 1.17A and clause 1.19 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

#### Commercial and Industrial (New Building and Additions) Code

Complying development under the Commercial and Industrial Alterations Code **may not** be carried out on the land as the land is affected by specific land exemptions as identified in Clause 5A.1 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008.

#### **Container Recycling Facilities Code**

Complying development under the Container Recycling Facilities Code **may not** be carried out on the land as the land is not in a specified zone B1, B2, B3, B4, B5, B6, B7, B8, IN1, IN2, IN3, IN4 or SP3.

#### Subdivisions Code

Complying development under the Subdivisions Code may be carried out on the land.

#### Demolition Code

Complying development under the Demolition Code **may** be carried out on the land.

Fire Safety Code

Complying development under the Fire Safety Code **may** be carried out on the land.

### 4 Coastal protection

Whether or not the land is affected by the operation of section 38 or 39 of the <u>Coastal Protection Act</u> <u>1979</u>, but only to the extent that the council has been so notified by the Department of Public Works.

Not Applicable to this property.

### 4A Certain information relating to beaches and coasts

- (1) Whether an order has been made under Part 4D of the <u>Coastal Protection Act 1979</u> in relation to emergency coastal protection works (within the meaning of the Act) on the land (or on public land adjacent to that land), except where the council is satisfied that such an order has been fully complied with.
- (2) (a) whether the council has been notified under section 55X of the <u>Coastal Protection Act</u> <u>1979</u> that emergency coastal protection works (within the meaning of the Act) have been placed on the land (or on public land adjacent to that land), and
  - (b) if works have been so placed whether council is satisfied that the works have been removed and the land restored in accordance with that Act.
- (3) Such information (if any) as is required by the regulations under section 56B of the <u>Coastal</u> <u>Protection Act 1979</u> to be included in the planning certificate and of which council has been notified pursuant to those regulations.

Not Applicable to this property.

# 4B Annual charges under <u>Local Government Act 1993</u> for coastal protection services that relate to existing coastal protection works

Whether the owner (or any previous owner) of the land has consented in writing to the land being subject to annual charges under section 196B of the <u>Local Government Act 1993</u> for coastal protection services that relate to existing coastal protection works (within the meaning of section 553B of that Act).

**Note:** "Existing coastal protection works" are works to reduce the impact of coastal hazards on land (such as seawalls, revetments, groynes and beach nourishment) that existed before the commencement of section 553B of the <u>Local Government Act 1993.</u>

Not Applicable to this property.

# 5 Mine subsidence

Whether or not the land is proclaimed to be a mine subsidence district within the meaning of section 15 of the <u>Mine Subsidence Compensation Act 1961</u>.

No

# 6 Road widening and road realignment

Whether or not the land is affected by any road widening or road realignment under:

#### (a) Division 2 of Part 3 of the <u>Roads Act 1993</u>, or

For information please consult with the Roads and Maritime Services and / or your title deeds.

#### (b) any environmental planning instrument, or

No

#### (c) any resolution of the council.

No

# 7 Council and other public authority policies on hazard risk restrictions

Whether or not the land is affected by a policy that restricts the development of the land because of the likelihood of land slip, bushfire, tidal inundation, subsidence, acid sulphate soils or any other risk (other than flooding).

(a) adopted by the council, or

No

(b) adopted by any other public authority and notified to the council for the express purpose of its adoption by that authority being referred to in planning certificates issued by the council.

No

### 7A Flood related development controls information

(1) Whether or not development on that land or part of the land for the purposes of dwelling houses, dual occupancies, multi dwelling housing or residential flat buildings (not including development for the purposes of group homes or seniors housing) is subject to flood related development controls.

No

(2) Whether or not development on that land or part of the land for any other purpose is subject to flood related development controls.

No

# 8 Land reserved for acquisition

Whether or not any environmental planning instrument or proposed environmental planning instrument referred to in clause 1 make provision in relation to the acquisition of the land by a public authority, as referred to in section 27 of the Act.

No.

# 9 Contributions plans

The name of each contributions plan applying to the land.

Glen Innes Severn Section 94A Contributions Plan.

*Please Note:* For further details please see Council's website – www.gisc.nsw.gov.au.

# 9A Biodiversity certified land

If the land biodiversity certified land (within the meaning of Part 7AA of the <u>Threatened Species</u> <u>Conservation Act 1995</u> relates.

No.

# 10 Biobanking agreements

If the land is land to which a biobanking agreement under Part 7A of <u>the Threatened Species</u> <u>Conservation Act 1995</u> relates, a statement to that effect (but only if the council has been notified of the existence of an agreement by the Director-General of Heritage NSW).

No

# *10A* Native vegetation clearing set asides

If the land contains a set aside area under section 60ZC of the Local Land Services Act 2013, a statement to that effect (but only if the council has been notified of the existence of the set aside area by Local Land Services or it is registered in the public register under that section).

Council has not been notified that this land is affected by a set aside area under the <u>Local Land Services</u> <u>Act 2013.</u>

# 11 Bush fire prone land

If any of the land is bush fire prone land (as defined in the Act), a statement that all or, as the case may be, some of the land is bush fire prone land.

If none of the land is bush fire prone land, a statement to that effect.

The land is not identified in the certified Bush Fire Prone Land map for the Glen Innes Severn area.

# 12 Property vegetation plans

If the land is land to which a property vegetation plan under the <u>Native Vegetation Act 2003</u> applies, a statement to that effect (but only if the council has been notified of the existence of the plan by the person or body that approved the plan under that Act).

Council has not been notified that this land is affected by a property vegetation plan under the <u>Native</u> <u>Vegetation Act 2003</u>.

# 13 Orders under <u>Trees (Disputes Between Neighbours) Act 2006</u>

Whether an order has been made under the <u>Trees (Disputes Between Neighbours) Act 2006</u> to carry out work in relation to a tree on the land (but only if the council has been notified of the order).

No.

# 14 Directions under Part 3A

If there is a direction by the Minister in force under section 75P (2) (c1) of the Act that a provision of an environmental planning instrument prohibiting or restricting the carrying out of a project or a stage of a project on the land under Part 4 of the Act does not have effect, a statement to that effect identifying the provision that does not have effect.

No such direction applies to the land.

### 15 Site compatibility certificates and conditions for seniors housing

If the land is land to which <u>State Environmental Planning Policy (Housing for Seniors or People with a</u> <u>Disability) 2004</u> applies:

- (a) a statement of whether there is a current site compatibility certificate (of which the council is aware), issued under clause 25 of that Policy in respect of proposed development on the land and, if there is a certificate, the statement is to include:
  - *(i) the period for which the certificate is current, and*
  - (ii) that a copy may be obtained from the head office of the Department of Planning & Infrastructure, and
- (b) a statement setting out any terms of a kind referred to in clause 18 (2) of that Policy that have been imposed as a condition of consent to a development application granted after 11 October 2007 in respect of the land.

Not applicable to this property.

#### 16 Site compatibility certificates for infrastructure

A statement of whether there is a valid site compatibility certificate (of which the council is aware), issued under clause 19 of State Environmental Planning Policy (Infrastructure) 2007 in respect of proposed development on the land and, if there is a certificate, the statement is to include:

- (a) the period for which the certificate is valid, and
- (b) that a copy may be obtained from the head office of the Department of Planning & Infrastructure.

Not applicable to this property.

# 17 Site compatibility certificates for conditions for affordable rental housing

- (1) A statement of whether there is a current site compatibility certificate (affordable rental housing), of which the council is aware, in respect of proposed development on the land and, if there is a certificate, the statement is to include:
  - (a) the period for which the certificate is valid, and
  - (b) that a copy may be obtained from the head office of the Department of Planning & Infrastructure.

Council is not aware of a site compatibility certificate for affordable rental housing being applicable to this property.

(2) A statement setting out any terms of a kind referred to in clause 17(1) or 38(1) of State Environmental Planning Policy (Affordable Rental Housing) 2009 that have been imposed as a condition of consent to a development application in respect of the land.

Not applicable to this property.

### 18 Paper Subdivision information

(1) The name of any development plan adopted by a relevant authority that applies to the land or that is proposed to be subject to a consent ballot.

Not applicable to this property.

#### (2) The date of any subdivision order that applies to the land.

Not applicable to this property.

(3) Words and expressions used in this clause have the same meaning as they have in Part 16C of this Regulation

this Regulation.

Not applicable to this property.

## **19** Site verification certificates

A statement of whether there is a current site verification certificate, of which the council is aware, in respect of the land and, if there is a certificate, the statement is to include:

(a) the matter certified by the certificate, and

Note. A site verification certificate sets out the Secretary's opinion as to whether the land concerned is or is not biophysical strategic agricultural land or critical industry cluster land—see Division 3 of Part 4AA of State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007.

(b) the date on which the certificate ceases to be current (if any), and

(c) that a copy may be obtained from the head office of the Department.

Council is not aware of a site verification certificate being applicable to this property.

### 20 Loose-fill asbestos insulation

If the land includes any residential premises (within the meaning of Division 1A of Part 8 of the Home Building Act 1989) that are listed on the register that is required to be maintained under that Division, a statement to that effect.

Council is not aware of any residential premises (within the meaning of Division 1A of Part 8 of the Home Building Act 1989) applicable to this property being listed on the register.

# 21 Affected building notices and building product rectification orders

(1) A statement of whether there is any affected building notice of which the council is aware that is in force in respect of the land

Council is not aware of any affected building notice applicable to this property being listed on the register.

#### (2) A statement of:

- (a) Whether there is any building product rectification order of which the council is aware that is in force in respect of the land and has not been fully complied with, and
- (b) Whether any notice of intention to make a building product rectification order of which the council is aware has been given in respect of the land and is outstanding

#### (3) In this clause:

Affected building notice has the same meaning as in Part 4 of the <u>Building Products (Safety) Act</u> 2017

Building product rectification order has the same meaning as in the <u>Building Products (Safety)</u> <u>Act 2017</u>

- (a) Council is not aware of any building product rectification order that is in force in respect of the land and that has not been fully complied with.
- (b) Council is not aware of any notice of intention to make a building rectification order in respect of the land and that is outstanding.

# ADDITIONAL MATTERS TO BE SPECIFIED IN PLANNING CERTIFICATE

#### Additional matters are pursuant to Schedule 4 of the

#### Environmental Planning And Assessment Regulation 2000, as amended

### Contaminated Land Management Act 1997

The following matters are prescribed by section 59 (2) of the <u>Contaminated Land Management</u> <u>Act 1997</u> as additional matters to be specified in a planning certificate:

(a) that the land to which the certificate relates is significantly contaminated land within the meaning of that Act—if the land (or part of the land) is significantly contaminated land at the date when the certificate is issued,

#### Not Applicable

(b) that the land to which the certificate relates is subject to a management order within the meaning of that Act—if it is subject to such an order at the date when the certificate is issued,

#### Not Applicable

(c) that the land to which the certificate relates is the subject of an approved voluntary management proposal within the meaning of that Act—if it is the subject of such an approved proposal at the date when the certificate is issued,

Not Applicable

(d) that the land to which the certificate relates is subject to an ongoing maintenance order within the meaning of that Act—if it is subject to such an order at the date when the certificate is issued,

Not Applicable

(e) that the land to which the certificate relates is the subject of a site audit statement within the meaning of that Act—if a copy of such a statement has been provided at any time to the local authority issuing the certificate.

Not Applicable

Nation Building and Jobs Plan (State Infrastructure Delivery) Act 2009

Section 26 of this Act\_provides that advice about any exemption under section 23 or authorisation under section 24 of that Act is to be included in this certificate, if the council is provided with a copy of the exemption or authorisation by the Co-ordinator General under that Act.

Not Applicable to this Property

Haminis

Kathleen Taminiau Town Planner

Date: 5 May 2022

#### ANNEXURE 1

#### STATE ENVIRONMENTAL PLANNING POLICIES APPLICABLE AT DATE OF ISSUE OF THIS CERTIFICATE

# (INFORMATION IS PROVIDED TO EXTENT THAT COUNCILHAS BEEN NOTIFIED BY THE NSW DEPARTMENT OF PLANNING & INFRASTRUCTURE)

SEPP (Affordable Rental Housing) 2009

The aims of this Policy are as follows-

(a) to provide a consistent planning regime for the provision of affordable rental housing,

(b) to facilitate the effective delivery of new affordable rental housing by providing incentives by way of expanded zoning permissibility, floor space ratio bonuses and non-discretionary development standards,

(c) to facilitate the retention and mitigate the loss of existing affordable rental housing,

(d) to employ a balanced approach between obligations for retaining and mitigating the loss of existing affordable rental housing, and incentives for the development of new affordable rental housing,

(e) to facilitate an expanded role for not-for-profit-providers of affordable rental housing,

(f) to support local business centres by providing affordable rental housing for workers close to places of work,

(g) to facilitate the development of housing for the homeless and other disadvantaged people who may require support services, including group homes and supportive accommodation.

#### SEPP Building Sustainability Index: BASIX 2004

This SEPP operates in conjunction with <u>Environmental Planning and Assessment Amendment (Building</u> <u>Sustainability Index: BASIX) Regulation 2004</u> to ensure the effective introduction of BASIX in NSW. The SEPP ensures consistency in the implementation of BASIX throughout the State by overriding competing provisions in other environmental planning instruments and development control plans, and specifying that SEPP 1 does not apply in relation to any development standard arising under BASIX. The draft SEPP was exhibited together with draft <u>Environmental Planning and Assessment Amendment (Building Sustainability Index: BASIX) Regulation 2004</u>.

#### SEPP (Exempt and Complying Development Codes) 2008

This policy commences from 27 February 2009. It aims to provide streamlined assessment processes for development that complies with specified development standards by:

(a) providing exempt and complying development codes that have State-wide application, and

(b) identifying, in the General Exempt Development Code, types of development that are of minimal environmental impact that may be carried out without the need for development consent, and

(c) identifying, in the General Housing Code, types of complying development that may be carried out in accordance with a complying development certificate as defined in the <u>Environmental Planning and</u> <u>Assessment Act 1979</u>, and

(d) enabling the progressive extension of the types of development in this Policy, and

(e) providing transitional arrangements for the introduction of the State-wide codes, including the amendment of other environmental planning instruments.

#### SEPP (Housing for Seniors or People with a Disability) 2004

Aims to increase the supply and choice of housing for older people or people with a disability. Such housing is permitted, with council consent, wherever houses, flats, hospitals or certain 'special uses' are permitted in or adjoining urban areas, except for some environmentally sensitive lands. The policy contains development standards and matters a council and the Department of Planning & Infrastructure must consider when determining development applications. For example, future residents must have reasonable access to services they require, taking into account convenience, affordability and the type and scale of housing. Relevant Government Circulars should be read in conjunction with this Policy.

Provides a consistent planning regime for infrastructure and the provision of services across NSW, along with providing for consultation with relevant public authorities during the assessment process. The SEPP supports greater flexibility in the location of infrastructure and service facilities along with improved regulatory certainty and efficiency.

#### SEPP Koala Habitat Protection 2020

Encourages the conservation and management of natural vegetation areas that provide habitat for koalas to ensure permanent free-living populations will be maintained over their present range. The policy applies to 107 local government areas. Local councils cannot approve development in an area affected by the policy without an investigation of core koala habitat. The policy provides the state-wide approach needed to enable appropriate development to continue, while ensuring there is ongoing protection of koalas and their habitat.

#### SEPP (Mining, Petroleum Production and Extractive Industries) 2007

This Policy aims to provide for the proper management and development of mineral, petroleum and extractive material resources for the social and economic welfare of the State. The Policy establish appropriate planning controls to encourage ecologically sustainable development.

#### SEPP No. 21 – Caravan Parks

The aim of this Policy is to encourage-

(a) the orderly and economic use and development of land used or intended to be used as a caravan park catering exclusively or predominantly for short-term residents (such as tourists) or for long-term residents, or catering for both, and

(b) the proper management and development of land so used, for the purpose of promoting the social and economic welfare of the community, and

(c) the provision of community facilities for land so used, and

(d) the protection of the environment of, and in the vicinity of, land so used.

#### SEPP No. 33 - Hazardous and Offensive Development

Provides new definitions for 'hazardous industry', 'hazardous storage establishment', 'offensive industry' and 'offensive storage establishment'. The definitions apply to all planning instruments, existing and future. The new definitions enable decisions to approve or refuse a development to be based on the merit of proposal. The consent authority must careful consider the specifics the case, the location and the way in which the proposed activity is to be carried out. The policy also requires specified matters to be considered for proposals that are 'potentially hazardous' or 'potentially offensive' as defined in the policy. For example, any application to carry out a potentially hazardous or potentially offensive development is to be advertised for public comment, and applications to carry out potentially hazardous development must be supported by a preliminary hazard analysis (PHA). The policy does not change the role of councils as consent authorities, land zoning, or the designated development provisions of the Environmental Planning and Assessment Act 1979.

#### SEPP No. 36 - Manufactured Home Estates

Helps establish well-designed and properly serviced manufactured home estates (MHEs) in suitable locations. Affordability and security of tenure for residents are important aspects. The policy applies to Gosford, Wyong and all local government areas outside the Sydney Region. To enable the immediate development of estates, the policy allows MHEs to be located on certain land where caravan parks are permitted. There are however, criteria that a proposal must satisfy before the local council can approved development. The policy also permits, with consent, the subdivision of estates either by community title or by leases of up to 20 years. A section 117 direction issued in conjunction with the policy guides councils in preparing local environmental plans for MHEs, enabling them to be excluded from the policy.

#### SEPP No. 55 - Remediation of Land

Introduces state-wide planning controls for the remediation of contaminated land. The policy states that land must not be developed if it is unsuitable for a proposed use because it is contaminated. If the land is unsuitable, remediation must take place before the land is developed. The policy makes remediation permissible across the State, defines when consent is required, requires all remediation to comply with standards, ensures land is investigated if contamination is suspected, and requires councils to be notified of all remediation proposals. To assist councils and developers, the Department, in conjunction with the Environment Protection Authority, has prepared Managing Land Contamination: Planning Guidelines.

#### SEPP No. 64 - Advertising and Signage

Aims to improve the amenity of urban and natural settings by managing the impact of outdoor advertising. The policy responds to growing concerns from the community, the advertising industry and local government that existing controls and guidelines were not effective. SEPP No. 64 offers the comprehensive provisions and consistent approach needed. SEPP 64 – Advertising and Signage: Explanatory Information should be read in conjunction with the policy.

#### SEPP No. 65 – Design Quality of Residential Flat Development

This SEPP highlights 10 design quality principles to guide architects designing residential flats and to assist councils in assessing these developments. The principles relate to key design issues such as:

- the context for design the locality and streetscape
- scale, form and density of the building
- measures to achieve resource, energy and water efficiency
- landscape design to create useful outdoor spaces for residents
- safety and security, including ensuring public areas are safe, visible and well lit at night.

Aims to improve the design quality of flats of three or more storeys with four or more dwellings. The policy sets out a series of design principles for local councils or other consent authorities to consider when assessing development proposals for flats. It also creates a role for special design review panels and registered architects in the design and approval

#### SEPP No. 70 Affordable Housing (Revised Schemes)

This Policy:

(a) identifies that there is a need for affordable housing across the whole of the State, and

(b) describes the kinds of households for which affordable housing may be provided, and

(c) makes a requirement with respect to the imposition of conditions relating to the provision of affordable housing.

SEPP (Primary Production and Rural Development) 2019

The aims of this Policy are as follows—

(a) to facilitate the orderly economic use and development of lands for primary production,

(b) to reduce land use conflict and sterilisation of rural land by balancing primary production, residential development and the protection of native vegetation, biodiversity and water resources,

(c) to identify State significant agricultural land for the purpose of ensuring the ongoing viability of agriculture on that land, having regard to social, economic and environmental considerations,

(d) to simplify the regulatory process for smaller-scale low risk artificial waterbodies, and routine maintenance of artificial water supply or drainage, in irrigation areas and districts, and for routine and emergency work in irrigation areas and districts,

(e) to encourage sustainable agriculture, including sustainable aquaculture,

(f) to require consideration of the effects of all proposed development in the State on oyster aquaculture,

(g) to identify aquaculture that is to be treated as designated development using a well-defined and concise development assessment regime based on environment risks associated with site and operational factors.

#### SEPP (State and Regional Development) 2011

The aims of this Policy are as follows—

(a) to identify development that is State significant development,

(b) to identify development that is State significant infrastructure and critical State significant infrastructure,

(c) to identify development that is regionally significant development.

#### SCHEDULE OF DRAFT STATE ENVIRONMENTAL PLANNING POLICIES OF WHICH COUNCIL HAS BEEN MADE AWARE AT DATE OF ISSUE OF CERTIFICATE

**Please Note**: The NSW Department of Planning & Infrastructure has issued Circular PS 08-013 to Councils on 13 November 2008. From 1 March 2009, Councils are directed not to consider draft environmental planning instruments that were exhibited prior to 1 March 2006 and not yet gazetted for the purpose of assessing development applications under Section 79C(a)(ii) of the Environmental Planning and Assessment <u>Act 1979</u>.

Nil Current

**GLEN INNES SEVERN COUNCIL** 



PO Box 61, Glen Innes, 2370 Ph: 02 6730 2350

# **SECTION 10.7(5) CERTIFICATE**

Information supplied pursuant to s149(5) of the

Environmental Planning And Assessment Act 1979, as amended

APPLICANT DETAILS		CERTIFICATE DETAILS	
Geolink		Certificate Number:	396/21-22
COFFS HARBOUR	NSW 2450	Certificate Date:	28 April 2022
PROPERTY DETAILS		Your Reference:	GEO03730
Property Details:	85 Taylor Street Glen Innes	Fee:	\$53.00
Legal Description:	Lot 2 DP 1208729 Parish Glen Innes	Receipt Number:	125886

# (a) Has development consent under the <u>Environmental Planning and Assessment Act 1979</u>, as amended been issued for a use of the land within the past five years? If so, what conditions of consent apply?

No

#### (b) Is the land affected by a Tree Preservation Order?

#### No

The above information has been taken from Council's records but Council cannot accept responsibility for any omission or inaccuracy.

#### Please Note:

- Prospective purchasers should consult their legal advisers concerning any easements or restrictions on the title of the property.
- Council does not incur any liability in respect of advice provided in good faith pursuant to s149(5) in accordance with s149(6) of the <u>Environmental Planning and Assessment Act 1979</u>, as amended.
- Information on any outstanding notices or orders pertaining to this property can be obtained through a Certificate available from Council pursuant to s121ZP of the <u>Environmental Planning as Assessment Act</u> <u>1979</u> and s735A of the Local Government Act 1993.

Janini

Kathleen Taminiau Town Planner

Date: 28 April 2022

# Southern Asbestos Consultancy Pty Ltd

4 Knight Street Junee NSW 2663 Australia 0414572746

# ASBESTOS/HAZMAT INVESTIGATION REPORT

July 2022 SAC22007

NSW Health Infrastructure

Building G108 Glen Innes District Hospital NSW

HI:SH

# **Document Control**

Document Quality Management Details.		
Report Name:	Asbestos/Hazmat Investigation Report	
Site Details:	Building G108, Glen Innes District Hospital NSW	
Project Number:	SAC22007	
Client Name:	NSW Health Infrastructure	
Client Number:	н	
Signature:	Prepared By: Steve Harley	

#### **Issue Status**

Version No.	Date	Creator	
2	23/07/2022	Steve Harley	

#### **Document Circulation**

No of Copies	Туре	Customer Name	Position & Company
1	Electronic	Stuart Diver	Senior Project Director

#### **Statement of Limitations**

This report has been prepared in accordance with the agreement between NSW Health Infrastructure and Southern Asbestos Consultancy Pty Ltd.

Within the limitations of the agreed upon scope of services, this work has been undertaken and performed in a professional manner, in accordance with generally accepted practices, using a degree of skill and care ordinarily exercised by members of its profession and consulting practice. No other warranty, expressed or implied, is made.

This report is solely for the use of NSW Health Infrastructure and any reliance on this report by third parties shall be at such party's sole risk and may not contain sufficient information for purposes of other parties or for other uses. This report shall only be presented in full and may not be used to support any other objective than those set out in the report, except where written approval with comments are provided by Southern Asbestos Consultancy Pty Ltd.

# Asbestos/Hazmat Investigation Report NSW Health Infrastructure

Building G108, Glen Innes District Hospital NSW

# **Table of Contents**

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# Asbestos/Hazmat Investigation Report

# NSW Health Infrastructure

# **Building G108, Glen Innes District Hospital NSW**

#### Introduction

This report presents the findings of an Asbestos/Hazmat Investigation within Building G108, Glen Innes District Hospital NSW. Southern Asbestos Consultancy Pty Ltd prepared this report following inspections between Monday 27<sup>th</sup> and Thursday 30<sup>th</sup> June 2021, Steve Harley (LAA000151) of Southern Asbestos Consultancy Pty Ltd undertook the inspection as requested by Stuart Diver from NSW Health Infrastructure.

#### **Project Objectives**

The objective of the report is to identify any Asbestos, SMF, PCB, ODS's and Lead Paint present within building G108, Glen Innes District Hospital NSW.

#### **Project Scope**

The scope of work involved the following:

• Present the findings of any Asbestos, SMF, PCB, ODS's and Lead Paint identified within building G108.

#### Background

NSW Health Infrastructure contacted Southern Asbestos Consultancy Pty Ltd to conduct an Asbestos/Hazmat investigation of Building G108, Glen Innes District Hospital NSW prior to demolition.

- The building was built in the late 1950's.
- Building structure consists of Three Levels.
- Exterior Brick Walls, concrete balconies with Asbestos containing roof sheeting.
- Exterior Roof Level Eaves Timber boards.
- Interior Ground Floor Timber floor with concrete floors in wet areas. Brick & concrete rendered walls, Concrete ceilings, Fibrous plaster ceilings in wet arears.
- Interior First Floor Concrete floor, Brick & concrete walls, Concrete ceilings, Fibrous plaster ceilings in wet areas.
- Interior Second Floor Concrete floor, Brick & concrete walls, Fibrous plaster ceilings.
- Subfloor Central service tunnels –concrete & brick piers, timber joist.
- Ceiling space Timber Trusses, Water Tanks & service pipes
- Fifteen (15) services risers within each level Ground floor, First floor & Second floor.

#### **Findings**

The Hazmat investigation conducted of the site identified the following:

- A total of Seventeen (17) samples were taken of possible asbestos containing materials of which ten (10) returned Positive to Asbestos.
- Paint coating White paint coating throughout the building. Samples from three levels were taken as a representative sample to identify Lead Paint. White paint coating < 0.01%
- Asbestos containing materials were identify throughout building G108.
- Interior Friable asbestos pipe insulation (sample 012) was identified throughout the building. Pipes inspected were in good condition.
- Interior Friable asbestos electrical wire insulation material (sample 003, photo 13) was identified throughout the building corridors on all levels.
- Interior Gaskets (sample 017, photos 1&2) were identified within the plant room, **Friable**/Non-friable material depending on removal process.
- Interior Plant room boiler containing friable asbestos insulation (photo 4).

- Exterior Water proofing membrane East, North & West Balcony's, photos 26,27,28,30&32, samples 001,008 &010 Non-friable asbestos material, (depending on removal process).
- Note: East balcony concrete pavers Possible Asbestos Cross Contamination.
- Interior Toilet partitions (sample 005, photo 14) Non-friable asbestos material.
- Interior Electrical Backing Board (EBB) samples 013&016, photos 19&20, Non-friable asbestos material.
- Exterior Roof sheeting, sample 014, photo 36, Non-friable asbestos material.
- Window putty –material from selected windows on all levels as a representative sample 002 Negative to asbestos.
- Exterior ground surface around building area well maintained No building derbies identified (roof sheeting/paint material).
- Interior, Bitumen Membrane under Parquetry floor, representative sample taken from two levels Sample SO2021332-011 Negative to asbestos
- Exterior Southwest Exhaust flue SMF insulation.

#### Samples Positive to Asbestos

- SO2021331-001 Exterior-First Floor- North- Balcony- Drain pipe insulation Membrane mat
- SO2021331-003 Interior-Ground Floor- East West Corridor- recessed light fitting-Electrical wire insulation material.
- SO2021331-005 Interior-Ground Floor- South- Ladies toilet- Partition-Compressed Fibre Cement Sheet.
- SO2021331-008 Exterior-First Floor- North-Balcony -Water Proofing Membrane.
- SO2021331-010 Exterior-First Floor- East-101 Flat Roof -Under concrete pavers-Water Proofing

#### Membrane.

- SO2021331-012 Interior- Second Floor- Bedroom 210- Riser Pipe insulation material.
- SO2021331-013 Interior- Ground Floor- North-South Corridor -Electrical switch board EBB
- SO2021331-014 Ceiling Space-Roof sheeting Moulded Fibre Cement Sheeting.
- SO2021331-016 Plant Room- Electrical switch board Electrical Backing Board.
- SO2021331-017 Plant Room- Pipe vales flange joints Gaskets material.
- Synthetic Mineral Fibre (SMF) Insulation batts was identified throughout level two ceiling space. SMF Insulation within the water tanks within the ceiling space, pipe insulation within the Subfloor area, Exhaust flue Southwest corner.
- Paint system White, Same paint system throughout exterior/interior of the building. Samples from three levels were taken as a representative sample to identify Lead Paint.White paint coating, Lead (%w/w) = 0.01% < 0.01.
- No ODS's were observed.
- No PCBs were identified Light fittings throughout the building were of the same style with inspections of selected light fittings on all levels within the building.
- Subfloor Services pipes throughout with friable asbestos containing insulation were identified.
   Service tunnel under building northern exterior wall (length unknown) water pipes with friable asbestos containing insulation & SMF pipe insulation was identified.
- Note: Possible ACM packers on piers.
- Ground floor Electrical Switch Boards EBB, fifteen (15) services risers, two service bulkheads, ACM toilet partitions, Corridors (Throughout) recessed light fittings-Electrical wire **friable** asbestos insulation material.
- Level One Electrical Switch Board EBB, fifteen (15) services risers, Balcony's North, East & West Water proofing membrane, Corridors (Throughout) recessed light fittings-Electrical wire **friable** asbestos insulation material.
- Level Two Electrical Switch Board EBB, fifteen (15) services risers, Balcony's North & West Water proofing membrane Corridors (Throughout) recessed light fittings-Electrical wire **friable** asbestos insulation material.
- Level Two ceiling space Water pipes throughout with asbestos containing pipe insulation & SMF water tank insulation was identified, SMF insulation batts throughout ceiling space.
- Note: Possible ACM packers between exterior wall and trusses.
- Roof Area ACM roof sheeting

#### **Recommendations**

The following recommendations are made regarding the asbestos containing materials identified during the investigation:

- □ The friable asbestos containing materials are to be removed by a Class A (friable) Licensed Asbestos Removal Contractor (LARC).
- □ Licenced Asbestos Assessor (LAA) to be present/on site prior to & during asbestos removal works to inspect asbestos removal zones and asbestos removal process each day for safety and in accordance with the relevant legislation, to assess & sign off SWMS, to assess any unexpected finds or issues related to removal procedures.
- □ Asbestos fibre air monitoring must be undertaken during asbestos removal works and clearance air monitoring within containment enclosures following friable asbestos removal works.
- Once the asbestos containing materials have been removed, a Licenced Asbestos Assessor (LAA) will be required to conduct a clearance inspection following completion of the removal works for an Asbestos Clearance Certification to be issued.
- Subfloor Following asbestos containing materials removal, a Licenced Asbestos Assessor (LAA) will be required to conduct a clearance inspection following completion of the removal works. The LAA to access if soil samples are required for clearance certificate.
- The asbestos removal contractor (LARC) should ensure appropriate controls are in place during the works, including barricades/warning tape or fencing, warning signage and dust suppression (e.g. a fine mist water spray, or PVA-mix spray). Negative air containment enclosures to be inspected by an LAA prior to removal works of Friable asbestos containing materials.
- All workers entering asbestos removal zones of the site are to wear appropriate Personal Protective Equipment (PPE) (e.g. disposable coveralls (Asbestos rated P5), half-face respirators (fitted with P2 rated filters) at all times during asbestos-related work activities;
- All asbestos contaminated materials/waste is to be transported from site for disposal at a landfill facility licensed to accept asbestos waste.
- □ All asbestos removal works must be undertaken in accordance with the relevant legislation for the site by a licensed asbestos removal contractor. All works should be conducted as per relevant legislation 'Work Health & Safety Regulation (2017)' and the 'Code of Practice: How to Safely Remove Asbestos (2017)'.
- SMF insulating materials were identified throughout the building. Removal by persons suitably experienced in handling SMF insulation.

# NSW Health Infrastructure Asbestos/Hazmat Investigation Report Building G108, Glen Innes District Hospital NSW

**Appendix A: Photographs** 























Asbestos – SO2021332-003 - Corridors throughout – recessed light fittings- wire insulation Photo 13.

#### SO2021332-012 - throughout - risers (15) - pipe insulation

(See attached Subfloor Hydraulic building plan for location of risers on all levels).

Example of risers – photos 49,50,51,52,53&54.

SO2021332-005 - Ladies toilet - Partitions - CFCS, photo 14.

SO2021332-013 - Electrical Switch Board – EBB, photo 19&20.

SO2021332-016 - Plant room - Electrical Switch Board - EBB, photo 3.

SO2021332-017 – Plant room – Pipe vales flange gaskets, photos 1&2.

Service tunnel – (under building northern exterior wall) water pipes with asbestos containing pipe insulation & SMF pipe insulation was identified photos 11&12.

SMF insulation – Exterior, exhaust pipe insulation, Ground level to roof level, photo 42



#### **First Floor Plan**

Asbestos - SO2021332-001 – Exterior, North balcony, (12 pipes) pipe insulation, photo 25.

SO2021332-003 - Corridors, throughout - recessed light fittings- wire insulation Photo 13.

SO2021332-008 - Exterior, North balcony, Water proofing membrane, photo 26.

SO2021332-008 – Exterior, West balcony, Water proofing membrane, photo 30.

SO2021332-010 - Exterior, East balcony, Under concrete pavers, Water proofing membrane, photo 28.

Note: Photo 27 – Exterior – East balcony concrete pavers, possible cross contamination with asbestos membrane during asbestos removal.

SO2021332-013 - Electrical Switch Board – EBB. Photo 19.

SO2021332-012 - throughout - risers (15) - pipe insulation

Example of risers – photos 49,50,51,52,53&54.

(See attached Subfloor Hydraulic building plan for location of risers on all levels).



#### Asbestos -

Photo 32.

SO2021332-003 - Corridors throughout – recessed light fittings- wire insulation photo 13.

SO2021332-008 - Exterior, North balcony, Water proofing membrane, Photo 32.

SO2021332-008 – Exterior, West balcony, Water proofing membrane, similar to photo 30.

SO2021332-013 - Electrical Switch Board – EBB photo 19.

SO2021332-012 - throughout - risers (15) - pipe insulation

Example of risers – photos 49,50,51,52,53&54.

(See attached Subfloor Hydraulic building plan for location of risers on all levels).



#### Ceiling space Hydraulic Plan

#### Asbestos

SO2021332-012 – All pipes throughout ceiling space – Friable asbestos insulation (not highlighted) photos 38,39&40

• Note: Possible ACM packers between exterior wall and trusses photo 37.

• SO2021332-014 - roof sheeting MFCS - photo 36

SMF insulation batts throughout ceiling space, photo 35 SMF insulation – Water tanks x Two, photos 33&34.



wall) water pipes with asbestos containing pipe insulation & SMF pipe insulation was identified (photos 11&12). length of tunnel unknown.

#### Subfloor Hydraulic Plan

#### Asbestos

SO2021332-012 -all pipes throughout subfloor – service pipes - asbestos insulation (not highlighted) photos 7,8,9&10.

SO2021332-016 - Plant room - Electrical Switch Board - EBB (photo 3).

SO2021332-017 – Plant room – Pipe vales flange gaskets (photos 1&2).

• Note: Possible ACM packers on piers.

Service tunnel – (under building northern exterior wall) water pipes with asbestos containing pipe insulation & SMF pipe insulation was identified (photos 11&12) length of tunnel unknown.

# NSW Health Infrastructure Asbestos/Hazmat Investigation Report

Building G108, Glen Innes District Hospital NSW

**Appendix B: Sample Analysis Reports** 



Emma Anderson

1310 Bowraville Road Bellingen New South Wales 2454 Attention: Emma Anderson Email: eanderson@geolink.net.au

Dear Sir or Madam:

AHIMS Web Service search for the following area at Address : 85 TAYLOR STREET GLEN INNES 2370 with a Buffer of 1000 meters, conducted by Emma Anderson on 12 August 2022.

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



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

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

Your Ref/PO Number : Demolition Client Service ID : 707869

Date: 12 August 2022
Home Public registers Contaminated land record of notices

### Site and notice details

Your search for: Suburb: GLEN INNES Return to list of search results 2 notices on 1 site were matched. Search Again Refine Search

### Area No: 3105

The information below was correct at the time the notices were issued.

Site: Council-owned Laneway Address: Lot 2 Lang STREET, GLEN INNES LGA: GLEN INNES SEVERN

Owner: Lang Street Pty Limited, Laneway owned by Council

#### Notices relating to this site (0 current and 2 former)

(Map) where available, maps show the part of the site affected by the notice \*notice matched search criteria

Notice recipient	Notice type & number		Status	Date
Glen Innes	EHC Act Revocation Notice *	<u>562</u>	Former	Issued 14 Jul 2009
Severn Council				
Glen Innes	Section 36 EHC Act Order *	<u>416</u>	Former	Issued 08 Jan 1996
Council				Revoked 14 Jul 2009

17 August 2022

### For business and industry ^

### For local government ^

### Contact us

131 555 (tel:131555)

Online (https://yoursay.epa.nsw.gov.au/epa-website-feedback)

info@epa.nsw.gov.au (mailto:info@epa.nsw.gov.au)

EPA Office Locations (https://www.epa.nsw.gov.au/about-us/contact-us/locations)

Accessibility (https://www.epa.nsw.gov.au/about-us/contact-us/website-service-standards/help-index) Disclaimer (https://www.epa.nsw.gov.au/about-us/contact-us/website-service-standards/disclaimer) Privacy (https://www.epa.nsw.gov.au/about-us/contact-us/website-service-standards/privacy) Copyright (https://www.epa.nsw.gov.au/about-us/contact-us/website-service-standards/copyright) in (https://au.l environmer protectiony autlority-(https://wttper//c

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# **EPBC** Act Protected Matters Report

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

Report created: 03-Aug-2022

Summary Details Matters of NES Other Matters Protected by the EPBC Act Extra Information Caveat Acknowledgements

# Summary

# Matters of National Environment Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	3
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	3
Listed Threatened Species:	29
Listed Migratory Species:	11

# Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Lands:	2
Commonwealth Heritage Places:	1
Listed Marine Species:	17
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

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

State and Territory Reserves:	None
Regional Forest Agreements:	1
Nationally Important Wetlands:	None
EPBC Act Referrals:	2
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

# Details

# Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands)		[Resource Information]
Ramsar Site Name	Proximity	Buffer Status
Banrock station wetland complex	1100 - 1200km upstream from Ramsar site	In feature area
<u>Riverland</u>	1100 - 1200km upstream from Ramsar site	In feature area
The coorong, and lakes alexandrina and albert wetland	1300 - 1400km upstream from Ramsar site	In feature area

## Listed Threatened Ecological Communities

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

Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Natural grasslands on basalt and fine- textured alluvial plains of northern New South Wales and southern Queensland	Critically Endangered	Community may occurIn feature area within area	
<u>New England Peppermint (Eucalyptus</u> nova-anglica) Grassy Woodlands	Critically Endangered	Community may occu within area	rIn feature area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community may occu within area	rIn feature area

Listed Threatened Species			[Resource Information]
Status of Conservation Dependen Number is the current name ID.	t and Extinct are not MNES und	er the EPBC Act.	
Scientific Name	Threatened Category	Presence Text	Buffer Status



Anthochaera phrygia Regent Honeyeater [82338]

## Critically Endangered

Species or species habitat may occur within area

### In feature area

[Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Botaurus poiciloptilus			
Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area	In feature area
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Ervthrotriorchis radiatus			
Red Goshawk [942]	Vulnerable	Species or species habitat may occur within area	In feature area
Falco hypoleucos			
Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Geophaps scripta scripta			
Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat may occur within area	In feature area
Grantiella picta			
Painted Honeyeater [470]	Vulnerable	Species or species habitat may occur within area	In feature area
Hirundapus caudacutus			
White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Lathamus discolor			
Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
Rostratula australis			
Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area

MAMMAL

## Chalinolobus dwyeri

Large-eared Pied Bat, Large Pied Bat Vulnerable [183]

Species or species In feature area habitat likely to occur within area

# Dasyurus maculatus maculatus (SE mainland population)Spot-tailed Quoll, Spotted-tail Quoll,EndangeredTiger Quoll (southeastern mainlandpopulation) [75184]

Species or species In feature area habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Nyctophilus corbeni			
Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat may occur within area	In feature area
Petaurus australis australis			
Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat may occur within area	In feature area
Petrogale penicillata			
Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat may occur within area	In feature area
Phascolarctos cinereus (combined popula	ations of Qld, NSW and th	<u>e ACT)</u>	
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat known to occur within area	In feature area
Potorous tridactulus tridactulus			
Long-nosed Potoroo (northern) [66645]	Vulnerable	Species or species habitat may occur within area	In feature area
Pteropus poliocephalus			
Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour may occur within area	In feature area
<b>ΟΙ ΔΝΙ</b> Τ			
Arthraxon hispidus			
Hairy-joint Grass [9338]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Boronia granitica			
Granite Boronia [18598]	Endangered	Species or species habitat may occur within area	In buffer area only
Callistemon pungens			
[55581]	Vulnerable	Species or species	In feature area

[22201]

vunciabic

habitat likely to occur within area

Dichanthium setosum bluegrass [14159]

Vulnerable

Species or species In feature area habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diuris pedunculata			
Small Snake Orchid, Two-leaved Golden Moths, Golden Moths, Cowslip Orchid, Snake Orchid [18325]	Endangered	Species or species habitat likely to occur within area	In feature area
Eucalyptus mckieana			
McKie's Stringybark [20199]	Vulnerable	Species or species habitat may occur within area	In feature area
Eucalyptus nicholii			
Narrow-leaved Peppermint, Narrow- leaved Black Peppermint [20992]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Prasophyllum sp. Wybong (C.Phelps ORC	G 5269)		
a leek-orchid [81964]	Critically Endangered	Species or species habitat may occur within area	In feature area
Thesium australe			
Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat known to occur within area	In feature area
REPTILE			
Uvidicolus sphyrurus			
Border Thick-tailed Gecko, Granite Belt Thick-tailed Gecko [84578]	Vulnerable	Species or species habitat may occur within area	In feature area
Wollumbinia belli			
Bell's Turtle, Western Sawshell Turtle, Namoi River Turtle, Bell's Saw-shelled Turtle [86071]	Vulnerable	Species or species habitat may occur within area	In feature area
Listed Migratory Species		[ Res	source Information
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur	In feature area

within area

# Migratory Terrestrial Species

Hirundapus caudacutus

White-throated Needletail [682]

Vulnerable

Species or species In feature area habitat likely to occur within area

Monarcha melanopsis Black-faced Monarch [609]

Species or species In feature area habitat may occur within area

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

Other Matters Protected by the EPBC Act

## Commonwealth Lands

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

Commonwealth Land Name	State	Buffer Status
Communications, Information Technology and the Arts - Australian Postal C	orporation	
Commonwealth Land - Australian Postal Commission [11408]	NSW	In feature area

Communications, Information Technology and the Arts - Telstra Corporation Limited Commonwealth Land - Telstra Corporation Limited [11409] NSW In feature area

Commonwealth Heritage Places		[ <u>F</u>	<u> Resource Information ]</u>
Name	State	Status	Buffer Status
Historic			
Glen Innes Post Office	NSW	Listed place	In feature area

Listed Marine Species		[ <u>Res</u>	source Information
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Gallinago hardwickii			

### Latham's Snipe, Japanese Snipe [863]

Species or species In feature area habitat likely to occur within area overfly marine area

Species or species In feature area habitat likely to occur within area

<u>Haliaeetus leucogaster</u> White-bellied Sea-Eagle [943]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Hirundapus caudacutus			
White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area overfly marine area	In feature area
Lathamus discolor			
Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In buffer area only
Merops ornatus			
Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Monarcha melanopsis			
Black-faced Monarch [609]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla flava			
Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area
Mviagra cyanoleuca			
Satin Flycatcher [612]		Species or species habitat likely to occur within area overfly marine area	In feature area
Neophema chrysostoma			
Blue-winged Parrot [726]		Species or species habitat may occur within area overfly marine area	In feature area
Rhipidura rufifrons			
Rufous Fantail [592]		Species or species habitat likely to occur	In feature area

within area overfly marine area

## Rostratula australis as Rostratula benghalensis (sensu lato)

Australian Painted Snipe [77037]

Endangered

Species or species In feature area habitat likely to occur within area overfly marine area

# Extra Information

Regional Forest Agreements	[ <u>R</u>	esource Information ]
Note that all areas with completed RFAs have been included.		
RFA Name	State	Buffer Status
North East NSW RFA	New South Wales	In feature area

EPBC Act Referrals			[Resou	rce Information ]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
Not controlled action (particular manne	er)			
Aerial baiting for wild dog control	2006/2713	Not Controlled Action (Particular Manner)	Post-Approval	In feature area

# Caveat

### 1 PURPOSE

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

The report contains the mapped locations of:

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

### 2 DISCLAIMER

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

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

### 3 DATA SOURCES

### Threatened ecological communities

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

### Threatened, migratory and marine species

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

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

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

### 4 LIMITATIONS

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

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

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

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

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

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

# Acknowledgements

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

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

-Australian Institute of Marine Science

-Reef Life Survey Australia

-American Museum of Natural History

-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania

-Tasmanian Museum and Art Gallery, Hobart, Tasmania

-Other groups and individuals

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

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

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# Construction and Operational Noise and Vibration Impact Assessment

Glen Innes Hospital Upgrade Glen Innes, NSW



Prepared for: OzArk Environment and Heritage August 2022 MAC221546-03RP1V1

# **Document Information**

# Construction and Operational Noise and Vibration Assessment

Glen Innes Hospital Upgrade

Glen Innes, NSW

Prepared for: OzArk Environment and Heritage PO Box 2069 Dubbo NSW 2830

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MAC221546-03RP1V1	17 August 2022	Dale Redwood	Pull	Oliver Muller	al

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### 1 Introduction

Muller Acoustic Consulting Pty Ltd (MAC) has been commissioned by OzArk Environment and Heritage (OzArk), on behalf of Health Infrastructure (HI) and Hunter New England Local Health District (HNELHD) to complete a Construction and Operational Noise and Vibration Assessment (CONVA) for the Glen Innes Hospital Upgrade Project at Glen Innes, NSW (the 'proposal').

This report presents the results, findings and recommendations of the CONVA and has been prepared to support the Review of Environmental Factors (REF) being prepared for the proposal. The assessment has been completed in general accordance with the following standards and guidelines:

- NSW Environment Protection Authority's (EPA's), Noise Policy for Industry (NPI), 2017;
- NSW Department of Environment and Climate Change (DECC), Interim Construction Noise Guideline (ICNG), 2009;
- NSW Department of Planning (DPI), Development Near Rail Corridors and Busy Roads Interim Guidelines, 2008;
- Australian Standard AS 2436-2010 (R2016) Guide to Noise Control on Construction, Maintenance and Demolition Sites;
- Australian Standard AS 2107:2016 Acoustics Recommended design sound levels and reverberation times for building interiors;
- Australian Standard AS 1055:2018 (AS 1055) Description and Measurement of Environmental Noise;
- AS IEC 61672.1-2019 Electroacoustics Sound level meters Specifications;
- NSW Department of Environment and Conservation (DEC), Assessing Vibration: A Technical Guideline, 2006;
- British Standard BS 7385: Part 2-1993 "Evaluation and measurement for vibration in buildings Part 2"; and
- German Institute for Standardisation DIN 4150 (1999-02) Part 3 (DIN4150-3) Structural Vibration - Effects of Vibration on Structures.

A glossary of terms, definitions and abbreviations used in this report is provided in Appendix A.



### 1.1 Assessment Objectives

The CONVA quantifies potential construction noise and vibration impacts and operational noise intrusion to residential receivers adjacent to the proposal site.

Primary considerations in this assessment report include:

- Provide a technical document that can support the REF for the proposal;
- Identification of sensitive receivers;
- Quantifying construction noise and vibration impacts from the proposal based on the proposal brief information; and
- Quantifying potential operational noise, including consideration of public address systems, alarms, mechanical services and maintenance activities;
- Review of external transportation noise sources, including road, rail and aviation sources, and assessment of potential noise intrusion to adjacent receivers; and
- Review reasonable and feasible control measures to mitigate noise and vibration emissions with the aim of meeting noise management levels and relevant vibration criteria.



### 2 Project Description

### 2.1 Site Description

The Glen Innes District Hospital is an existing hospital campus located at 94 Taylor Street, Glen Innes, on the Northern Tablelands of the New England Region of NSW. The hospital campus comprises several existing buildings with services offered including acute medical and surgical, maternity, emergency and subacute services, ambulatory care, allied health, mental health, and child and family services to residents of the Glen Innes Severn Local Government Area (LGA).

The study area for the proposal is illustrated in Figure 1.

### 2.2 Proposal Background

The majority of the existing Glen Innes District Hospital (GIDH) was constructed in the mid-1950s, and the existing three level building does not support contemporary models of care due to the current layout and vertically stacked accommodation. The Emergency Department is remote from the Main Entry, and the Impatient Unit does not meet modern standards. It is also unlikely that the existing building meets Building Codes of Australia (BCA) compliance.

The Glen Innes Hospital Upgrade is dedicated to upgrading aging infrastructure with a priority for improved inpatient services and connectivity. The project scope is the upgrade of the Glen Innes District Hospital in line with the current Clinical Services Plan (CSP) including the master planning and delivery of the following:

- Improved efficiency of service delivery;
- Provision of short stay staff accommodation;
- Upgrade of Telehealth and internet connectivity; and
- Provision of Aboriginal people mental health space as part of effort to integrate culturally appropriate services.

The Glen Innes Hospital Upgrade will involve the demolition of the old nurse's quarters, and the construction of a new hospital building at the corner of Macquarie Street and Ferguson Street. The new building will be constructed adjacent to the main site entry / drop off, and ambulance access, and will have direct connectivity to the existing hospital building. The project will potentially involve the delivery of staff accommodation and a new ambulance station.

The upgrade masterplan for the proposal is presented in Appendix B.



### 2.3 Identification of Sensitive Receivers

The noise environment surrounding the proposal site is typical of a suburban environment, with dominant noise sources including road traffic noise and environmental noise (birds, wind in trees).

A review of aerial photography identifies that the study area comprises predominantly residential properties, with the nearest residential receivers located approximately 35m of the project boundary. The closest non-residential receivers include the Glen Innes and District Historical Society (passive recreation) immediately to the east of the project site, the Glen Innes District Tennis Association (active recreation) approximately 130m to the east of the project site, The Church of Holy Trinity (place of worship) approximately 140m to the southeast of the project site, and commercial receiver approximately 90m to the southwest of the project site.

The level of affectation for each receiver is influenced by the activity that is being undertaken and the distance and exposure of each receiver to the proposal site. It is noted that the area of affectation is the distance from the proposal where receivers may experience noise levels above the relevant noise management levels. The locality plan identifying the position of the potentially affected receivers is provided in Figure 2.







### 3 Existing Environment

The community's reaction to noise from construction may be influenced by the time of day that work is carried out. Residents are potentially more affected by work that occurs during OOH periods (ie evening or night periods). Therefore, it is important to understand the existing noise environment surrounding the proposal to manage and minimise potential noise impact on the environment and local community.

### 3.1 Unattended Noise Monitoring

The unattended noise survey was conducted in general accordance with the procedures described in Australian Standard AS 1055:2018, "Acoustics - Description and Measurement of Environmental Noise". The selected monitoring location is shown in Figure 2.

The noise monitoring charts for the background monitoring assessment are provided in Appendix C.

The measurements were carried out at one monitoring location (L1) using a Svantek Type 1, Svan 977 noise monitor from Thursday 26 May 2022 to Monday 6 June 2022. Monitoring location L1 was selected as representative of the nearest residential receivers adjacent to the proposal site. Observations on-site identified that the noise environment of the locality is characterised by distant traffic, environmental noise (bird calls) and domestic noise.

Calibration of all instrumentation was checked before and after measurements. Drift in calibration did not exceed ±0.5 dBA. All equipment carried appropriate and current National Association of Testing Authorities (NATA) (or manufacturer) calibration certificates.

### 3.1.1 Rating Background Noise Levels

The results of the long-term unattended noise monitoring were used to determine the Rating Background Level (RBL) for the assessment during the day, evening and night periods in accordance with the NPI, as required by the ICNG. Data affected by adverse meteorological conditions, including wind speeds above 5m/s at microphone height and rain have been excluded from the calculation of the RBLs in accordance with methodologies provided in Fact Sheet A4 of the NPI. The results of long-term unattended noise monitoring are provided in Table 1.

Table 1 Summary of Existing Background Noise Levels						
	Measured background noise level, RBL, dBA <sup>1</sup>				Measured dB LAec	
Location	Day	Evening	Night	Day	Evening	Night
	7am to 6pm	6pm to 10pm	10pm to 7am	7am to 6pm	6pm to 10pm	10pm to 7am
L1	35 (31)	30 (28)	30 (23)	53	44	42

Note: Excludes periods of wind or rain affected data, meteorological data obtained from the Bureau of Meteorology Glen Innes Airport AWS (29.7°S 151.7°E 1045m AMSL). Note 1: Where the RBLs are below the assumed NPI minimums, the minimum assumed RBLs are adopted.



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### 4 Construction Noise Impact Assessment

### 4.1 Construction Noise Policy and Guidelines

The assessment and management of noise from construction work is completed with reference to the Interim Construction Noise Guideline (ICNG). The ICNG is specifically aimed at managing noise from construction work regulated by the EPA and is used to assist in setting statutory conditions in licences or other regulatory instruments.

The ICNG sets out procedures to identify and address the impact of construction noise on residences and other sensitive land uses. This section provides a summary of noise objectives that are applicable to the assessment. The ICNG provides two methodologies for the assessment of construction noise emissions:

- Quantitative, which is suited to major construction proposals with typical durations of more than three weeks
- Qualitative, which is suited to short term infrastructure maintenance (for proposals with a typical duration of less than three weeks).

The methodology for a quantitative assessment requires a more complex approach, involving noise emission predictions from construction activities to the relevant assessment locations, whilst the qualitative assessment methodology is a more simplified approach that relies primarily on noise management strategies.

This report has adopted a quantitative assessment approach. The assessment includes identification of potentially affected assessment locations, description of activities involved in the proposal, derivation of the construction noise criteria for standard and out of hours (OOH) periods, quantification of potential noise impacts at receivers and, provides management and mitigation recommendations.

### 4.1.1 Standard Hours for Construction

 Table 2 presents the ICNG recommended standard hours for construction works.

Table 2 Recommended Standard Hours for Construction				
Daytime	Construction Hours			
Monday to Friday	7am to 6pm			
Saturdays	8am to 1pm			
Sundays or Public Holidays	No construction			



These recommended hours do not apply in the event of direction from police, or other relevant authorities, for safety reasons or where required in an emergency to avoid the loss of lives, property and/or to prevent environmental harm.

Construction activities are anticipated to be undertaken primarily during standard constructions hours. It is understood that minor works to the existing hospital may be undertaken during out of hours work periods, however, these works will be internal and will not generate significant noise emissions. Hence, construction works during out of hours work periods have not been assessed further.

### 4.1.2 Construction Noise Management Levels

 Table 3 reproduces the ICNG management levels for residential receivers. The construction Noise

 Management Level (NML) is the sum of the management level and relevant Rating Background Level

 (RBL) for each specific assessment period. Table 4 reproduces the ICNG management levels for other receiver types.



Table 3 ICNG Residential M	Management Levels	
Time of Day	Management Level LAeq(15min) <sup>1</sup>	How to Apply
Recommended standard hours:	Noise affected RBL	The noise affected level represents the point above which
Monday to Friday 7am to 6pm	+ 10dB.	there may be some community reaction to noise.
Saturday 8am to 1pm No work		Where the predicted or measured LAeq(15min) is greater than
on Sundays or public holidays.		the noise affected level, the proponent should apply all feasible
		and reasonable work practices to meet the noise affected
		level.
		The proponent should also inform all potentially impacted
		residents of the nature of works to be carried out, the expected
		noise levels and duration, as well as contact details.
	Highly noise affected	The highly noise affected level represents the point above
	75dBA.	which there may be strong community reaction to noise.
		Where noise is above this level, the relevant authority (consent,
		determining or regulatory) may require respite periods by
		restricting the hours that the very noisy activities can occur,
		taking into account:
		• times identified by the community when they are
		less sensitive to noise such as before and after
		school for works near schools, or mid-morning or
		mid-afternoon for works near residences.
		• if the community is prepared to accept a longer
		period of construction in exchange for restrictions
		on construction times.
Outside recommended	Noise affected RBL	A strong justification would typically be required for works
standard hours.	+ 5dB.	outside the recommended standard hours.
		The proponent should apply all feasible and reasonable work
		practices to meet the noise affected level.
		Where all feasible and reasonable practices have been
		applied and noise is more than 5dBA above the noise affected
		level, the proponent should negotiate with the community.
		For guidance on negotiating agreements see section 7.2.2.

## Note 1: The Rating Background Level (RBL) is an overall single figure background level representing each assessment period over the whole monitoring period. The RBL is used to determine the construction NML for noise assessment purposes and is the median of the ABL's.



#### Table 4 Noise Management Levels for Other Noise Sensitive Receivers

Land use	Whore chiestive explice	Management Level
	where objective applies	LAeq(15min) <sup>1</sup>
Classrooms at schools and other educational institutions	Internal noise level	45dB
Hospital wards and operating theatres	Internal noise level	45dB
Places of worship	Internal noise level	45dB
Active recreation areas	External noise level	65dB
Passive recreation areas	External noise level	60dB
Commercial premises	External noise level	70dB
Industrial premises	External noise level	75dB

Note 1: Noise management levels apply when receiver areas are in use only.

Where the predicted or measured LAeq(15min) noise level is greater than the NML, the proponent should apply all feasible and reasonable work practices to meet the relevant NML.

### 4.2 Construction Noise Management Levels (Criteria)

Construction NMLs for residential receivers are established from the prevailing background noise levels of the locality. The NMLs for standard and out of hours work periods are summarised in **Table 5** for residential receivers and **Table 6** for applicable non-residential receivers.

Table 5 Construction NMLs – Residential Receivers					
Location	Accessment Pariod	RBL, dBA	NML	Highly noise affected NML <sup>1</sup>	
	Assessment renou		dB LAeq(15min)	dB LAeq(15min)	
All residential receivers	Day	25 <sup>2</sup>	45	76	
	(Standard Hours)	30	(RBL+10dBA)	75	
	Evening	$20^2$	35	75	
	(OOH Period 1)	30	(RBL+5dBA)	75	
	Night	$20^2$	35	75	
	(OOH Period 2)	30	(RBL+5dBA)	75	

Note 1: The highly noise affected NML is a hypothetical level that is adopted to ensure the avoidance of strong community reaction. Should this level be exceeded the construction methodology is to be reviewed to reduce the impact on surrounding sensitive receivers.

Note 2: Where the RBLs are below the assumed NPI minimums, the minimum assumed RBLs are adopted.

Table 6 Construction NMLs – Non-Residential Receivers						
Location	Accessment Period	Whore NML Applies	NML			
	Assessment renou	where Mill Applies	dB LAeq(15min)			
Place of Worship	When in use	Internal noise level	45			
Passive Recreation	When in use	External noise level	60			
Active Recreation	When in use	External noise level	65			
Commercial Receivers	When in use	External noise level	70			



### 4.3 Noise Assessment Methodology

A computer model was developed to quantify project noise emissions to neighbouring receivers using DGMR (iNoise, Version 2022.1) noise modelling software. iNoise is an intuitive and quality assured software for industrial noise calculations in the environment. 3D noise modelling is considered industry best practice for assessing noise emissions from projects.

The model incorporated a three-dimensional digital terrain map giving all relevant topographic information used in the modelling process. Additionally, the model uses relevant noise source data, ground type, attenuation from barrier or buildings and atmospheric information to predict noise levels at the nearest potentially affected receivers. Where relevant, modifying factors in accordance with Fact Sheet C of the NPI have been applied to calculations.

The model calculation method used to predict noise levels was in accordance with ISO 9613-1 'Acoustics - Attenuation of sound during propagation outdoors. Part 1: Calculation of the absorption of sound by the atmosphere' and ISO 9613-2 'Acoustics - Attenuation of sound during propagation outdoors. Part 2: General method of calculation' including corrections for meteorological conditions using CONCAWE<sup>1</sup>. The ISO 9613 standard from 1996 is the most used noise prediction method worldwide. Many countries refer to ISO 9613 in their noise legislation. However, the ISO 9613 standard does not contain guidelines for quality assured software implementation, which leads to differences between applications in calculated results. In 2015 this changed with the release of ISO/TR 17534-3. This quality standard gives clear recommendations for interpreting the ISO 9613 method. iNoise fully supports these recommendations. The models and results for the 19 test cases are included in the software.

<sup>&</sup>lt;sup>1</sup> Report no. 4/18, "the propagation of noise from petroleum and petrochemical complexes to neighbouring communities", Prepared by C.J. Manning, M.Sc., M.I.O.A. Acoustic Technology Limited (Ref.AT 931), CONCAWE, Den Haag May 1981



### 4.4 Proposed Works and Construction Scenarios

Construction activities considered to have the greatest potential for noise impact on nearby receivers were determined in consultation with the NSW Public Works Advisory (PWA). The construction scenarios included in this assessment are described in **Table 7** and the typical plant and equipment, along with the fleet sound power level (SWL) and maximum noise levels (LAmax) for each of the construction activities are provided in **Table 8**. The fleet sound power levels, and maximum noise levels were sourced from the Transport for NSW (TfNSW) Construction and Maintenance Noise Estimator tool.

The precise locations and types of equipment used for construction are not known in detail at the concept design phase of the proposal. Hence, the construction fleet for each activity was modelled across the potential extent of each work area, with all plant and equipment operating simultaneously and at maximum capacity for the duration of the assessment period. It is noted that typical construction plant and equipment are unlikely to operate simultaneously but may be used sequentially across each part of the construction area. On that basis, this assessment provides a broad assessment of the likely worst-case impacts from each stage of the construction works.

Table 7 Proposed Construction Scenarios					
Scenarios	Description				
S1 Domalition of existing structures	<ul> <li>Demolition of existing structures</li> </ul>				
ST – Demonition of existing structures	Breaking up rubble including existing footings				
S2 Bulk carthworks	Excavation and relocation of fill across the site				
32 - Duik earniworks	Removal of excess fill using truck and dog type arrangements				
S2 Site Propagation and factings	<ul> <li>Construction of footings / foundations</li> </ul>				
	Installation of services				
	Erection of structures				
S4 Construction of buildings	<ul> <li>Building facades</li> </ul>				
34 - Construction of buildings	Internal fit out				
	Landscaping				



		Construction Scenarios				
Item	SWLs	S1	S2	S3	S4	
		Demolition	Earthworks	Site Preparation	Construction	
Excavator (20t)	105	$\checkmark$	✓			
Excavator Hammer (10t) <sup>1</sup>	118	$\checkmark$				
Loader – Front End /	110					
Telehandler	112	v				
Tipper Truck	108	$\checkmark$	$\checkmark$			
Genset	98	$\checkmark$			$\checkmark$	
Grinder / Impact Wrench	109	$\checkmark$			$\checkmark$	
Dozer (D6)	110		$\checkmark$			
Roller	109		$\checkmark$			
Backhoe / Trencher	104			$\checkmark$		
Concrete Truck	109			$\checkmark$		
Concrete Pump	109			$\checkmark$		
Truck (10t)	103			$\checkmark$	$\checkmark$	
EWP	95				$\checkmark$	
Franna	98				$\checkmark$	
Mobile Crane	105				$\checkmark$	
Hand Tools (Powered)	102				$\checkmark$	
Welding Equipment	110				$\checkmark$	
Total Fleet SWL <sup>1</sup>	108	120	113	113	114	

### Table 8 Construction Scenarios & Fleet Sound Power Levels dB LAeq(15min) – Construction Phase



### 4.5 Construction Noise Levels

Construction noise levels have been predicted for sensitive receiver locations for each of the construction scenarios described in Section 4.4. A summary of the predicted LAeq(15min) noise emissions is presented for the most affected receiver location for each receiver type in Table 9. Predicted levels exceeding the NMLs are displayed BOLD text.

Table 9 Summary of Noise Assessment Results – Most Affected Receivers						
Receiver Type	Dariad	NML	Highest Predicted dB LAeq Per Scenario <sup>1</sup>			
	renou	(dB LAeq)	Demolition	Earthworks	Site Prep	Construction
Residential	Standard	45	70	63	65	65
Place of Worship	When in use	65 <sup>2</sup>	58	48	52	48
Passive Recreation	When in use	80 <sup>2</sup>	76	72	70	67
Active Recreation	When in use	65	52	49	43	36
Commercial	When in use	70	63	56	58	60

Note 1: Exceedance of relevant NMLs highlighted and shown in BOLD.

Note 2: External noise criteria derived using 20dBA façade attenuation for a closed facade as per Table 4.2 of ENMM.

The results of the assessment demonstrate that LAeq(15min) noise emissions would be above the relevant NMLs for residential receivers for all construction scenarios during standard construction hours. The highest LAeq(15min) noise levels are predicted at up to 70dB at 217 Ferguson Street, Glen Innes, NSW during demolition of existing structures (S1). Construction noise levels are predicted to remain below the highly affected NML of 75dB LAeq(15min) at all residential receivers.

The construction noise emissions are predicted to remain below the relevant NMLs for all non-residential receivers during each construction scenario. It is noted that assessment of noise levels at the adjacent Glen Innes and District Historical Society (passive recreation area) assumed internal noise levels with windows closed. Where activities associated with the museum are conducted outside on the museum grounds, noise levels are expected to exceed the passive recreation NML of 60dB LAeq(15min) during each of the assessed construction scenarios.

Further analysis was undertaken to determine the potentially affected distance from the project site, and the number of residential receivers within the affected area for each of the construction scenarios. The results of the analysis are provided in **Table 10**. For detailed mapping of the affected areas, noise contours for each modelled scenario are presented in **Appendix D**.



Table 10 Affected Distances – Construction Activities					
Receiver Type	Construction Sconaria	NML	Affected Distance	Number of Receivers	
	Construction Scenario	dB LAeq(15min)	(m)	Affected	
- Residential -	S1 – Demolition		~630	~220	
	S2 – Earthworks	45	~340	~60	
	S3 – Site Preparation	45	~310	~60	
	S4 – General Construction		~475	~65	

The results of the assessment demonstrate that during demolition works, residential receivers located within approximately 630m of the project site may experience noise levels above the relevant NML for standard construction hours, with up to 220 houses potentially affected. During earthworks, up to 60 residential receivers within approximately 340m of the project site are predicted to experience noise levels above the standard hours NML, while up to 60 receivers within 310m and 65 receivers within 475m of the project site are predicted to experience noise levels above the standard hours NML during site preparation works and general construction works respectively.

Potential mitigation measures to minimise the impacts of construction noise on nearby sensitive receivers are discussed in Section 4.6.


#### 4.6 Construction Noise Mitigation Measures

Noise modelling identifies that relevant NMLs for the project may be exceeded during each of the proposed construction activities. The ICNG and Australian Standard AS 2436-2010 "Guide to Noise Control on Construction, Maintenance and Demolition Sites" outline noise management and mitigation initiatives to minimise the impact and improve the acoustic amenity of receivers potentially affected by construction proposals.

Recommendations provided in the ICNG and AS2436 include combinations of operational strategies, source noise control strategies, noise barrier controls, and community consultation. Adopting strategies contained in this standard may result in the following noise attenuation:

- up to 10dBA where space requirements place limitations on the attenuation options available;
   and
- up to 20dBA in situations where noise source noise mitigation measures (silencers, mufflers, etc) can be combined with noise barriers and other management techniques.

The potential mitigation measures are provided in Table 11.



#### Table 11 Standard Mitigation Measures

Action Required Management Measures

Universal Work Practices						
	All employees, contractors and subcontractors are to receive an environmental induction. The induction must at least include:					
	relevant noise and vibration mitigation measures					
	licence and approval conditions					
	permissible hours of work					
	limitations on high noise generating activities					
Pre-Construction /	location of nearest sensitive receivers					
Sile inductions	construction employee parking areas					
	<ul> <li>designated loading/unloading areas and procedures</li> </ul>					
	• site opening/closing times					
	environmental incident procedures.					
	Implement a noise monitoring program to quantify noise emissions from construction activities and guide practical reasonable and feasible noise control measures.					
Dian Warksitaa	Locate compounds away from sensitive receivers and discourage access from local roads.					
Plan worksites	Plan traffic flow, parking and loading/unloading areas to minimise reversing movements within the site.					
	Conduct toolbox talks pre-shift to communicate awareness regarding the importance of noise emission management.					
	Ensure site managers periodically check the site and nearby residences and other sensitive land uses for noise problems so that solutions can be quickly applied.					
Site Practices /	Include in tenders, employment contracts, subcontractor agreements and work method statements clauses that require minimisation of noise and compliance with					
Behavioural	directions from management to minimise noise					
Practices	Avoid shouting and minimise talking loudly. Avoid dropping materials from height, throwing of metal items and slamming of doors.					
	Keep truck drivers informed of designated vehicle routes, parking locations, acceptable delivery hours or other relevant practices					
	Encourage workers to operate equipment in a conservative manner.					



#### Table 11 Standard Mitigation Measures

#### Action Required Management Measures

	Provide information to neighbours detailing work activities, dates and hours, impacts and mitigation measures, work schedule over the night period, any operational noise				
Notification	benefits from the works (where applicable) and contact telephone number.				
	Notifications should be a minimum of 7 calendar days prior to the start of the works.				
	Use site information board at the front of the site with relevant details about site contacts, hours of operation and regular information updates.				
Complainta	Have a documented complaints handling procedure with an escalation procedure so that if a complaint is not satisfied, there is a clear path to follow.				
Complaints	Implement all feasible and reasonable measures to address the source of the complaint.				
Tanding	Keep a register of any complaints including all relevant details and provide a quick response to all complaints.				
Construction	Use quieter and less vibration emitting construction methods where feasible and reasonable (egibbre niles rather than impact driven niles)				
Method					
	Select the quietest plant to perform a specific function and consider the noise levels of plant and equipment in rental or purchasing decisions.				
Equipment /	Regularly inspect and maintain equipment to ensure that it is in good working order.				
Maintenance	Equipment must not be operated until it is maintained or repaired, where maintenance or repair would address an annoying character of noise identified.				
	Return any hired equipment that is causing noise that is not typical for the equipment – the increased noise may indicate the need for repair.				
	The offset distance between noisy plant and adjacent sensitive receivers should be maximised and restrict areas that mobile plant can be operated during sensitive times.				
	Maximise shielding between plant and adjacent sensitive receivers by making use of natural landforms, temporary structures and stockpiles, and barriers.				
	Operate plant in a quiet and efficient manner. Reduce throttle settings and turn off equipment when not being used.				
	Where practicable, avoid the coincidence of noisy plant/machinery working simultaneously in close proximity to sensitive receivers.				
Site Practices	Minimise disturbance arising from delivery of goods to construction sites by:				
	• avoid queuing of vehicles where practicable or ensure engines are switched off to reduce their overall noise impacts on receivers				
	• minimise the use of engine brakes				
	• fit delivery vehicles with straps rather than chains				

• select site access points and roads as far away as possible from sensitive receivers and provide shielding where practicable.



#### Table 11 Standard Mitigation Measures

#### Action Required Management Measures

	Where feasible and reasonable, construction should be carried out during standard construction hours (daytime period). Work generating high noise and/or vibration
	should be scheduled during less sensitive time periods.
	Where additional activities or plant may only result in a marginal noise increase and speed up works, consider limiting duration of impacts by concentrating noisy activities
Work Scheduling	at one location and move to another as quickly as possible.
	Schedule delivery of materials to occur during the day or early evening periods only.
	Organise deliveries and access to optimise the number of vehicle trips to and from the site – movements can be organised to amalgamate loads rather than using a
	number of vehicles with smaller loads.
	Reduce the line-of-sight transmission from noise emissions sources to residences or other sensitive land uses using temporary barriers or mobile screens.
Physical Methods	Erect temporary noise barriers before work commences to ensure noise is minimised during the entire shift.
	Consider the height of mobile screens and barriers to ensure adequate shielding to multistorey dwellings.



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### 5 Construction Vibration Impact Assessment

#### 5.1 Construction Vibration Criteria

British Standard BS 7385:Part 2-1993 "Evaluation and measurement for vibration in buildings Part 2", gives guidance on the levels of vibration which building structures could be damaged. BS7385 also takes into consideration the frequency of the vibration which is critical when assessing the likelihood of building damage.

Guide values are set for building vibration based on the lowest vibration levels above which damage has been credibly demonstrated. These levels are judged to result in a minimum risk of vibration-induced damage, where minimal risk for a named effect is usually taken as a 95% probability of no effect.

The recommended limits (guide values) for transient vibration to ensure minimal risk of cosmetic damage to residential and heavy commercial/industrial buildings are presented in **Table 12**. Where sources of continuous vibration may give rise to dynamic magnification due to resonance, the values provided in **Table 12** should be reduced by 50%, this is especially the case with respect to Peak Particle Velocity (PPV) at lower frequencies.

Table 12 Transient Vibration Guide Values - Minimal Risk of Cosmetic Damage					
		Peak Component Par	ticle Velocity		
Line	Type of Building	in Frequency Range of Predominant Pulse			
		4 Hz to 15 Hz	15 Hz and above		
1	Reinforced or framed structures Industrial and heavy commercial buildings	50 mm/s at 4 Hz :	and above		
2	Unreinforced or light framed structures Residential or light commercial type buildings	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above		

#### 5.2 Heritage Items

It is noted that the CNVG and BS7385 do not specify recommended vibration limits or minimum working distances for heritage items or other sensitive structures. BS7385 indicates that heritage buildings and structures should not be assumed to be more sensitive to vibration unless they are found to be structurally unsound. If a heritage building or structure is structurally unsound (following inspection) a more conservative cosmetic damage objective as per DIN 4150 would be applicable.

German Standard DIN 4150 - Part 3: 1999 provides guideline values for vibration velocity to be used with evaluating the effects of short-term vibration on structures, including for sensitive structures such as heritage items. The DIN 4150 values are summarised in **Table 13**.



#### Table 13 Structural Damage Guideline – DIN4150

	Vibration Velocity in mm/s				
Type of Structure	Less than 10Hz	10Hz to 50 Hz	50Hz to 100Hz	at horizontal plane of highest floor (all frequencies)	
Buildings used for commercial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40	
Dwellings and buildings of similar design and/or use	5	5 to 15	15 to 20	15	
Structures that because of their particular sensitivity to vibration do not correspond to those above and have intrinsic value (e.g. heritage buildings)	3	3 to 8	8 to 10	8	

**Table 13** demonstrates that for sensitive buildings such as heritage structures, the guideline vibration values for effects on structures are typically half of those for dwellings. Therefore, based on the DIN 4150 structural damage guidelines, the minimum working distance for heritage structures that are found to be structurally unsound would be approximately equal to twice the minimum working distance for other building types. Human Comfort – Assessing Vibration a Technical Guideline.

#### 5.3 Human Comfort – Assessing Vibration a Technical Guideline

Humans are far more sensitive to vibration than is commonly realised and may detect vibration levels which are well below levels that may cause damage to buildings or structures. Assessing vibration: a technical guideline was published in February of 2006 by the DECC and is based on guidelines contained in BS 6472 – 1992, Evaluation of human exposure to vibration in buildings (1-80 Hz) and provides guidance on assessing vibration against human comfort.

The guideline presents preferred and maximum vibration values for use in assessing human responses to vibration and provides recommendations for measurement and evaluation techniques. At vibration values below the preferred values, there is a low probability of adverse comment or disturbance to building occupants. Where all feasible and reasonable mitigation measures have been applied and vibration values are still beyond the maximum value, it is recommended the operator negotiate directly with the affected community.

The guideline defines three vibration types and provides direction for assessing and evaluating the applicable criteria. Table 2.1 of the guideline provides examples of the three vibration types and has been reproduced in Table 14.



#### Table 14 Examples of types of vibration (from Table 2.1 of the guideline)

Continuous		Intermittent Vibration	
Vibration	Impuisive vibration		
Machinery, steady	Infrequent: Activities that create up to	Trains, intermittent nearby construction activity,	
road traffic,	three distinct vibration events in an	passing heavy vehicles, forging machines, impact	
continuous	assessment period, e.g. occasional	pile driving, jack hammers. Where the number of	
construction	dropping of heavy equipment,	vibration events in an assessment period is three or	
activity	occasional loading and unloading.	fewer these would be assessed against impulsive	
(such as tunnel	Blasting is assessed using ANZECC	vibration criteria.	
boring machinery)	(1990)		

#### 5.3.1 Continuous Vibration

Appendix C of the guideline outlines acceptable criteria for human exposure to continuous vibration (1-80 Hz), the criteria are dependent on both the time of activity (usually daytime or night-time) and the occupied place being assessed. Table 15 reproduces the preferred and maximum criteria relating to measured peak velocity.

Table 15 Criteria for Exposure to Continuous Vibration					
Diace	Time <sup>1</sup>	Peak Velocity (mm/s)			
Place	Time —	Preferred	Maximum		
Critical working Areas (e.g. hospital		0.14	0.00		
operating theatres, precision laboratories)	Day of Night	0.14	0.20		
Posidenaaa	Day	0.28	0.56		
Residences	Night	0.20	0.40		
Offices	Day or Night	0.56	1.1		
Workshops	Day or Night	1.1	2.2		

Note: rms velocity (mm/s) and vibration velocity value (dB re 10<sup>-9</sup> mm/s) values given for most critical frequency >8Hz assuming sinusoidal motion.

Note 1: Daytime is 7am to 10pm and Night-time is 10pm to 7am.

#### 5.3.2 Impulsive Vibration

Appendix C of the guideline outlines acceptable criteria for human exposure to impulsive vibration (1-80 Hz), these criteria are dependent on both the time of activity (usually daytime or night-time) and the occupied place being assessed. Impulsive vibration (as defined in Section 2.1 of the guideline) is generally associated with infrequent activities that create up to three (3) distinct vibration events in an assessment period e.g. occasional dropping of heavy equipment, occasional loading and unloading. **Table 16** reproduces the preferred and maximum criteria relating to measured peak velocity.



Table 16 Criteria for Exposure to Impulsive Vibration						
		Assessment Criteria				
Place	Time <sup>1</sup>	Peak Velocity (mm/s)				
		Preferred	Maximum			
Critical working Areas (e.g. hospital	Critical working Areas (e.g. hospital					
operating theatres, precision	Day or Night-time	0.14	0.28			
laboratories)						
Desidences	Daytime	8.6	17.0			
Residences	Night-time	2.8	5.6			
Offices	Day or Night-time	18.0	36.0			
Workshops	Day or Night-time	18.0	36.0			

Note 1: Daytime is 7am to 10pm and Night-time is 10pm to 7am.

#### 5.3.3 Intermittent Vibration

Intermittent vibration (as defined in Section 2.1 of the guideline) is assessed using the vibration dose concept which relates to vibration magnitude and exposure time.

Intermittent vibration is representative of activities such as impact hammering, rolling or general excavation work (such as an excavator tracking).

Section 2.4 of the Guideline provides acceptable values for intermittent vibration in terms of vibration dose values (VDV) which requires the measurement of the overall weighted RMS (root mean square) acceleration levels over the frequency range 1-80 Hz. To calculate VDV the following formula (refer section 2.4.1 of the guideline) was used:

$$VDV = \left[\int_{0}^{T} a^{4}(t)dt\right]^{0.25}$$

Where VDV is the vibration dose value in  $m/s^{1.75}$ , a (t) is the frequency-weighted RMS of acceleration in  $m/s^2$  and T is the total period of the day (in seconds) during which vibration may occur.

The Acceptable Vibration Dose Values (VDV) for Intermittent Vibration is reproduced in Table 17.



Table 17 Acceptable vibration Dose values (VDV) for intermittent vibration						
	Day	time	Night-time			
Location	Preferred Value	Maximum Value	Preferred Value	Maximum Value		
	m/s <sup>1.75</sup>	m/s <sup>1.75</sup>	m/s <sup>1.75</sup>	m/s <sup>1.75</sup>		
Critical Areas	0.10	0.20	0.10	0.20		
Residences	0.20	0.40	0.13	0.26		
Offices, schools, educational	0.40	0.80	0.40	0.80		
institutions and places of worship	0.40	0.80	0.40	0.80		
Workshops	0.80	1.60	0.80	1.60		

### Table 17 Acceptable Vibration Dose Values (VDV) for Intermittent Vibration

Note: Daytime is 7am to 10pm and Night-time is 10pm to 7am.

Note: These criteria are indicative only, and there may be a need to assess intermittent values against continuous or impulsive criteria for critical areas.

There is a low probability of adverse comment or disturbance to building occupants at vibration values below the preferred values. Adverse comment or complaints may be expected if vibration values approach the maximum values. The guideline states that activities should be designed to meet the preferred values where an area is not already exposed to vibration.

#### 5.4 Vibration Assessment

The items of plant with the greatest potential for vibration during construction include hydraulic hammers during the demolition of existing structures, or vibratory rollers during earthworks. Peak levels of vibration from rolling typically occurs as the roller stops to change direction and a resonance is created as the roller (and vibrator) is stationary.

Table 18 provides the minimum working distances for the use of various vibration intensive sources to nearby receivers to meet cosmetic damage and human response criteria. It is important to note that the minimum working distances are indicative and will vary depending on the particular item of plant and local geotechnical conditions.



		Minimum working distance			
Plant item	Rating / Description	Cosmetic damage (BS 7385)	Sensitive Items (DIN 4150)	Human response (OH&E)	
	< 50 kN (Typically 1-2 tonnes)	5m	10m	15m to 20m	
	< 100 kN (Typically 2-4 tonnes)	6m	12m	20m	
	< 200 kN (Typically 4-6 tonnes)	12m	24m	40m	
Vibratory Roller	< 300 kN (Typically 7-13 tonnes)	15m	30m	100m	
	> 300 kN (Typically 13-18 tonnes)	20m	40m	100m	
	> 300 kN (> 18 tonnes)	25m	50m	100m	
Small Hydraulic Hammer	(300 kg - 5 to 12t excavator)	2m	4m	7m	
Medium Hydraulic Hammer	(900 kg – 12 to 18t excavator)	7m	14m	23m	
Large Hydraulic Hammer	(1600 kg – 18 to 34t excavator)	22m	44m	73m	

#### Table 18 Minimum Working Distances or Vibratory Plant (m)

Note: Source, CNVG (Roads and Maritime, 2016).

A review of aerial photography identifies that the nearest residential receivers are located approximately 45m from the project site, while the nearest non-residential receiver (Glen Innes and District Historical Society) is located approximately 50m from the project site (to rear of the museum building). A review of the State Heritage Inventory identifies that the closest heritage item is the Beardies Museum (former hospital complex), which is on the grounds of the Glen Innes and District Historical Society.

Based on the minimum working distances provided in **Table 18**, it is anticipated that vibration levels would remain below the cosmetic damage criteria for all residential receivers. Where a vibratory roller in excess of 6 tonnes or a large hydraulic hammer is utilised, vibration levels are likely to exceed the human response criteria at nearby residential receiver locations. Once the final vibratory plant has been selected a review of minimum offset distances should be conducted.



It is anticipated that construction vibration levels would remain below the cosmetic damage criterion for sensitive structures, however, where vibration intensive work is planned to occur close to Beardies Museum, minimum offset distances should be reviewed following selection of final plant. Where works are proposed to occur within the minimum safe working distance and there is a risk of exceedance of the cosmetic damage objective, a different construction method with lower source vibration levels should be used where feasible and reasonable, or, vibration monitoring should be undertaken at the commencement and throughout the works.

#### 5.5 Noise and Vibration Impacts to Existing Hospital Buildings

Assessment of noise and vibration is typically undertaken for noise sensitive receivers surrounding the project site. Although not specially required under the ICNG, assessment of noise and vibration is undertaken at the existing hospital buildings to enable proactive and pragmatic management of potential impacts.

The assessment considered noise levels at the southern façades of buildings GI01 and GI02, which are the most exposed facades of the existing hospital buildings to the proposed construction works. The results were assessed against the ICNG criteria for "hospital wards and operation theatres", with a conservative external to internal attenuation of 20dB for a closed building.

A summary of the predicted LAeq(15min) noise emissions is presented for the existing hospital buildings in Table 9. Predicted levels exceeding the NMLs are displayed BOLD text.

Table 19 Summary of Noise Assessment Results – Existing Hospital Buildings						
Hospital Building	Period	NML	Highest Predicted dB LAeq Per Scenario <sup>1</sup>			
	renou	(dB LAeq)	Demolition	Earthworks	Site Prep	Construction
GI01	When in use	65 <sup>2</sup>	65	60	60	63
GIO2	When in use	65 <sup>2</sup>	73	69	68	70

Note 1: Exceedance of relevant NMLs highlighted and shown in BOLD.

Note 2: External noise criteria derived using 20dBA façade attenuation for a closed facade as per Table 4.2 of ENMM.

The results of the analysis indicate that the internal noise levels for hospital spaces adjacent to the southern façade of building Gl02 would potentially exceed the internal design sound levels. It is understood however, that building Gl02 is the old laundry building, and does not comprise sensitive spaces such as hospital wards or operating theatres. Nevertheless, prior to the initiation of construction works, a review of sensitive spaces should be undertaken. Where construction works may impact on sensitive spaces, consultation should be undertaken with the administrators of the hospital to schedule construction works around critical activities.



A review of offset distances identifies that the proposed construction works would occur within approximately 70m of building GI01 and approximately 25m of GI02. Where a vibratory roller in excess of 6t or a large hydraulic hammer is utilised, vibration levels may exceed the cosmetic damage criteria for sensitive items. Once the final vibratory plant has been selected a review of minimum offset distances should be conducted. Where the works are to be undertaken close to sensitive processes, different construction method with lower source vibration levels should be used where feasible and reasonable.



#### 6 Assessment of Operational Noise Impacts

#### 6.1 Operational Noise Policy and Guidelines

The Noise Policy for Industry (NPI) sets out the NSW EPAs requirements for the assessment and management of noise from industrial facilities. The policy provides a procedure for establishing noise criteria and operational requirements for development consents.

The objectives of the NPI are to:

- provide noise criteria that is used to assess the change in both short term and long-term noise levels;
- provide a clear and consistent framework for assessing environmental noise impacts from industrial premises and industrial development proposals;
- promote the use of best-practice noise mitigation measures that are feasible and reasonable where potential impacts have been identified; and
- support a process to guide the determination of achievable noise limits for planning approvals and/or licences, considering the matters that must be considered under the relevant legislation (such as the economic and social benefits and impacts of industrial development).

The policy sets out a process for industrial noise management involving the following key steps:

- Determine the Project Noise Trigger Levels (PNTLs) (ie criteria) for a development. These are the levels (criteria), above which noise management measures are required to be considered. They are derived by considering two factors: shorter-term intrusiveness due to changes in the noise environment; and maintaining the noise amenity of an area.
- 2. Predict or measure the noise levels produced by the development with regard to the presence of annoying noise characteristics and meteorological effects such as temperature inversions and wind.
- 3. Compare the predicted or measured noise level with the PNTL, assessing impacts and the need for noise mitigation and management measures.
- 4. Consider residual noise impacts that is, where noise levels exceed the PNTLs after the application of feasible and reasonable noise mitigation measures. This may involve balancing economic, social and environmental costs and benefits from the proposed development against the noise impacts, including consultation with the affected community where impacts are expected to be significant.



- 5. Set statutory compliance levels that reflect the best achievable and agreed noise limits for the development.
- 6. Monitor and report environmental noise levels from the development.

#### 6.1.1 Project Noise Trigger Levels (PNTL)

The policy sets out the procedure to determine the PNTLs relevant to an industrial development. The PNTL is the lower (ie, the more stringent) of the **Project Intrusiveness Noise Level** (PINL) and **Project Amenity Noise Level** (PANL) determined in accordance with Section 2.3 and Section 2.4 of the NPI.

#### 6.1.2 Rating Background Level (RBL)

The Rating Background Level (RBL) is a determined parameter from noise monitoring and is used for assessment purposes. As per the NPI, the RBL is an overall single figure background level representing each assessment period (day, evening and night) over the noise monitoring period. The measured RBLs relevant to the project are contained in **Section 3**.

#### 6.1.3 Project Intrusiveness Noise Level (PINL)

The PINL (LAeq(15min)) is the RBL + 5dB and seeks to limit the degree of change a new noise source introduces to an existing environment. Hence, when assessing intrusiveness, background noise levels need to be measured.

#### 6.1.4 Project Amenity Noise Level (PANL)

The PANL is relevant to a specific land use or locality. To limit continuing increases in intrusiveness levels, the ambient noise level within an area from all combined industrial sources should remain below the recommended amenity noise levels specified in Table 2.2 (of the NPI). The NPI defines two categories of amenity noise levels:

- Amenity Noise Levels (ANL) are determined considering all current and future industrial noise within a receiver area; and
- Project Amenity Noise Level (PANL) is the recommended level for a receiver area, specifically focusing the project being assessed.

Additionally, Section 2.4 of the NPI states: "to ensure that industrial noise levels (existing plus new) remain within the recommended amenity noise levels for an area, a project amenity noise level applies for each new source of industrial noise as follows":

**PANL** for new industrial developments = recommended **ANL** minus 5dBA.



The following exceptions apply when deriving the PANL:

- areas with high traffic noise levels;
- proposed developments in major industrial clusters;
- existing industrial noise and cumulative industrial noise effects; and
- greenfield sites.

There are no significant sources of industrial noise in the vicinity of the project site, hence, no correction to the amenity noise level has been applied;

The recommended amenity noise levels as per Table 2.2 of the NPI are reproduced in Table 20.

Table 20 Amenity Noise Levels						
		Time of day.	Recommended amenity noise level			
Receiver Type	Noise Amenity Area	Time of day	dB LAeq(period)			
		Day	55			
Residential	Suburban	Evening	45			
		Night	40			
Hotels, motels, caretakers'			5dB above the recommended amenity			
quarters, holiday	Coo column 4	Coo column 4	noise level for a residence for the			
accommodation, permanent	See column 4	See column 4	relevant noise amenity area and time			
resident caravan parks.			of day			
Cabaal Classroom	A.I.	Noisiest 1-hour	35 (internal)			
School Classicolli	All	period when in use	45 (external)			
	All	Noisiest 1-hour	35 (internal)			
Hospital ward	All	Noisiest 1-hour	50 (external)			
Place of worship	All	When in use	40 (internal)			
Passive Recreation	All	When in use	50			
Active Recreation	All	When in use	55			
Commercial premises	All	When in use	65			
Industrial	All	When in use	70			

Notes: The recommended amenity noise levels refer only to noise from industrial noise sources. However, they refer to noise from all such sources at the receiver location, and not only noise due to a specific project under consideration. The levels represent outdoor levels except where otherwise stated.

Types of receivers are defined as rural residential; suburban residential; urban residential; industrial interface; commercial; industrial – see Table 2.3 and Section 2.7 of the NPI.

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.



#### 6.1.5 Maximum Noise Assessment Trigger Levels

The potential for sleep disturbance from maximum noise level events from a project during the nighttime period needs to be considered. The NPI considers sleep disturbance to be both awakenings and disturbance to sleep stages.

Where night-time noise levels from a development/premises at a residential location exceed the following criteria, a detailed maximum noise level event assessment should be undertaken:

- LAeq(15min) 40dB or the prevailing RBL plus 5dBA, whichever is the greater, and/or
- LAmax 52dB or the prevailing RBL plus 15dBA, whichever is the greater.

A detailed assessment should cover the maximum noise level, the extent to which the maximum noise level exceeds the rating background noise level, and the number of times this happens during the night-time period.

Other factors that may be important in assessing the impacts on sleep disturbance include:

- how often the events would occur;
- the distribution of likely events across the night-time period and the existing ambient maximum events in the absence of the development;
- whether there are times of day when there is a clear change in the noise environment (such as during early morning shoulder periods); and
- current understanding of effects of maximum noise level events at night.

#### 6.1.6 Road Traffic Noise

The road traffic noise criteria are provided in the Road Noise Policy (RNP), 2011. The policy sets out noise criteria applicable to different road classifications for the purpose of quantifying traffic noise impacts. Road noise criteria relevant to this assessment are presented in detail in Section 6.2.5.



#### 6.2 Operational Assessment Criteria

#### 6.2.1 Intrusiveness Noise Levels

The PINL for the project are presented in **Table 21** and have been determined based on the RBL +5dBA and only apply to residential receivers.

Table 21 Project Intrusiveness Noise Levels				
Receiver Type	Deried <sup>1</sup>	Measured RBL	Adopted RBL	PINL
	Period	dB LA90	dB LA90 <sup>2</sup>	dB LAeq(15min)
All residential	Day	31	35	40
	Evening	28	30	35
	Night	23	30	35

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods. Note 2: Where this level is less than 35dBA for the day period, the rating background noise level is set to 35dBA; where the noise level is less than 30dBA for the evening and night periods, the rating background noise level is set to 30dBA.

#### 6.2.2 Amenity Noise Levels and Project Amenity Noise Levels

The PANL for residential receivers and other receiver types (ie non-residential) potentially affected by the project are presented in Table 22.

Table 22 Amenity Noise Levels and Project Amenity Noise Levels					
Receiver Type	Noise Amenity Area	Assessment Period <sup>1</sup>	NPI Recommended ANL dB LAeq(period)	ANL dB LAeq(period)	PANL dB LAeq(15min) <sup>2</sup>
		Day	55	55	58
Residential	Suburban	Evening	45	45	48
		Night	40	40	43
Place of worship	All	When in use	40 (internal)	40 (internal 1 hr)	43 (internal 1 hr) 63 (external 1 hr) <sup>3</sup>
Passive All Recreation		Mhon in use	EQ (internal)	EQ (internal)	53 (internal)
		when in use	when in use 50 (internal)		73 (external) <sup>3</sup>
Active Recreation	All	When in use	55	55	58
Commercial	All	When in use	65	65	68

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

Note 2: Includes a +3dB adjustment to the amenity period level to convert to a 15-minute assessment period as per Section 2.2 of the NPI.

Note 3: External level based on 20dB loss through a closed façade.



#### 6.2.3 Project Noise Trigger Levels

The PNTL are the lower of either the PINL or the PANL. **Table 23** presents the derivation of the PNTLs in accordance with the methodologies outlined in the NPI.

Table 23 Project Noise Trigger Levels					
Receiver	Noise Amenity	Assessment	PINL	PANL	PNTL
Туре	Area	Period <sup>1</sup>	dB LAeq(15min)	dB LAeq(15min)	dB LAeq(15min)
		Day	40	58	40
Residential	Suburban	Evening	35	48	35
		Night	35	43	35
Place of	A 11		N1/A	43 (internal 1 hr)	43 (internal 1 hr)
worship	worship		When in Use N/A		63 (external 1 hr) <sup>2</sup>
Passive	ΛII	When in Lice	N1/A	52 (intornal)	$72 (axternal)^2$
Recreation	All	when in Use IN/A		55 (Internal)	73 (external)
Active	<b>A</b> 11	When in Lice	N1/A	59	59
Recreation	Recreation		N/A	50	50
Commercial	All	When in Use	N/A	68	68

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods. Note 2: External level based on 20dB loss through a closed façade.

#### 6.2.4 Maximum Noise Assessment Trigger Levels

The maximum noise trigger levels shown in **Table 24** are based on night time RBLs and trigger levels as per Section 2.5 of the NPI. The trigger levels will be applied to transient noise events that have the potential to cause sleep disturbance.

Table 24 Maximum Noise Trigger Level (Night / Morning Shoulder / Evening Shoulder)			
Residential Receivers			
LAeq(15min) LAmax			
40dB LAeq(15min) or RBL + 5dB		52dB LAmax or RBL + 15dB	
Trigger	40	Trigger	52
RBL +5dB	35	RBL +15dB	45
Highest	40	Highest	52

Note: Monday to Saturday; Night 10pm to 7am. On Sundays and Public Holidays Night 10pm to 8am. Morning Shoulder 5am to 7am; Evening Shoulder 10pm to 12am.

Note: NPI identifies that maximum of the two values is to be adopted which is shown in bold font.



#### 6.2.5 Road Traffic Noise Criteria

 Table 25 presents the road traffic noise assessment criteria reproduced from the RNP relevant to this assessment.

Table 25 Road Traffic Noise Assessment Criteria				
Pood optogon/	Type of project/development	Assessment Criteria – dBA		
Road Category	Type of project/development	Day (7am to 10pm)	Night (10pm to 7am)	
	Existing residences affected by			
Freeways/arterial/	additional traffic on freeways/arterial/sub-	60dP   Acc(15br)	55dP L Agg(0br)	
sub-arterial Roads	arterial roads generated by land use		JJUB LAed(all)	
	developments			

Additionally, the RNP states where existing road traffic noise criteria are already exceeded, any additional increase in total traffic noise level should be limited to 2dBA, which is generally accepted as the threshold of perceptibility to a change in noise level.

#### 6.3 Operational Noise Assessment Methodology

An operational noise model was developed to quantify project noise emissions to neighbouring receivers, consistent with the methodology described in Section 4.3.

Noise generated by the project will typically be associated with the following sources:

- Vehicle movements within the new carpark; and
- Mechanical plant operation.

It is understood that a detailed mechanical services plan has not been completed at the Master Plan stage of the project. Hence, the assessment of noise emissions from mechanical plant is indicative only, assuming the following potential items of plant:

- Chilled water plant room;
- Hydraulic hot water plant;
- Relief air fans; and
- Cooling tower.

Assessment of noise emissions from vehicles in the new car park has assumed up to nine (9) vehicles traversing the car park during any 15 minute period, representing 25% of the potential car spaces.

It is noted that the hospital will not utilise public address systems, and equipment alarms will involve notifications to devices only.



#### 6.3.1 Sound Power Levels

Table 26 presents the sound power level for each noise source modelled in this assessment. It is noted that sound power levels were sourced from manufacturer's specifications or from in-field measurements at similar project sites.

Table 26 Acoustically Significant Sources	- Sound Power Leve	els dBA (re 10 <sup>-12</sup> Watts)	
Itom and quantity	Individual Sound	Modelled Sound	
(per 15 minutes)	Power Level	Power Level	Source Height <sup>1</sup>
(per 13 minutes)	dB LAeq	dB LAeq(15min)	
	Operation		
Chilled Water Plant Room	63	63	1m
Hydraulic Hot Water Plant	76	76	1m
Relief Air Fan	90	90	1m
Cooling Tower	97	97	1m
Car idle, start up and drive off $(x9)^2$	81	84	0.5m
Sleep disturbance assessment (LAmax), Night time periods (10pm to 7am)			
Car Door Slam		92	1.0m

Note 1: Height above the relative ground or building below source.

Note 2: Includes a duration adjustment assuming vehicles operate for three (3) minutes continuously within a period of 15-minutes.

#### 6.4 **Operational Noise Levels**

This assessment has quantified operational noise levels at the nearest sensitive receivers. Noise predictions from all sources have been quantified at sensitive receivers surrounding the project site, with the highest predicted noise levels for each receiver type presented in Table 27.

Table 27 Operational Noise Predictions – All Receivers							
		R	esidential Re	eceivers			
	Pre	dicted Noise L	evel		PNTL		Compliant
Receiver		dB LAeq(15min	)		dB LAeq(15min)		Compliant
-	Day	Evening	Night	Day	Evening	Night	
Residential	32	32	32	40	35	35	$\checkmark$
Place of Worship	<30	<30	<30		63 <sup>1</sup>		$\checkmark$
Passive Recreation	51	51	51		73 <sup>1</sup>		√
Active Recreation	<30	<30	<30		58		$\checkmark$
Commercial	<30	<30	<30		68		$\checkmark$

Note: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

Note 1: External noise level with internal to external correction for 20dB for closed building.



The results of the operational noise predictions indicate that noise emissions from vehicles in the new car park, and mechanical plant would satisfy the PNTLs at all receiver locations. It is noted that the assessment has assumed indicative mechanical plant, including type and location of plant, in lieu of a detailed mechanical services plan.

It is recommended that a review of mechanical plant should be undertaken as part of the detailed design of the project, including prediction of noise emissions and identification of feasible and reasonable mitigation measures to ameliorate potential noise impacts.

Mitigation measures for mechanical plant may include:

- Siting of mechanical plant behind existing buildings to prevent line of sight to nearby receivers;
- Acoustic enclosures or plant rooms;
- Lining of ductwork; and
- Intake/discharge attenuators or silencers.

#### 6.4.1 Maximum Noise Level Assessment

In assessing maximum noise events, typical LAmax noise levels from transient events were assessed at the nearest residential receivers. For the sleep disturbance assessment, a sound power level of 92dBA for a door slam in the new car park area is adopted for this assessment.

Predicted noise levels from LAeq(15min) and LAmax events for the most affected residential receiver are presented in **Table 28**. Results identify that the maximum noise trigger levels will be satisfied for all residential receivers.

Table 28 Max	Table 28 Maximum Noise Trigger Level Assessment (Night) <sup>1</sup>				
		Night Period			
Peceiver	Predicted	Noise Level	Trigger Le	vel	Compliant
Receiver	dB LAeq(15min)	dB LAmax	dB LAeq(15min)	dB LAmax	Compliant
Residential	35	44	40	52	✓

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.



#### 6.4.2 Road Traffic Noise Assessment

Access to the new hospital car park would be directly from the Gwydir Highway. A review of annual average daily traffic (AADT) volumes from the TfNSW traffic volume viewer (station ID: 91447), identifies that the Gwydir Highway carries approximately 4,500 vehicles per day. An increase in road traffic noise of greater than 2dB, would require a 60% increase in traffic volumes, or an additional 2,700 vehicles daily. Hence, as the project would not result in a significant increase in traffic volumes, road traffic noise levels would remain below the 2dBA increase criterion.



#### 7 External Noise Intrusion

The assessment of noise intrusion from external sources is undertaken in accordance with the Department of Planning's (DoP) Development near Rail Corridors and Busy Roads – Interim Guideline (2008) ('the guideline').

The guideline outlines internal criterion levels for Clause 87 (Rail) and Clause 102 (Road) of the State Environmental Planning Policy (SEPP) for Infrastructure (Infrastructure SEPP):

"If the development is for the purpose of a building for residential use, the consent authority must be satisfied that appropriate measures will be taken to ensure that the following LAeq levels are not exceeded:

- in any bedroom in the building: 35dBA at any time 10pm–7am; and
- anywhere else in the building (other than a garage, kitchen, bathroom or hallway): 40dBA at any time."

These clauses apply to development for any purpose that is on land in or immediately adjacent to a rail corridor or to a road corridor with an AADT volume of more than 40,000 vehicles, and the consent authority considers is likely to be adversely impacted by noise or vibration. In circumstances where a development is located adjacent to a road with an AADT volume of 20,000 to 40,000 vehicles, the guideline provides best practice advice.

A review of AADT volumes from the TfNSW Traffic Volume Viewer identifies that Gwydir Highway, adjacent to the Glen Innes District Hospital carries approximately 4,500 vehicles per day. Additionally, the hospital is not located adjacent to an existing rail line. Hence, further assessment to address the requirements of the SEPP Infrastructure is not required.



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#### 8 Discussion and Conclusion

Muller Acoustic Consulting Pty Ltd has prepared a Construction and Operational Noise and Vibration Assessment for the Glen Innes Hospital Upgrade Project at Glen Innes, NSW. The assessment was completed in accordance with the relevant guidelines to accompany the review of environmental factors for the project.

The construction noise assessment demonstrates that noise from the project is anticipated to exceed the noise management levels at residential receivers adjacent to the proposal site during each of the construction scenarios during standard construction hours. It is anticipated that construction noise levels would remain below the relevant NMLs for non-residential receivers during each of the construction activities.

Further analysis of potential noise impacts demonstrates that during demolition works, up to 220 residential receivers within approximately 630m of the project site may experience noise levels above the relevant NML for standard construction hours. Similarly, during earthworks, up to 60 residential receivers within approximately 340m of the project site are predicted to experience noise levels above the standard hours NML, while up to 60 receivers within 310m of the project site and 65 receivers within 475m of the project site are predicted to experience noise levels above the standard hours NML during site preparation works and general construction works respectively.

A review of safe working distances for vibration intensive equipment indicates that construction vibration levels would potentially exceed the criteria for human comfort for receivers immediately adjacent to the project site. Where vibration intensive works are undertaken in close proximity to the adjacent Beardies Museum (former hospital building), a review of safe working distances should be undertaken prior to commencement of construction activities.

Prior to commencement of works, a detailed construction noise and vibration management plan will be prepared as part of the environmental management plan for the project. The plan will identify all feasible and reasonable management measures to minimise noise and vibration impacts on nearby sensitive receivers.

Operational noise levels associated with vehicle movements in the new hospital car park and mechanical plant are predicted to achieve the relevant NPI criteria. It is noted that the assessment of mechanical plant was indicative only and should be reviewed following development of a detailed mechanical services plan.



Analysis of potential sleep disturbance impacts from transient events such as car door slams within the new hospital car park, demonstrates that LAmax noise levels at the nearest residential receivers are predicted to remain below the maximum noise trigger level. Hence sleep disturbance impacts are unlikely to occur.

The results of the operational road traffic noise assessment demonstrates that due to high existing traffic volumes on the Gwydir Highway, the change in noise levels at the nearest residential receivers would remain significantly below the 2dBA increase criterion. Hence, it is considered that there would be no additional impact from road traffic noise resulting from the project.

A review of potential external noise intrusion, undertaken in accordance with the Department of Planning Development Near Rail Corridors and Busy Roads – Interim Guideline, identified that traffic volumes on the adjacent Gwydir Highway are below the threshold for assessment. Hence, noise levels are expected to comply with the internal design sound levels.



# Appendix A – Glossary of Terms



A number of technical terms have been used in this report and are explained in Table A1.

Table A1 Glossary of	of Acoustical Terms
Term	Description
1/3 Octave	Single octave bands divided into three parts
Octave	A division of the frequency range into bands, the upper frequency limit of each band being
	twice the lower frequency limit.
ABL	Assessment Background Level (ABL) is defined in the NPI as a single figure background
	level for each assessment period (day, evening and night). It is the tenth percentile of the
	measured L90 statistical noise levels.
Ambient Noise	The total noise associated with a given environment. Typically, a composite of sounds from all
	sources located both near and far where no particular sound is dominant.
A Weighting	A standard weighting of the audible frequencies designed to reflect the response of the
	human ear to sound.
Background Noise	The underlying level of noise present in the ambient noise, excluding the noise source under
	investigation, when extraneous noise is removed. This is usually represented by the LA90
	descriptor
dBA	Noise is measured in units called decibels (dB). There are several scales for describing
	noise, the most common being the 'A-weighted' scale. This attempts to closely approximate
	the frequency response of the human ear.
dB(Z), dB(L)	Decibels Z-weighted or decibels Linear (unweighted).
Extraneous Noise	Sound resulting from activities that are not typical of the area.
Hertz (Hz)	The measure of frequency of sound wave oscillations per second - 1 oscillation per second
	equals 1 hertz.
LA10	A sound level which is exceeded 10% of the time.
LA90	Commonly referred to as the background noise, this is the level exceeded 90% of the time.
LAeq	Represents the average noise energy or equivalent sound pressure level over a given period.
LAmax	The maximum sound pressure level received at the microphone during a measuring interval.
Masking	The phenomenon of one sound interfering with the perception of another sound.
	For example, the interference of traffic noise with use of a public telephone on a busy street.
RBL	The Rating Background Level (RBL) as defined in the NPI, is an overall single figure
	representing the background level for each assessment period over the whole monitoring
	period. The RBL, as defined is the median of ABL values over the whole monitoring period.
Sound power level	This is a measure of the total power radiated by a source in the form of sound and is given by
(Lw or SWL)	10.log10 (W/Wo). Where W is the sound power in watts to the reference level of $10^{12}$ watts.
Sound pressure level	the level of sound pressure; as measured at a distance by a standard sound level meter.
(Lp or SPL)	This differs from Lw in that it is the sound level at a receiver position as opposed to the sound
	'intensity' of the source.



Table A2 Common Noise Sources and Their Typical Sound Pressure Levels (SPL), dBA			
Source	Typical Sound Pressure Level		
Threshold of pain	140		
Jet engine	130		
Hydraulic hammer	120		
Chainsaw	110		
Industrial workshop	100		
Lawn-mower (operator position)	90		
Heavy traffic (footpath)	80		
Elevated speech	70		
Typical conversation	60		
Ambient suburban environment	40		
Ambient rural environment	30		
Bedroom (night with windows closed)	20		
Threshold of hearing	0		

Table A2 provides a list of common noise sources and their typical sound level.

#### Figure A1 – Human Perception of Sound





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## Appendix B – Master Plan Design





### **Option 2 - Corner Site**



Fuiton trotter ARCHITECTS



Health Hunter New England Local Health District



Public Works Advisory





# Appendix C – Background Monitoring Charts





Background Noise Levels

94 Taylor St, Glen Innes 2370 - Thursday 26 May 2022



Wind Speed m/s (10m AGL)

Time (End of 15 Minute Sample Interval)



Background Noise Levels

94 Taylor St, Glen Innes 2370 - Friday 27 May 2022



Wind Speed m/s (10m AGL)

Time (End of 15 Minute Sample Interval)


94 Taylor St, Glen Innes 2370 - Saturday 28 May 2022





94 Taylor St, Glen Innes 2370 - Sunday 29 May 2022



Wind Speed m/s (10m AGL)



94 Taylor St, Glen Innes 2370 - Monday 30 May 2022



Wind Speed m/s (10m AGL)



94 Taylor St, Glen Innes 2370 - Tuesday 31 May 2022





94 Taylor St, Glen Innes 2370 - Wednesday 1 June 2022



Wind Speed m/s (10m AGL)



94 Taylor St, Glen Innes 2370 - Thursday 2 June 2022



Wind Speed m/s (10m AGL)



94 Taylor St, Glen Innes 2370 - Friday 3 June 2022





94 Taylor St, Glen Innes 2370 - Saturday 4 June 2022



Wind Speed m/s (10m AGL)



94 Taylor St, Glen Innes 2370 - Sunday 5 June 2022



Wind Speed m/s (10m AGL)



94 Taylor St, Glen Innes 2370 - Monday 6 June 2022





94 Taylor St, Glen Innes 2370 - Tuesday 7 June 2022



Wind Speed m/s (10m AGL)

# Appendix D – Construction Noise Contours











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**Asbestos Register** 



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APPENDIX A Photographs of <u>Confirmed</u> Asbestos Containing Materials



# **Main Hospital Building**

Constructed around the 1940s, the Main Hospital Building is a three-storey structure with the front elevation facing north. Built of brick and concrete suspended slab floors, timber framed roof and Colorbond roof sheeting. There is an additional wing built to the rear of the main building for catering and services. There is friable asbestos pipe lagging throughout the subfloor, ground floor ceiling, Level 1 ceiling void and risers. **Access to these areas is under controlled conditions only.** 

# **Ground Floor**

Main Hospital Building (GI01): Photo No. 001: Service block kitchen - level 2

The Flat Fibre Cement Sheet eave soffit lining to the service block kitchen - level 2 - was presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise

Main Hospital Building (GI01): Photo No. 002: Ground Floor – ceiling void throughout

No Image Provided

There may be thermal asbestos rope insulation to pipework throughout ceiling void of the ground floor, which is presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise

Main Hospital Building (GI01): Photo No. 003: Ground Floor – Dental Surgery 2 – Room 0067

No Image Provided

The Flat Fibre Cement Sheet ceiling lining to the Dental Surgery 2 - Room 0067 was presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise



Main Hospital Building (GI01): Photo No. 004: Ground Floor – kitchen – Room 0037 – stove/oven area



The Flat Fibre Cement Sheet ceiling lining to the kitchen, Room 0037, stove/oven area was presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise

Main Hospital Building (GI01): Photo No. 005: Ground Floor - Main Service Riser to Rooms B1003, 0033, 1057, 2065, 3001, 4001



The thermal "lagging" insulation to pipework to the Main Service Riser to Rooms B1003, 0033, 1057, 2065, 3001, 4001 was previously tested by others and **proved to be an asbestos containing material** 

Main Hospital Building (GI01): Photo No. 006: Ground Floor Service Riser 1 to Rooms 0003, 1031, 2033

No Image Provided

The Thermal Insulation to pipework to the Service Riser 1 to Rooms 0003, 1031, 2033 was presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise



Main Hospital Building (GI01): Photo No. 007: Ground Floor Service Riser 2 to Rooms 0003, 1032, 2036



The Thermal Insulation to pipework to the Service Riser 2 to Rooms 0003, 1032, 2036 was presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise

Main Hospital Building (GI01): Photo No. 008: Ground Floor Service Riser 3 to Rooms 0006, 1033, 2038

No Image Provided

The Thermal Insulation to pipework to the Service Riser 3 to Rooms 0006, 1033, 2038 was presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise

Main Hospital Building (GI01): Photo No. 009: Ground Floor Service Riser 4 to Rooms 0007, 1034, 2040

No Image Provided

The Thermal Insulation to pipework to the Service Riser 4 to Rooms 0007, 1034, 2040 was presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise

Main Hospital Building (GI01): Photo No. 010: Ground Floor Service Riser 5 to Rooms 0018, 1035, 2042

No Image Provided

The Flat Fibre Cement Sheet to the Service Riser 5 to Rooms 0018, 1035, 2042 was presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise



Main Hospital Building (GI01): Photo No. 011: Ground Floor Service Riser 6 to Rooms 0022, 1039, 2048

No Image Provided

The Thermal Insulation to pipework to the Service Riser 6 to Rooms 0022, 1039, 2048 was presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise

Main Hospital Building (GI01): Photo No. 012: Ground Floor Service Riser 7 to Rooms 0025, 1042, 2050



The Thermal Insulation to pipework to the Service Riser 7 to Rooms 0025, 1042, 2050 was presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise

Main Hospital Building (GI01): Photo No. 013: Ground Floor Service Riser 8 to Rooms 0026, 1045, 2052

No Image Provided

The Thermal Insulation to pipework to the Service Riser 8 to Rooms 0026, 1045, 2052 was presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise

Main Hospital Building (GI01): Photo No. 014: Ground Floor Service Riser 9 to Rooms 0027, 1049, 2056

No Image Provided

The Thermal Insulation to pipework to the Service Riser 9 to Rooms 0027, 1049, 2056 was presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise

Main Hospital Building (GI01): Photo No. 015: Ground Floor Service Riser 10 to Rooms 0030, 1054, 2062

No Image Provided

The Thermal Insulation to pipework to the Service Riser 10 to Rooms 0030, 1054, 2062 was presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise



Main Hospital Building (GI01): Photo No. 016: Ground Floor Service Riser 11 to Rooms 0043

No Image Provided

The Thermal Insulation to pipework to the Service Riser 11 to Rooms 0043 was presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise

Main Hospital Building (GI01): Photo No. 017: Ground Floor Service Riser 12 to Rooms 0045

No Image Available

The Thermal Insulation to pipework to the Service Riser 12 to Rooms 0045 was presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise

Main Hospital Building (GI01): Photo No. 018: Ground Floor Service Riser 13 to Rooms 0046 and 1070

No Image Provided

The Thermal Insulation to pipework to the Service Riser 13 to Rooms 0046 and 1070 was presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise

Main Hospital Building (GI01): Photo No. 019: Ground Floor Service Riser 14 to Rooms 0051, 1007 and 2010



The Thermal Insulation to pipework to the Service Riser 14 to Rooms 0051, 1007 and 2010 was presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise



Main Hospital Building (GI01): Photo No. 020: Ground Floor Service Riser 15 to Rooms 0055, 1010 and 2010

No Image Provided

The Thermal Insulation to pipework to the Service Riser 15 to Rooms 0055, 1010 and 2010 was presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise

Main Hospital Building (GI01): Photo No. 021: Ground Floor Service Riser 16 to Rooms 0057, 1014 and 2015

No Image Provided

The Thermal Insulation to pipework to the Service Riser 16 to Rooms 0057, 1014 and 2015 was presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise

Main Hospital Building (GI01): Photo No. 022: Ground Floor Service Riser 17 to Rooms 0058, 1016 and 2015

No Image Provided

The Thermal Insulation to pipework to the Service Riser 17 to Rooms 0058, 1016 and 2015 was presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise

Main Hospital Building (GI01): Photo No. 023: Ground Floor Service Riser 18 to Rooms 0060, 1016 and 2016

No Image Provided

The Thermal Insulation to pipework to the Service Riser 18 to Rooms 0060, 1016 and 2016 was presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise

Main Hospital Building (GI01): Photo No. 024: Ground Floor Service Riser 19 to Rooms 0070, 1021 and 2023

No Image Provided

The Thermal Insulation to pipework to the Service Riser 19 to Rooms 0070, 1021 and 2023 was presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise



Main Hospital Building (GI01): Photo No. 025: Ground Floor Service Riser 20 to Rooms 0072, 1022 and 2025

No Image Provided

The Thermal Insulation to pipework to the Service Riser 20 to Rooms 0072, 1022 and 2025 was presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise

Main Hospital Building (GI01): Photo No. 026: Ground Floor Service Riser 21 to Rooms 0074, 1026 and 2029

No Image Provided

The Thermal Insulation to pipework to the Service Riser 21 to Rooms 0074, 1026 and 2029 was presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise

Main Hospital Building (GI01): Photo No. 027: Ground Floor Service Riser 22 to Rooms 0076, 1027 and 2030

No Image Provided

The Thermal Insulation to pipework to the Service Riser 22 to Rooms 0076, 1027 and 2030 was presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise

Main Hospital Building (GI01): Photo No. 028: Ground Floor throughout



The Thermal Insulation to pipework throughout the ground floor ceiling void was presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise



### 1<sup>st</sup> Floor

Main Hospital Building (GI01): Photo No. 029: 1st Floor - ceiling void throughout



The Thermal Insulation to pipework to the ceiling void throughout the first floor ceiling void was presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise

Main Hospital Building (GI01): Photo No. 030: 1st Floor ceiling void throughout



The Thermal Insulation to pipework to the ceiling void throughout was presumed to contain asbestos and **as** such SHALL be considered an asbestos-containing material until or unless it is proven otherwise



# Basement

Main Hospital Building (GI01): Photo No. 031: Basement Level B1 throughout - corridors and crawl space





# 2<sup>nd</sup> FLOOR

Main Hospital Building (GI01): Photo No. 032: 2nd Floor ceiling void - service riser to lift



The insulation panel to the electrical backing board to the battery charging unit/emergency lighting panel in the ceiling void to the service riser to lift was presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise

Main Hospital Building (GI01): Photo No. 033: 2nd Floor distribution cupboard adjacent to Lift 2 Room 0048 in the main corridor Room 2002



The Insulation Panel to the distribution cupboard adjacent to Lift 2 Room 0048 in the main corridor Room 2002, and the moulded fibre cement "Bakelite" switches, were presumed to contain asbestos and **as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise** 

Main Hospital Building (GI01): Photo No. 034: 2nd Floor fire door to airlock Room 2003 and Storeroom A Room 2005

No Images Provided

The Insulation Panel core to the fire door to airlock Room 2003 and Storeroom A Room 2005 was presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise



#### 3<sup>rd</sup> Floor

Main Hospital Building (GI01): Photo No. 035: 3rd Floor Emergency Backup Room 3002



The Insulation Panel to the electrical backing board to the Battery Charging Unit/Emergency Lighting Panel in Room 3002 was presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise

#### 4<sup>th</sup> Floor

Main Hospital Building (GI01): Photo No. 036: 4th Floor Lift Motor Room 4002



The Flat Fibre Cement Sheet ceiling lining and cover strip to the Lift Motor Room 4002 was presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise

Main Hospital Building (GI01): Photo No. 037: 4th Floor Lift Motor Room 4002

No Image Provided

The asbestos brake linings to Lift Motors One and Two to the Lift Motor Room 4002 could not be accessed but are assumed to be in place and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise



Main Hospital Building (GI01): Photo No. 038: 4th Floor Lift Motor Room 4002 - east wall

Main Hospital Building (GI01): Photo No. 039: 4th Floor Lift Motor Room 4002 throughout

No Image Provided

The four Moulded Fibre Cement "Bakelite" switches throughout the Lift Motor Room 4002 were previously tested by others and **proved to be an asbestos containing material** 









# Mortuary

Single-storey construction solid brick, concrete floors, timber frame and tile roof. Stands separate to the main building on the South Eastern side of the Old Laundry. There is some compressed sheeting in this building. Do not damage surface.

Mortuary (GI03): Photo No. 042: Eave



The Flat Fibre Cement Sheet soffit lining to the eave was presumed to contain asbestos and **as such SHALL** be considered an asbestos-containing material until or unless it is proven otherwise. Damaged sheets were replaced in 2012.

Mortuary (GI03): Photo No. 043: Entrance verandah

No Image Provided

The Flat Fibre Cement Sheet ceiling lining to the entrance verandah was presumed to contain asbestos and **as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise** 

Mortuary (GI03): Photo No. 044: Throughout

No Image Provided

There may be Thermal Insulation to pipework throughout the mortuary and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise

Mortuary (GI03): Photo No. 045: Entrance Room 0001

No Image Provided

The Flat Fibre Cement Sheet ceiling lining to the entrance Room 0001 was presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise


Mortuary (GI03): Photo No. 046: Store Room 0003 northwest wall

No Image Provided

The Insulation Panel to the electrical switchboard in Store Room 0003 (northwest wall) was presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise



### **Old Laundry**

Old Laundry (GI02): Photo No. 047: Clean Linen Room 0004 medical records area

No Image Provided

The Flat Fibre Cement Sheet wall linings to the Clean Linen Room 0004 medical records area was presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise

Old Laundry (GI02): Photo No. 048: Community Health Storage Room 0007



The Flat Fibre Cement Sheet wall lining and moulded cover strip to the Community Health Storage Room 0007 were presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise

Old Laundry (GI02): Photo No. 049: Corridor Room 0011 north wall

No Image Provided

The Insulation Panel to the Corridor Room 0011 north wall was presumed to contain asbestos and **as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise** 





Old Laundry (GI02): Photo No. 051: Medical Gas Store Room 0010

No Image Provided

The Flat Fibre Cement Sheet ceiling lining and cover strip to the Medical Gas Store Room 0010 were presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise

Old Laundry (GI02): Photo No. 052: Recycle Room 0018

No Image Provided

The Flat Fibre Cement Sheet wall lining to the Recycle Room 0018 was presumed to contain asbestos and **as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise** 

Old Laundry (GI02): Photo No. 053: Tea Room 0012



The Flat Fibre Cement Sheet ceiling lining and moulded cover strip to the Tea Room 0012 were presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise

Old Laundry (GI02): Photo No. 054: Throughout

No Image Provided

There may be asbestos rope lagging to pipework throughout the building's wall cavity and **as such SHALL be** considered to exist until or unless it is proven otherwise



### **Old Maintenance Building**

Constructed in the early 1920s, this single-storey building consists of solid brick and a painted metal roof. It is to the east of the Old Nurses Home. There is compressed sheeting throughout the building. Do not damage surfaces. The ceiling space has friable asbestos lagging and is damaged in places where there is unavoidable contact. Access to this ceiling space is under controlled conditions.

Old Maintenance Building (GI04): Photo No. 055: Room 0009 above door

No Image Provided

The Flat Fibre Cement Sheet infill panel above the door to Room 0009 was presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise

Old Maintenance Building (GI04): Photo No. 056: Room 0009 eastern verandah roof

No Image Provided

The Flat Fibre Cement Sheet faux weatherboards to the Room 0009 eastern verandah roof were presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise

Old Maintenance Building (GI04): Photo No. 057: Rooms 0008 and 0009



The Flat Fibre Cement Sheet infill panels to the exterior of Rooms 0008 and 0009 was presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise



Old Maintenance Building (GI04): Photo No. 058: Ceiling space throughout



The thermal insulation lagging to pipework and debris contamination to the ceiling space throughout were presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise

Old Maintenance Building (GI04): Photo No. 059: Fireplace Room 0004

No Image Provided

The Flat Fibre Cement Sheet lining to the Fireplace opening in Room 0004 was presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise

Old Maintenance Building (GI04): Photo No. 060: Room 0008 southern corner of the walls



The Flat Fibre Cement Sheet double wall lining to Room 0008, the southern corner of the walls, was presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise



Old Maintenance Building (GI04): Photo No. 061: Room 0009 western wall

No Image Provided

The Insulation Panel to the electrical switchboard on the western wall of Room 0009 was presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise

Old Maintenance Building (GI04): Photo No. 062: Room 0011

No Image Provided

The stored electrical backing board and compressed sheet to Room 0011 were presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise

Old Maintenance Building (GI04): Photo No. 063: Room 0017



The thermal lagging insulation to pipework, and subsequent asbestos debris, to Room 0017 was presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise

Old Maintenance Building (GI04): Photo No. 064: Throughout

No Image Provided

The Moulded Fibre Cement Bakelite light switches throughout were presumed to contain asbestos and **as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise** 

Old Maintenance Building (GI04): Photo No. 065: Throughout

No Image Provided

The Thermal Insulation to pipework throughout the wall cavities was presumed to contain asbestos and **as** such SHALL be considered an asbestos-containing material until or unless it is proven otherwise



### **Gardeners Shed**

No longer belongs to HNELHD, Lands Department are the new owners.



### **Old Nurses Home**

Built in the early 1950s, a three-storey construction built of solid brickwork and concrete floors, timber framed roof with asbestos corrugated roof sheeting. There is friable asbestos debris throughout the subfloor and ceiling of this building. Do not enter unless under controlled conditions.





### **Basement (Old Nurses Home)**

Old Nurses Home GI08: Photo No. 068: Basement corridors and crawl spaces

No Image Provided

The Thermal Insulation to pipework to the basement corridors and crawl spaces was presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise

Old Nurses Home GI08: Photo No. 069: Basement entry

No Image Provided

The Thermal Insulation to pipework to the basement entry was presumed to contain asbestos and **as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise** 

Old Nurses Home GI08: Photo No. 070: Basement boiler vessel to basement entry

No Image Provided

The Thermal Insulation to pipework to the boiler vessel to basement entry was presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise

### Ground Floor

Old Nurses Home Gl08: Photo No. 071: Ground Floor - Female toilet

No Image Provided

The Fibre Reinforced Cement cubicle partitions to the female toilet were presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise

Old Nurses Home GI08: Photo No. 072: Ground Floor - risers throughout

No Image Provided

The Thermal Insulation to pipework to the risers throughout was presumed to contain asbestos and **as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise** 



Old Nurses Home GI08: Photo No. 073: Ground Floor - Throughout

No Image Provided

The Thermal Insulation to pipework to the wall cavities throughout was presumed to contain asbestos and **as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise** 

Old Nurses Home GI08: Photo No. 074: Ground Floor - Throughout

No Image Provided

The Moulded Fibre Cement "Bakelite" light switches throughout were presumed to contain asbestos and **as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise** 

#### 1<sup>st</sup> Floor

Old Nurses Home Gl08: Photo No. 075: 1st Floor - service risers throughout

No Image Provided

The Thermal Insulation to pipework to the service risers throughout the first floor was presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise

Old Nurses Home GI08: Photo No. 076: 1st Floor throughout

No Images Provided

The Moulded Fibre Cement "Bakelite" light switches throughout were presumed to contain asbestos and **as** such SHALL be considered an asbestos-containing material until or unless it is proven otherwise



### 2<sup>nd</sup> Floor



The thermal "lagging" insulation to pipework and the subsequent debris to the ceiling void were presumed to contain asbestos and as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise

Old Nurses Home Gl08: Photo No. 078: 2nd Floor – risers throughout

No Image Provided

The Thermal Insulation to pipework to the risers throughout was presumed to contain asbestos and **as such** SHALL be considered an asbestos-containing material until or unless it is proven otherwise

Old Nurses Home GI08: Photo No. 079: 2nd Floor - throughout

No Image Provided

The Moulded Fibre Cement "Bakelite" light switches throughout were presumed to contain asbestos and **as such SHALL be considered an asbestos-containing material until or unless it is proven otherwise** 



APPENDIX B Asbestos Register



										Glen Inr	es District	t Hospita	al - Main Hos	pital Building	(GI01)											
Survey	Details		Site Location				ription			Sample Deta	ils				R	isk Assessm	nent Algoritl	nm						Corrective	Alarm	
Survey Date	Assessed by Company / Consultant	Workplace Name	Building	Floor	Room	Location	Applicatio n	Assumed Asbestos	Sample ID	Sample results	Quantity (sqm)	Photo Number	A. Asbestos classification	B. Product Type	C. Accessibility	D. Labelled	E. Condition	Asbestos Type (non mandatory)	Risk Rating	Control Measures	Comments /	Reinspection Date	Consultant/ Hygienist Name	Control Action Taken	Date actioned	Contractor details
12/03/2015	PES	Glen Innes District Hospital	Main Hospital Building (Gl01)	External	service block kitchen - level 2	eave soffit lining	Flat Fibre Cement Sheet	Yes	SP	Presumed Asbestos	40m²	001	Non- Friable 1	Flat Fibre Cement Sheet 1	Limited Access 1	No Labelling 1	Good condition 0	Presumed Asbestos	Very Low 4	C1; C2; C3; C4;		12/03/2020	Tony Milligan	Noted in Register	12/03/2015	
12/03/2015	PES	Glen Innes District Hospital	Main Hospital Building (Gl01)	Ground Floor	ceiling void throughout	pipework	Thermal Insulation to pipework	Yes	SP	Presumed Asbestos	100m²	002	Friable 2	Thermal Insulation to pipework 3	Limited Access 1	Labelled 0	Low Damage 1	Presumed Asbestos	Low 7	C1; C2; C3; C4; C12;		12/03/2020	Tony Milligan	Noted in Register	12/03/2015	
12/03/2015	PES	Glen Innes District Hospital	Main Hospital Building (Gl01)	Ground Floor	Dental Surgery 2 - Room 0067	ceiling lining	Flat Fibre Cement Sheet	Yes	SP	Presumed Asbestos	40m²	003	Non- Friable 1	Flat Fibre Cement Sheet 1	Moderate Access 2	Labelled 0	Good condition 0	Presumed Asbestos	Very Low 4	C1; C2; C3; C4;		12/03/2020	Tony Milligan	Noted in Register	12/03/2015	
12/03/2015	PES	Glen Innes District Hospital	Main Hospital Building (Gl01)	Ground Floor	kitchen - Room 0037 - stove/oven area	ceiling lining	Flat Fibre Cement Sheet	Yes	SP	Presumed Asbestos	10m²	004	Non- Friable 1	Flat Fibre Cement Sheet 1	Moderate Access 2	Labelled 0	Good condition 0	Presumed Asbestos	Very Low 4	C1; C2; C3; C4;		12/03/2020	Tony Milligan	Noted in Register	12/03/2015	
12/03/2015	PES	Glen Innes District Hospital	Main Hospital Building (Gl01)	Ground Floor	Main Service Riser to Rooms B1003, 0033, 1057, 2065, 3001, 4001	pipework	Thermal Insulation to pipework	Yes	PS	Presumed Asbestos	100lin m	005	Friable 2	Thermal Insulation to pipework 3	Limited Access 1	Labelled 0	Low Damage 1	Presumed Asbestos	Low 7	C1; C2; C3; C4; C12;		12/03/2020	Tony Milligan	Noted in Register	12/03/2015	
12/03/2015	PES	Glen Innes District Hospital	Main Hospital Building (Gl01)	Ground Floor	Service Riser 1 to Rooms 0003, 1031, 2033	pipework	Thermal Insulation to pipework	Yes	SP	Presumed Asbestos	40lin m	006	Friable 2	Thermal Insulation to pipework 3	Limited Access 1	Labelled 0	Medium Damage 2	Presumed Asbestos	Low 8	C1; C2; C3; C4; C12;		12/03/2020	Tony Milligan	Noted in Register	12/03/2015	
12/03/2015	PES	Glen Innes District Hospital	Main Hospital Building (Gl01)	Ground Floor	Service Riser 10 to Rooms 0030, 1054, 2062	pipework	Thermal Insulation to pipework	Yes	SP	Presumed Asbestos	100lin m	007	Friable 2	Thermal Insulation to pipework 3	Limited Access 1	Labelled 0	Medium Damage 2	Presumed Asbestos	Low 8	C1; C2; C3; C4; C12;		12/03/2020	Tony Milligan	Noted in Register	12/03/2015	
12/03/2015	PES	Glen Innes District Hospital	Main Hospital Building (Gl01)	Ground Floor	Service Riser 11 to Rooms 0043	pipework	Thermal Insulation to pipework	Yes	SP	Presumed Asbestos	50lin m	008	Friable 2	Thermal Insulation to pipework 3	Limited Access 1	Labelled 0	Medium Damage 2	Presumed Asbestos	Low 8	C1; C2; C3; C4; C12;		12/03/2020	Tony Milligan	Noted in Register	12/03/2015	



										Glen Inr	nes Distric	t Hospita	al - Main Hos	pital Building	(GI01)											
Survey	Details		Site Lo	ocation		Site Desc	cription			Sample Deta	ails				R	isk Assessn	nent Algorith	ım						Corrective	Alarm	
12/03/2015	PES	Glen Innes District Hospital	Main Hospital Building (Gl01)	Ground Floor	Service Riser 12 to Rooms 0045	pipework	Thermal Insulation to pipework	Yes	SP	Presumed Asbestos	50lin m	009	Friable 2	Thermal Insulation to pipework 3	Limited Access 1	Labelled 0	Medium Damage 2	Presumed Asbestos	Low 8	C1; C2; C3; C4; C12;	12/	/03/2020	Tony Milligan	Noted in Register	12/03/2015	
12/03/2015	PES	Glen Innes District Hospital	Main Hospital Building (Gl01)	Ground Floor	Service Riser 13 to Rooms 0046 and 1070	pipework	Thermal Insulation to pipework	Yes	SP	Presumed Asbestos	50lin m	010	Friable 2	Thermal Insulation to pipework 3	Limited Access 1	Labelled 0	Medium Damage 2	Presumed Asbestos	Low 8	C1; C2; C3; C4; C12;	12/	/03/2020	Tony Milligan	Noted in Register	12/03/2015	
12/03/2015	PES	Glen Innes District Hospital	Main Hospital Building (Gl01)	Ground Floor	Service Riser 14 to Rooms 0051, 1007 and 2010	pipework	Thermal Insulation to pipework	Yes	SP	Presumed Asbestos	50lin m	011	Friable 2	Thermal Insulation to pipework 3	Limited Access 1	Labelled 0	Medium Damage 2	Presumed Asbestos	Low 8	C1; C2; C3; C4; C12;	12/	/03/2020	Tony Milligan	Noted in Register	12/03/2015	
12/03/2015	PES	Glen Innes District Hospital	Main Hospital Building (Gl01)	Ground Floor	Service Riser 15 to Rooms 0055, 1010 and 2010	pipework	Thermal Insulation to pipework	Yes	SP	Presumed Asbestos	50lin m	012	Friable 2	Thermal Insulation to pipework 3	Limited Access 1	Labelled 0	Medium Damage 2	Presumed Asbestos	Low 8	C1; C2; C3; C4; C12;	12/	/03/2020	Tony Milligan	Noted in Register	12/03/2015	
12/03/2015	PES	Glen Innes District Hospital	Main Hospital Building (Gl01)	Ground Floor	Service Riser 16 to Rooms 0057, 1014 and 2015	pipework	Thermal Insulation to pipework	Yes	SP	Presumed Asbestos	50lin m	013	Friable 2	Thermal Insulation to pipework 3	Limited Access 1	Labelled 0	Medium Damage 2	Presumed Asbestos	Low 8	C1; C2; C3; C4; C12;	12/	/03/2020	Tony Milligan	Noted in Register	12/03/2015	
12/03/2015	PES	Glen Innes District Hospital	Main Hospital Building (Gl01)	Ground Floor	Service Riser 17 to Rooms 0058, 1016 and 2015	pipework	Thermal Insulation to pipework	Yes	SP	Presumed Asbestos	50lin m	014	Friable 2	Thermal Insulation to pipework 3	Limited Access 1	Labelled 0	Medium Damage 2	Presumed Asbestos	Low 8	C1; C2; C3; C4; C12;	12/	/03/2020	Tony Milligan	Noted in Register	12/03/2015	
12/03/2015	PES	Glen Innes District Hospital	Main Hospital Building (Gl01)	Ground Floor	Service Riser 18 to Rooms 0060, 1016 and 2016	pipework	Thermal Insulation to pipework	Yes	SP	Presumed Asbestos	50lin m	015	Friable 2	Thermal Insulation to pipework 3	Limited Access 1	Labelled 0	Medium Damage 2	Presumed Asbestos	Low 8	C1; C2; C3; C4; C12;	12/	/03/2020	Tony Milligan	Noted in Register	12/03/2015	
12/03/2015	PES	Glen Innes District Hospital	Main Hospital Building (Gl01)	Ground Floor	Service Riser 19 to Rooms 0070, 1021 and 2023	pipework	Thermal Insulation to pipework	Yes	SP	Presumed Asbestos	50lin m	016	Friable 2	Thermal Insulation to pipework 3	Limited Access 1	Labelled 0	Medium Damage 2	Presumed Asbestos	Low 8	C1; C2; C3; C4; C12;	12/	/03/2020	Tony Milligan	Noted in Register	12/03/2015	
12/03/2015	PES	Glen Innes District Hospital	Main Hospital Building (Gl01)	Ground Floor	Service Riser 2 to Rooms 0003, 1032, 2036	pipework	Thermal Insulation to pipework	Yes	SP	Presumed Asbestos	100lin m	017	Friable 2	Thermal Insulation to pipework 3	Moderate Access 2	Labelled 0	Medium Damage 2	Presumed Asbestos	Medium 9	C1; C2; C3; C4;	12/	/03/2020	Tony Milligan	Noted in Register	12/03/2015	



									Glen Inn	nes District	Hospita	al - Main Hos	pital Building	(GI01)											
Survey Details		Site Lo	ocation		Site Desc	cription			Sample Deta	ils				R	isk Assessn	nent Algorith	ım						Corrective	Alarm	
12/03/2015 PES	Glen Innes District Hospital	Main Hospital Building (GI01)	Ground Floor	Service Riser 20 to Rooms 0072, 1022 and 2025	pipework	Thermal Insulation to pipework	Yes	SP	Presumed Asbestos	50lin m	018	Friable 2	Thermal Insulation to pipework 3	Limited Access 1	Labelled 0	Medium Damage 2	Presumed Asbestos	Low 8	C1; C2; C3; C4; C12;	1	12/03/2020	Tony Milligan	Noted in Register	12/03/2015	
12/03/2015 PES	Glen Innes District Hospital	Main Hospital Building (GI01)	Ground Floor	Service Riser 21 to Rooms 0074, 1026 and 2029	pipework	Thermal Insulation to pipework	Yes	SP	Presumed Asbestos	50lin m	019	Friable 2	Thermal Insulation to pipework 3	Limited Access 1	Labelled 0	Medium Damage 2	Presumed Asbestos	Low 8	C1; C2; C3; C4;	1	12/03/2020	Tony Milligan	Noted in Register	12/03/2015	
12/03/2015 PES	Glen Innes District Hospital	Main Hospital Building (GI01)	Ground Floor	Service Riser 22 to Rooms 0076, 1027 and 2030	pipework	Thermal Insulation to pipework	Yes	SP	Presumed Asbestos	50lin m	020	Friable 2	Thermal Insulation to pipework 3	Limited Access 1	Labelled 0	Medium Damage 2	Presumed Asbestos	Low 8	C1; C2; C3; C4; C12;	1	12/03/2020	Tony Milligan	Noted in Register	12/03/2015	
12/03/2015 PES	Glen Innes District Hospital	Main Hospital Building (GI01)	Ground Floor	Service Riser 3 to Rooms 0006, 1033, 2038	pipework	Thermal Insulation to pipework	Yes	SP	Presumed Asbestos	100lin m	021	Friable 2	Thermal Insulation to pipework 3	Limited Access 1	Labelled 0	Medium Damage 2	Presumed Asbestos	Low 8	C1; C2; C3; C4; C12;	1	12/03/2020	Tony Milligan	Noted in Register	12/03/2015	
12/03/2015 PES	Glen Innes District Hospital	Main Hospital Building (GI01)	Ground Floor	Service Riser 4 to Rooms 0007, 1034, 2040	pipework	Thermal Insulation to pipework	Yes	SP	Presumed Asbestos	100lin m	022	Friable 2	Thermal Insulation to pipework 3	Limited Access 1	Labelled 0	Medium Damage 2	Presumed Asbestos	Low 8	C1; C2; C3; C4; C12;	1	12/03/2020	Tony Milligan	Noted in Register	12/03/2015	
12/03/2015 PES	Glen Innes District Hospital	Main Hospital Building (GI01)	Ground Floor	Service Riser 5 to Rooms 0018, 1035, 2042	pipework	Flat Fibre Cement Sheet	Yes	SP	Presumed Asbestos	100lin m	023	Friable 2	Flat Fibre Cement Sheet 1	Limited Access 1	Labelled 0	Medium Damage 2	Presumed Asbestos	Very Low 6	C1; C2; C3; C4; C12;	1	12/03/2020	Tony Milligan	Noted in Register	12/03/2015	
12/03/2015 PES	Glen Innes District Hospital	Main Hospital Building (GI01)	Ground Floor	Service Riser 6 to Rooms 0022, 1039, 2048	pipework	Thermal Insulation to pipework	Yes	SP	Presumed Asbestos	100lin m	024	Friable 2	Thermal Insulation to pipework 3	Limited Access 1	Labelled 0	Medium Damage 2	Presumed Asbestos	Low 8	C1; C2; C3; C4; C12;	1	12/03/2020	Tony Milligan	Noted in Register	12/03/2015	
12/03/2015 PES	Glen Innes District Hospital	Main Hospital Building (GI01)	Ground Floor	Service Riser 7 to Rooms 0025, 1042, 2050	pipework	Thermal Insulation to pipework	Yes	SP	Presumed Asbestos	100lin m	025	Friable 2	Thermal Insulation to pipework 3	Limited Access 1	Labelled 0	Medium Damage 2	Presumed Asbestos	Low 8	C1; C2; C3; C4; C12;	1	12/03/2020	Tony Milligan	Noted in Register	12/03/2015	
12/03/2015 PES	Glen Innes District Hospital	Main Hospital Building (GI01)	Ground Floor	Service Riser 8 to Rooms 0026, 1045, 2052	pipework	Thermal Insulation to pipework	Yes	SP	Presumed Asbestos	100lin m	026	Friable 2	Thermal Insulation to pipework 3	Limited Access 1	Labelled 0	Medium Damage 2	Presumed Asbestos	Low 8	C1; C2; C3; C4; C12;	1	12/03/2020	Tony Milligan	Noted in Register	12/03/2015	

										Glen Inn	nes District	Hospita	al - Main Hos	pital Building	(GI01)										
Survey D	Details		Site Lo	ocation		Site Desc	ription			Sample Deta	ils				Ri	isk Assessn	nent Algoriti	nm					Corrective	Alarm	
12/03/2015	PES	Glen Innes District Hospital	Main Hospital Building (Gl01)	Ground Floor	Service Riser 9 to Rooms 0027, 1049, 2056	pipework	Thermal Insulation to pipework	Yes	SP	Presumed Asbestos	100lin m	027	Friable 2	Thermal Insulation to pipework 3	Limited Access 1	Labelled 0	Medium Damage 2	Presumed Asbestos	Low 8	C1; C2; C3; C4; C8;	12/03/2020	Tony Milligan	Noted in Register	12/03/2015	
12/03/2015	PES	Glen Innes District Hospital	Main Hospital Building (Gl01)	Ground Floor	throughout	pipework	Thermal Insulation to pipework	Yes	SP	Presumed Asbestos	100lin m	028	Friable 2	Thermal Insulation to pipework 3	No Access 0	No Labelling 1	Medium Damage 2	Presumed Asbestos	Low 8	C1; C2; C3; C4;	12/03/2020	Tony Milligan	Noted in Register	12/03/2015	
12/03/2015	PES	Glen Innes District Hospital	Main Hospital Building (Gl01)	1st Floor	ceiling void throughout	pipework	Thermal Insulation to pipework	Yes	SP	Presumed Asbestos	50lin m	029	Friable 2	Thermal Insulation to pipework 3	Limited Access 1	Labelled 0	Medium Damage 2	Presumed Asbestos	Low 8	C1; C2; C3; C4; C12;	12/03/2020	Tony Milligan	Noted in Register	12/03/2015	
12/03/2015	PES	Glen Innes District Hospital	Main Hospital Building (Gl01)	1st Floor	ceiling void throughout	pipework	Thermal Insulation to pipework	Yes	SP	Presumed Asbestos	50lin m	030	Friable 2	Thermal Insulation to pipework 3	Limited Access 1	Labelled 0	Medium Damage 2	Presumed Asbestos	Low 8	C1; C2; C3; C4; C12;	12/03/2020	Tony Milligan	Noted in Register	12/03/2015	
12/03/2015	PES	Glen Innes District Hospital	Main Hospital Building (Gl01)	Baseme nt	Level B1 throughout - corridors and crawl space	soil con- tamination	Thermal Insulation to pipework	Yes	SP	Presumed Asbestos	100m²	031	Friable 2	Thermal Insulation to pipework 3	Limited Access 1	Labelled 0	High Damage 3	Presumed Asbestos	Medium 9	C1; C2; C3; C4; C5; C9; C12;	12/03/2020	Tony Milligan	Noted in Register	12/03/2015	
12/03/2015	PES	Glen Innes District Hospital	Main Hospital Building (Gl01)	2nd Floor	ceiling void - service riser to lift	battery charging unit/ emergency lighting panel	Insulation Panel	Yes	SP	Presumed Asbestos	1m²	032	Non- Friable 1	Insulation Panel 1	Limited Access 1	Labelled 0	Good condition 0	Presumed Asbestos	Very Low 3	C1; C2; C3; C4;	12/03/2020	Tony Milligan	Noted in Register	12/03/2015	
12/03/2015	PES	Glen Innes District Hospital	Main Hospital Building (Gl01)	2nd Floor	distribution cupboard adjacent to Lift 2 Room 0048 in the main corridor Room 2002	electrical switchboard with Bakelite switch	Insulation Panel	Yes	SP	Presumed Asbestos	1m²	033	Non- Friable 1	Insulation Panel 1	Limited Access 1	Labelled 0	Good condition 0	Presumed Asbestos	Very Low 3	C1; C2; C3; C4;	12/03/2020	Tony Milligan	Noted in Register	12/03/2015	
12/03/2015	PES	Glen Innes District Hospital	Main Hospital Building (Gl01)	2nd Floor	fire door to airlock Room 2003 and Storeroom A Room 2005	core	Insulation Panel	Yes	SP	Presumed Asbestos	2m²	034	Non- Friable 1	Insulation Panel 1	No Access 0	Labelled 0	Good condition 0	Presumed Asbestos	Very Low 2	C1; C2; C3; C4;	12/03/2020	Tony Milligan	Noted in Register	12/03/2015	
12/03/2015	PES	Glen Innes District Hospital	Main Hospital Building (Gl01)	3rd Floor	Emergency Backup Room 3002	electrical switchboard	Insulation Panel	Yes	SP	Presumed Asbestos	1m²	035	Non- Friable 1	Insulation Panel 1	Limited Access 1	Labelled 0	Good condition 0	Presumed Asbestos	Very Low 3	C1; C2; C3; C4; C8;	12/03/2020	Tony Milligan	Noted in Register	12/03/2015	



										Glen Inn	nes Distric	t Hospita	al - Main Hos	pital Building	(GI01)										
Survey	Details		Site Lo	ocation		Site Desc	cription			Sample Deta	ils				R	isk Assessn	nent Algorith	ım					Corrective	Alarm	
12/03/2015	PES	Glen Innes District Hospital	Main Hospital Building (Gl01)	4th Floor	Lift Motor Room 4002	ceiling lining and moulded cover strip	Flat Fibre Cement Sheet	Yes	SP	Presumed Asbestos	10m²	036	Non- Friable 1	Flat Fibre Cement Sheet 1	Limited Access 1	Labelled 0	Good condition 0	Presumed Asbestos	Very Low 3	C1; C2; C3; C4;	12/03/2020	Tony Milligan	Noted in Register	12/03/2015	
12/03/2015	PES	Glen Innes District Hospital	Main Hospital Building (Gl01)	4th Floor	Lift Motor Room 4002 - east wall	electrical switchboard	Insulation Panel	Yes	SP	Presumed Asbestos	1m²	037	Non- Friable 1	Insulation Panel 1	Limited Access 1	Labelled 0	Good condition 0	Presumed Asbestos	Very Low 3	C1; C2; C3; C4;	12/03/2020	Tony Milligan	Noted in Register	12/03/2015	
12/03/2015	PES	Glen Innes District Hospital	Main Hospital Building (Gl01)	4th Floor	Lift Motor Room 4002 throughout	Bakelite power points x 4	Moulded Fibre Cement	Yes	PS	Presumed Asbestos	1m²	038	Non- Friable 1	Moulded Fibre Cement 1	Limited Access 1	Labelled 0	Good condition 0	Presumed Asbestos	Very Low 3	C1; C2; C3; C4;	12/03/2020	Tony Milligan	Noted in Register	12/03/2015	
12/03/2015	PES	Glen Innes District Hospital	Main Hospital Building (Gl01)	4th Floor	Tank Room 4001	ceiling lining and cover strip	Flat Fibre Cement Sheet	Yes	SP	Presumed Asbestos	10m²	039	Non- Friable 1	Flat Fibre Cement Sheet 1	Limited Access 1	Labelled 0	Good condition 0	Presumed Asbestos	Very Low 3	C1; C2; C3; C4;	12/03/2020	Tony Milligan	Noted in Register	12/03/2015	
12/03/2015	PES	Glen Innes District Hospital	Main Hospital Building (Gl01)	4th Floor	Tank Room 4001	hot water tank	Thermal Insulation to pipework	Yes	SP	Presumed Asbestos	2m²	040	Friable 2	Thermal Insulation to pipework 3	Limited Access 1	Labelled 0	Medium Damage 2	Presumed Asbestos	Low 8	C1; C2; C3; C4;	12/03/2020	Tony Milligan	Noted in Register	12/03/2015	

										Gle	en Innes	District H	lospital - N	Mortuary (GI03	3)										
Survey	Details		Site Lo	cation		Site Des	cription		5	Sample Details	6				Ris	sk Assessm	ent Algorith	m					Corrective	Alarm	
12/03/2015	PES	Glen Innes District Hospital	n Innes strict spital (GI03) External eave soffit lining F				Fibre Reinforced Cement	Yes	SP	Presumed Asbestos	12m²	041	Non- Friable 1	Fibre Reinforced Cement 1	Moderate Access 2	Labelled 0	Good condition 0	Presumed Asbestos	Very Low 4	C1; C2; C3; C4;	12/03/2020	Tony Milligan	Noted in Register	12/03/2015	
12/03/2015	PES	Glen Innes District Hospital	Mortuary (Gl03)	External	entrance verandah	soffit lining	Flat Fibre Cement Sheet	Yes	SP	Presumed Asbestos	12m²	042	Non- Friable 1	Flat Fibre Cement Sheet 1	Full Access 3	Labelled 0	Good condition 0	Presumed Asbestos	Very Low 5	C1; C2; C3; C4;	12/03/2020	Tony Milligan	Noted in Register	12/03/2015	
12/03/2015	PES	Glen Innes District Hospital	Mortuary (Gl03)	External	throughout	pipework	Thermal Insulation to pipework	Yes	SP	Presumed Asbestos		043	Friable 2	Thermal Insulation to pipework 3	No Access 0	No Labelling 1	Medium Damage 2	Presumed Asbestos	Low 8	C1; C2; C3; C4;	12/03/2020	Tony Milligan	Noted in Register	12/03/2015	
12/03/2015	PES	Glen Innes District Hospital	Mortuary (Gl03)	Ground Floor	entrance Room 0001	ceiling lining	Flat Fibre Cement Sheet	Yes	SP	Presumed Asbestos	10m²	044	Non- Friable 1	Flat Fibre Cement Sheet 1	Full Access 3	Labelled 0	Good condition 0	Presumed Asbestos	Very Low 5	C1; C2; C3; C4;	12/03/2020	Tony Milligan	Noted in Register	12/03/2015	



										GI	en Innes	District	Hospital -	Mortuary (GI	03)											
Survey I	Details		Site Lo	cation		Site Des	cription			Sample Details	s					Risk Asses	sment Algor	ithm						Corrective	Alarm	
12/03/2015	PES	Glen Innes District Hospital	Mortuary (Gl03)	Ground Floor	Store Room 0003 northwest wall	electrical switchboard	Insulation Panel	Yes	SP	Presumed Asbestos	1m²	045	Non- Friable 1	Insulation Panel 1	Limited Access 1	Labelle 0	ed Good conditio 0	Presumed Asbestos	Very Low 3	C1; C2 C3; C4	h. 19	12/03/2020	Tony Milligan	Noted in Register	12/03/2015	
										Clar	- Inn - D	:-4:-4	a anital O	Id I. a dw . //												
Survey	Details		Site Lo	cation		Site Des	cription			Gier	n innes D	ISTRICT H	ospital - O	id Laundry (	2102) Ri	ek Assassm	ent Algorith							Corrective	Alarm	
Ourvey	Details		One LO			One Des	cription				<b>,</b>					5K A3363311										
12/03/2015	PES	Glen Innes District Hospital	Old Laundry (Gl02)	Ground Floor	Clean Linen Room 0002	all wall linings	Flat Fibre Cement Sheet	Yes	SP	Presumed Asbestos		046	Non- Friable 1	Flat Fibre Cement Sheet 1	Moderate Access 2	No Labelling 1	Good condition 0	Presumed Asbestos	Very Low 5	C1; C2; C3; C4;		12/03/2020	Tony Milligan	Noted in Register	12/03/2015	
12/03/2015	PES	Glen Innes District Hospital	Old Laundry (Gl02)	Ground Floor	Clean Linen Room 0004 medical records area	wall lining	Flat Fibre Cement Sheet	Yes	SP	Presumed Asbestos	20m²	047	Non- Friable 1	Flat Fibre Cement Sheet 1	Moderate Access 2	Labelled 0	Good condition 0	Presumed Asbestos	Very Low 4	C1; C2; C3; C4;		12/03/2020	Tony Milligan	Noted in Register	12/03/2015	
12/03/2015	PES	Glen Innes District Hospital	Old Laundry (Gl02)	Ground Floor	Community Health Storage Room 0007	northern wall lining and cover strips	Flat Fibre Cement Sheet	Yes	SP	Presumed Asbestos	20m²	048	Non- Friable 1	Flat Fibre Cement Sheet 1	Moderate Access 2	Labelled 0	Good condition 0	Presumed Asbestos	Very Low 4	C1; C2; C3; C4;		12/03/2020	Tony Milligan	Noted in Register	12/03/2015	
12/03/2015	PES	Glen Innes District Hospital	Old Laundry (Gl02)	Ground Floor	Corridor Room 0011 north wall	electrical switchboard and Bakelite switches	Insulation Panel	Yes	SP	Presumed Asbestos	1m²	049	Non- Friable 1	Insulation Panel 1	Limited Access 1	Labelled 0	Good condition 0	Presumed Asbestos	Very Low 3	C1; C2; C3; C4;		12/03/2020	Tony Milligan	Noted in Register	12/03/2015	
12/03/2015	PES	Glen Innes District Hospital	Old Laundry (Gl02)	Ground Floor	Male Change Room 0009	ceiling lining and cover strip	Flat Fibre Cement Sheet	Yes	SP	Presumed Asbestos	10m²	050	Non- Friable 1	Flat Fibre Cement Sheet 1	Moderate Access 2	Labelled 0	Good condition 0	Presumed Asbestos	Very Low 4	C1; C2; C3; C4;		12/03/2020	Tony Milligan	Noted in Register	12/03/2015	
12/03/2015	PES	Glen Innes District Hospital	Old Laundry (Gl02)	Ground Floor	Medical Gas Store Room 0010	ceiling lining and cover strip	Flat Fibre Cement Sheet	Yes	SP	Presumed Asbestos	12m²	051	Non- Friable 1	Flat Fibre Cement Sheet 1	Moderate Access 2	Labelled 0	Good condition 0	Presumed Asbestos	Very Low 4	C1; C2; C3; C4;		12/03/2020	Tony Milligan	Noted in Register	12/03/2015	
12/03/2015	PES	Glen Innes District Hospital	Old Laundry (Gl02)	Ground Floor	Recycle Room 0018	wall lining	Flat Fibre Cement Sheet	Yes	SP	Presumed Asbestos	10m²	052	Non- Friable 1	Flat Fibre Cement Sheet 1	Moderate Access 2	Labelled 0	High Damage 3	Presumed Asbestos	Low 7	C2; C3; C4; C12; C14; C15;		12/03/2020	Tony Milligan	Noted in Register	12/03/2015	
12/03/2015	PES	Glen Innes District Hospital	Old Laundry (Gl02)	Ground Floor	Tea Room 0012	ceiling lining and cover strip	Flat Fibre Cement Sheet	Yes	SP	Presumed Asbestos	12m²	053	Non- Friable 1	Flat Fibre Cement Sheet 1	Moderate Access 2	Labelled 0	Good condition 0	Presumed Asbestos	Very Low 4	C1; C2; C3; C4;		12/03/2020	Tony Milligan	Noted in Register	12/03/2015	



										Glen	Innes D	istrict Ho	ospital - O	ld Laundry (	GI02)									
Survey	Details		Site Loo	cation		Site Des	cription			Sample Details	i				Ri	sk Assessm	nent Algorith	ım					Corrective	Alarm
12/03/2015	PES	Glen Innes District Hospital	Old Laundry (Gl02)	Ground Floor	throughout	pipework	Suspected Asbestos	Yes	SP	Presumed Asbestos	10lin m	054	Friable 2	Suspected Asbestos 3	No Access 0	No Labelling 1	Medium Damage 2	Presumed Asbestos	Low 8	C1; C2; C3; C4;	12/03/2020	Tony Milligan	Noted in Register	12/03/2015
										Glen Innes	District I	Hospital	- Old Main	tenance Bui	Iding (GI04)									
Survey	Details		Site Loo	cation		Site Des	cription			Sample Details	;					Risk Asse	ssment Algo	orithm					Corrective	Alarm
12/03/2015	PES	Glen Innes District Hospital	Old Maintenance Building	External	Room 0009 above	infill panel	Flat Fibre Cement	Yes	SP	Presumed Asbestos	2m²	055	Non- Friable	Flat Fibro Cement	e Full Access	Labelled 0	Good condition	Presumed Asbestos	Very Low 5	C1; C2; C3; C4;	12/03/2020	Tony Milligan	Noted in Register	12/03/2015

										Glen Innes	District H	lospital	- Old Maint	enance Buildin	g (GI04)										
Survey D	Details		Site Loca	ation		Site Des	cription			Sample Details	5					Risk Asse	ssment Algo	rithm						Corrective	Alarm
12/03/2015	PES	PES Glen Innes District Hospital (GI04) Externa		External	Room 0009 above door	infill panel	Flat Fibre Cement Sheet	Yes	SP	Presumed Asbestos	2m²	055	Non- Friable 1	Flat Fibre Cement Sheet 1	Full Access 3	Labelled 0	Good condition 0	Presumed Asbestos	Very Low 5	C1; C2; C3; C4;	12/03/2	)20	Tony Milligan	Noted in Register	12/03/2015
12/03/2015	PES	Glen Innes District Hospital	Old Maintenance Building (Gl04)	External	Room 0009 eastern verandah roof	faux weatherboar d style cladding	Flat Fibre Cement Sheet	Yes	SP	Presumed Asbestos	10m²	056	Non- Friable 1	Flat Fibre Cement Sheet 1	Full Access 3	Labelled 0	Good condition 0	Presumed Asbestos	Very Low 5	C1; C2; C3; C4;	12/03/2	020	Tony Milligan	Noted in Register	12/03/2015
12/03/2015	PES	Glen Innes District Hospital	Old Maintenance Building (Gl04)	External	Rooms 0008 and 0009	wall cladding	Flat Fibre Cement Sheet	Yes	SP	Presumed Asbestos	20m²	057	Non- Friable 1	Flat Fibre Cement Sheet 1	Full Access 3	Labelled 0	Good condition 0	Presumed Asbestos	Very Low 5	C1; C2; C3; C4;	12/03/2	020	Tony Milligan	Noted in Register	12/03/2015
12/03/2015	PES	Glen Innes District Hospital	Old Maintenance Building (Gl04)	Ground Floor	ceiling space throughout	pipework insulation and debris	Thermal Insulation to pipework	Yes	SP	Presumed Asbestos	8m²	058	Friable 2	Thermal Insulation to pipework 3	Limited Access 1	Labelled 0	High Damage 3	Presumed Asbestos	Medium 9	C1; C2; C3; C4;	12/03/2	020	Tony Milligan	Noted in Register	12/03/2015
12/03/2015	PES	Glen Innes District Hospital	Old Maintenance Building (Gl04)	Ground Floor	Fireplace Room 0004	wall lining	Flat Fibre Cement Sheet	Yes	SP	Presumed Asbestos	2m²	059	Non- Friable 1	Flat Fibre Cement Sheet 1	Full Access 3	Labelled 0	Good condition 0	Presumed Asbestos	Very Low 5	C1; C2; C3; C4;	12/03/2	020	Tony Milligan	Noted in Register	12/03/2015
12/03/2015	PES	Glen Innes District Hospital	Old Maintenance Building (Gl04)	Ground Floor	Room 0008 southern corner of the walls	double wall lining	Flat Fibre Cement Sheet	Yes	SP	Presumed Asbestos	4m²	060	Non- Friable 1	Flat Fibre Cement Sheet 1	Full Access 3	Labelled 0	Medium Damage 2	Presumed Asbestos	Low 7	C1; C2; C3; C4;	12/03/2	020	Tony Milligan	Noted in Register	12/03/2015
12/03/2015	PES	Glen Innes District Hospital	Old Maintenance Building (Gl04)	Ground Floor	Room 0009 western wall	electrical switchboard	Insulation Panel	Yes	SP	Presumed Asbestos	1m²	061	Non- Friable 1	Insulation Panel 1	Full Access 3	Labelled 0	Good condition 0	Presumed Asbestos	Very Low 5	C1; C2; C3; C4;	12/03/2	020	Tony Milligan	Noted in Register	12/03/2015
12/03/2015	PES	Glen Innes District Hospital	Old Maintenance Building (Gl04)	Ground Floor	Room 0011	stored flat sheet and electrical switchboard	Insulation Panel	Yes	SP	Presumed Asbestos	2m²	062	Non- Friable 1	Insulation Panel 1	Moder ate Access 2	Labelled 0	Good condition 0	Presumed Asbestos	Very Low 4	C1; C2; C3; C4;	12/03/2	020	Tony Milligan	Noted in Register	12/03/2015



										Glen Innes I	District H	lospital ·	Old Maint	enance Building	g (GI04)									
Survey	Details		Site Loca	ation		Site Des	cription			Sample Details						Risk Asse	ssment Algo	rithm					Corrective	Alarm
12/03/2015	PES	Glen Innes District Hospital	Old Maintenance Building (Gl04)	Ground Floor	Room 0017	pipework insulation and debris	Thermal Insulation to pipework	Yes	SP	Presumed Asbestos	2lin m	063	Friable 2	Thermal Insulation to pipework 3	Limited Access 1	Labelled 0	High Damage 3	Presumed Asbestos	Medium 9	C1; C2; C3; C4; C12; C14; C15;	12/03/2020	Tony Milligan	Noted in Register	12/03/2015
12/03/2015	PES	Glen Innes District Hospital	Old Maintenance Building (Gl04)	Ground Floor	throughou t	Bakelite light switches	Moulded Fibre Cement	Yes	SP	Presumed Asbestos	1m²	064	Non- Friable 1	Moulded Fibre Cement 1	Full Access 3	Labelled 0	Good condition 0	Presumed Asbestos	Very Low 5	C1; C2; C3; C4;	12/03/2020	Tony Milligan	Noted in Register	12/03/2015
12/03/2015	PES	Glen Innes District Hospital	Old Maintenance Building (Gl04)	Ground Floor	throughou t	pipework	Thermal Insulation to pipework	Yes	SP	Presumed Asbestos		065	Friable 2	Thermal Insulation to pipework 3	No Access 0	No Labellin g 1	Medium Damage 2	Presumed Asbestos	Low 8	C1; C2; C3; C4;	12/03/2020	Tony Milligan	Noted in Register	12/03/2015

										Glen I	nnes Dis	trict Ho	spital - Gar	deners Shed	I GI06											
Survey	Details		Site Lo	cation		Site De	scription		5	Sample Details	5				R	isk Assessn	nent Algorith	ım						Corrective	Alarm	
Survey Date	Assessed by Company / Consultant	Workplace Name	Building	Floor	Room	Location	Application	Assumed Asbestos	Sample ID	Sample results	Quantity (sqm)	Photo Number	A. Asbestos classification	B. Product Type	C. Accessibility	D. Labelled	E. Condition	Asbestos Type (non mandatory)	Risk Rating	Control Measures	Comments / Details	Reinspection Date	Consultant/ Hygienist Name	Control Action Taken	Date actioned	Contractor details
12/03/2015	PES	Glen Innes District Hospital	Gardeners Shed GI06	External	western wall	pipework	Thermal Insulation to pipework	Yes	SP	Presumed Asbestos	10lin m	066	Friable 2	Thermal Insulation to pipework 3	Limited Access 1	Labelled 0	Medium Damage 2	Presumed Asbestos	Low 8	C1; C2; C3; C4;		20/05/2025	Tony Milligan	Noted in Register	12/03/2015	

										Glen Ir	nnes Distric	t Hospital	- Old	Nurses H	lome GI08										
Survey	Details		Site Lo	cation		Site Descr	ription		Sa	Sample Deta	ails					Ris	sk Assessm	ent Algorith	m				Cor	rective Alar	m
12/03/2015	PES	Glen Innes District Hospital	Old Nurses Home GI08	External	roof	cladding	Corrugated 'Super Six' Cladding	Yes	SP Pr A	Presumed Asbestos	100m²	067		Non- Friable 1	Corrugated 'Super Six' Cladding 1	Limited Access 1	Labelled 0	Medium Damage 2	Presumed Asbestos	Very Low 5	C1; C2; C3; C4;	20/05/2025	Tony Milligan	Noted in Register	12/03/ 2015
12/03/2015	PES	Glen Innes District Hospital	Old Nurses Home GI08	Basement	basement corridors and crawl spaces	pipework and debris	Thermal Insulation to pipework	Yes	SP Pr A	Presumed Asbestos	100lin m	068		Friable 2	Thermal Insulation to pipework 3	Limited Access 1	Labelled 0	Medium Damage 2	Presumed Asbestos	Low 8	C1; C2; C3; C4; C12;	20/05/2025	Tony Milligan	Noted in Register	12/03/ 2015
12/03/2015	PES	Glen Innes District Hospital	Old Nurses Home GI08	Basement	basement entry	pipework and debris	Thermal Insulation to pipework	Yes	SP Pr A	Presumed Asbestos	20lin m	069		Friable 2	Thermal Insulation to pipework 3	Limited Access 1	Labelled 0	Medium Damage 2	Presumed Asbestos	Low 8	C1; C2; C3; C4; C12;	20/05/2025	Tony Milligan	Noted in Register	12/03/ 2015



	Glen Innes District Hospital - Old Nurses Home Gl08																										
Survey [	Details		Site Lo	cation		Site Descr	iption	Sample Details						Risk Assessment Algorithm									Corrective Alarm				
12/03/2015	PES	Glen Innes District Hospital	Old Nurses Home GI08	Basement	boiler vessel to basement entry	encapsulated insulation	Thermal Insulation to pipework	Yes	SP	Presumed Asbestos	1m²	070		Friable 2	Thermal Insulation to pipework 3	No Access 0	Labelled 0	Low Damage 1	Presumed Asbestos	Very Low 6	C1; C2; C3; C4;		20/05/2025	Tony Milligan	Noted in Register	12/03/ 2015	
12/03/2015	PES	Glen Innes District Hospital	Old Nurses Home GI08	Ground Floor	female toilet	partitions	Fibre Reinforced Cement	Yes	SP	Presumed Asbestos	3m²	071		Non- Friable 1	Fibre Reinforced Cement 1	Moderate Access 2	Labelled 0	Good condition 0	Presumed Asbestos	Very Low 4	C1; C2; C3; C4;		20/05/2025	Tony Milligan	Noted in Register	12/03/ 2015	
12/03/2015	PES	Glen Innes District Hospital	Old Nurses Home GI08	Ground Floor	risers throughout	pipework	Thermal Insulation to pipework	Yes	SP	Presumed Asbestos	80lin m	072		Friable 2	Thermal Insulation to pipework 3	No Access 0	Labelled 0	Medium Damage 2	Presumed Asbestos	Low 7	C1; C2; C3; C4;		20/05/2025	Tony Milligan	Noted in Register	12/03/ 2015	
12/03/2015	PES	Glen Innes District Hospital	Old Nurses Home GI08	Ground Floor	throughout	pipework	Thermal Insulation to pipework	Yes	SP	Presumed Asbestos	20lin m	073		Friable 2	Thermal Insulation to pipework 3	No Access 0	No Labellin g 1	Medium Damage 2	Presumed Asbestos	Low 8	C1; C2; C3; C4;		20/05/2025	Tony Milligan	Noted in Register	12/03/ 2015	
12/03/2015	PES	Glen Innes District Hospital	Old Nurses Home GI08	Ground Floor	throughout	Bakelite light switches	Moulded Fibre Cement	Yes	SP	Presumed Asbestos	1m²	074		Non- Friable 1	Moulded Fibre Cement 1	Moderate Access 2	Labelled 0	Low Damage 1	Presumed Asbestos	Very Low 5	C1; C2; C3; C4;		20/05/2025	Tony Milligan	Noted in Register	12/03/ 2015	
12/03/2015	PES	Glen Innes District Hospital	Old Nurses Home GI08	1st Floor	service risers throughout	pipework	Thermal Insulation to pipework	Yes	SP	Presumed Asbestos	100lin m	075		Friable 2	Thermal Insulation to pipework 3	No Access 0	Labelled 0	Medium Damage 2	Presumed Asbestos	Low 7	C1; C2; C3; C4; C12;		20/05/2025	Tony Milligan	Noted in Register	12/03/ 2015	
12/03/2015	PES	Glen Innes District Hospital	Old Nurses Home GI08	1st Floor	throughout	Bakelite light switches	Moulded Fibre Cement	Yes	SP	Presumed Asbestos	1m²	076		Non- Friable 1	Moulded Fibre Cement 1	Moderate Access 2	Labelled 0	Low Damage 1	Presumed Asbestos	Very Low 5	C1; C2; C3; C4;		20/05/2025	Tony Milligan	Noted in Register	12/03/ 2015	
12/03/2015	PES	Glen Innes District Hospital	Old Nurses Home GI08	2nd Floor	ceiling void	pipework and debris	Thermal Insulation to pipework	Yes	SP	Presumed Asbestos	20m²	077		Friable 2	Thermal Insulation to pipework 3	Limited Access 1	Labelled 0	High Damage 3	Presumed Asbestos	Mediu m 9	C1; C2; C3; C4; C10; C12;		20/05/2025	Tony Milligan	Noted in Register	12/03/ 2015	
12/03/2015	PES	Glen Innes District Hospital	Old Nurses Home GI08	2nd Floor	risers throughout	pipework	Thermal Insulation to pipework	Yes	SP	Presumed Asbestos	10lin m	078		Friable 2	Thermal Insulation to pipework 3	No Access 0	Labelled 0	Medium Damage 2	Presumed Asbestos	Low 7	C1; C2; C3; C4; C12;		20/05/2025	Tony Milligan	Noted in Register	12/03/ 2015	



	Glen Innes District Hospital - Old Nurses Home Gl08																								
Survey Details		Site Location			Site Description			Sample Details				Risk Assessment Algorithm								Corrective Alarm					
12/03/2015	PES	Glen Innes District Hospital	Old Nurses Home GI08	2nd Floor	throughout	Bakelite light switches	Moulded Fibre Cement	Yes	SP Presumed Asbestos	1m²	079		Non- Friable 1	Moulded Fibre Cement 1	Moderate Access 2	Labelled 0	Good condition 0	Presumed Asbestos	Very Low 4	C1; C2; C3; C4;	20/05/2025	Tony Milligan	Noted in Register	12/03/ 2015	



# APPENDIX C Risk Assessment



## 1. Asbestos / ACM Risk Assessment Algorithm

	Sample Variable	Score	Example of Score						
۸	Ashestos Classification	1	Non-Friable (bonded)						
7		2	Friable						
		1	Asbestos-reinforced composites (plastics, resins, roofing felts, vinyl floor tiles, semi-rigid paints or decorative finishes, asbestos cement etc.) Asbestos contained within ground soil						
В	Product Type	2	Asbestos Insulation Board (AIB), millboards, other low-density insulation boards (LDB), asbestos textiles, gaskets, ropes and woven textile, asbestos paper and felt						
		3	Thermal insulation (e.g. pipe and boiler lagging), sprayed asbestos, loose asbestos, asbestos mattresses and packaging.						
		0	No Access (e.g. under floor boards)						
C	Accessibility	1	Limited access, typically accessible by maintenance staff only, no public access						
U		2	Moderate access, accessible by maintenance and general staff only, no public access						
		3	Access for both staff and public at all times						
		0	Adequate labelling/signage.						
	Labelleu	1	Inadequate or no labelling/signage.						
		0	Good condition: no visible damage						
		1	Low damage: a few scratches or surface masks, broken edges on boards, tiles etc.						
E	Condition	2	Medium damage: significant breakage of materials or several small areas where material has been damaged revealing loose asbestos fibres.						
		3	High damage or delamination of materials, sprays and thermal insulation. Visible asbestos debris.						
	TOTAL SCORE								



Score	Risk Rating	Timeframe to implement controls
12	High	Immediate 0 – 3 months
9-11	Medium	0 to 6 months
7-8	Low	0 to 2 years
6 or less	Very Low	0 to 5 years

### 2. Risk Rating Based Upon Algorithm

## 3. Reinspection Date

Score	Risk Rating	Timeframe
12	High	
9-11	Medium	Minimum 5 years
7-8	Low	Winning years
6 or less	Very Low	



### 4. Example of Control Measures

Control Number	Action
C1	Manage in-situ.
C2	Incorporate into a current / develop an Asbestos Management Plan
C3	Label as asbestos containing in accordance with AS 1319-1994 Safety signs for the occupational environment.
C4	Re-inspect conditions every 5 years or sooner if deemed necessary in accordance with the WHS Regulations 2017 & code of Practice 'How to Manage and Control Asbestos in the Workplace [SWA (2011)].
C5	Consider further sampling/analysis to establish whether asbestos is present within the material.
C6	Consider further sampling/analysis to establish whether asbestos is present within the associated dust
C7	Consider further sampling/analysis to establish whether asbestos is present within the sub- soil.
C8	Seal damaged edges with an appropriate sealant such as Emerclad paint.
C9	Encapsulate / enclose in accordance with the WHS Regulations 2017 and Code of Practice 'How to safely remove asbestos'
C10	Seal-off area and erect appropriate warning signage in accordance with AS 1319-1994 Safety Signs for the Occupational Environment
C11	Undertake a suitable and sufficient risk assessment prior to access, which may include the use of appropriate PPE and RPE.
C12	Restrict access to maintenance/service personnel.
C13	Restrict access to all personnel.
C14	Remove in accordance with the WHS Regulations 2017 and Code of Practice 'How to Safely Remove Asbestos'.
C15	Remove in accordance with the WHS Regulations 2017 and Code of Practice 'How to Safely Remove Asbestos' prior to any works in the area that may disturb the material.
C16	Undertake a dust sampling regime within the area in accordance with the WHS 2011 Code of Practice 'How to Manage and control asbestos in the Workplace'.
C17	Undertake airborne fibre monitoring within the area in accordance with the WHS Regulations 2017, code of Practice how to manage and control asbestos in the workplace and how to safely remove asbestos.
C18	A detailed roof inspection by a competent person, is inspected to investigate the potential for contamination in areas such as gutter, drains/pipes and air conditioning systems. Subsequent to this detailed inspection, recommendations can be made about the condition of the roof and an appropriate course of action detailed.

Note: Asbestos Survey Consultant to determine Control Measures based on Professional Judgement.



APPENDIX E Photographs of Materials <u>NOT</u> Containing Asbestos



### Main Hospital Building

Photo No. 080: Main Hospital Building - Roof

The Corrugated 'Super Six' Cladding roof to the Main Hospital Building was REMOVED in 2010

Photo No. 081: 2nd Floor ceiling void throughout

No Image Provided

The asbestos to the ceiling void was REMOVED by the area asbestos removal team in 2007. Supervisor was M Freund.

Photo No. 082: 2nd Floor Female toilet Room 2070

No Image Provided

The Fibre Reinforced Cement partitions to the Female toilet Room 2070 were REMOVED in 2011 by trade staff

Photo No. 083: 2nd Floor Male toilet Room 2069

No Image Provided

The Fibre Reinforced Cement partitions to the Male toilet Room 2069 were REMOVED in 2011 by trade staff

Photo No. 084: 4th Floor Lift Motor Room 4002



The woven wire sheathing to Lift Motors 1 and 2 to the Lift Motor Room 4002 was previously tested and was **REMOVED** 



Photo No. 073: 4th Floor Lift Motor Room 4002

No Image Provided

The primary electrical backing board to Lift Motor 1 to the Lift Motor Room 4002 was REMOVED

Photo No. 074: 4th Floor Lift Motor Room 4002

No Image Provided

The secondary electrical backing board to Lift Motor 1 to the Lift Motor Room 4002 was REMOVED

Photo No. 072: 4th Floor Lift Motor Room 4002

No Image Provided

The Friction Material brake linings to Lift Motors 1 and 2 to the Lift Motor Room 4002 were previously tested and proved NOT to be an asbestos containing material

### Old Laundry

Photo No. 076: Clean Linen Room 0002

No Image Provided

The Flat Fibre Cement Sheet ceiling lining and moulded cover strip to Clean Linen Room 0002 were **REMOVED** 



# APPENDIX F Site Identification







# MAIN HOSPITAL BUILDING (GI01)

Constructed around 1940s, a three-storey commercial type building with north-facing front elevation.



### OLD LAUNDRY (GI02)

Located on the southern side of the main building. A semidetached, connected via breeze way, single-storey building of solid brick walls and concrete floors, timber frame and colour bond roof.



### MORTUARY (GI03)

Single-storey construction of solid brick, concrete floors, timber frame and tile roof. Stands separate to the main building on the south eastern side of the old laundry.





# OLD MAINTENANCE BUILDING (GI04)

Constructed in the early 1920s, a single-storey building of solid brick construction painted metal roof, on the eastern side of the Old Nurses Home.



### STORAGE SHED (GI05)

South East of the Morgue is this single-storey timber frame and weatherboard wall cladding with a corrugated metal painted roof.



### **GARDENERS SHED (GI06)**

No longer belongs to HNELHD, Lands Department are the new owners.





Stores Building and Work Shops (GI07)

Constructed of metal frame and trim deck wall sheeting with metal roof and concrete floors. Located in the rear car park area to the Western side of the property



Old Nurses Home (GI08)

Building was built in the early 1950s, a three-storey construction built of solid brickwork and concrete floors, timber-framed roof with asbestos corrugated roof sheeting.



Staff Accommodation (GI10)

Single storey construction slab on ground brick veneer building, timber truss roof and Colorbond roof sheeting. This building was built post December 2003. No register is required.





Shade Shelter (GI11)

This structure was built post December 2003 No register is required.



**Blood Collection Centre (GI97)** 

A single-storey construction slab on ground, brick commercial building, this building has had a major upgrade in 2011. There was NO ACM sighted during inspection.





APPENDIX F Relevant Governing Legislation



# ANNEXURE A - REGULATION GOVERNING IDENTIFICATION AND MANAGEMENT OF ASBESTOS IN THE WORKPLACE

The NSW Workplace Health and Safety (WHS) Regulation (2017) commenced on January 1, 2012. The following extracts from Chapter 8 Part 8.3 of that instrument outline the requirement for an asbestos register and the content demanded.

Section 422 of the Regulation calls for 'asbestos to be identified or assumed at workplace'.

A person with management or control of a workplace must ensure, so far as is reasonably practicable:

- 1. That all asbestos or ACM at the workplace is identified by a competent person;
- 2. If material at the workplace cannot be identified but a competent person reasonably believes that the material is asbestos or ACM—assume that the material is asbestos, and
- 3. If part of the workplace is inaccessible to workers and likely to contain asbestos or ACM— assume that asbestos is present in the part of the workplace.

**Section 424** of the Regulation demands that a person with management or control of a workplace must ensure that:

- 1. The presence and location of asbestos or ACM identified at the workplace under clause 422 is clearly indicated, and
- 2. If it is reasonably practicable to do so, indicate the presence and location of the asbestos or ACM by a label.

**Section 425** of the Regulation states that a person with management or control of a workplace must ensure that a register (an asbestos register) is prepared and kept at the workplace.

The person must ensure that the asbestos register is maintained to ensure the information in the register is up to date.

The asbestos register must:

- 1. record any asbestos or ACM identified at the workplace under clause 422, or likely to be present at the workplace from time to time including:
- 2. the date on which the asbestos or ACM was identified, and
- 3. the location, type and condition of the asbestos or ACM, or
- 4. state that no asbestos or ACM is identified at the workplace if the person knows that no asbestos or


5. ACM is identified, or is likely to be present from time to time, at the workplace.

The person is not required to prepare an asbestos register for a workplace if a register has already been prepared for that workplace.

Subject to subclause (6), this clause applies to buildings whenever constructed.

This clause **DOES NOT** apply to a workplace if the workplace is a building that **was constructed after 31 December 2003** 

**Section 426** 'Review of Asbestos Register' states that a person with management or control of a workplace where an asbestos register is kept must ensure that the register is reviewed and as necessary revised if:

- (a) The asbestos management plan is reviewed under clause 430, or
- (b) Further asbestos or ACM is identified at the workplace, or
- (c) Asbestos is removed from, or disturbed, sealed or enclosed at, the workplace

**Section 430** determines frequency of register review as the register forms part of the asbestos management plan for a site. It states that a person with management or control of a workplace that has an asbestos management plan must ensure that the plan is reviewed and as necessary revised in the following circumstances:

- 1. There is a review of the asbestos register or a control measure,
- 2. Asbestos is removed from, or disturbed, sealed or enclosed at, the workplace,
- 3. The plan is no longer adequate for managing asbestos or ACM at the workplace,
- 4. A health and safety representative requests a review under subclause (2),
- 5. At least once every 5 years.



# ANNEXURE B - CODE OF PRACTICE\_HOW TO MANAGE AND CONTROL ASBESTOS IN THE WORKPLACE (WorkCover, December 2011)

Section 1.2 \_ Who has duties to Manage & Control Asbestos or ACM states:

- Person conducting a business or undertaking (PCBU) with management or control of a workplace Identifying or assuming asbestos or ACM must ensure, so far as is reasonably practicable, that all asbestos or ACM at the workplace is identified by a competent person or assume its presence may identify asbestos or ACM by arranging a sample of the material to be analysed. Indicating presence and location must ensure the presence and location of asbestos or ACM identified (or assumed to be identified) at the workplace is clearly indicated (by a label if reasonably practicable).
- 2. PCBU must ensure an asbestos register is prepared, maintained, reviewed and kept at the workplace. It must be readily available to workers, their health and safety representatives and other persons must ensure, when management or control of the workplace is relinquished, a copy of the asbestos register is given to the person assuming management or control. Asbestos management plan must, where asbestos has been identified at the workplace, ensure an asbestos management plan is prepared, maintained and reviewed. It must be accessible to workers, their health and safety representatives and other persons.

#### ARBORICUTURAL ASSESSMENT - PRELIMINARY FOR 2022 DEVELOPMENT AT; GLEN INNES HOSPITAL NSW 2370

#### 1. INTRODUCTION.

Health Infrastructure NSW are planning a redevelopment at the Glen Innes Hospital. This will involve demolition of existing buildings and construction of new facilities within the site. A preliminary assessment and evaluation of the existing tree population has been requested as part of the planning for the development.

#### 2. SCOPE AND PURPOSE.

The report has been commissioned by Stuart Landrigan –Senior Project Manager with Public Works Advisory– on behalf of Health Infrastructure NSW. He can be contacted on 0428 211 200. Lauren Stock of NSW Health Infrastructure is the Project Director – she can be contacted on 0467 829 058.

The report is designed to provide;

- accurate identification of tree vegetation,
- tree condition, including any significant hazards present
- evaluation of the trees relative to their contribution to the environment, amenity, cultural and any other identified values
- preliminary evaluation of development impacts on the tree population if known
- to identify trees with high retention values and maximise existing canopy coverage
- recommendations for retention or removal of trees and management of any issues identified at this stage of planning.

The following Drawings were supplied to aid in the evaluation process.

#### Master plan overview – Option 1 and Option 2. CR2 Consulting – undated extract.

#### DETAIL SURVEY OF LOT 2 DP 1208729 GLEN INNES HOSPITAL SITE No. 85 TAYLOR STREET, GLEN INNES. Reference 22/0056 dated 30/05/2022 (Draft – issue for Arborist). Monteath and Powys.

This drawing has been reproduced at the conclusion of this report and marked up to provide allocated tree numbers to the surveyed trees which can be added to the surveyed plan.

<u>Annexure 1 – Tree Data File</u> provides a detailed list and evaluation criteria of the trees surrounding the development - which can be found at the conclusion of the report. This Annexure is also available in Microsoft Excel format on request.

Interpretation of impacts and recommendations are based on the author's interpretation of *Australian Standard 4970-2009 Protection of trees on development sites*.

### 3. Site Conditions and Background.

The site is bounded by Taylor Street to the north, Ferguson Street to the south, West Avenue to the east and Macquarie Street to the west. The site area is approximately 31,500 square meters (NSW Spatial Map Viewer 2022.)

The current Hospital site consists of a range of buildings, car parks of varying ages and open space areas. As such there are also trees scattered across the site of various ages and conditions. All trees and shrubs on site are considered amenity plantings – there are no remnant trees identified within the survey area – although some trees in the north east corner were not surveyed. The tree survey area was confined to areas relative to options 1 and two of the master plan.

The site has a significant collection of large and aged exotic tree species including *Quercus robur* (Red Oak), *Acer* species, *Liquidambar* species and conifers – primarily *Cedrus deodara* (Himalayan cedar). Some of these trees are of considerable age and have some rudimentary heritage values. Some 58 trees and shrubs have been identified across the site.



**Diagram 1 - Site Location and lot boundary**. Source – Adapted from supplied plans.

It is understood that Option 2 is the preferred option at this point. This option proposes to demolish existing building GI 08 and part of GI 07. Construct a new building in place of GI 08 with links to GI 01 and new car parking areas on the south boundary.



Diagram 2 – Primary development are in green – demolition of existing building and construction of new. Source – Adapted from Master Plan supplied.

- 4. Summary of Tree Assessment and Evaluation.
- Tree numbers have been allocated commencing at the corner of Macquarie and Taylor, then across the north boundary, east boundary, south then west sides.
- 58 Trees and shrubs have been identified and recorded. A number of the trees and shrubs are small (less than 8 meters in height), some trees are dead or in very poor condition and are of little significance.
- Alternatively 10 large aged trees are graded as significant with long life expectancy
- Each tree is individually graded for its retention values within the development area based upon a range of criteria as detailed within *Annexure 1 – Tree Data file* contained at the conclusion of the report. The following Table A is a summary of individual tree retention values.

	Table A – Summary of Tree Evaluation	
Evaluation Category	Descriptors	Tree No's
Retain Priority	<ul> <li>Tree Significance, High or Very High.</li> <li>Strong positive amenity and/or other values – normally long life expectancy.</li> <li>Replacement very long term 50 - 100 years or more</li> <li>Removal would be very difficult to justify</li> </ul>	11 Trees in total Tree numbers 3,7,8,9,11,12,39 41,43,44 & 50
Retain	<ul> <li>Tree significance moderate or high</li> <li>Positive Amenity values and/or other values with longer life expectancy</li> <li>Replacement long term 30 - 80 years.</li> <li>Removal would be difficult to justify.</li> </ul>	4 Trees in Total Tree Numbers 4,5,,16 and 37
Retain if Possible	<ul> <li>Tree with some positive landscape, amenity or other values         <ul> <li>In fair to good condition with some useful remaining life.</li> </ul> </li> <li>OR a younger semi mature tree in Excellent or good condition with long life expectancy or expected contribution.</li> <li>However if the impost on the development of retention is very high or the development impact on the tree is high then removal or replacement can be considered a valid decision.</li> <li>On balance of considerations the tree is worth retaining.</li> </ul>	12 Trees in total Tree Numbers 1,2,6,10,40,42, 45,48,51,54,55,57
Remove	<ul> <li>The tree is normally in poor condition with short useful life expectancy, or</li> <li>Structurally unsound to a point not worth effort of ameliorating. OR</li> <li>A small tree where the impost of retention is not justified. It would easily be replaced in 0-7 years.</li> <li>At this point a new tree is normally considered a better long term option.</li> </ul>	21 Trees in total. Tree numbers 14,15,17,18,19, 21 to 28 inclusive 30,34,46,47,49,56 & 58



	Table A – Summary of Tree Evaluation	
Evaluation Category	Descriptors	Tree No's
Remove Priority	<ul> <li>An insignificant tree (shrub) - very small or</li> <li>the tree is in very poor condition or a weed species or</li> <li>structurally very poor or short useful life expectancy</li> <li>a replacement tree/s is a far better option</li> </ul>	9 Tree in total Tree numbers – 13,29,31,33,35,36,38, 52 & 53

• The marked up detailed site survey provides the location of each tree and a tree number has been added. These tree numbers can be added to the site survey plan along with the calculated Tree Protection Zone (TPZ) which is also contained in Annexure 1 – Tree Data File below.

## The Tree protection zone is expressed as radius meters form stem centre.

### • Significant Trees.

- o <u>11 Significant Trees are identified in the survey.</u>
- Tree numbers 3,7,8,9,11,12,39,41,43,44 and 50.
  - Trees 3, 7,8,9,11,12 are contained at the front of the hospital off Taylor Street and present as being unaffected by the proposed development.
  - Trees 39, 41, 43, 44 and 50 are contained on the permitter of Ferguson and Macquarie Streets and border the proposed development.
- In this preliminary report there are no significant trees that present as in direct conflict with the development master plan.
- <u>Site Canopy coverage</u>. The area of the site is approximated at 31500 square meters. The theoretical canopy coverage from the survey indicated current canopy coverage of 4900 square meters. This equates to about 16% site canopy coverage that is considered quite a modest percentage. Opportunity exists to improve this percentage.



- 5. Discussion and Identified Development impacts on existing trees.
- <u>The footprint of the preferred Masterplan</u> as supplied impacts primarily small trees and shrubs with little significance.
- <u>Trees 39, 41, 43, 44, and 50 Are significant trees</u> on the property border of Ferguson and Macquarie Streets that are likely to have some impacts from the demolition and development processes. Appropriate development processes and protection measures will need to be developed to retain these trees and their ongoing viability. Retention of these trees should be considered as a priority unless there is a compelling reason to remove any; noting that replacement of such trees is in the order of 50 or more years.



Diagram 3 – Significant trees which may be impacted by demolition and construction processes. Tree s in dark green, trees 39, 41, 43, 44 and 50. Development area within red area. Source – adapted from Google Earth 2022.

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**Photo 1 – Tree 39** - Cedrus deodara, (Himalayan cedar) – entrance off Ferguson street. Significant tree will require planning consideration in the demolition of GI 08 and construction of new building.



**Photo 2 – Tree 41**- Cedrus deodara, (Himalayan cedar) – property boundary of Ferguson street. Significant tree will require planning consideration in the demolition of GI 08 and construction of new building.



**Photo 3 – Tree 44**- Cupressus macrocarpa (Monterey cypress) – property boundary of Ferguson Street. Significant tree will require planning consideration in the demolition of GI 08 and construction of new building.



**Photo 4 – Tree 50**- Cedrus deodara, (Himalayan cedar) – property boundary of Macquarie street. Significant tree will require planning consideration in the demolition of GI 08 and construction of new building.



**Photo 5. Tree numbers 46 and 47** – examples of trees that are graded with low significance and will have to be removed to allow demolition as the stems are at the edge of the existing building footing. The trees are also in direct conflict with the proposed new building.

## 6. Findings and General Recommendations.

## A. Tree Retention or Removal Decisions.

Existing site trees that are of some age, have good structure and longer life expectancy should be considered for retention and protection unless there is a compelling reason to remove them. New trees cannot replace such trees within short space of time. The loss of tree benefits and public amenity is immediate and replacement time frames are in the order of decades for larger trees.

Alternatively trees in poor condition and/or with short useful life expectancy are normally recommended for removal on the basis that the effort and cost of retention through the development is not commensurate with short term amenity value, or risk a tree may pose if it fails. Removal of the tree and establishing a new tree with a long life expectancy is a better option. Additionally the tree in poor condition often has little ability to cope with significant changes in its root zone from the development impact.

Where trees have major impacts to the tree protection zone then removal is likely the best alternative unless the tree is significant and specific measures and resources can be developed to assist the tree through the development.

It should be noted that the calculated tree protection zone (TPZ) is for the most part the minimum space required for the tree to maintain viability and stability, and the actual tree root zone will in most instances extend well past the calculated TPZ; meaning that if the development encroaches up to the TPZ a large amount of roots and root space is still lost for the tree.

- B. <u>Demolition and construction site access and egress plans should</u> evaluate impacts on trees particularly trees with high or moderate significance.
- C. <u>Tree Removal. The loss of the existing tree benefits</u> should be planned to be offset and improved. It is recommended that the landscape plan should maximise the increase of canopy coverage well in excess of the trees that will be removed; based on the low percentage of canopy coverage that currently exists within the Preferred Masterplan footprint. Tree canopies can easily be expected to reduce ground surface temperatures in the order of 20 degrees Celsius in summer periods which in turn results in effective mitigation of radiant heat. (Kaluarachichi et al 2020).
- D. <u>A full Arboricultural Impact Assessment</u> (AIA) will be required for development application when the final plan is determined.
  - a. <u>Draft Tree Protection Measures</u> should be included in the AIA.
  - b. <u>Tree Protection Plan</u> should be developed once consent conditions are determined and the Tree Protection plan should form part of the demolition/construction project plans.

#### Reference.

Kaluarachichi T.U.N., Tjoelker M.G. and Pfautsch S. (2020). *Temperature Reduction in Urban Surface Materials through Tree Shading Depends on Surface Type Not Tree Species*. Forests 2020, 11, 1141.

#### Terms, Conditions and Limitations that apply.

Obviously, visual tree assessment from the ground has some limitation as every single portion of the tree cannot be observed or inspected. Most or the large majority of tree conditions, factors or issues can be observed from the ground. Where aerial inspection or other investigative means should be considered the report or email will recommend or provide those as an additional considerations. The integrity of the root zone of trees can often be difficult to determine from visual inspection – particularly on steep slopes and on shallow soil profiles. Unless there are indicators of some instability then most trees are effectively accessed as stable as part of Visual Tree Assessment.

Trees are a valuable asset and necessary part of both the urban and natural environment. They are the cornerstone of our environment and provide numerous benefits to our social wellbeing, biodiversity and ecology of any area. They provide water balance stability, salinity and erosion control, amenity, cultural, public health and aesthetic benefits; efforts should be made to preserve and plant new trees where possible. As an asset they require appropriate management and resource inputs.

It should be noted that trees cannot be guaranteed 'risk free'. All trees represent some degree of risk. Arboriculture is not an exacting science; rather it is an educated interpretation of the interaction of biotic and environmental circumstances, which change over time. It is not possible to determine or predict all limb or tree failures. This report is such an interpretation at the time of inspection.

Unless Quantified Tree Risk Assessment (QTRA) has been specifically applied and reported, then this report or email does not constitute a risk assessment. The Author does not seek to determine what level of risk any individual or organisation is prepared to accept but serves to provide tree managers with tree condition, hazards and other salient issues or factors associated with the tree or trees; and provide or recommend management options.

27 June 2022 Wade Ryan Contracting – Independent Arboriculture Consultant AQF Level 5. BAppSc(EnvHort) – AdvDip OH&S Institute of Australian Consulting Arboriculturists (IACA) Accredited Member (ACM 0622018) QTRA – Registered Advanced User (4519). Member - International Society of Arboriculture Associate Member – The Arboriculture Association (UK)



Deve	eloped Wade Ryan Contracting 0408 300 989 agaatreeconsultancy.com.au										A	nnexur	e 1 - Tree Da	ate File - P	Proposed Development at Glen Inne	s Hospital -	2022							
1	waderyan1@bigpond.com																							
Tree No	9 Species	Lat Lon	General Location	Species Origin	General Size	Age Class	Stem base Ø (m)	DBH Heig (m) M	ht Canop Ø	y Tree Vigour	Tree Structure	Canopy Area (M <sup>2</sup> )	SRZ Radius in m from centre of stem	TPZ Radius in m from stem	Factors, Observed Conditions or Issues Commentary on tree	Environmental Rating/Value	Estimated remaining useful life	Replacement Time Frame	Significant Tree Value	Retention Value	Recommended Action for planning of development	Primary Reason for Recommendation	DA proposal if known	Other Comments
1	Lagerstroemia spp . (Crape myrtle)	29.73272628 151.7311039	Macquarie	Exotic	Small	Mature	0.5	0.29 5	6	Good	Fair	28.2857	2.47	3.48		Very Low	15 plus	10-20	Low or nil	Good	Retain if possible	Sound tree suited to site	Retain Impacts	
2	Fraxinus excelsior 'Aurea'	-29.732946 151.7310589	Macquarie	Exotic	Small	Mature	0.64	0.56 7	11	Excellent	Excellent	95.0714	2.74	6.72		Very Low	15 plus	10-20	Low or nil	Good	Retain if possible	Sound tree suited to site	Retain Impacts	
3	Quercus palustris, (Pin oak)	29.73274223 151.7314226	Taylor driveway west	t Exotic	Large	Mature	0.95	0.83 17	1	Excellent	Good	0.78571	3.24	9.96	Minor bark inclusion in main stem - failure potential moderate - tree may well date	Low	40 plus	50+	High	Excellent	Retain Priority	Significant Tree	Retain Impacts	
4	Acer negundo (Box Elder maple)	29.73286981 151.7313879	Taylor driveway west	t Exotic	Medium	Mature	1.25	1.03 10	16	Good	Good	201.143	3.63	12.36	Minor bark inclusion in main stem - failure potential moderate	Low	15 plus	20+	Moderate	Good	Retain	Sound tree suited to site	Retain Impacts	
5	Liquidambar styraciflua	29.73301688 151.7312265	Taylor driveway west	t Exotic	Medium	Mature	1.36	0.96 15	16	Excellent	Excellent	201.143	3.77	11.52		Low	40 plus	20+	Moderate	Excellent	Retain	Sound tree suited to site	Retain Impacts	
6	Ulmus parvifolia (Chinese elm)	29.73305409 151.7311775	Lawn off Taylor	Exotic	Small	Mature	0.64	0.5 9	12	Fair	Good	113.143	2.74	6		Low	15 plus	20+	Moderate	Good	Retain if possible	Sound tree suited to site	Retain Impacts unlikely	
7	Quercus rubra , (Red Oak)	-29.73301334 151.7317291	Lawn area front entrance west tree	Exotic	Large	Mature	1.6	1.3 17	16	Excellent	Good	201.143	4.03	15	Large mature tree of some age in very good condition - tree would likely date construction of main building.	Low	40 plus	50+	High	Excellent	Retain Priority	Significant Tree	Retain Impacts unlikely	
8	Liquidambar styraciflua	29.73294423 151.7317904	Lawn area front off Taylor	Exotic	Large	Mature	0.75	0.67 17	12	Excellent	Excellent	113.143	2.93	8.04	innin oniong.	Low	40 plus	20+	High	Excellent	Retain Priority	Significant Tree	Retain Impacts unlikely	
9	Quercus rubra , (Red Oak)	29.73300979 151.7318865	Lawn area front entrance east tree	Exotic	Large	Over Mature	1.9	1.7 17	17	Good	Fair	227.071	4.33	15	Stem inclusions with some decay in smaller central stems deadwood to 150mm - stem system moderate failure potential - tree would likely date main building construction	Low	15 plus	50+	High	Good	Retain Priority	Significant Tree	Retain Impacts unlikely	Tree requires dead wood pruning and bracing system to stabilise stems to prolong its useful life as a significant tree
10	Ulmus glabra 'Camperdownii' (Golden Elm)	29.73279362 151.7318272	Lawn area Taylor	Exotic	Medium	Semi Mature	0.8	0.67 10	10	Good	Fair	78.5714	3.01	8.04	stem inclusions - failure potential moderate	Low	15 plus	10-20	Moderate	Good	Retain if possible	Positive amenity values	Retain Impacts unlikely	
11	Quercus palustris, (Pin oak)	29.73279362 151.7320172	Lawn area driveway off Taylor - west tree	Exotic	Large	Mature	1.6	1 25	21	Excellent	Excellent	346.5	4.03	12	Large sound tree - may well date construction of main building	Low	40 plus	50+	High	Excellent	Retain Priority	Significant Tree	Retain Impacts unlikely	
12	Quercus palustris, (Pin oak)	29.73283614 151.7322297	Lawn area driveway off Taylor - east tree	Exotic	Large	Semi Mature	1.1	0.81 22	19	Excellent	Fair	283.643	3.44	9.72	Inclusion in main stem system at 4m mark failure potential moderate - tree may well date construction of main building	Low	40 plus	50+	High	Good	Retain Priority	Significant Tree	Retain Impacts unlikely	
13	Acer negundo (Box Elder maple)	29.73292297 151.7322543	Lawn Area off Taylor east side driveway	Exotic	Medium	Dead	1	0.78 10	15	Very Poor	Poor	176.786	3.31	9.36	Tree 90% dead -	Very Low	0	5-10	Low or nil	Very Poor	Remove Priority	Poor Condition	Retain Impacts unlikely	
14	Cedrus deodara, (Himalayan cedar)	29.73298322 151.732334	Lawn Area off Taylor east side driveway	Exotic	Medium	Senescent	2	0.69 9	14	Fair	Fair	154	4.43	8.28	50 % canopy dead	Very Low	5 to 15	10-20	Low or nil	Poor	Remove	Poor Condition	Retain Impacts unlikely	
15	Aesculus hippocastanum, (Horse chestnut)	-29.73307004 151.732193	Lawn Area off Taylor east side driveway	Exotic	Small	Over Mature	0.9	0.45 7	10	Poor	Fair	78.5714	3.17	5.4	Included stem structure - 10% canopy dieback extensive decay in central leader and 1 failed leader	Very Low	5 to 15	10-20	Low or nil	Poor	Remove	Poor Condition	Retain Impacts unlikely	
16	Aesculus hippocastanum, (Horse chestnut)	29.7330789 151.7324566	Lawn Area off Taylor east side driveway	Exotic	Medium	Mature	1.05	0.92 10	14	Good	Good	154	3.38	11.04		Low	15 plus	20+	Moderate	Good	Retain	Sound tree suited to site	Retain Impacts unlikely	
17	Unidentified conifer surrounded by Celtis species stems	-29.73313206 151.7323605	Lawn Area off Taylor east side driveway	Exotic	Medium	Senescent	0.9	0.4 9	10	Very Poor	Poor	78.5714	3.17	4.8	Original tree 90% necrotic - has been taken over by Celtis seedlings	Very Low	0	5-10	Low or nil	Very Poor	Remove	Poor Condition	Retain Impacts unlikely	
18	Prunus species (Likely Apricot)	-29.73332874 151.7322502	East end main building GI 01	Exotic	Small	Over Mature	0.65	0.4 7	10	Fair	Fair	78.5714	2.76	4.8	light decay in stems - apricot or plumb species	Very Low	5 to 15	5-10	Low or nil	Poor	Remove	Replaced in short term	Retain Impacts unlikely	
19	Prunus species (Likely Apricot)	-29.7333571 151.7323442	East end main building GI 01	Exotic	Small	Over Mature	0.6	0.4 5	9	Fair	Fair	63.6429	2.67	4.8	included stem system - apricot or plumb	Very Low	5 to 15	5-10	Low or nil	Poor	Remove	Replaced in short term	Retain Impacts unlikely	
20	Tree removed recent	-29.73344924 151.7319539	South side GI 01	Exotic								0	1.50	0	No tree - recently removed					-	_			
21	Cotoneaster species	-29.73363706 151.7320806	North side Old Nurse quarters - west tree	Exotic	Small	Over Mature	0.6	0.3 4	/	Poor	Fair	38.5	2.67	3.6	In line of aged small trees - planting of some age	Low	5 to 15	5-10	Low or nil	Poor	Remove	Replaced in short term	Retain Impacts unlikely	
22	Cotoneaster species	-29.73363706 151.7321317	quarters	Exotic	Small	Over Mature	0.6	0.3 4	/	Fair	Fair	38.5	2.67	3.0	in line of aged small trees - planting of some age	Very Low	5 to 15	5-10	Low or nil	Poor	Remove	Replaced in short term	Impacts unlikely	
23	Cotoneaster species	29.73303883 151.7321725	quarters	Exolic	Small	Over Mature	0.6	0.3 4	/	Fair	Fair	38.5	2.67	3.0	in line of aged small trees - planting of some age	Very Low	5 10 15	5-10	Low or hit	Poor	Remove	Replaced in short term	Impacts unlikely	
24	Cotoneaster species	-22.72266541 454 722200	quarters		Small	Over Mature	0.0	0.2 4	7			20 5	2.07	2.6	In line of aged small trees - planting of some age	Very LOW	5 to 15	5-10		Poer	Remove	Replaced in short tarm	Impacts unlikely	
20	Cotopeoster species	-22.7226601 151.7522808	quarters	Exotic	Small	Over Mature	0.0	0.2 4	7	Fair	Fair	20 5	2.07	2.6	In line of aged small trees - planting of some age	Very LOW	5 to 15	5-10		Poor	Remove	Replaced in short term	Impacts unlikely	
20	Cotopeoster species	-23.7330001 151./52321/	quarters		Small	Over Mature	0.0	0.2 4	7			20 5	2.07	2.6	In line of aged small trees - planting of some age	Very LOW	5 to 15	5-10		Poer	Remove	Replaced in short tarm	Impacts unlikely	
29	Cotoneaster species	.22.72202020 151./523483	quarters		Small	Over Mature	0.0	0.3 4	7	Fair	Fair	29 5	2.07	3.0	In line of aged small trees - planting of some age	Very Low	5 to 15	5-10	Low or nil	Poor	Remove	Replaced in short term	Impacts unlikely	
20	Unidentified conifer covered	22.73303030 251.73233/3	quarters - east tree	Exotic	Modium	Senescent	0.0	0.3 0	/ 	Ven/ Door	Poor	12 571.4	2.07	3.0	Tree has been completely quarteles by her	Venulow	0 to 5	0.5		Very Door	Remove Drivity	Poor Condition	Impacts unlikely	
29	in lvey	-29.73300/18 151./320172	quarters	EXUTIC	Iviedium	seriescent	0.5	v.3 19	4	very Poor	POOP	12.5/14	2.47	3.0	nee has been completely overtaken by Ivy	very LOW	0 10 5	0-5	LOW OF NIL	very Poor	Remove Priority	Poor Condition	Impacts unlikely	

Tree No	Species	Lat	Lon	General Location	Species	General	Age Class	Stem	DBH He	ight Car	opy Tree	Tree	Canopy	SRZ	TPZ	Factors, Observed Conditions or Issues	Environmental	Estimated	Replacement	Significant	Retention	Recommended	Primary Reason	DA proposal	Other Comments
					Origin	Size		base	(m) M	ø	Vigour	Structure	Area	Radius in m	Radius in m	Commentary on tree	Rating/Value	remaining	Time Frame	Tree	Value	Action for	for	<mark>if known</mark>	
								Ø (m)					(M²)	from centre of	from stem			useful life		Value		planning of	Recommendation		
30	Chamaecynaris species	-29 73369731	151 7319355	West end old Nurse	Exotic	Medium	Over Mature	14	0.55 11	5	Fair	Fair	19 6429	3.81	6.6	one stem dead	Vervlow	5 to 15	5-10	Low or nil	Poor	Remove	Poor Condition	Retain	
				quarters						-														Impacts	
24	Data to see to to	20 72 4 400 6 2	454 7040000		5	C		2					7.074.4				No. 1.	0.1.5	0.5	1			Design of the second	unlikely	
31	Betula penaula, (Silver birch)	-29.73440962	151./318088	Lawn area east side Museum	EXOTIC	Small	Over Mature	2	0.2 3	3	Poor	Poor	7.0714:	4.43	2.4	two trees in very close planting - treat as one tree. Heavy compaction in root zone - canopy dieback	very Low	0 to 5	0-5	Low or hil	very Poor	Remove Priority	Poor Condition	Remove	
	(															40%									
32	Camelia species	-29.73415233	3 151.7314656	East side GI 08	Exotic	Small	Mature	0.2	0.2 4	3	Fair	Good	7.07143	3 1.68	2.4	Shrub in general good condition	Very Low	5 to 15	0-5	Low or nil	Poor	Remove	Replaced in short term	Remove	
33	Betula penaula, (Silver birch)	-29.73410642	151./3135/4	East side GI U8	EXOTIC	Small	Dead	0.34	0.34 5	2	Very Poor	very Poor	3.14280	2.10	4.08		very Low	0	0-5	Low or hil	very Poor	Remove Priority	Poor Condition	Remove	
34	Betula pendula,	-29.734126	151.7312998	East side GI 08	Exotic	Medium	Over Mature	0.65	0.52 16	10	Poor	Fair	78.5714	1 2.76	6.24	canopy with very heavy fasciation - whole canopy -	Low	5 to 15	5-10	Low or nil	Poor	Remove	Poor Condition	Remove	
	(Silver birch)															presents as in the condition for many years.									
35	Betula pendula.	-29.73425902	151.7312499	East side GI 08	Exotic	Medium	Dead	0.35	0.35 12	4	Very Poor	Verv Poor	12.5714	1 2.13	4.2	2 dead trees in close proximity	Verv Low	0	0-5	Low or nil	Poor	Remove Priority	Poor Condition	Remove	
	(Silver birch)										.,	.,		_		······································									
36	Betula pendula,	-29.73425024	151.7313761	East side GI 08	Exotic	Medium	Dead	0.26	0.26 10	1	Very Poor	Very Poor	0.78571	1.88	3.12		Very Low	0	0-5	Low or nil	Poor	Remove Priority	Poor Condition	Remove	
37	(Silver birch) Cedrus deodara.	-29.73426645	5 151.7314485	East side GI 08	Exotic	Medium	Semi Mature	0.94	0.86 20	11	Good	Good	95.0714	1 3.22	10.32	7 failed branches - likely snow fall and excessive	Low	15 plus	20+	Moderate	Good	Retain	Sound tree suited to site	Remove	
-	(Himalayan cedar)													-		weight loading			-						
38	Cupressus sempervirens	-29.73430291	151.7314438	East side GI 08	Exotic	Small	Senescent	0.4	0.3 5	1.5	Very Poor	Fair	1.76786	5 2.25	3.6	40% tree dead	Very Low	0 to 5	0-5	Low or nil	Very Poor	Remove Priority	Poor Condition	Remove	
39	(Pencil Pine) Cedrus deodara.	-29.7344886	151.7313582	Driveway off	Exotic	Large	Mature	0.11	0.95 22	14	Good	Excellent	154	1.50	11.4	Tree of some age.	Low	40 plus	50+	High	Excellent	Retain Priority	Significant Tree	Not	Tree forms part of line of 4
	(Himalayan cedar)			Ferguson - west side																0				determined	large aged significant trees on
																									Ferguson street boundary
40	Catalantin	20 72446024	151 7212052	0# 5	Funtin	Can all		1	0.25		Curral la at	Color.	20.5	2.21	2		Versileur	15 alua	0.5	1	[ aia	Detain if a sociale	Council to an available to aite	Net	Charle within an and have done
40	coloneaster species	-29.73440834	151./313052	Off Ferguson	EXOLIC	Small	Mature	1	0.25 5	ľ	Excellent	Fair	38.5	3.31	3		very Low	15 plus	0-5	LOW OF HIT	Fair	Retain II possible	Sound tree suited to site	determined	of two significant trees - do
																									not remove unless joining
																									large trees are removed
41	Cadava da adava	20 72445070	151 7212242	0# 5	Funtin	1		0.04	0.04 20	10	Cand	Guant	201.14		10.00	True of some one	1	40 alua	50.	115-6	Fueellest	Dataia Driasity	Circuificant Tran	Net	Tree forme cash of line of 4
41	(Himalayan cedar)	-29.73445079	151.7312343	Off Ferguson	EXOLIC	Large	Mature	0.94	0.84 20	10	Good	Excellent	201.14:	3.22	10.08	Tree of some age.	LOW	40 plus	50+	High	excellent	Retain Priority	Significant free	determined	large aged significant trees on
																									Ferguson street boundary
42	Cotoneaster species	-29.73443053	3 151.7311845	Off Ferguson	Exotic	Small	Mature	1	0.25 5	7	Excellent	Fair	38.5	3.31	3		Very Low	15 plus	0-5	Low or nil	Fair	Retain if possible	Sound tree suited to site	Not	Shrub within canopy boundary
																								determined	of two significant trees - do
																									large trees are removed
43	Cedrus deodara,	-29.73442108	3 151.7310786	Off Ferguson	Exotic	Large	Mature	1.27	1.06 25	15	Good	Good	176.786	5 3.66	12.72	Tree of some age.	Low	40 plus	50+	High	Excellent	Retain Priority	Significant Tree	Not	Tree forms part of line of 4
	(Himalayan cedar)																							determined	Ferguson street boundary
																									reigason street boandary
44	Cupressus macrocarpa	-29.7344123	151.7309758	Off Ferguson	Exotic	Large	Mature	4	1.17 17	19	Excellent	Fair	283.643	3 5.92	14.04	included leader unions - moderate failure potential	Low	40 plus	50+	High	Good	Retain Priority	Significant Tree	Not	Tree forms part of line of 4
	(Monterey cypress)																							determined	large aged significant trees on Ferguson street boundary
																									reigason street boandary
45	Photinia serratifolia	-29.73442715	5 151.7309221	Off Ferguson	Exotic	Small	Mature	1	0.46 5	10	Good	Good	78.5714	4 3.31	5.52	Tree supressed by tree 44	Very Low	15 plus	5-10	Low or nil	Fair	Retain if possible	Sound tree suited to site	Not	
46	Chinese photinia Betula pendula.	-29,73408549	151,7310288	Against GL08 south	Exotic	Large	Mature	0.3	0.26 14	4	Good	Fair	12.5714	1 2.00	3.12	Tree stem located only 1.5 m from building footing	Vervlow	15 plus	5-10	Low or nil	Fair	Remove	Direct Conflict with DA	Remove	Tree can not be retained in
	(Silver birch)			side		8-				-						······································									demolition of existing.
47	Celtis occidentalis ,	-29.73408414	151.7309813	Against GI 08 south	Exotic	Small	Semi Mature	0.44	0.31 9	4	Excellent	Good	12.5714	1 2.34	3.72	stem only 2 m to building footing - tree has likely	Very Low	15 plus	5-10	Low or nil	Fair	Remove	Direct Conflict with DA	Remove	Tree can not be retained in
48	(Hackberry) Acacia bailevana	-29.73424282	151.7307913	side Macquarie st fence	Exotic	Small	Mature	0.55	0.3 5	10	Good	Good	78.5714	1 2.57	3.6	seeded in this location	Medium	5 to 15	5-10	Low or nil	Fair	Retain if possible	Sound tree suited to site	Not	demolition of existing.
	(Cootamundra wattle)			line - south tree				1						1										determined	
49	llev species	-20 72410127	151 7207025	Macquaric et fonce	Exotic	Small	Over Mature	0.5	0.2 4	-	Poor	Fair	10 6420	2 47	2.4	canopy diaback 40%	Venderr	0 to 5	0.5	low or pil	Enir	Remove	Poor Condition	Not	
49	(Holly)	29.7341813/	101./00/835	line	LAUGE	Jundli	over iviature	0.5	J.2 4	°	19001	1 dii	19.0425	2.4/	2.4	canopy dieback 4070	Very LOW	0.03	0-5	LOW OF THE	1 011	Remove		determined	
50	Cedrus deodara,	-29.73409629	151.7307991	Macquarie st fence	Exotic	Medium	Semi Mature	0.97	0.82 24	16	Excellent	Excellent	201.143	3 3.27	9.84		Low	40 plus	20+	High	Excellent	Retain Priority	Significant Tree	Not	
51	(Himalayan cedar) Ginkao biloba	-20 73209015	151 72001	line Macquarie st fence	Exotic	Small	Semi Mature	0.26	0.22 10	6	Fair	Good	28.205	7 1 88	2.64		Very Low	5 to 15	5-10	low or pil	Fair	Retain if possible	Sound tree suited to site	determined Not	
51	(Maidenhair tree)	20.1000000	, 131./ 3001	line	- Notic	Small	Serie Wature	0.20	J.22 10	0	1 011	5500	20.203	1.00	2.04		VCI Y LOW	5 (0 1)	5 10			incluint in possible	Sound a ce suited to site	determined	
52	Conifer species	-29.73392546	151.730803	Macquarie st fence	Exotic	Medium	Dead	0.76	0.56 12	6	Very Poor	Fair	28.2857	7 2.95	6.72		Very Low	0	5-10	Low or nil	Very Poor	Remove Priority	Poor Condition	Not	
53	Celtis occidentalis	-29.73383903	3 151,7308388	line Macquarie st fence	Exotic	Medium	Senescent	1.2	1 11	9	Poor	Poor	63 6420	3.57	12	failed leaders - extensive decay	Very Low	0 to 5	5-10	Low or pil	Very Poor	Remove Priority	Poor Condition	determined Not	
35	(Hackberry)	25.7555555	, 191., 900900	line GI 07	ENGLIC	mediani	Schestent			Ĵ	1 001		05.012.	5.57			1017 2011	0.000	5 10	2011 01 111	very roor	nemote money		determined	
54	Celtis occidentalis ,	-29.73376273	3 151.7308528	Macquarie st fence	Exotic	Medium	Mature	0.7	0.66 11	8	Fair	Fair	50.2857	7 2.85	7.92		Very Low	15 plus	10-20	Low or nil	Fair	Retain if possible	Positive amenity values	Not	
55	(nackberry) Celtis occidentalis	-29,73368372	2 151.7308583	Macquarie st fence	Exotic	Medium	Mature	0.65	0.48 10	8	Fair	Fair	50.285	7 2.76	5,76		Very Low	5 to 15	10-20	Low or nil	Fair	Retain if possible	Positive amenity values	aetermined Not	
	(Hackberry)			line GI 07						ľ							.,							determined	
56	Celtis occidentalis ,	-29.73358851	151.7308879	Macquarie st fence	Exotic	Medium	Over Mature	1.05	0.48 12	9	Fair	Fair	63.6429	3.38	5.76	decay into lopped limb east side and into east	Very Low	5 to 15	10-20	Low or nil	Poor	Remove	Poor Condition	Not	
	(nackberry)			line GLU7												union at base of tree - moderate failure potential				1				determined	
57	Celtis occidentalis ,	-29.73334813	3 151.7309665	Macquarie st fence	Exotic	Medium	Mature	0.75	0.57 10	10	Fair	Fair	78.5714	1 2.93	6.84	included union at base - moderate failure potential	Very Low	5 to 15	10-20	Low or nil	Fair	Retain if possible	Positive amenity values	Not	
	(Hackberry)			line GI 07																			-,	determined	
58	Rhododendron species	-29.73329749	151.7312639	south west corner GI	Exotic		Mature	0.36	0.27 3.5	4	Good	Good	12.5714	2.15	3.24		Very Low	5 to 15	0-5	Low or nil	Fair	Remove	Replaced in short term	Not	
				01		1						1	4891.27	7 Theoretical cano	opy coverage		1	1	1	1				uetermined	1
						1		1						current				1	1						
								-				-	31500	Property area	16%	canopy coverage current		-		1		1		1	
					1			1						square meters	1		1			1		1			

				Annexure	2 - Assessment and Evaluation criteria - Definitions. (Version	date 02/06/2022)				
	Species Origin	C Ti	ieneral ree Size		Age Class	Overall Condition - summation of all considerations. Includes Stem/Canopy Structure Defects, Form, Canopy Vigour, Extent of any decay, Pest and Disease influences	ERL - estimated remaining useful life in years under current Situation	Tree Vigour		Retention value
Remnant	Endemic species naturally occurring	Very Large	> 25m	New	Recent Planting - last year or two	Excellent	0	Excellent	Excellent	Interpretation Based on
Endemic	Species is native to this location	Large	18-25m	Young	Sapling, extended growth remaining	Good	0 to 5	Good	Good	overall tree condition, species
Aus Native	Species native to Australia but not this location	Medium	10-18m	Semi Mature	Some remaining growth to reach maturity for the site and species	Fair	5 to 15	Fair	Fair	environment, expected
		Small	< 10m	Mature	Considered mature size for site and species - typically no sign of decline	Poor	15 plus	Poor	Poor	remaining life significance of
Exotic	Species introduced to Australia	Very Small	< 3m	Over Mature	Tree has commenced to decline - obvious signs	Very Poor	40 plus	Very Poor	Very Poor	tree in landscape and
		_		Senescent	Extended signs of decline - recovery not expected		I.			replacement time frame
		1		Dead	Little or no metabolic function remaining					
						1				
Environmental Rating/Value			Env	rironmental Ev	aluation Considerations/criteria				Pic	ks
Very High	Normally Old growth Remnant Tree, multiple hollow	ws important to th	retened or endangered	d fauna, replac	ement would be well in excess of 150 years			Replacement time:	1	Very High
High	Large or mature Endemic Tree or Aus Native that ha	as high substitute	values as endemic tree	with or without	t hollows, plays an important part in local ecology - replacement would take 50-1	100 years		0-5	2	High
Medium	Young or semi mature Endemic tree or Aust native	species that has so	ome positive values for	local fauna/ec	osystems - replacement would take 20 or more years. Large Exotic tree with eleva	ated general values.		5-10	3	Moderate
Low	Normally exotic species, or small, young endemic o	r native that could	be replaced in the sho	rt term 5-10 ye	ears			10-20	4	Low or nil
Very Low	Listed Weed or nuisance species; or very small valu	e or insignificant t	o local ecology - could	be replaced wi	thin 5 years or readily replaced with species of greater value			20+	5	Yes
				1			•	50+		No
	Significant Tree value considerations,	/criteria		4	Recommended Action for DA/Developmen	t Primary Reasons	4	100+		
	Defined as Significant Tree by regulatory or other a	uthority or		1	Retain Priority	very significant tree	1			

	•
	Defined as Significant Tree by regulatory or other authority or
Vory High	Environmental rating 1 or
veryrngn	Heritage Listed or
	Very High Cultural or heritage Values
	Environmental rating 2 or
High	Medium or large tree in good/excellent condition, suited to local environment or
mgn	imposing within the local landscape with long life expectancy and or
	strong amenity values or some cultural or heritage links
Moderate	A tree that is somewhat noteworthy - it is likely to grow into a significant tree
Not Significant	A tree with low or very values to the environment or local amenity

Significance - 'sufficiently great or important to be worthy of attention; noteworthy'. Oxford Dictionary (2022).

Recommended Action for DA/Development	Primary Reasons
Retain Priority	Very Significant tree
Retain	Significant Tree
Retain if possible	Sound tree suited to site
Remove	Positive amenity values
Remove Priority	Elevated environmental value
	Poor Condition
	Unsuitable for location
	Species not suited to Environment
	Condition or Safety
	Replaced in short term
	Direct Conflict with DA
	Exempt species
	Exempt height
	Weed Species
	Other

#### Known Development Impact Remove Retain Impacts to Manage Retain Impacts unlikely Not determined

Tree Height and canopy spread is estimated unless otherwise specified.

Other Definitions

Tree stem diameter is measured at approximately 1.4m above - or at a point indicative of the tree dimension where abnormal growth occurs at 1.4m above ground. Multi stemmed trees are calculated as per AS 4970

TP2 - Tree Protection Zone - specified area above and below ground and at a given distance from the trunk set aside for the protection of the tree's roots and crown to provide for the viability of a tree to be retained where it is potentially subject to damage by development.

SRZ - Structural Root Zone - the area around the base of a tree required for the tree's stability in the ground - calculated in meters radially from stem centre.

From Australian Standard 4970-2009 Protection of Trees on development sites

TPZ and SRZ are calculated from AS 4970

Tree canopy area is a calculated area from the diameter of the of the canopy - some actual variation may exist in the calculation if the canopy is not symmetrical.

Detailed explanation of Recommendations for Development						
	The Tree is a high value tree from an amenity, environmental or other					
Retain Priority	perspective - its removal should only occur under some extenuating					
	circumstance					
Retain	The tree has good or excellent retention values - a compelling reason should					
itetaiii	exist to remove the tree					
	The tree has some positive values for retention - it will not be significant - the					
Retain if Possible	positive values outweigh the negative values					
	It is recognised that removal may be required in many instances.					
Bemove	The tree condition, structure, size, species or other consideration dictates that					
hemove	a new tree is a better option					
	The tree condition, structure, size species of other consideration dictates that					
Remove Priority	the tree should be removed and not retained for stated reasons.					



2. ALL REDUCED LEVELS ARE ON AUSTRALIAN HEIGHT DATUM (A.H.D)

4. MGA AND ISG CO-ORDINATE SYSTEMS ARE BASED ON A MATHEMATICAL EARTH MODEL AND SUBJECT TO VARIABLE SCALE FACTORS. DISTANCES CALCULATED FROM CO-ORDINATES MAY VARY SIGNIFICANTLY FROM GROUND MEASUREMENTS. IF FURTHER CLARIFICATION IS REQUIRED CONTACT MONITEATH AND POWYS.

ONLY VISIBLE SERVICES HAVE BEEN LOCATED BY SURVEY.

NOT ALL SERVICE INFORMATION MAY BE SHOWN DUE TO UNAVAILABILITY OF SERVICE PLANS OR CURRENT INFORMATION.

THE BOUNDARIES SHOWN ON THIS PLAN ARE BASED ON OUR FIELD SURVEY. TO FORMALISE THESE DIMENSIONS, WE WOULD RECOMMEND THE PREPARATION OF A REDEFINITION PLAN, SUITABLE FOR LODGEMENT AND REGISTRATION WITH NSW LAND REGISTRY SERVICES. THIS PLAN SHOULD NOT BE USED FOR BUILDING WORKS CLOSE TO OR ON THE BOUNDARY, OR TO PROSCRIBED SET-BACKS WITHOUT FURTHER SURVEY INVESTIGATION.

CRITICAL LEVELS (E.G. FLOOR LEVELS) AND CRITICAL LOCATIONS (E.G. STRUCTURES) THAT HAVE NOT BEEN SHOWN MUST BE VERIFIED BY FURTHER SURVEY PRIOR TO FINAL DESIGN

NO EXCAVATIONS HAVE BEEN MADE TO DETERMINE THE EXTENT TO WHICH ANY SUBJECT WALLS, FOUNDATIONS OR FOOTINGS MAY ENCROACH UPON ADJOINING LAND.

NO EXCAVATIONS HAVE BEEN MADE TO DETERMINE THE EXTENT TO WHICH ANY ADJOINING WALLS, FOUNDATIONS OR FOOTINGS MAY ENCROACH UPON SUBJECT LAND.

ALL TREE DIMENSIONS, HEIGHT (H), CANOPY (C) AND TRUNK DIAMETER (D) HAVE BEEN ESTIMATED. IF ACCURATE DIMENSIONS ARE REQUIRED FOR DESIGN PURPOSES, FURTHER SURVEY SHOULD BE REQUESTED.

CONTOURS SHOWN DEPICT THE TOPOGRAPHY. CONTOURS DO NOT REPRESENT THE EXACT LEVEL AT ANY PARTICULAR POINT, EXCEPT AT SPOT LEVELS SHOWN.

THIS PLAN MUST REMAIN UNALTERED AS ISSUED BY MONTEATH & POWYS. ALTERING ANY PART OF THIS PLAN DESTROYS THE INTEGRITY OF THE PLAN. ANY REVISIONS REQUESTED MUST BE ISSUED BY MONTEATH & POWYS.

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HEALTH INFRASTRU	TURE Sheet No.
DETAIL SURVEY OF LOT 2	1208729
GLEN INNES HOSPITAL	ITE Revision
NO.05 TATLOR STREET, GL	1
6C_01 Ref No: 22/0056	Date: 30/05/2022

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#### LEGEND

**BUILDING** AIR CON UNIT COLUMN AC. COL DOWNPIPE FLOOR LEVEL DOP FL DRAINAGE DIP DRAINAGE INLET PIT DIP INVERT LEVEL KERB INLET PIT INV KIP SIP SURFACE INLET PIT ELECTRICITY EM ELECTRICITY MARKER FLECTRICITY SUB STATION ESS EPI EPT ELECTRICITY PILLAR ELECTRICITY PIT LP LIGHT POLE PP POWER POLE <u>GAS</u> GAS MARKER GM GMT GAS METER GAS PIT GPT GV GAS VALVE MISCELLANEOUS MPILL MISCELLANEOUS PILLAR MPIPE MISCELLANEOUS PIPE MPIT MISCELLANEOUS PIT SEWER SMH SEWER MANHOLE IPS SEWER INSPECTION SVT SEWER VENT SEWER INSPECTION POINT SEWER VENT STRUCTURE BOL BOLLARD SGN SIGN POST TELECOMMUNICATIONS TELECOMMUNICATIONS PILLAR TELECOMMUNICATIONS PIT TPI TPT <u>TREES</u> TREE TR HEIGHT OF TREE SPREAD OF CANOPY DIAMETER OF TRUNK WATER HYD SV HYDRANT STOP VALVE

WATER METER WMT











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ES BY ABNT ARCHITECT CONTRACT Nº 277/ 17 DRAWINGS DY



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В GLEN INNES DISTRICT HOSPITAL NEW NURSES' HOME SECOND FLOOR PLAN



AIA





ELEVATION SOUTH



LONG DINAL SECTION A - B



CROSS - SECTION C-D .....


ARCHITECTS

LEGEND	
GI01 - HOSPITAL BUILDING	
GI02 - OLD LAUNDRY BUILDING	
GI03 - MORTUARY	
GI04 - OLD MAINTENANCE BUILDING	
GI05 - STORAGE SHED	
GI06 - OLD HOSPITAL/MUSEUM	
GI07 - MAINTENANCE BUILDING	
GI08 - OLD NURSE'S QUARTERS	
GI09 - OLD HOSPITAL/MUSEUM	
GI10 - STAFF ACCOMODATION	
GI11 - ABORIGINAL SHADE SHELTER	



AVENUE

WEST



#### Summary of Mitigation Measures

Aspect	Mitigation measure	Timing
Traffic, Access and Parking	<ul> <li>A Construction Traffic Management Plan shall be prepared by the demolition contractor and shall include, but not be limited to, the following for all demolition activities:</li> </ul>	Prior to Commencement of Works / During Works
	- traffic control plan(s)	
	- driver code of conduct	
	- vehicle routes	
	- number of trucks	
	- hours of operation	
	- access arrangements	
	- traffic control measures	
	<ul> <li>Appropriate signage will be erected, and details will be confirmed by appropriate Project personnel responsible for site safety during the development.</li> </ul>	
	• The erection of short-term directional signage providing direction to staff, patients, and visitors regarding any changes to site traffic and access arrangements. Any such signage should be erected at the entry to the site and intermittently as required to ensure appropriate site management.	
	• Where necessary, the establishment of appropriate temporary parking areas for demolition work vehicles, visitors, staff and patients.	
	• Appropriate traffic control and management measures to ensure the safe movement of vehicles, into and around the site.	
	Regard to public safety will be maintained at all times.	
	• Neighbouring residents are to be informed in writing at least two weeks prior with respect to any changes to pedestrian movements and parking restrictions associated with the development.	
	• Public roads and access points will not be obstructed by any materials, vehicles, refuse skips or the like, under any circumstances.	
Noise and Vibration	The following work hours are proposed:	Prior to Commencement of Works / During Works

Aspect	Mitigation measure	Timing
	- Monday to Friday: 7am to 6pm.	
	- Saturday: 8am to 1pm.	
	- Sundays and Public Holidays: No excavation or demolition works.	
	<ul> <li>Noise control measures are to be implemented during these hours following consultation and engagement with the community. High noise level works should be scheduled to not occur during shoulder periods of the recommended standard hours – i.e. 7 am to 8 am and 5 pm to 6 pm.</li> </ul>	
	<ul> <li>The Standard Mitigation Measures outlined in Table 11 of the Construction and Operational Noise and Vibration Impact Assessment, Muller Acoustic Consulting (July 2022) are to be implemented before and during the Activity.</li> </ul>	
	<ul> <li>Prior to commencement of the Activity, a detailed Construction Noise and Vibration Management Plan will be prepared as part of the environmental management plan for the Activity. The plan will identify all feasible and reasonable management measures to minimise noise and vibration impacts on nearby sensitive receivers.</li> </ul>	
	• Prior to commencement of the Activity, a review of sensitive spaces should be undertaken. Where noise from the Activity may impact on sensitive spaces, consultation should be undertaken with the administrators of the hospital to schedule works around critical activities. To prevent vibration levels exceeding the human response criteria at nearby residential receiver locations and/or cosmetic damage criteria for sensitive items (i.e. heritage listed museum), once the final vibratory plant has been selected a review of minimum offset distances is to be conducted. Where works are proposed to occur within the minimum safe working distance and there is a risk of exceedance of the cosmetic damage objective, a different construction method with lower source vibration levels should be used where feasible and reasonable, or, vibration monitoring should be undertaken at the commencement and throughout the works.	
	Furthermore, where vibration intensive work is planned to occur in close proximity to Beardies Museum, minimum offset distances are to be reviewed following selection of final plant.	
Air Quality and Energy	<ul> <li>Recommendations from the Asbestos/Hazmat Investigation Report by Southern Asbestos Consultancy Pty Ltd dated July 2022 are to be implemented as part of the Activity:</li> </ul>	Prior to Commencement of Works / During Works
	No materials will be burnt on site.	

Aspect	Mitigation measure	Timing
	<ul> <li>Vehicles transporting waste or other materials that may produce dust will be covered during transportation.</li> </ul>	
	• Vehicles, machinery and equipment will be maintained in accordance with manufacturer's specifications in order to meet the requirements of the Protection of the Environment Operations Act 1997 and associated regulations.	
	<ul> <li>Vehicles and equipment will be switched off when not operating.</li> </ul>	
	• Debris and waste will be immediately collected into appropriate storage facilities and removed from the site as soon as practical to ensure light-weight material is not dispersed by wind gusts.	
	• Stockpiles and exposed soils will be covered or dampened to reduce incidence of air dispersal.	
	<ul> <li>Appropriate practices are to be in place to minimise dust that could be dispersed during excavation.</li> </ul>	
	New fixtures and fittings would meet relevant energy efficiency standards.	
Soils and Geology	<ul> <li>An Erosion and Sediment Control Plan is required to be prepared prior to works commencing and will form part of the Construction Environmental Management Plan for the Activity.</li> </ul>	Prior to Commencement of Works / During Works
	• Erosion and sediment controls would be implemented in accordance with the Landcom/ Department of Housing Managing Urban Stormwater, Soils and Construction Guidelines (the Blue Book) and ensure any water diversion or control outlets associated with the site compound/ stockpile do not result in scouring.	
	<ul> <li>Works would only commence once all erosion and sediment controls have been established. The controls would be maintained in place until the works are complete, and all exposed erodible materials are stable.</li> </ul>	
	• Erosion and sedimentation controls would be checked and maintained (including clearing of sediment from behind barriers) on a regular basis (including after any precipitation events) and records kept and provided on request.	
	Disturbance of natural sediments and vegetation would be minimised.	
Hydrology, Flooding and Water Quality	• The erosion and sediment control measures for the site will be implemented during construction. The design of these measures is to be in accordance with the Landcom "Blue Book". These will include:	Prior to Commencement of Works

Aspect	Mitigation measure	Timing
	- A sediment fence.	
	- Temporary access to site with shaker pad.	
	- An indicative stockpile area with sediment fence around it during construction.	
	- Geotextile inlet pit filters or sandbags to be placed around existing stormwater pits.	
Visual Amenity	<ul> <li>A Construction Environmental Management Plan is to be prepared prior to commencement of works.</li> </ul>	Prior to Commencement of Works / During Works /
	<ul> <li>The work site is to be kept clean and orderly. All waste would be removed from the site at completion of works.</li> </ul>	Completion of works
	<ul> <li>The areas where demolition occurs is to be cleaned up and restored to a suitable standard following the removal of the structure.</li> </ul>	
Aboriginal Heritage	<ul> <li>All personnel working on site would receive induction on their responsibilities under the NPW Act; and</li> </ul>	Prior to Commencement of Works / During Works
	<ul> <li>If Aboriginal cultural material is identified on site, a Stop Work Procedure will be followed, which includes:</li> </ul>	
	- Works will cease immediately.	
	- A temporary exclusion zone established.	
	- CVC project manager and Local Aboriginal Land Council will be contacted immediately.	
	- Heritage NSW contacted immediately.	
Non-Aboriginal Heritage	• The stop work provision should be applied in line with the requirements of the NSW Heritage Act 1977 if any unexpected archaeological find, both historical and Aboriginal, be exposed during construction and earthworks. An appropriately qualified heritage professional and an archaeologist should be engaged to assess the finds and advise on their management.	Prior to Commencement of Works / During Works
	<ul> <li>Once the selection of final plant is confirmed and where vibration intensive work is planned to occur close to the heritage listed buildings relating to adjoining Lot 1 DP1208729, minimum offset distances should be reviewed. Where works are proposed to occur within the minimum safe working distance and there is a risk of exceedance of the cosmetic damage objective, a different construction method with lower source vibration levels should be used where feasible</li> </ul>	

Aspect	Mitigation measure	Timing
	and reasonable, or, vibration monitoring should be undertaken at the commencement and throughout the works.	
Ecology	• Trees identified for retention will be protected during demolition works in accordance with the Preliminary Arboricultural Assessment prepared by Wade Ryan Contracting (27 June 2022).	Prior to Commencement of Works / During Works
	<ul> <li>Demolition and construction site access and egress plans should evaluate impacts on trees, particularly trees with high or moderate significance.</li> </ul>	
Bushire	No mitigation measures are required.	N/A
Land Uses and Services	• Any potential services interruptions shall be communicated to the relevant services authorities to enable flow on notifications to any affected services customers.	Prior to Commencement of Works / During Works
	<ul> <li>The primary contractor is to liaise with Hospital staff in relation to any work identified as being a potential disruption to the ongoing operations of the Glen Innes Hospital, including access by Staff, support services, and visitors.</li> </ul>	
Waste Generation	<ul> <li>A Construction Waste Management Plan is to be prepared and is to detail the framework to reduce waste directed to landfill.</li> </ul>	Prior to Commencement of Works / During Works /
	Any Asbestos removal must be undertaken by appropriately licenced contractors.	Completion of works
	<ul> <li>Any hazardous materials would be handled, managed, transported, and disposed of according to applicable regulations, including WH&amp;S and EPA waste protocols.</li> </ul>	
	<ul> <li>Any waste or materials that are transported off-site shall be transported to an approved waste management facility, in accordance with the requirements of the <i>Protection of the Environment</i> <i>Operations Act 1997</i>.</li> </ul>	
	Evidence of waste disposal such as weighbridge dockets and invoices shall be retained.	
	<ul> <li>Demolition waste shall be stored within the site and not within public areas such as footpaths, public and / or road reserves.</li> </ul>	
	Adequate measures shall be implemented to prevent litter from being blown from the site.	
	• The working areas will accommodate bins and other waste storage structures as required.	
	<ul> <li>At the completion of demolition works the development site shall be left clear of waste and debris.</li> </ul>	

Aspect	Mitigation measure	Timing
Hazardous Materials and Contamination	• Storage and handling of material shall be in accordance with AS1940 The Storage and Handling of Flammable and Combustible Liquids, SafeWork NSW Code of Practice - Managing Risks of Hazardous Chemicals at Workplaces, <i>Protection of the Environment Operations Act 1997</i> and <i>Work Health and Safety Act</i> and Regulations 2011.	Prior to Commencement of Works/ During Works
	• A spill containment kit would be available at all times. All personnel would be made aware of the location of the kit and trained in its effective deployment.	
	<ul> <li>Any hazardous materials would be handled, managed, transported, and disposed of according to applicable regulations, including WH&amp;S and EPA waste protocols.</li> </ul>	
	<ul> <li>In the event that any unexpected conditions are encountered during earthworks (e.g. underground storage tanks, stained or odorous soils, fibre cement fragments, etc), all work should cease in that section of the site and an environmental consultant should be engaged to inspect the site and address the issue.</li> </ul>	
	<ul> <li>Any hazardous materials would be handled, managed, transported, and disposed of according to applicable regulations, including WH&amp;S and EPA waste protocols.</li> </ul>	
	<ul> <li>The following recommendations from the Asbestos/Hazmat Investigation Report dated July 2022 are to be implemented as part of the project:</li> </ul>	
	- The friable asbestos containing materials are to be removed by a Class A (friable) Licensed Asbestos Removal Contractor (LARC).	
	<ul> <li>Licenced Asbestos Assessor (LAA) to be present / on site prior to and during asbestos removal works to inspect asbestos removal zones and asbestos removal process each day for safety and in accordance with the relevant legislation, to assess a sign off SWMS, to assess any unexpected finds or issues related to removal procedures.</li> </ul>	
	<ul> <li>Asbestos fibre air monitoring must be undertaken during asbestos removal works and clearance air monitoring within containment enclosures following friable asbestos removal works.</li> </ul>	
	<ul> <li>Once the asbestos containing materials have been removed, a Licenced Asbestos Assessor (LAA) will be required to conduct a clearance inspection following completion of the removal works for an Asbestos Clearance Certification to be issued.</li> </ul>	

Aspect	Mitigation measure	Timing
	<ul> <li>Subfloor: Following asbestos containing materials removal, a Licenced Asbestos Assessor (LAA) will be required to conduct a clearance inspection following completion of the removal works. The LAA to access if soil samples are required for clearance certificate.</li> </ul>	
	- The asbestos removal contractor (LARC) should ensure appropriate controls are in place during the works, including barricades/warning tape or fencing, warning signage and dust suppression (e.g. a fine mist water spray, or PVA-mix spray). Negative air containment enclosures to be inspected by an LAA prior to removal works of Friable asbestos containing materials.	
	<ul> <li>All workers entering asbestos removal zones of the site are to wear appropriate Personal Protective Equipment (PPE) (e.g. disposable coveralls (Asbestos rated P5), half-face respirators (fitted with P2 rated filters) at all times during asbestos-related work activities.</li> </ul>	
	<ul> <li>All asbestos contaminated materials / waste is to be transported from site for disposal at a landfill facility licensed to accept asbestos waste.</li> </ul>	
	<ul> <li>All asbestos removal works must be undertaken in accordance with the relevant legislation for the site by a licensed asbestos removal contractor. All works should be conducted as per relevant legislation 'Work Health &amp; Safety Regulation (2017)' and the 'Code of Practice: How to Safely Remove Asbestos (2017)'.</li> </ul>	
	<ul> <li>SMF insulating materials identified throughout the building are to be removed by persons suitably experienced in handling and disposing of SMF insulation.</li> <li>An asbestos clearance certificate must be obtained by the demolition contractor to certify that all asbestos has been appropriately removed from the site.</li> <li>As part of the Main Works Stage the following must be completed:</li> </ul>	
	- Prepare and implement an Asbestos Management Plan (AMP) for asbestos in soil;	
	<ul> <li>Undertake a Detailed (Stage 2) Site Investigation (DSI) to address the data gaps identified in Section 10.4 of the Preliminary (Stage 1) Investigation.</li> </ul>	
	Note: As not all areas of the hospital are being redeveloped, the extent of 'the site' for the DSI needs to be confirmed to limit the DSI to broadly capture the proposed development footprint; and	
	<ul> <li>Following completion of the DSI, prepare and implement a Remediation Action Plan (RAP) to document the remediation and validation requirements for the site; and</li> </ul>	

Aspect	Mitigation measure	Timing
	<ul> <li>Upon the completion of remediation works, validate the remediation works and prepare a Validation Assessment report.</li> </ul>	
Community Impact / Social Impact	No mitigation measures are required.	N/A
Cumulative Impact	<ul> <li>Health Infrastructure and project staff shall monitor DPIE's major projects register and Glen Innes Severn Council's Development Application tracker for any significant developments that may occur locally and with potential to coincide with the Activity period.</li> </ul>	Prior to Commencement of Works / During Works
	• Where required, project staff will undertake pre-works review and liaison with other development sites to co-ordinate works and minimise impacts (e.g. delivery times, parking).	

30.08.2022



Aerial view of Glen Innes Hospital (Source: NSW Health Infrastructure).

# **STATEMENT OF HERITAGE IMPACT**

# **GLEN INNES HOSPITAL UPGRADE**

GLEN INNES, NSW NOVEMBER 2022

Report prepared by OzArk Environment & Heritage for NSW Health Infrastructure



# OzArk Environment & Heritage

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Enquiries should be addressed to OzArk Environment & Heritage.

#### Acknowledgement

OzArk acknowledge the traditional custodians of the area on which this assessment took place and pay respect to their beliefs, cultural heritage, and continuing connection with the land. We also acknowledge and pay respect to the post-contact experiences of Aboriginal people with attachment to the area and to the Elders, past and present, as the next generation of role models and vessels for memories, traditions, culture and hopes of local Aboriginal people.

#### **EXECUTIVE SUMMARY**

OzArk Environment & Heritage (OzArk) has been engaged by NSW Public Works Advisory, on behalf of NSW Health Infrastructure (the proponent) to complete a Statement of Heritage Impact (SOHI) for the Glen Innes Hospital Upgrade project (the project). The proposal is in the Glen Innes Severn Local Government Area (LGA). The study area for the assessment is the existing Glen Innes Hospital site, located at Lot 2 DP1126060. The area comprises eight existing buildings and structures and the landscaped remainder of the site.

The proposed works aim to upgrade ageing infrastructure and to improve efficiency of services. Master Planning for the project has resulted in the project progressing with a preferred option. The preferred option will include the demolition of two buildings: the Old Nurses' Quarters (GI 08) and a maintenance building usually referred to as the Isolation Ward (GI 04) and also known as the Spanish Flu building. The Isolation Ward is part of an existing heritage item, the Land of the Beardies Museum (former hospital complex), which is listed on the Glen Innes-Severn Local Environmental Plan (LEP) as item 1076.

The study area was inspected by OzArk archaeologist Harrison Rochford on 26 July 2022. The site inspection determined that most buildings that comprise the modern hospital complex are not associated with significant heritage values. The likelihood for archaeological deposits to be present within the study area was assessed as low.

The SOHI has determined that the proposed works will have a negative impact on the heritage values that are present within the study area, particularly in association with the planned demolition of the Isolation Ward. While the Nurses' Quarters has been assessed as having little heritage value and a low association with the remaining buildings, the Isolation Ward has historic heritage values and a stronger association with the Land of the Beardies (former hospital complex) listing on the Glen Innes-Severn LEP.

Recommendations concerning the historic values relevant to the study area are as follows.

- There are no constraints from a heritage perspective related to the demolition of the Nurses' Quarters. This structure may be demolished without further investigation and the record of the building in this report is considered sufficient to record the structure.
- 2. The detailed design phase of the project should fully explore retention of the Isolation Ward building and suitable adaptive re-use in the future hospital.
- 3. If retention of the Isolation Ward is deemed to be unfeasible due to (for example) a lack of suitable adaptive re-use opportunities or an unreasonable restriction to the design of the new hospital facilities, then the following mitigation measures should be undertaken prior to demolition:

- Archival photographic recording of the building should be carried out to provide a record of the Isolation Ward's main features and heritage values for future generations. Copies of this archival record should be provided to Glen Innes-Severn Shire Council and the Glen Innes and District Historical Society.
- An interpretation plan should be developed with Glen Innes and District Historical Society and the Land of the Beardies History House Museum and Research Centre. The plan should include opportunities and policies to conserve any moveable heritage items or physical fabric that can be reasonably retained and exhibited at the museum.
- 4. The recommendations of the construction noise and vibration assessment (MAC 2022) undertaken for the project must be implemented, including minimum working distances and vibration monitoring as described in **Section 3.7**.
- Although the risk of the project affecting archaeological deposits at the study area has been assessed as low, the *Unanticipated Finds Protocol* (Appendix 1) should be followed if potential significant heritage items are encountered during construction.
- As the project will impact a heritage item (I076) on the Glen Innes-Severn LEP, this SOHI and determined Review of Environmental Factors (REF) for the project should be sent to Glen Innes-Severn Shire Council for their consideration.

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# **1** INTRODUCTION

## **1.1 BRIEF DESCRIPTION OF THE PROJECT**

OzArk Environment & Heritage (OzArk) has been engaged by NSW Public Works Advisory on behalf of NSW Health Infrastructure (the proponent) to complete a Statement of Heritage Impact (SOHI) report for the Glen Innes Hospital Upgrade project (the project). The proposal is in the Glen Innes Severn Local Government Area (LGA) (**Figure 1-1**).





## 1.2 STUDY AREA

The study area for the assessment is the existing Glen Innes Hospital site, located at Lot 2 DP1126060. The main entrance is on Taylor Street, but the study area also fronts Macquarie Street and Ferguson Street, as shown on **Figure 1-2** and **Figure 1-3**.

The area comprises eight existing buildings and structures and the landscaped remainder of the site.

# **1.3 PROPOSED WORK AND STAGING**

The proposed works aim to upgrade ageing infrastructure and to improve efficiency of services. Master Planning for the project has resulted in the project progressing with a preferred option. The preferred option will include the demolition of two buildings: the Old Nurses' Quarters (GI 08) and a maintenance building usually referred to as the Isolation Ward (GI 04), also known as the Spanish Flu building. A new multipurpose building is proposed at the former location of the Old Nurses' Quarters and a car park is planned for the location of the Isolation Ward. The current hospital site layout is shown on **Figure 1-4** and the proposed demolition plans are shown on **Figure 1-5**.

It is understood that multiple Reviews of Environmental Factors (REFs) will be prepared for various stages of the proposed works. This report will support multiple REFs as relevant to the proposed impacts assessed throughout. The proposed demolition of the Old Nurses' Quarters will be the subject of an individual REF and key results of this assessment of this work are presented at **Table 3-2** and **Table 3-3**, and result in **Recommendation 1**.



Figure 1-2: Aerial showing the study area.



Figure 1-3: Cadastral boundaries at the study area.







Figure 1-5: Glen Innes Hospital demolition plan.

# 2 HISTORIC HERITAGE ASSESSMENT BACKGROUND

## 2.1 INTRODUCTION

The current assessment will apply the Heritage Council *Historical Archaeology Code of Practice* (Heritage Council 2006) and the International Council on Monuments and Sites' *The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance* (Burra Charter 2013) in the completion of a historical heritage assessment, including field investigations.

## 2.2 RELEVANT LEGISLATION

#### 2.2.1 State legislation

#### Environmental Planning and Assessment Act 1979 (EP&A Act)

This Act established requirements relating to land use and planning. The main parts of the EP&A Act that relate to development assessment and approval are Part 4 (development assessment) and Part 5 (environmental assessment). The purpose of the Part 5 assessment system is to ensure public authorities fully consider environmental issues before they undertake or approve activities that do not require development consent from a council or the Minister. The Minister responsible for the Act is the Minister for Planning.

The EP&A Act currently provides the primary legislative basis for planning and environmental assessment in NSW. The objects of the EP&A Act include encouragement of:

- The proper management, development, and conservation of natural resources
- The provision and coordination of the orderly and economic use and development of land
- Protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats
- Ecologically sustainable development.

The objects also provide for increased opportunity for public involvement and participation in environmental planning and assessment.

The EP&A Act includes provisions to ensure that the potential environmental impacts of a development or activity are rigorously assessed and considered in the decision-making process.

The framework governing environmental and heritage assessment in NSW is contained within the following parts of the EP&A Act:

• Part 5: Environmental impact assessment on any heritage items which may be impacted by activities undertaken by a state government authority or a local government acting as a self-determining authority.

#### Applicability to the proposal

The current proposal will be assessed under Part 5 of the EP&A Act.

## Heritage Act 1977 (Heritage Act)

The *Heritage Act* 1977 (Heritage Act) is applicable to the current assessment. This Act established the Heritage Council of NSW. The Heritage Council's role is to advise the government on the protection of heritage assets, make listing recommendations to the Minister in relation to the State Heritage Register (SHR), and assess/approve/decline proposals involving modification to heritage items or places listed on the SHR. Most proposals involving modification are assessed under Section 60 of the Heritage Act.

Automatic protection is afforded to 'relics', defined as 'any deposit or material evidence relating to the settlement of the area that comprised New South Wales, not being Aboriginal settlement, and which holds state or local significance' (note: formerly the Act protected any 'relic' that was more than 50 years old. Now the age determination has been dropped from the Act and relics are protected according to their heritage significance assessment rather than purely on their age). Excavation of land on which it is known or where there is reasonable cause to suspect that 'relics' will be exposed, moved, destroyed, discovered, or damaged is prohibited unless ordered under an excavation permit.

### 2.2.2 Commonwealth legislation

#### Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

The EPBC Act, administered by the Commonwealth Department of Climate Change, Energy, the Environment and Water, provides a framework to protect nationally significant flora, fauna, ecological communities, and heritage places. The EPBC Act establishes both a National Heritage List and Commonwealth Heritage List of protected places.

The assessment and permitting processes of the EPBC Act are triggered when a proposed activity or development could potentially have an impact on one of the matters of national environment significance listed by the Act. Ministerial approval is required under the EPBC Act for proposals involving significant impacts to national/commonwealth heritage places.

## 2.2.3 Glen Innes-Severn Local Environmental Plan 2012

Heritage items on the Glen Innes-Severn Local Environmental Plan (LEP) 2012 are subject to the following heritage conservation objectives:

- to conserve the environmental heritage of Glen Innes Severn
- to conserve the heritage significance of heritage items and heritage conservation areas, including associated fabric, settings, and views,

- to conserve archaeological sites,
- to conserve Aboriginal objects and Aboriginal places of heritage significance.

#### The relevant clauses of the LEP are shown in Table 2-1.

#### Table 2-1: LEP provisions.

Clause				
(2) Requirement for consent				
Development consent is required for any of the following:				
1.	demolishing or moving any of the following or altering the exterior of any of the following (including, in the case of a building, making changes to its detail, fabric, finish or appearance):			
	(i) a heritage item,			
	(ii) an Aboriginal object,			
	(iii) a building, work, relic or tree within a heritage conservation area,			
2.	altering a heritage item that is a building by making structural changes to its interior or by making changes to anything inside the item that is specified in Schedule 5 in relation to the item,			
3.	disturbing or excavating an archaeological site while knowing, or having reasonable cause to suspect, that the disturbance or excavation will or is likely to result in a relic being discovered, exposed, moved, damaged or destroyed,			
(5) Heritage assessment				
The consent authority may, before granting consent to any development:				
1.	on land on which a heritage item is located, or			
2.	on land that is within a heritage conservation area, or			
3.	on land that is within the vicinity of land referred to in paragraph (a) or (b),			
Require a heritage management document to be prepared that assesses the extent to which the carrying out of the proposed development would affect the heritage significance of the heritage item or heritage conservation area concerned.				

## 2.2.4 Applicability to the proposal

The proposal will be assessed under Part 5 of the EP&A Act.

Any items of local or state historical heritage significance within the study area are afforded legislative protection under the Heritage Act.

The provisions of the Glen Innes-Severn LEP must be considered if significant harm to an item of local heritage value is likely.

It is noted there are no Commonwealth or National heritage listed places within the study area, and as such, the heritage provisions of the EPBC Act do not apply (see **Section 2.5.1**).

## 2.3 HISTORIC HERITAGE ASSESSMENT OBJECTIVES

The current assessment will apply the Heritage Council's *Historical Archaeology Code of Practice* (Heritage Council 2006) in the completion of a historical heritage assessment, including field investigations, to meet the following objectives:

**<u>Objective One</u>**: To identify whether historical heritage items or areas are, or are likely to be, present within the study area

**<u>Objective Two</u>**: To assess the significance of any recorded historical heritage items or areas

# <u>Objective Three</u>: Determine whether the proposal is likely to cause harm to recorded historical heritage items or areas

**<u>Objective Four</u>**: Provide management recommendations and options for mitigating impacts.

## 2.4 BRIEF HISTORY OF GLEN INNES HOSPITAL

Glen Innes is located on the land of the Ngarabal people of the Severn River valley and plains, including the area of modern Ashford, Tenterfield, and Glen Innes on the New England Tablelands. While the town of Glen Innes was not gazetted as a town until 1852, the surrounding plains had been occupied by pastoral settlers and squatter since the 1820s.

The Glen Innes hospital was built in 1876-7, because of an 1873 campaign to petition the Municipal Council and raise funds from the residents of the district (Cameron 1972). The hospital complex developed around the main single storey 1877 building of Victorian Italianate design. Wards and accommodation buildings were progressively added to the complex from 1880–1926.

The modern era hospital to the west of the original hospital complex was opened in 1956, and the former complex was closed. In 1970, the former hospital complex was repurposed as the Land of the Beardies Museum.

## 2.5 HERITAGE LISTINGS RELEVANT TO THE STUDY AREA

#### 2.5.1 Desktop database searches conducted

A desktop search was conducted on the following databases to identify any potential previously recorded heritage within the study area. The results of this search are summarised in **Table 2-2**.

Name of Database Searched	Date of Search	Type of Search	Comment
National and Commonwealth Heritage Listings	1/7/2022	Study area	No results
State Heritage Register (SHR)	1/7/2022	Study area	The closest SHR item to the study area is the Glen Innes Railway Station, 270 m west of the study area.
Glen Innes-Severn Local Environmental Plan (LEP)	1/7/2022	Study area	One relevant result: 1076.

Table 2-2: Historic heritage: desktop-database search results.

A search of the Heritage Council of NSW administered heritage databases and the Glen Innes-Severn LEP 2013 returned one relevant result for records for historic heritage items sites within the designated search areas.

The Land of the Beardies Museum (former hospital complex) listing (1076 on the Glen Innes-Severn LEP) includes the study area. Until 2019, the Land of the Beardies Museum listing included the entire block on which the former and current hospitals are located. However, the subdivision of Lot 1 DP1126060 (presumably in 2019) has led to the newly created lot (Lot 2 DP1126060, see **Figure 1-3**) on which the current hospital infrastructure and the study area is located. This Lot is not included in the location details of the I076 listing in Schedule 5 of on the Glen Innes-Severn LEP (corner of Ferguson Street and West Avenue), however, it appears that both Lots are still included in the heritage listing.

While the statutory listing includes the study area, only certain items, such as the Isolation Ward, are included in the description of the Land of the Beardies listing and it is clear that the heritage listing refers to the old hospital complex in Lot 2 DP1126060. As such, despite the actual heritage curtilage for 1076 being unclear, items such as the Isolation Ward should be treated as if they associated with the heritage significance of the 1076 and is therefore afforded the heritage conservation protections of Section 5.10 of the Glen Innes-Severn LEP. The listing is discussed further in **Section 2.6**.

## 2.6 HISTORIC HERITAGE ITEMS AT THE STUDY AREA

As the heritage item has already been catalogued and assessed, the following is adapted from the State Heritage Inventory (SHI) listing for the item I076.

## Land of the Beardies Museum (former hospital complex)

Location of site: Ferguson Street and West Avenue, Glen Innes NSW 2370

**Description of site**: The early single storey building (1876) is constructed of decorative, concrete work with a gabled entrance way decorated in a way to complement the sets of three windows with Norman arches. The buildings from this phase of construction are of Victorian Italianate style. These buildings of the former Glen Innes Hospital comprise wards and staff accommodation were designed by the Colonial Architect's Office and Public Works Department. The later buildings are of Edwardian and Queen Anne style.

The complex also includes the separate building located to the west of the main complex; that is, the Isolation Ward. It is a stand-alone building built of the distinctive blue brick with a galvanised iron roof with dragon heads typical of the period.

## Timeline and catalogue of buildings:

- 1. 1880: construction of the female ward and central courtyard
- 2. 1901: operation room completed
- 3. 1904: construction of the northern addition
- 4. c1911: fever wards completed

- 5. 1918: extension of male wards
- 6. 1919: construction of Matron's quarters and hospital kitchen
- 1920s: the first nurses' home and isolation wards built
- 8. 1926: a children's ward opened

- 1936: new operating theatres opened; northern wing opened on 4 November 1970
- 10. 2003-2004: roofing and guttering replaced



Figure 2-1: Aerial image showing the Land of the Beardies Museum from the east (Source: Skyview Aerial/ NSW Health Infrastructure).

#### 2.7 ASSESSMENT OF HISTORIC HERITAGE SIGNIFICANCE

#### 2.7.1 Assessment of significance—general principles

NSW Heritage Office's publication *Assessing Heritage Significance* (NSW Heritage Office 2001) defines the criteria for heritage significance. A historic heritage site must satisfy at minimum one of the following criteria to be assessed as having heritage significance:

- **Criterion (a):** An item is important in the course, or pattern, of NSW's cultural or natural history (or the cultural or natural history of the local area).
- **Criterion (b):** An item has a strong or special association with the life or works of a person, or group of persons, of importance in NSW's cultural or natural history (or the cultural or natural history of the local area).
- **Criterion (c):** An item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW (or the local area).
- **Criterion (d):** An item has strong or special association with a particular community or cultural group in NSW (or the local area) for social, cultural or spiritual reasons.
- **Criterion (e):** An item has potential to yield information that will contribute to an understanding of NSW's cultural or natural history (or the cultural or natural history of the local area).
- **Criterion (f):** An item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history (or the cultural or natural history of the local area).
- **Criterion (g):** An item is important in demonstrating the principal characteristics of a class of NSW's cultural or natural places; or cultural or natural environments (or a class of the local area's cultural or natural places; or cultural or natural environments).

Significance assessments are carried out on the basis that decisions about the future of heritage items must be informed by an understanding of these items' heritage values. The *Australia ICOMOS Burra Charter* (Burra Charter 2013) recognises four categories of heritage value: historic, aesthetic, scientific, and social significance

Items are categorised as having local or state level, or no significance. The level of significance is assessed in accordance with the geographical extent of the item's value. An item of state significance is one that is important to the people of NSW whilst an item of local significance is one that is principally important to the people of a specific LGA.

#### 2.7.2 Assessment of significance of historic items

The Land of the Beardies (former hospital complex) listing has been previously assessed as having state heritage values, however, it is not listed on the State Heritage Register (SHR). It is

the opinion of OzArk that the heritage values described in the existing heritage assessment are of local heritage significance and that the item would not satisfy the criteria for state heritage significance.

## Land of the Beardies (former hospital complex)

**Table 2-3** provides the assessment criteria for item 1076. This table has been reproduced from the SHI entry for the item. The listing for 1076 did not assigned levels of significance to the individual criteria, so this has been inferred from the available information and added.

Table 2-3: Assessment of heritage significance – Land of the Beardies (former hospital complex)

Criterion	Comments	Significance
а	The former hospital complex is historically associated with the development of Glen Innes developing as a service town and with the development of hospital services to Glen Innes and district. It is also historically linked with the Sydney Doctor Alfred Roberts who designed early hospitals. The building is also historically associated with the noted Inverell architect J.F. O'Connor.	Local
b	Not assessed.	The item does not meet this criterion
C	Aesthetic significance arises from the distinctive Victorian Free Classical style constructed as a single storey building and then a similar building constructed in 1904. The original building is an interesting example of a rural hospital in the late 19th century with a central courtyard. The site has significant archaeological potential arising from the architectural skills of the Glen Innes, Inverell and Sydney architects. The distinctive isolation ward is an asymmetrical building with small windows, French doors and separate sections within the building. It demonstrates the different architectural features of this	Local
	building in contrast to the larger medical wards now used as a museum.	
d	The complex has social and historic value as the Glen Innes Hospital between 1877 and 1956. It also has educational value arising from its development as a local history museum and research centre.	Local
e	Construction of this hospital provides the opportunity to research the development of early colonial hospitals in the Northern Tablelands. The complex provides the opportunity to research and investigate how buildings have been modified to meet the needs for increased accommodation and the need to adapt design for a harsh climate.	Local
f	It is rare that the planning work of the Sydney Doctor. Dr. Alfred Roberts in designing a hospital has survived. It is rare that an isolation ward has survived and the fact that the children's ward was opened as a war memorial. Many district school children contributed to the construction of this ward.	
g	The hospital is representative of the lobbying power of community groups to ensure that a hospital was constructed to meet the needs of Glen Innes and district residents and the role of colonial governments to ensure that hospitals were provided. The isolation ward and children's ward demonstrate how particular patients were isolated and treated separately away from the major complex. Accommodation for nurses would have been made available with thein separate wards.	Local

**Table 2-4** details the assessed significance of existing historic heritage item in accordance with

 the NSW Heritage Office guidelines and the *Burra Charter*.

#### Table 2-4: Historic heritage: assessment of significance for Item 1076.

Site name	Level of significance
Land of the Beardies Museum (former hospital complex)	Local

## 2.8 STATEMENT OF SIGNIFICANCE

The statement of significance for the Land of the Beardies museum is reproduced below:

The former hospital complex has historic, social, cultural, archaeological, architectural, aesthetic, rarity, group, and landmark values. Historical significance arises from its direct association with the provision of health care in Glen Innes and district. Historical and social significance also arises from the relationship between the health committee, the architects, and the noted Sydney Doctor Dr. Alfred Roberts. It is rare that the planning work in hospital design of Dr Roberts has survived. The original building is an interesting example of a rural hospital in the late 19th century within a central courtyard. The site has significant archaeological potential arising from the architectural skills of the work of Sydney and Glen Innes architects. The complex provides the opportunity to research how the buildings have been modified to meet the demand for increased accommodation and the need to adapt design for a harsh climate as well as the architectural skills revealed in the building The hospital is constructed to meet the needs of Glen Innes and district residents and the role of the colonial government to ensure that hospitals are provided.

### 2.9 SUMMARY OF DESKTOP RESULTS

The available information presented indicates that the study area includes one heritage item that is associated with the Land of the Beardies Museum (former hospital complex) listing: the Isolation Ward.

The Isolation Ward, also known as the Spanish Flu Building and identified on hospital plans as GI 04 (Old Maintenance Building), derives its heritage significance from contrasting design elements and identifiable function in relation to the other buildings in the former hospital complex.

# 3 RESULTS OF HISTORIC HERITAGE ASSESSMENT

## 3.1 DESCRIPTION OF THE ASSESSMENT

The study area was inspected by OzArk archaeologist Harrison Rochford on 26 July 2022. Standard archaeological field survey and recording methods were employed in this study (Burke & Smith 2004).

There were no significant constraints to the assessment. The interior of the Old Nurses' Quarters (GI 08) was not accessed as the building has been condemned and access was not permitted for safety reasons. This did not limit the assessment of the proposed impacts to the building.

Three small outbuildings (Gardeners Shed [GI 06], Storage Shed [GI 05] and the Mortuary [GI 03]) were also inspected due to their proximity to the impact footprint of the proposed works and the potential of the proposed works to affect the items at the detailed design phase of the project.



#### Figure 3-1: Aerial showing inspected area during the assessment.

## 3.2 DETAILS OF POTENTIAL HERITAGE ITEMS

#### Old Nurses' Quarters (GI 08)

**Location of item**: Southwest of study area. Corner Ferguson Street and Macquarie Street (Figure 3-2).

**Description of item**: The Old Nurses' Quarters was constructed in 1954 and opened in June 1955. The building was also known as 'Crommelin House' in honour of Beatrice Crommelin, who was matron of the hospital from 1910 to 1945. It is a disused three-storey brick building with cantilevered balconies designed for accommodation and education functions (**Figure 3-3**). The original form of the building was for two storeys with the provision for a third (Fraser 2012: 63).

#### Figure 3-2: Aerial view of the Old Nurses' Quarters from the northeast.




#### Figure 3-3: Views of the Old Nurses' Quarters during the assessment

#### **Isolation Ward (GI 04)**

**Location of item**: Eastern edge of the study area surrounded by carpark and ambulance access (Figure 3-4).

**Description of item**: The single-storey building is constructed of red brick with a steeply pitched galvanised iron gable roof. The gable ends are painted in white, and the roof has white decorative finials above the gable ends (**Figure 3-5**). The construction date is not clear, posited by Arup during the structural due diligence assessment as from the 1890s (Arup 2021:13), however, the SHI entry puts the construction as between 1919 and 1921. Newspaper articles from the period refer to two isolation wards, referring to this stand-alone building and one of the attached wings of the main hospital building used to treat contagious patients.

The building is in fair condition, as the concrete slab is intact and most visible damage is to superficial elements (i.e. plaster and finishes; Arup 2021:13).



Figure 3-4: Aerial view of the Isolation Ward from the northwest.

Figure 3-5: Views of the Isolation Ward during the assessment.





# Storage Shed and Gardener's Shed (GI 05 and GI 06)

**Location of item**: Eastern edge of study area, north of the Isolation Ward (Figure 3-6).

**Description of item**: The utilitarian sheds are constructed in timber with concrete and brick foundations (**Figure 3-7**). The Gardener's Shed is semi-attached to the rear of the kitchen wing of the former hospital complex. Engineering plans from 1930 show the footprint of the Gardener's Shed as a boiler room attached to the kitchen of the former hospital complex (**Figure 3-8**). The freestanding Storage Shed is not visible on the plans.



#### Figure 3-6: Aerial view of the mortuary and sheds from the northwest.



Figure 3-7: Views of the sheds during the assessment.





Isolation Ward is at the top left and the boiler room/Gardener's Shed is at the bottom right. North is to the right. (Source: Department of Public Works NSW 1930)

# Mortuary (GI 03)

Location of item: Centre of study area.

**Description of item**: 1970's brick structure with a tiled roof. The building was formerly used as a mortuary and is currently used for staff accommodation (**Figure 3-9**).

### Figure 3-9: Views of the mortuary during the assessment.



# 3.3 ASSESSMENT OF SIGNIFICANCE

 Table 3-1 provides the assessment criteria for the item.

Item	Criterion	Comments	Significance
	а	The item has not had a significant role in course of NSW or local history	The item does not meet this criterion
	b	The building was named to honour the services of matron Beatrice Crommelin. However, this naming does not tie the building to her works which are more clearly associated with the former hospital complex.	The item does not meet this criterion
	c	The functional mid-century design of the Old Nurses' Quarters does not have significant aesthetic values	The item does not meet this criterion
Old Nurses' Quarters (GI 08)	d	The item does not have special associations for particular community groups.	The item does not meet this criterion
	e There is low potential for the item to yield research value.		The item does not meet this criterion
	f	The mid-century public service building is not a rare item.	The item does not meet this criterion
	<b>g</b> The item is not an important example of a type or class of heritage items.		The item does not meet this criterion
Storage Shed (GI 05)	a	The item has not had a significant role in course of NSW or local history	The item does not meet this criterion

#### Table 3-1: Assessment of heritage significance

Item	Criterion	Comments	Significance
	b	The item has no known associations with significant individuals	The item does not meet this criterion
	c	The utilitarian building does not have significant aesthetic values	The item does not meet this criterion
	d	The item does not have special associations for particular community groups.	The item does not meet this criterion
	e	There is low potential for the item to yield research value.	The item does not meet this criterion
	f	The shed is not a rare item across the state or local area.	The item does not meet this criterion
	g	The item is not an important example of a type or class of heritage items.	The item does not meet this criterion
	а	The item is associated with the former hospital complex and has associative values with the listed item	Local (associative)
	b	The items have no known associations with significant individuals	The item does not meet this criterion
	c The utilitarian buildings do not have significant aesthetic values		The item does not meet this criterion
Gardeners Shed (GI 06)	d	The item is associated with the former hospital complex and has associative values with the listed item	Local (associative)
	e	There is low potential for the items to yield research value.	The item does not meet this criterion
	f	The item is not rare across the state or local area.	The item does not meet this criterion
	g	The item is associated with the former hospital complex and has associative values with the listed item	Local (associative)
	a	The mortuary has not had a significant role in course of NSW or local history	The item does not meet this criterion
	b	The item has no known associations with significant individuals	The item does not meet this criterion
	c	The utilitarian building does not have significant aesthetic values	The item does not meet this criterion
Mortuary (GI 03)	d	The item does not have special associations for particular community groups.	The item does not meet this criterion
	e	There is low potential for the items to yield research value.	The item does not meet this criterion
	f	While the freestanding mortuary building is not a common building type, its rarity is not associated with a significant aspect of cultural or natural history.	The item does not meet this criterion
	g	The items are not an important example of a type or class of heritage items.	The item does not meet this criterion

**Table 3-2** summarises the assessed significance of potential heritage items at the study area in accordance with the NSW Heritage Office guidelines and the *Burra Charter*.

Site name	Level of significance
Isolation Ward (part of Land of the Beardies Museum [former hospital complex]) (GI 06)	Local
Gardeners Shed (GI 06 [part])	Associative (local)
Old Nurses' Quarters (GI 08)	None
Storage Shed (GI 05)	None
Mortuary (GI 03)	None

Table 3-2: Historic heritage: assessment of significance.

# 3.4 DISCUSSION

As summarised in **Section 2.9**, the heritage values at the study area derive significance from their association with the Land of the Beardies Museum/former hospital complex. The site inspection determined that most buildings that comprise the modern hospital complex do not have significant heritage values. The Old Nurses' Quarters and Mortuary are mid-century functional buildings that do not have historic or aesthetic associations with the former hospital complex.

The Gardener's Shed is semi-attached to the kitchen of the former hospital complex and appears to have been constructed prior to 1930. It has an appreciable association with the former hospital complex, despite a change of use from a boiler room. It has therefore been assigned associative significance in **Table 3-2**, despite the item itself not expressing significant heritage values. It is understood that the Gardener's Shed is on the same lot as the Land of the Beardies (former hospital complex) item and will not be impacted by the project.

The Storage Shed appears to postdate the 1930 engineering diagrams (**Figure 3-7**) and has a less clear functional association with the former hospital and is not considered to have significant heritage values.

The Isolation Ward is part of the Land of the Beardies (former hospital complex) local heritage listing (1076). The original function of the building as an isolation ward for the former hospital complex can appreciated from its design features and current condition. Modifications, such as the fibro lean-to, and wear to the building have not significantly reduced the potential for the heritage values of the site to be appreciated.

# 3.5 ARCHAEOLOGICAL ASSESSMENT

The study area has been progressively landscaped as new buildings and car parks have been installed across the hospital complex. Historical plans do not indicate that significant structures that have now been demolished are present within the study area. Further, the potential for undocumented structures within the study area is low because the early phases of the Glen Innes hospital are to the east of the study area at the former hospital complex.

The likelihood of any habitation deposits associated with the Isolation Ward is thought to be low due to constant reuse of the site and the solid concrete slab construction that is not conducive to retaining archaeological artefacts beneath the current footprint of the building.

# 3.6 LIKELY IMPACTS TO HISTORIC HERITAGE FROM THE PROJECT

**Table 3-3** details the anticipated impacts to historic heritage item from the project.

Item name	Will this site be impacted?	
Isolation Ward (part of Land of the Beardies Museum [former hospital complex]) (GI 04)	Yes	
Old Nurses' Quarters (GI 08)	Yes	
Gardeners Shed (GI 06 [part])	No	
Storage Shed (GI 05)	Possible	
Mortuary (GI 03)	Possible	

#### Table 3-3: Historic heritage: impact assessment.

# 3.7 ANALYSIS OF THE PROPOSED WORKS

#### 3.7.1 Demolition of the Old Nurses Quarters

As outlined in **Section 3.4**, the Old Nurses Quarters does not meet the criteria for heritage listing. The existing three-storey Old Nurses' Quarters does not interact with the view to the Land of the Beardies Museum from its key eastern vantage point from West Avenue. The removal of this structure will not have a negative impact on the heritage values associated with the Land of the Beardies (former hospital complex) heritage item.

The risk of harm the Land of the Beardies (former hospital complex) resulting from vibration and noise impacts associated with the demolition of the Old Nurses Quarters has been assessed in MAC 2022. The assessment identified that the Land of the Beardies (former hospital complex) heritage item is located beyond the minimum working distances for all plant items that pose a risk of harm to heritage structures (MAC 2022: 27-31). It was recommended that a review of construction methods be conducted if works were required within the safe working distances from the Land of the Beardies (former hospital complex) heritage item and that vibration monitoring be completed throughout the works (MAC 2022: 33).

### 3.7.2 Demolition of the Isolation Ward

The proposed works will result in the removal of the Isolation Ward, which is a heritage item with local significance that contributes to the interpretation of the Land of the Beardies (former hospital complex) listing. The demolition of the Isolation Ward will allow for the unconstrained construction a large multi-purpose hospital facility that will provide all the services identified by the Clinical Services Plan. Removal of the Isolation Ward also allows the provision for future site development at the northeast of the site.

This report accepts that the demolition of the Isolation Ward is optimal from a public health infrastructure perspective. It should also be considered that the heritage values of the Isolation Ward are derived from the provision of public health services to the community and its demolition will allow for these services to be effectively delivered in the future.

However, from a heritage perspective, the proposal does not offer any opportunities to conserve the heritage values of the site. While it is appreciated that the removal of the building allows for greater freedom to design and construct an optimised multi-purpose facility, the current plans show the building being removed to be replaced by a car park. If this is the proposed impact at the location of the Isolation Ward, then demolition of the item is difficult to support from a heritage management point of view. It is recommended that further consideration for retention of the item be explored during the detailed design phase.

Should retention of the Isolation Ward be unfeasible or unreasonable, the impacts to the heritage values because of the proposal will be partially mitigated. While demolition of the Isolation Ward is not the ideal heritage outcome, the heritage values associated with former hospital have been effectively conserved by the Land of the Beardies Museum. The significant fabric of the former hospital complex has been conserved in exceptional condition by the historical society and the historical themes of the site are presented engagingly. In this context, the heritage impact of one of the components of the former hospital complex being lost to facilitate the ongoing provision of health services on the site is less acute. If the exterior features of the Isolation Ward were archivally recorded prior to the demolition, then establishing an interpretation plan with the Land of the Beardies Museum would provide an advantageous outcome partially mitigating the harm to heritage items currently at the Isolation Ward or key exterior fabric, such as the distinctive finials, in an exhibit.

At its closest point, the Isolation Ward is located 10-15 m from the other items that constitute the Land of the Beardies (former hospital complex) heritage item. This places potential demolition works at the Isolation Ward within the minimum working distances for some plant items (MAC 2022: 32). As per the recommendations of MAC (2022), appropriate selection of final vibratory plant for the demolition tasks at this location must be made and vibration monitoring undertaken.

# 4 STATEMENT OF HERITAGE IMPACT

The NSW Heritage Manual poses a series of questions that comprise the minimum information to form a SOHI which is required to properly address proposals impact items of heritage significance. The following assessment refers to the removal of the Isolation Ward (GI 04) and the construction of the new hospital building adjacent to the Land of the Beardies (former hospital complex) local heritage item.

Other items noted in **Section 3.2** (Old Nurses' Quarters, Mortuary etc) are not discussed here as they have been assessed as not having heritage values that would be protected by the Heritage Act.

### 4.1 DEMOLITION OF A BUILDING OR STRUCTURE - ISOLATION WARD (GI 04)

This section considers the implications associated with the planned demolition of the Isolation Ward which is part of the I076 listing for the former hospital complex.

#### Have all options for retention and adaptive re-use been explored?

The Master Planning for the project considered a wide range of options to deliver the aims of the hospital upgrade project. The preferred option (referred to as Option 5 during the planning process) originally aimed to retain the Isolation Ward but was redesigned as removal of a functional modern building (GI 07) was avoided.

The building has been previously adaptively reused as a COVID-19 testing clinic. However, ongoing reuse of the small building that is in poor operational condition has not been considered desirable as the project aims to deliver long-term positive health management outcomes.

# Can all of the significant elements of the heritage item be kept and any new development be located elsewhere on the site?

Relocation of the building is unlikely to be possible and is not considered warranted given the local level of heritage significance and the difficulties of relocating buildings. No significant moveable heritage items were identified during the assessment that could represent the building after its demolition.

The Land of the Beardies History House and Museum and Research Centre should be afforded the opportunity to determine if any heritage items at the Isolation Ward could contribute to their exhibitions.

# Is demolition essential at this time or can it be postponed in case future circumstances make its retention and conservation more feasible?

In the view of NSW Health Infrastructure, the Isolation Ward is not fit for repurposing and demolition is essential for the delivery of the preferred Master Plan option.

# Has the advice of a heritage consultant been sought? Have the consultant's recommendations been implemented? If not, why not?

Yes, this report is advice of an independent heritage consultant, and its recommendations will be implemented.

# 4.2 NEW DEVELOPMENT ADJACENT TO A HERITAGE ITEM - LAND OF THE BEARDIES (FORMER HOSPITAL COMPLEX)

This section considers the impact of the new building footprint to the main elements of the listed Land of the Beardies Museum (Former Hospital Complex).

# How is the impact of the new development on the heritage significance of the item or area to be minimised?

The single-storey design of the new development has significantly reduced the potential impact of the project on the heritage values of the adjacent Land of the Beardies (former hospital complex) local heritage item.

The slope and aspect to the Land of the Beardies Museum also limits the potential visibility of the new development. The existing three-storey Old Nurses' Quarters does not overshadow or negatively affect the view to the Land of the Beardies Museum from its key eastern vantage point from West Avenue. **Figure 4-1** provides a representation of the new works to the Land of the Beardies Museum (buildings to the east of the proposed building footprint) and a representative view to the Land of the Beardies Museum from the west.

### Why is the new development required to be adjacent to a heritage item?

The Land of the Beardies (former hospital complex) local heritage item derives its heritage significance from its previous function as the Glen Innes Hospital. The new development and the current hospital campus share the site with the heritage item. The relationship between former and current hospitals does not negatively impact the heritage values of the item.

# How does the curtilage allowed around the heritage item contribute to the retention of its heritage significance?

The eastern section of the heritage item curtilage is an important part of its heritage significance as it conserves the key view to the item and houses outdoor exhibits. The new development is to the west of the heritage curtilage and will not impinge on the item.

### How does the new development affect views to, and from, the heritage item?

There will be a negligible impact on the views to and from the heritage item. The key eastern vantage point will not be impacted and there are no significant views from the heritage item to the west, where the new development is located.

#### What has been done to minimise negative effects?

The main heritage curtilage of the Land of the Beardies (former hospital complex) local heritage item has been avoided. The visual impact of the new development has been considered during the Master Plan development and the single-storey design will effectively minimise impacts.

# Is the development sited on any known, or potentially significant archaeological deposits? If so, have alternative sites been considered? Why were they rejected?

No, the potential for significant archaeological deposits at the site has been assessed as low.

# Is the new development sympathetic to the heritage item? In what way (e.g. form, siting, proportions, design)?

The siting of the new development to the west of the heritage item will lead to sympathetic design by minimising the potential crowding or overshadowing of the heritage item. The development will employ sympathetic design principles under its commitment to 'Design for the Neighbourhood and Surrounding Environment' which aims to create a positive contribution to surrounding environment.

### Will the additions visually dominate the heritage item? How has this been minimised?

The visual impact of the new development has been considered during the Master Plan development and the single-storey design will effectively minimise impacts.

#### Will the public, and users of the item, still be able to view and appreciate its significance?

Yes, public access to the heritage item will not be hindered in any way. The views to the item and its heritage significance will not be negatively impacted.



#### Figure 4-1: Master Plan elevations and view to main building of the Land of the Beardies Museum.



2. View west up the slope on which the Land of the Beardies Museum (right) is located. The white chimneys of the Isolation Ward are visible in the background. From this vantage point, the three-storey Old Nurses' Quarters, that is located beyond the Isolation Ward, cannot be seen, indicating that the one-storey building proposed to be constructed will not have an appreciable visual impact.

# 5 MANAGEMENT RECOMMENDATIONS

The Statement of Heritage Impact has determined that the proposed works will have a negative impact on the heritage values that are present within the study area. The Isolation Ward that will be demolished as part of the project has local heritage significance as a part of the Land of the Beardies (former hospital complex) listing on the Glen Innes-Severn LEP.

Recommendations concerning the historic values relevant to the study area are as follows.

- There are no constraints from a heritage perspective related to the demolition of the Nurses' Quarters. This structure may be demolished without further investigation and the record of the building in this report is considered sufficient to record the structure.
- 2. The detailed design phase of the project should fully explore retention of the Isolation Ward building and suitable adaptive re-use in the future hospital.
- 3. If retention of the Isolation Ward is deemed to be unfeasible due to (for example) a lack of suitable adaptive re-use opportunities or an unreasonable restriction to the design of the new hospital facilities, then the following mitigation measures should be undertaken prior to demolition:
  - Archival photographic recording of the building should be carried out to provide a record of the Isolation Ward's main features and heritage values for future generations. Copies of this archival record should be provided to Glen Innes-Severn Shire Council and the Glen Innes and District Historical Society.
  - An interpretation plan should be developed with Glen Innes and District Historical Society and the Land of the Beardies History House Museum and Research Centre. The plan should include opportunities and policies to conserve any moveable heritage items or physical fabric that can be reasonably retained and exhibited at the museum.
- 4. The recommendations of the construction noise and vibration assessment (MAC 2022) undertaken for the proposal must be implemented, including minimum working distances and vibration monitoring as described in **Section 3.7**.
- Although the risk of the project affecting archaeological deposits at the study area has been assessed as low, the Unanticipated Finds Protocol (Appendix 1) should be followed if potential significant heritage items are encountered during construction.
- As the project will impact a heritage item (I076) on the Glen Innes-Severn LEP, this SOHI and determined Review of Environmental Factors (REF) for the project should be sent to Glen Innes-Severn Shire Council for their consideration.

# References

ARUP 2021	Arup Australia 2021. <i>Due Diligence and 3D Photogrammetry Rural Hospitals</i> – <i>Glen Innes</i> . Report to Health Infrastructure NSW.
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Heritage Council 2006	Historical Archaeology Code of Practice. Heritage Council of New South Wales and the NSW Government Department of Planning.
MAC 2022	Muller Acoustic Consulting 2022. <i>Construction and Operational Noise and Vibration Impact Assessment: Glen Innes Hospital Upgrade.</i> Report to Health Infrastructure NSW.
NSW Heritage Office 2001	Assessing heritage significance. NSW Heritage Manual 2.

# **APPENDIX 1: HISTORIC HERITAGE: UNANTICIPATED FINDS PROTOCOL**

A historic artefact is anything which is the result of past activity not related to the Aboriginal occupation of the area. This includes pottery, wood, glass, and metal objects as well as the built remains of structures, sometimes heavily ruined.

Heritage significance of historic items is assessed by suitably qualified specialists who place the item or site in context and determine its role in aiding the community's understanding of the local area, or their wider role in being an exemplar of state or even national historic themes.

The following protocol should be followed if previously unrecorded or unanticipated historic objects are encountered:

- 1. All ground surface disturbance in the area of the finds should cease immediately, then:
  - The discoverer of the find(s) will notify machinery operators in the immediate vicinity of the find(s) so that work can be halted
  - 2. The site supervisor will be informed of the find(s).
- 3. If finds are suspected to be human skeletal remains, then NSW Police must be contacted as a matter of priority.
- 4. If there is substantial doubt regarding the historic significance for the finds, then gain a qualified opinion from an archaeologist as soon as possible. This can circumvent proceeding further along the protocol for items which turn out not to be significant. If a quick opinion cannot be gained, or the identification is that the item is likely to be significant, then proceed to the next step.
- Notify Heritage NSW as soon as practical on (02) 9873 8500 (heritagemailbox @environment.nsw.gov.au), providing any details of the historic find and its location.
- If in the view of the heritage specialist or Heritage NSW that the finds appear <u>not</u> to be significant, work may recommence without further investigation. Keep a copy of all correspondence for future reference.
- 7. If in the view of the heritage specialist or Heritage NSW that the finds appear to be significant, facilitate the recording and assessment of the finds by a suitably qualified heritage specialist. Such a study should include the development of appropriate management strategies.
- 8. If the find(s) are determined to be significant historic items (i.e. of local or state significance), any re-commencement of ground surface disturbance may only resume following compliance with any legal requirements and gaining written approval from Heritage NSW.



REPORT TO

HI

ON GEOTECHNICAL INVESTIGATION

FOR

**PROPOSED ALTERATIONS AND ADDITIONS** 

AT

94 TAYLOR STREET, GLEN INNES, NSW

Date: 19 August 2022 Ref: 35093URrpt

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#### **ATTACHMENTS**

East West Enviroag Pty Ltd 'California Bearing Ratio Report Sheets (Report No. EW225313-1 and 2) East West Enviroag Pty Ltd 'Soil Classification Test Report' (Report No. EW225313-3). East West Enviroag Pty Ltd 'Analysis Report Soil' (EW221210 Report No. 1) Table A: Flexible Pavement Thickness Recommendations Borehole Logs 1 to 6 Test Pit Logs 1 and 2 Figure 1: Site Location Plan Figure 2: Test Location Plan Figure 3: Graphical Borehole and Test Pit Summary (BH6, BH5, BH3, TP3 and BH2) Figure 4: Graphical Borehole and Test Pit Summary (TP5, TP6, BH7, BH4, TP2, BH1 and TP1) Report Explanation Notes



# **1** INTRODUCTION

This report presents the results of a geotechnical investigation for the proposed alterations to Glenn Innes Hospital, 94 Taylor Street, Glenn Innes, NSW. The location of the site is shown in Figure 1. The investigation was commissioned by Health Infrastructure (Contract No. HI22038GI and Variation No. 1) via email dated 2 May 2022. The commission was on the basis of our fee proposals (Ref. P56125UR) dated 9 September 2021 and (Ref. P56125UR Variation No 1) dated 30 May 2022.

We have been provided with the following relevant information:

- Survey plan (Reference Number 22/0056 Rev. 2, dated 10 June 2022) prepared by Monteath & Powys.
- Masterplan for Glenn Inness Hospital Upgrade (Ref. MP-100 to MP-108) prepared by Fulton Trotter Architects.
- Architectural drawing (Drawing Number 7104GI02-FS1003 Rev. 1, dated 2 August 2022) prepared by Fulton Trotter Architects.

Based on a review of the provided information and additional information provided by Rory Dale (Northrop), and John Ward (Fulton Trotter Architects), we understand that the proposed alterations and additions will include:

- A new single storey light-weight steel frame building over the south-west corner of the hospital grounds and a single storey link structure extending north to the existing Main Hospital Building. Due to the variation in site surface levels, it is currently proposed that that the southern portion of the new building is likely to comprise a stiffened on-grade raft slab possibly locally requiring raising of surface levels to form a building platform with engineered fill. The northern portion of the slab is likely to comprise a slab suspended between strip footings supporting masonry walls with sacrificial formwork ('Bondek' or similar) used to support the slab. A new lift and staircase will be situated to the north of the proposed building. Existing mature trees over the south-western portion of the site will remain.
- Additional car parking areas and access roads will be provided to the south and east of the proposed building. The design traffic loading for the car parks and access roads has been assumed to be 1 x 10<sup>5</sup> ESA's (Equivalent Standard Axles).
- Design surface levels have not been provided but we understand that there will be a number of retaining walls formed as well as permanent batter slopes; we have assumed excavation and raising of site surface levels by a maximum of about 1m depth or height, respectively. We also understand that the intent is to achieve balanced cut and fill earthworks.

The purpose of the investigation was to obtain geotechnical information on the subsurface conditions, and to use this as a basis for providing comments and recommendations on the geotechnical aspects of the proposed development, such as demolition and excavation, measures to reduce vibrations, temporary and permanent cut and fill batter slopes, retention design and suitable retention systems (together with advice on geotechnical related construction aspects), site classification to AS2870-2011, footing design, earthquake site classification to AS1170.4 – 2007, earthworks, pavement design parameters, pavement materials, a flexible pavement thickness design, any slope stability issues and suitable methods to improve stability, if required.



This geotechnical investigation was carried out in conjunction with an environmental site assessment by our environmental division, JK Environments (JKE). Reference should be made to the separate reports by JKE, Ref: E35093UPDrpt, dated August 2022 and E35093BTrpt-HAZ, dated August 2022, for the results of the environmental site assessments.

# 2 INVESTIGATION PROCEDURE

The investigation included:

- A desk top study of available geotechnical and geological mapping, soil landscape information, other published information (where available), our database of nearby investigations and historical aerial imagery in order to identify any risks in relation to the expected geology, soils and instability.
- A subsurface investigation including:
  - Six boreholes (BH1 to BH6) auger drilled using a TS350 drill rig to refusal depths between 1.3m and 4.2m. BH6 was extended from the auger refusal depth of 1.3m to a final depth of 3.12m using NMLC diamond coring techniques and water flush. However, very little core sample was recovered.
  - Two test pits (TP1 and TP2) excavated using a bucket attachment to a 5 tonne excavator to 1.1m depth. The test pits were primarily excavated for environmental investigation purposes.

Prior to the commencement of the fieldwork, the test locations were scanned using electro-magnetic equipment for the presence of buried services by a specialist sub-contractor.

The test locations, as shown on the attached Figure 2, were set out by taped measurements from existing surface features and were situated as close as practicable to the test locations nominated by Northrop. The approximate surface RLs at the test locations were interpolated between spot levels and contours shown on the provided survey plan. The attached Figure 2 is based on aerial imagery sourced from 'Sixmaps' with the outline of the proposed new building and connecting structure superimposed. The survey datum is the Australian Height Datum (AHD).

The compaction of the fill and the strength of the residual clay soils were assessed from the Standard Penetration Test (SPT) 'N' values, augmented by the results of hand penetrometer readings on the cohesive soil samples recovered in the SPT split tube and sides of test pits. The strength of the bedrock was assessed from observation of drilling resistance when using a tungsten carbide ('TC') bit and examination of the recovered rock cuttings. The assessment of rock strength in this way is approximate, and variations of about one order of strength should not be unexpected.

Groundwater observations were made in the boreholes and test pits during and on completion of auger drilling and excavation. No longer term ground monitoring has been carried out.

The fieldwork for the investigation was carried out under the direction of RGS Geotechnical Engineers, who were present full-time on site, and set out the test locations, directed the buried services scan, logged the





encountered subsurface profile, and nominated in-situ testing and sampling. The borehole and test pit logs (which include field tests and groundwater observations) are attached, together with a glossary of logging terms and symbols used.

Selected soil samples were returned to the East West Enviroag Pty Ltd (EWEPLP) NATA registered laboratory for moisture content, Atterberg Limits, linear shrinkage, Standard compaction and four day soaked CBR testing and soil pH, chloride and sulfate content and resistivity testing. The results are summarised on the attached EWEPLP 'Soil Classification Test Report' (Report No. EW225313-1, dated 6 July 2022), 'California Bearing Ratio Report Sheets' (Report No. 2022EW225313-1 and 2, dated 11 July 2022) and 'Analysis Report Soil' (Report No. 1, dated 6 July 2022).

# **3** RESULTS OF INVESTIGATION

#### 3.1 Desk Top Study

Reference to the Grafton 1:250 000 scale geological map and the report (Ref. LS032438 EP, dated 20 May 2022) prepared by Lotsearch Pty Ltd (LPL) for the JKE assessment indicates that the site is underlain by Tertiary age Maybole Volcanics comprising basalts.

Based on the available soil mapping summarised in the LPL report the soil landscape comprises Vertosols (soils containing a high content of expansive clay minerals) with the soil landscape principally comprising valley plains with dark 'cracking' clays.

Based on our experience the geology of the area, including our geotechnical investigation for the nearby proposed ambulance station, the subsurface profile is expected to comprise residual clays overlying basalt bedrock at shallow to moderate depth.

The drillers log information from the registered bores within a 500m radius of the site typically identified sandy or gravelly clay soils overlying basalt bedrock from depths of about 3.5m and 9.0m. Standing water levels in the bores ranged between 3.0m and 5.0m depth.

### 3.2 Site Description

The site is situated within the grounds of Glen Innes Hospital which is located within gently undulating topography towards the crest of a hillside that slopes down to the north-east at a maximum of approximately 4°. The hospital site has western, southern, eastern and northern frontages respectively onto Macquarie Street, Ferguson Street, West Avenue and Taylor Street.

At the time of the fieldwork the hospital site contained a number of single to three storey brick buildings and metal or weatherboard clad sheds, with grass covered surrounds and asphaltic concrete paved access roads and parking areas and concrete paved walkways.



In places, buildings had been constructed on flat building platforms excavated into the slopes with cut faces formed typically at a maximum of about 45° with a sparse cover of vegetation in places. Small to large trees were scattered throughout the site and in places planter beds were supported by low height brick retaining walls.

### 3.3 Subsurface Conditions

The boreholes and test pits have disclosed a generalised profile comprising a variable thickness of fill overlying residual silty clays with weathered basalt bedrock encountered at shallow to moderate depth. It appears the transition from residual clays to bedrock is quite gradational in this case with corestones likely increasing in size and proportion with depth. For such a case, referring to a 'bedrock surface' is therefore not useful as a descriptor. Groundwater was not encountered within the depth of the investigation. Reference should be made to the attached borehole and test pit logs for specific details at each location. A summary of the pertinent subsurface characteristics is presented below and a graphical summary of the subsurface profile along two sections orientated east-west and north-south are presented as Figures 3 and 4, respectively.

#### Topsoil

Silty clay topsoil assessed to be of medium plasticity was encountered in BH3 and was 0.15m thick.

#### Fill

Silty clay fill assessed to be of medium to high plasticity with varying gravel and cobble content was encountered from surface level in BH1, BH4, BH5, BH6, TP1 and TP2 and extended to depths between 0.2m and 0.6m.

Due to the limited thickness of fill encountered SPT testing was not carried out. However, in the absence of formal records of placement and density test results, the fill is regarded as 'uncontrolled' as defined in AS2870-2011 'Residential slabs and footings'.

#### **Residual Clays**

Residual silty clays of medium and high plasticity and with varying basalt and sandy clays with a variable gravel and cobble sized inclusions of basalt were encountered below the fill, topsoil or from surface level in all the boreholes and test pits. On first contact, the residual clays were of stiff or stiff to very stiff strength and generally improved to very stiff or hard strength with depth. Below 2.5m depth in BH5 bands of extremely weathered basalt were noted. Both test pits were terminated at 1.1m depth in the residual clays and BH2, BH4 and BH5 were terminated in the residual clays at 'TC' bit refusal depths of 1.6m, 2.2m, 3.2m and 1.3m, respectively. 'TC' bit refusal has been inferred to indicate either medium to high strength basalt clay profile or the bedrock surface. In this regard we note that 'TC' bit refusal in BH6 at 1.3m depth indicated the top surface of the weathered basalt.



#### Weathered Basalt

Extremely weathered basalt material assessed to be of hard strength gravelly clays of low to medium plasticity were encountered in BH1, BH3 and BH6 at respective depths of 1.0m, 4.0m and 1.3m. The 'TC' bit refusal at 1.3m (BH1) and 4.2m (BH3) may be interpreted as representing bands of basalt bedrock or limited thickness corestones of at least medium to high strength. In this regard we note that BH6 was extended beyond the 'TC' bit refusal depth of 1.3m using diamond coring techniques to 3.12m and an extremely weathered profile was encountered which contained inclusions of medium to high strength basalt (likely to be corestones).

#### Groundwater

All the boreholes and test pits were 'dry' during and on completion of auger drilling or excavation, respectively. Groundwater levels may not have stabilised over the relatively short observation period. No long-term groundwater level monitoring was carried out.

### 3.4 Laboratory Test Results

Based on the Liquid Limit and Linear Shrinkage determination, the samples of residual silty clay tested from BH3, BH4 and BH5 were of medium to high plasticity with an assessed moderate potential for shrink/swell reactivity with changes in moisture content.

The four day soaked CBR values of the residual silty clay samples from BH2 and BH3 returned respective values of 3.5% and 4.5% when compacted to 100% of Standard Maximum Dry Density (SMDD) and surcharged with 4.5kg. The natural moisture content of the samples tested in BH2 and BH3 were respectively 3.75% and 2.2% 'wet' of the Standard Optimum Moisture Contents (SOMC).

Borehole	Depth (m)	Sample Type	рН	Sulphates SO₄ (ppm)	Chlorides Cl (ppm)	Resistivity (ohm.cm)
ВНЗ	2.5-2.95	Silty Clay RESDIUAL	5.93	5.16	107	50
BH4	1.5-1.95	Silty Clay RESDIUAL	5.99	5.59	29.5	25

The results of the soil aggression testing are tabulated below:

### 4 COMMENTS AND RECOMMENDATIONS

#### 4.1 Site Preparation

### 4.1.1 Dilapidation Surveys

Prior to site preparation works Council may require that dilapidation survey reports be completed on their assets lining the street frontages, i.e. the paved footpaths, roadways, kerbs and gutters. We recommend



that the property owners be asked to confirm that the reports present a fair record of existing conditions as the reports may assist the client in defending themselves from unfair damage claims.

#### 4.1.2 Demolition and Excavation

Site preparation will require demolition of selected existing buildings, structures and paved surfaces, stripping of topsoil and/or root affected soils and removal of the existing uncontrolled fill. Any obviously deleterious or contaminated natural soils should also be removed in accordance with the advice presented in the JKE report. The stripped contaminated materials should be taken off-site as they are not suitable for re-use as engineered fill.

The topsoil and/or root affected soils may also be separately stockpiled and used for subsequent landscaping purposes. The existing clayey fill will not be suitable for re-use as engineered fill without moisture conditioning or possibly lime stabilisation, and if either of these actions are not undertaken should be removed from site.

Tree root systems dry out the surrounding clayey soils and their removal will result in localised moisture recovery leading to swelling which may have a detrimental impact on the performance of nearby buildings and paved surfaces founded/supported in the clayey soil profile within the site. Therefore, trees should only be removed where absolutely necessary and as soon as practicable, in order for the moisture content of the clayey subsoils to recover; ideally this would be years in advance of construction though we understand this is not practical here. The same applies to the demolition of existing structures and pavements within the building footprint as these also result in abnormal moisture conditions.

Localised excavations to a maximum depth of about 1.0m have been assumed to be required to achieve the design surface levels and elsewhere engineered fill will need to be placed to raise site surface levels (maximum assumed height of about 1.0m).

Demolition, localised excavations and the earthworks will need to be carefully completed in order to maintain the stability of the adjacent sections of existing hospital buildings and structures that will remain. In this regard, excavations should not extend below a line drawn downward from any footing at 1V in 2H unless temporary shoring is installed, although this is unlikely to be required. This work will need to be completed using suitably experienced (and insured) contractors.

Where required to achieve design surface levels, excavations will encounter the fill and residual clays which we expect to be readily achievable using tracked excavators. However, locally low (or higher) strength basalt cobbles and possibly bands of similar strength basalt in the residual clays may be encountered.

We do not recommend that rock breakers be used for demolition and/or removal of low (or higher) strength basalt cobbles and possibly bands of similar strength basalt in the residual clays close to existing buildings or structures as they could be adversely affected by ground vibrations. We recommend that the removal of concrete paved surfaces, floor slabs and footings be completed using a diamond saw followed by removal of the concrete pieces using ripping tyne and bucket attachment to the tracked excavator. Where access is





restricted hand-held equipment, including demolition saws, may be required. Where basalt cobble and/or bands of basalt in the residual clays are encountered we recommend the use of a ripping tyne attachment to the tracked excavator and/or over excavation to facilitate their removal.

If rock breakers are proposed to be used during demolition and/or removal of low (or higher) strength basalt cobbles and possibly bands of similar strength basalt in the residual clays, then further advice should be sought regarding the need for quantitative vibration monitoring.

### 4.1.3 Seepage

Groundwater seepage was not encountered within the depth of the investigation. However, some ephemeral seepage inflows may be encountered in the excavations, particularly after periods of heavy rain.

In general, we expect that inflows, if any, to be very small and managed by conventional sump and pump techniques or gravity drainage. Inspection and monitoring of groundwater seepage during excavation is recommended, so that any unexpected conditions, which may be revealed can be incorporated into the drainage design.

#### 4.1.4 Temporary Batters

Temporary excavation batter slopes through the clayey soil profile no steeper than 1V in 1H are considered to be appropriate, provided surcharge loads such as from plant and stockpiles of material are kept well clear of the crests of the temporary batter slopes, say at least 1.5m back. These temporary batters are expected to be achievable within the site geometry. Steeper (sub-vertical) temporary soil batters may be considered in the clay fill or natural clays, say for trench excavations, but would only be feasible for cut faces of less than about 1.0m height (or 1.5m height if no site personnel are required to access the trench) and on condition no structures were located within a horizontal distance equivalent to at least twice the vertical height of the cut and the retaining walls were constructed or trenches backfilled as soon as practicable. With regard to service trenches, if there are concerns regarding the stability of existing buildings and structures in close proximity to the sub-vertical trench excavations, a temporary trench shoring system would be required and would also be necessary if sub-vertical batters are preferred and proposed trench depths are in excess of 1.0m and need to be accessed by site personnel.

### 4.2 Earthworks

The following earthworks recommendations should be complemented by reference to AS3798-2007 "Guidelines on Earthworks for Commercial and Residential Developments".

Following site preparation as outlined in Section 4.1 above, the subgrade of the proposed buildings will comprise moderately reactive, medium to high plasticity residual clays. We assume that the new car park areas and access roads will typically be formed at similar surface levels to the adjacent pavements and/or existing area of the hospital grounds, with localised areas of cut or fill (maximum 1.0m depth and height).



Based on the investigation results and following site preparation as outlined in Section 4.1 above, the proposed building will be constructed over a subgrade comprising reactive residual clays and the proposed car park and access road pavements constructed over a subgrade comprising reactive residual clays and engineered fill where site surface levels are proposed to be raised. Further discussion of reactive soil movements is presented in Section 4.4.1 below.

# 4.2.1 Site Drainage

The clayey soils at the site are expected to undergo substantial loss in strength when wet. Furthermore, based on our investigation results and the presence of trees, the residual clay soil subgrade is expected to have an extreme shrink-swell reactive potential. Therefore, it will be important to provide good and effective site drainage both during construction and for long-term site maintenance. The principle aim of the drainage is to promote run-off and reduce ponding. A poorly drained clayey subgrade may become un-trafficable when wet, and consideration should be given to providing a crushed rock or crushed concrete working platform to minimise delays following rainfall. The earthworks should be carefully planned and scheduled to maintain good cross-falls during construction.

Good surface and subsurface drainage must also be provided post construction to improve the long-term performance of the buildings and external paved areas.

# 4.2.2 Subgrade Preparation

Following excavation to design levels and stripping of surface materials as described in Section 4.1.2 above, the exposed soil subgrade should be inspected by an experienced geotechnical engineer. In general, the soils have moisture contents in excess of their plastic limits and it is possible that heavy rollers may get 'bogged'. Following inspection by the geotechnical engineer proof rolling should then be carried out where the subgrade is deemed suitable using a small (8 tonne) smooth drum roller operated in the static (non-vibration) mode under the direction of the geotechnical engineer in order to detect any unstable or soft areas. Where access is restricted, say at the margins of the site areas close to existing buildings and structures, we expect that proof rolling will be completed using a small (say 3 tonne) smooth drum roller.

If soft or heaving areas are detected during the geotechnical inspection or the proof rolling, they should be locally removed to a stable base and replaced with engineered fill, as outlined in Section 4.2.3 below, or further geotechnical advice should be sought. Further guidance on the treatment of heaving areas must be provided by the geotechnical engineer during or following the proof rolling inspection.

Alternatively, it may be preferred to treat any thicker or more laterally extensive poor subgrade areas (if encountered) using a 'bridging layer' which would involve over-excavating material by about 0.5m, then placing, tracking and rolling in a thin layer of hard/durable well graded angular 75mm to 150mm (with <10% 'fines') select fill and with subsequent layers placed until no more granular fill can be tracked into the subgrade. The area may then be static proof rolled (as described above) at least 24 hours after placing the select fill 'bridging' layer under the direction of a geotechnical engineer. Following satisfactory completion



of the rolling of the 'bridging layer', engineered fill may then be placed in thin layers without vibration due to the potential for pumping of 'fines', to achieve design surface levels.

If soil softening occurs after rainfall, then the subgrade should be over-excavated to below the depth of moisture softening and replaced with engineered fill. Conversely, if a clayey subgrade exhibits shrinkage cracking, then the surface should be lightly watered and rolled until the shrinkage cracks are no longer evident.

Where the exposed subgrade below the road pavements comprises natural clay soils, they must be ripped to a depth of 0.15m and recompacted to at least 100% of Standard Maximum Dry Density (SMDD), with a moisture content within 2% of the Standard Optimum Moisture Content (SOMC).

### 4.2.3 Engineered Fill

For raising of site surface levels and treatment of any poor subgrade areas, engineered fill should be used.

Engineered fill should be a well graded select granular material such as crushed sandstone free from organic materials, other contaminants and deleterious substances and have a maximum particle size not exceeding 75mm. Site won clays from the excavations may need to be disposed of due to their high moisture contents (unless moisture conditioning and possibly stabilisation with lime) and their reactive potential beneath floor slabs. However, it is expected that the majority of fill required to raise site surface levels will need to be imported non-reactive granular fill to limit potential reactive movements, as discussed in Section 4.4.1 below. Engineered fill should be compacted using the above-mentioned roller in layers of maximum 200mm loose thickness to a density between 98% and 102% of SMDD and within 2% of their SOMC. Where granular materials are used the specification could be relaxed to a density at least 98% of SMDD.

Backfill to conventional retaining walls should also comprise engineered fill. Well graded granular materials such as crushed sandstone and demolition rubble would be suitable for this purpose. This granular fill should be free of deleterious substances and should have a maximum particle size not exceeding 40mm. Such fill should be compacted in horizontal layers as above using a hand-held plate compactor (e.g. whacker packer). Care will be required to ensure excessive compaction stresses are not transferred to the retaining walls.

As an alternative to engineered fill for retaining wall backfill, single sized granular material (or 'no fines' gravel) may be used as backfill to retaining walls and this would also act as the drainage behind the wall and would only require nominal compaction (with no compaction testing). However, such material would not be suitable where building footings founded on Level 1 engineered fill are located close to the retaining wall backfill. The drainage material should be wrapped in a non-woven geotextile fabric (e.g. Bidim A34) to act as a filter against subsoil erosion. Further, unless covered by the car park pavement, the free draining retaining wall backfill should be provided with a cap of clay or crushed bedrock of at least 0.3m thickness at surface level to reduce the likelihood of surface water entering the backfill and surcharging the retaining walls.



Density tests should be carried out at the frequencies outlined in AS3798 (Table 8.1) for the volume of fill involved. Where the fill is required to support structural loads, Level 1 testing as defined in AS3798 is recommended, if not, then Level 2 testing will be appropriate. Any areas of insufficient compaction will require reworking. The Geotechnical Testing Authority should be directly engaged by the client or their representative and not by the earthworks contractor.

### 4.2.4 Trench Backfill

Backfilling of the trenches should be carried out using engineered fill, as described above, in order to reduce post-construction settlements, particularly where trenches will extend below pavements.

Engineered fill should be compacted as outlined above using a trench roller or a pad foot roller attachment fitted to an excavator, to a density ratio of at least 98% of SMDD and a moisture content within 2% of SOMC.

To further reduce post-construction settlements, we recommend that the trench works are completed before the pavements are constructed and the compacted trench backfill would form localised sections of the prepared subgrade upon which the sub-base is placed.

Where the trench passes through landscaped areas, it may be possible to relax the compaction specification if post construction settlements are acceptable to the designers. In landscaped areas, each layer should be compacted to a density ratio of at least 95% of SMDD and a moisture content within 3% of SOMC.

Density tests should be carried out on the engineered backfill to confirm the above specifications are achieved as outlined in Section 4.2.3 above.

### 4.3 Retention and Permanent Batter Slopes

Permanent retaining walls will be required to support cut faces where permanent batters are not suitable. Advice is provided below with regard to retention design, retaining walls supporting engineered fill and permanent batter slopes.

#### 4.3.1 Retention Design Parameters

The following earth pressure coefficients and subsoil parameters may be adopted for the design of conventional retaining walls:

- For design of conventional walls that will be propped, backfilled and permanently supported by the structure, we recommend the use of a triangular lateral earth pressure distribution with an 'at rest' earth pressure coefficient (k₀) of 0.6 for the retained profile, assuming a horizontal backfill surface.
- For design of the conventional walls, where some movements of retaining walls may be tolerated, they may be designed using a triangular lateral earth pressure distribution and a coefficient of 'active' earth pressure, (ka), of 0.35 for the soil profile, assuming a horizontal backfill surface.
- A bulk unit weight of 20kN/m<sup>3</sup> should be adopted for the retained profile.



- Any surcharge affecting the walls (e.g. nearby footings, compaction stresses, sloping retained surfaces, construction loads etc) should be allowed for in the design using the appropriate earth pressure coefficient from above.
- Conventional retaining walls should be designed as drained and provision made for permanent and effective drainage of the ground behind the walls. Subsurface drains should incorporate a non-woven geotextile fabric, such as Bidim A34, to act as a filter against subsoil erosion. The subsoil drains should discharge into the stormwater system.
- The lift pit walls should be designed to withstand full hydrostatic pressures (i.e. tanked) with a design groundwater level equivalent to the ground floor level. Alternatively, the potential groundwater pressures may be alleviated by providing the lift pit with drainage and a pump-out system.
- Lateral restraint of retaining walls founded in the soil profile below adjacent surface levels or bulk excavation level may be provided by the passive pressure of the soil below these levels. A 'passive' earth pressure coefficient, K<sub>p</sub>, of 3 may be adopted, using a triangular pressure distribution and provided a Factor of Safety of at least 2 is used in order to reduce the high deflections that are associated with achieving a full passive case. Localised excavations in front of the walls e.g. for buried services etc must also be taken into account in the design. Where these footings are on basalt corestones in the extremely weathered profile, the lateral resistance may be calculated using a friction angle of 30° for the footing/corestone interface.
- Due to the very high reactivity of the clay soils and potential differential movements, closely spaced articulation joints should be provided, in particular, close to any sections of retaining walls founded on a mix of clays and extremely weathered basalt containing corestones.

### 4.3.2 Retaining Walls Supporting Engineered Fill

Where any areas require raising of site surface levels and retaining walls are proposed to support the fill, the construction sequencing may involve:

- Fill initially placed and then cut back to allow retaining wall construction; this would only be feasible where there was sufficient space to place the fill outside the area of the works within the site.
- The retaining wall constructed first and then backfilled.

In either case, good compaction close to the retaining wall may not be feasible and some post-construction settlement of the fill surface may occur. In addition, care would be required not to transfer compaction stresses to the retaining wall, hence the use of free draining backfill, where appropriate.

### 4.3.3 Permanent Batter Slopes

Where required, permanent fill batter slopes and soil cuts should be formed at no steeper than 1V in 2H. However, for ease of maintenance (such as mowing) flatter slopes of 1V in 4H would be appropriate. For the permanent fill batter slopes, this assumes that the fill is placed as engineered fill in accordance with the advice provided above. Surface erosion protection, for example, quick establishing grass or proprietary erosion protection systems, must be provided to the permanent batter slopes.



# 4.4 Footing Design

# 4.4.1 Site Classification and Soil Reactivity Considerations

Based on the results of our investigation, due to the presence of trees (some of which we expect will be removed) and the removal of buildings and paved areas (both of which represent abnormal moisture conditions), and the presence of uncontrolled fill, the site is classified as Class 'P', in accordance with AS 2870 – 2011, "Residential Slabs and Footings". However, we note that AS2870 does not strictly apply for the proposed building but should be referenced for general guidance on footing and floor slab design and site maintenance.

Based on the results of the investigation, our nearby investigation for the proposed ambulance station and the design soil suction change depth for this climatic region, the residual silty clays (including the extremely weathered basalt comprising gravelly clays) are highly reactive with changes in moisture content (i.e. similar to those expected for a Class 'H1' site).

We note that there will be some trees removed from the proposed building footprint and a number of existing trees are preferred to remain. We assume these are the approximately nine trees (maximum 21m height) along the southern site boundary close to the proposed building. With the existing trees remaining in place, the predicted characteristic surface movements with changes in moisture content increase to those expected for a Class 'E' site.

In this regard, if engineered fill is placed to raise site surface levels and is proposed to support structural loads then we note the following:

- If site won or imported reactive clays are used as engineered fill then the predicted characteristic surface movements will be more severe. In this case, further advice should be sought from JK Geotechnics.
- If imported non-reactive granular soils are used as engineered fill and assuming a thickness of 0.9m then the predicted characteristic surface movements with changes in moisture content (and allowing for existing trees) will reduce to those expected for a Class 'H2' site.

We note that trees close to buildings founded in reactive clay soils is not preferred but that in this case a number of existing trees close to the proposed building will remain in place. In addition, removal of all the trees (or provision of a root barrier) would lead to recovery of the moisture content (and resulting swelling) of the clay soils over a number of years. As such our recommendations are:

- To remove as small a number of trees as soon as practicable to allow some recovery of the soil moisture content; and
- To not plant any more trees close to the proposed building unless the building will be fully suspended on piled footings with void formers between the soil and structure.

We also recommend that the following be adhered to in order to reduce potential reactive soil movements with changes in moisture content:



- Buildings be entirely surrounded with pavements at least 1.5m wide and slightly sloping away from the buildings to prevent the ponding of water, and all joints between the building and external pavements be infilled using a flexible "Mastic" sealer.
- Avoid establishing garden beds adjacent to proposed buildings. Moisture ingress into the subgrade at these locations could cause movement and damage to nearby structural elements. Any planter beds close to buildings should be completely encased in concrete with base drainage connected to the stormwater system for controlled disposal.

# 4.4.2 Footing Systems and Design Parameters

### 4.4.2.1 Design Considerations

Structural loadings have not been provided although we understand that it is currently proposed that that the southern portion of the new building is likely to comprise a stiffened on-grade raft slab possibly locally requiring raising of surface levels with engineered fill to form a building platform. The northern portion of the slab is likely to comprise a slab suspended between strip footings supporting masonry walls with sacrificial formwork ('Bondek' or similar) used to support the slab. Existing mature trees over the south-western portion of the site will remain, as discussed in Section 4.4.1 above.

Where engineered fill is required to support structural loads then it must be placed under Level 1 control as outlined in Section 4.2 above. However, to reduce reactive soil movements to those for a Class 'H1' site at least a 0.9m thickness of imported non-reactive fill would be required. Where in-situ reactive clay soils are removed to place engineered fill and there are localised areas of basalt bedrock, the reactive soil movements would be reduced locally and there would be the potential for differential shrink swell movements across the building. Also, we do not know if there is the ability to source appropriately qualified and experienced earthworks contractors and geotechnical testing authorities to provide Level 1 engineered fill platforms. Due to these concerns, we consider that there is an increased risk of poor building performance and potential building damage if an engineered fill platform is used to support footings. If this option is preferred then JK Geotechnics should be contacted for further advice. Our recommendation is to adopt structures and floor slabs suspended from piled footings with void formers between the subgrade and suspended structures and slabs.

The founding conditions at the site are quite complex due to considerations of reactive soil movements, the presence of trees and the presence of a transitional profile comprising an extremely weathered profile containing corestones. For reactive clay sites such as this our recommendation would be to found piles at a depth of at least 3m and with an embedment of at least 4 pile diameters into the hard clay foundation material or extremely weathered basalt. Piling in these conditions is extremely difficult and while we provide recommendations below for bored piles, we expect it would be preferable to use either piles or micro piles drilled with down-hole hammers, as discussed further below.

To overcome uplift of the piles from the swelling clays the piles should also be either a minimum length of 6m (i.e. twice the design suction depth) or de-bonded/permanently sleeved to 3m depth. However,



weathered basalt including corestone are present or inferred at depths between 1.0m and 4.2m. On this basis we recommend that where pile footings are adopted, they should be founded in the extremely weathered basalt or hard clay. Ideally a socket length of four pile diameters into the extremely weathered basalt is preferred but due to the presence of medium to high strength bands and/or cobbles (corestones) of basalt this may not be feasible and pile drill holes may prematurely refuse.

To overcome uplift of the piles from the swelling clays, the pile drill holes should be de-bonded/permanently sleeved through the residual clays and extremely weathered basalt comprising clays to a depth of 3.0m to 3m depth to overcome uplift of the piles from the swelling clays.

### 4.4.2.2 Design Parameters

For pile footings we provide below the following serviceability (allowable) and ultimate limit state design parameters and elastic parameters to assist with their design and also the suspended slab design.

Material	Ultimate Limit State Bearing Pressure	Serviceability (allowable) Limit State Bearing Pressure	Ultimate Limit State Adhesion (Bored Piles) <sup>1</sup>	Serviceability (allowable) Limit State Adhesion (Bored Piles) <sup>1</sup>	Elastic Modulus Short Term (Long Term)	Poisson's Ratio
Extremely Weathered Basalt	1,800kPa	600kPa	60kPa (compression) 30kPa (tension)	20kPa (compression) 10kPa (tension)	60MPa (42MPa)	0.3
Basalt corestones within very stiff Clay	600kPa	200kPa	N/A	N/A	30MPa (21MPa)	0.3

#### Note

1. These should only be adopted below 3.0m depth due to sleeving

In general, where pile lengths are less than 3.0m then they will be designed in end bearing only. Shaft adhesion values in tension and compression are only applicable where piles extend beyond 3.0m depth. Where piles are founded at depths of less than 3.0m due to refusal, some differential reactive movement would still occur; for example, piles founded at 1.5m depth would still be expected to undergo up to 45mm of reactive movement.

For the above allowable bearing pressures, maximum settlements for piles founded in bedrock would be equivalent to 1% of the pile diameter, plus any elastic shortening of the pile shaft.

The above allowable bearing pressure must be confirmed by inspection of a representative number of footings by a geotechnical engineer.



# 4.4.2.3 Pile Construction Considerations and Alternative Pile Types

The construction of bored piles will be difficult and to have any chance of achieving the design depth must be drilled using large piling rigs of sufficient power to penetrate the extremely weathered basalt profile (i.e. not drilled using an auger attachment to an excavator) with the augers fitted with 'TC' rock teeth. However, corestones may result in difficulties achieving pile verticality. Alternatively, it may be preferred to use down hole hammer techniques in order to achieve the design pile length. If the works are completed following prolonged rainfall, seepage could be encountered and there would be difficulties maintaining clean and dry bases as the extremely weathered basalt would be susceptible to softening if water is present and would require over-drilling to remove such materials. It would therefore be imperative to drill, clean out, inspect and pour bored pile footings with minimal delay.

In summary, the piling will be extremely difficult on this site, as five of our six boreholes refused on corestones shallow of the proposed piling depth, with a reasonably powerful rig with augers fitted with 'TC' teeth. We therefore consider the most appropriate piling system in this instance would be micro piles drilled with a down-hole hammer techniques. These are relatively small diameter holes relying on the skin friction for their load capacity. As the piles work in friction, it would be advantageous to sleeve the piles to 3.0m depth so that all of the friction below 3.0m can be used to support the structural loads.

The conditions at each micropile are likely to be different due to the nature of corestone weathering, with some encountering 'strong' basalt at shallow depth and adjoining locations encountering extremely weathered basalt or clay. Therefore, such micropiles must be installed using an experienced and reputable contractor on a design and construct basis.

The micropiles could be designed using an allowable bond of 50kPa in the hard clay and extremely weathered basalt, and 200kPa for the length within basalt if at least low strength. Selected piles should be load tested to confirm the load capacity as the capacity can also be influenced by inadequate cleaning of the hole etc. These load tests could be completed either in compression or in tension, possibly with sacrificial test piles, again with the upper 3.0m being de-bonded.

Steel screw piles are not recommended as they will be unable to penetrate even the first corestone encountered.

The piling contractor must be provided with a copy of this report so that they can provide appropriate equipment in order to form the pile footings.

### 4.5 Earthquake Design Classification

Based upon AS1170.4-2007 "Structural Design Actions, Part 4: Earthquake Actions in Australia", the following design parameters may be adopted:

- Hazard Factor (Z) = 0.08;
- Class C<sub>e</sub> "Shallow soil site".


## 4.6 Floor Slabs

On-grade infill floor slabs are not recommended due to the potential for extreme and possibly differential shrink swell movements as discussed in Section 4.4.1 above. Our recommendation is to design floor slabs as suspended between pile footings founded in bedrock with void formers provided below the slab and beams between the piles so that the swell pressures from the reactive clays are not transferred to the slabs. The void formers must be at least 80mm thick.

For floor slabs suspended over areas of fill subgrade, the subgrade preparation would comprise the removal of any existing paved surfaces, topsoil and/or any soil containing organics, completion of any excavations to achieve design surface levels and the nominal tracking of 'formwork fill' to the required subgrade level and the placement of a void former as described above. Alternatively, a sacrificial formwork (such as 'Bondek' or similar) could be used, which we understand is being considered in some instances for this site.

Pile design parameters and advice is presented in Section 4.4 above.

## 4.7 Pavement Design and Construction

The advice provided below assumes that the subgrade is prepared and any engineered fill placed in accordance with the recommendations given in Section 4.2 above.

## 4.7.1 Pavement Design Considerations

Based on the variable subgrade conditions, the results of the laboratory CBR tests and with regard to the elevated in-situ moisture contents of the residual clays, we recommend that the design of the proposed flexible pavements be based on a CBR value of 3%.

Improvement of poor subgrade areas may comprise placement of an upper select subgrade layer of at least 0.2m thickness of material (either select granular or lime stabilised clay with a soaked CBR value of at least 10%). In other areas, the natural subgrade could be excavated and replaced with this select subgrade layer. If this layer is extensive, it could then be utilised in the mechanistic design of the pavements, such as with the 'Circly' software program. If rigid pavements are proposed, the provision of a 150mm thick lean mix concrete sub-base would give an effective design CBR value of 40%.

The flexible pavements will need to be provided with cross falls to maintain drainage.

Surface and sub-soil drains should be provided along the perimeter of pavements, with subsoil drain inverts not less than 0.2m below subgrade level. The drainage trenches should be excavated with a longitudinal fall to appropriate discharge points so as to reduce the risk of water ponding. The pavement subgrade should be graded to promote water flow towards the sub-soil drains.



### 4.7.2 Pavement Thickness Design

The flexible pavement thickness design outlined below has been based on a mechanistic analysis using the program 'Circly' Version 6 which is in accordance with 'Guide to Pavement Technology' Part 2: Pavement Structural Design (AUSTROADS Sydney 2017).

For proposed access roads and car parking areas we recommend their design be based on a CBR value of 3% for the residual clay subgrade. The flexible pavement thickness designs provided below is based on an assumed design traffic loading of  $1 \times 10^5$  ESA's and must be confirmed once the actual traffic loading is provided. Designs are provided for both a clay subgrade, and for a select subgrade of 0.2m thickness of material with a soaked CBR value of at least 10% over the clay.

The recommended pavement thickness design, complete with material quality and compaction specifications are provided in the attached Table 1.

If the pavement is to be subject to repeated truck loads and in particular truck turning loads, then it would likely be necessary to use a much thicker AC layer and possibly a surface of polymer modified AC.

### 4.7.3 Pavement Materials

In addition to the information provided on the attached Table 1 we note the following compaction requirements and additional information regarding selection of pavement construction materials:

- The DGB20 should be compacted in a single layer using a large smooth drum roller to at least 98% of Modified Maximum Dry Density (MMDD).
- The sub-base should be compacted in maximum 200mm thick loose layers using a large smooth drum roller to at least 95% of MMDD. Alternatively, LMC could be used which would not require compaction but fatigue damage would need to be taken into account by the designer.
- Recycled materials may be used as sub-base provided they conform to the TfNSW QA specification 3051 (2018) requirements. However, recycled materials can be self-cementing, which can then cause reflective cracking through the pavement surface, which would then require crack sealing. While this may be an aesthetic issue, it would not necessarily cause significant reduction in the pavement life provided the cracks are appropriately sealed. The likelihood of reflective cracking is significantly increased on this site due to the very high reactive soil characteristic surface movements and presence of trees.

For the pavement construction materials, adequate moisture conditioning to within 2% of Modified Optimum Moisture Content (MOMC) should be provided during placement so as to reduce the potential for material breakdown during compaction.

Density tests should be carried out on the granular pavements material to confirm the above specifications are achieved. The frequency of density testing should be as per the requirements outlined in AS3798 and Level 2 testing is recommended. The Geotechnical Testing Authority should be directly engaged by the client or their representative and not by the earthworks contractor.





## 4.8 Soil Aggression

Based on the advice provided in AS2159-2009 "Piling Design and Installation" for corrosion protection and durability and in AS3600-2018 "Concrete Structures" we note that the laboratory chemical test results have indicated that the following Exposure Classifications are applicable:

- 'Non-aggressive' for concrete piles (based on Table 6.4.2 (C), in AS2159-2009),
- 'Moderate' for steel micropiles (based on Table 6.5.2 (C), in AS2159-2009), and
- A1 for concrete footings or slab thickenings (based on Table 4.8.1 in AS3600-2018).

## 4.9 Site Stability

Based on the relative flat and gently sloping nature of the topography within and neighbouring the site it is considered 'Barely Credible' that natural slope instability would occur and on this basis levels of risk to property and life under existing conditions and following the development are assessed to be at 'Acceptable' levels.

Provided the design and construction of the proposed alterations and additions are carried out in accordance with the advice presented in this report then we consider that for the assessed probabilities associated with the assessed likelihood of instability and assuming typical temporal, vulnerability, evacuation and spatial factors for this type of site, risks to life and property associated with potential instability of temporary or permanent batters slopes and existing and proposed retaining walls will also be at an 'Acceptable' level.

The terminology and criteria adopted in the above assessment is in accordance with the methodologies and criteria adopted in the Australian Geomechanics Society (2007c) 'Practice Note Guidelines for Landslide Risk Management' (Reference 1).

## 4.10 Further Geotechnical Input

The following is a summary of the further geotechnical input which is required and which has been detailed in the preceding sections of this report:

- Witnessing proof rolling.
- Density testing of engineered fill and pavement materials.
- Inspection of a representative number of footings.
- Witnessing the installation of micropiles, if adopted.

### 5 GENERAL COMMENTS

The recommendations presented in this report include specific issues to be addressed during the construction phase of the project. As an example, special treatment of soft spots may be required as a result of their discovery during proof-rolling, etc. In the event that any of the construction phase recommendations presented in this report are not implemented, the general recommendations may become inapplicable and



JK Geotechnics accept no responsibility whatsoever for the performance of the structure where recommendations are not implemented in full and properly tested, inspected and documented.

The long term successful performance of floor slabs and pavements is dependent on the satisfactory completion of the earthworks. In order to achieve this, the quality assurance program should not be limited to routine compaction density testing only. Other critical factors associated with the earthworks may include subgrade preparation, selection of fill materials, control of moisture content and drainage, etc. The satisfactory control and assessment of these items may require judgment from an experienced engineer. Such judgment often cannot be made by a technician who may not have formal engineering qualifications and experience. In order to identify potential problems, we recommend that a pre-construction meeting be held so that all parties involved understand the earthworks requirements and potential difficulties. This meeting should clearly define the lines of communication and responsibility.

Occasionally, the subsurface conditions between and below the completed boreholes and test pits may be found to be different (or may be interpreted to be different) from those expected. Variation can also occur with groundwater conditions, especially after climatic changes. If such differences appear to exist, we recommend that you immediately contact this office.

This report provides advice on geotechnical aspects for the proposed civil and structural design. As part of the documentation stage of this project, Contract Documents and Specifications may be prepared based on our report. However, there may be design features we are not aware of or have not commented on for a variety of reasons. The designers should satisfy themselves that all the necessary advice has been obtained. If required, we could be commissioned to review the geotechnical aspects of contract documents to confirm the intent of our recommendations has been correctly implemented.

A waste classification is required for any soil and/or bedrock excavated from the site prior to offsite disposal. Subject to the appropriate testing, material can be classified as Virgin Excavated Natural Material (VENM), Excavated Natural Material (ENM), General Solid, Restricted Solid or Hazardous Waste. Analysis can take up to seven to ten working days to complete, therefore, an adequate allowance should be included in the construction program unless testing is completed prior to construction. If contamination is encountered, then substantial further testing (and associated delays) could be expected. We strongly recommend that this requirement is addressed prior to the commencement of excavation on site.

This report has been prepared for the particular project described and no responsibility is accepted for the use of any part of this report in any other context or for any other purpose. If there is any change in the proposed development described in this report then all recommendations should be reviewed. Copyright in this report is the property of JK Geotechnics. We have used a degree of care, skill and diligence normally exercised by consulting engineers in similar circumstances and locality. No other warranty expressed or implied is made or intended. Subject to payment of all fees due for the investigation, the client alone shall have a licence to use this report. The report shall not be reproduced except in full.

**Reference 1:** Australian Geomechanics Society (2007c) 'Practice Note Guidelines for Landslide Risk Management', Australian Geomechanics, Vol 42, No 1, March 2007, pp63-114.



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NATA Accredited Laboratory Number. 12360

## East West Enviroag Pty Limited 82 Plain Street Tamworth NSW 2340

# **CALIFORNIA BEARING RATIO REPORT SHEET**

CLIENT: Regional Geo	otechnical Soluti	ons					
CLIENT ADDRESS: Unit	14, 25-27 Hurley	/ Drive, COFFS H	ARBOUR	R NSW 2450	REPORT	NO:	FW/225313-1
PROJECT: Hospital Red	evelopment				PROJECT	NO:	EW225313
SITE LOCATION: Glen	Innes RGS 3509	3UR					
DATE OF TESTING: 8/07	/2022				DATE OF	REPORT:	11/07/2022
TECHNICIAN: W.S					DATE SA	MPLED:	27/06/2022
		SAMP		A	L		, ,
Test Location	BH 2			Samala Num	hor		1
Depth	0.2 - 0.8m			Sample Num	Der		T
Material	d/Brown Gravell	V CLAY		Sampling Cla		Client, re	esults apply to
Description	,	,			use .	sample	as received.
Australian Sta           ✓         AS1289.5.1.1 -           □         AS1289.5.2.1 -           ✓         AS1289.5.2.1 -           ✓         AS1289.2.1.1 -	ndards Standard Compct Modified Compace Moisture Conten	LABORATORY CC tion ction t - Oven	OMPACTI	ON DATA	<b>RTA Meth</b> TfNSW T1 TfNSW T1 TfNSW T1	<b>iods</b> 11 - Standard 12 - Modified 20 - Moisturg	Compaction
							ountent oven
Maximum Dry Density	t/m³	1.46	1.2	1			
Optimum Moisture Conten	t %	29.2					
Curing time	hrs	96					
Liquid limit determination		Technician	1				*
CALIFORNIA BEAF	RING RATIO TEST F	RESULTS NSW T117	biston (kN)		*		
Dry Density (At Compaction	1) t/m³	1.46	uo	*			
Density Ratio (At Compaction	on) %	100	ad	*			
Moisture Content (At Comp	action) %	29.2	-0.4	*			
Moisture Ratio (At Compact	tion) %	100		*			
Days Soaked		4		*			
Surcharge Weight	kg	4.5	0.2				
Swell (After soaking)	%	0.8		1			
Dry Density (After soaking)	t/m³	1.45	0				
Moisture Content (Top 30m	m) %	33.3		)	5		10
Moisture Content (Remainin	ng Sample %	30.6	4		Penetr	ation (mm)	
CBR Value @ 2.5mm Penetr	ation %	3.5		Sampled By:	C	Client	
Percentage of sample retained	on 19mm Sieve	8	1	Tested By:	EW - T	Tamworth	
Oversize retained on the 19mm sie	eve was not included i	n CBR test samples	1	,			
Comments:							
This report remains the pro	perty of East West Enviroag Pty ed for compliance with ISO/IEC 1	Ltd until paid in full 7025 - Testing		Signed:  Signatory Name: : Document ID-1	5 Mitchell RFP-119	Approved Sign.	atory

Document ID: REP-119 Issue No: 4

Date of Issue: 11-Mar-20

Page 1 of 1



### East West Enviroag Pty Limited 82 Plain Street Tamworth NSW 2340 ABN 82 125 442 382 124 ph 02 6762 1733 fax 02 6765 9109

# **CALIFORNIA BEARING RATIO REPORT SHEET**

CLIENT: Region	al Geotechnical Solu	itions				
CLIENT ADDRESS:	Unit 14, 25-27 Hur	ey Drive, OFFS H	ARBOUR NSW 2450	REPORT	NO:	EW225313-2
PROJECT: Hospita	al Redevelopment			PROJECT	NO:	EW225313
SITE LOCATION:	Glen Innes RGS 350	)93UR		-		
DATE OF TESTING:	8/07/2022			DATE OF	REPORT:	11/07/2022
TECHNICIAN:	W.S.			DATE SA	MPLED:	27/06/2022
		SAMPL	LE DATA			
Test Location	BH 3					
Depth	0.2 - 0.6r	n	Sample Nun	nber		2
Material	Ded/Drown Crow				Client, re	sults apply to
Description	Red/Brown Grav		Sampling Cla	ause	sample	as received.
			L			
		LABORATORY CC	OMPACTION DATA			
	an Standards	action		RTA Meth	nods	
Δς1289.	5 2 1 - Modified Com	action		TINSVV 11	12 Modifier	Compaction
	2.1.1 - Moisture Cont	action		TINSVV 11		Compaction
	2.1.1 - Wolsture Cont	ent - Oven		ITINSVV II	20 - Moisture	e Content - Oven
Maximum Dry Densit	Y t/m³	1.47	<b>│</b> 1			
Optimum Moisture C	ontent %	30.5				
Curing time	hrs	96	0.9			•
Liquid limit determina	ation	Technician	0.0			
Field Moisture Conter	nt %	32.7	0.8		+	
			0.7	-		
	A BEARING RATIO TES	T RESULTS	(KV)			
AS1289.0	6.1.1	TfNSW T117	<b>U</b> .6			
			-, <b>ia</b> 0.5			
Dry Density (At Comp	action) t/m <sup>3</sup>	1.47	6			
Density Ratio (At Com	paction) %	100	<b>18</b> 0.4			
Noisture Content (At	Compaction) %	30.5				
Days Soaked	mpaction) %	100				
Surcharge Weight	μα	4	0.2			
Swell (After soaking)	Kg %	1.0	0.1			
Dry Density (After soa	king) t/m <sup>3</sup>	1.0				
Moisture Content (To	p 30mm) %	33.4	0 +			
Moisture Content (Re	maining Sample %	30.5	0	5		10
	and a second sec	50.5	-	Penetr	ation (mm)	
CBR Value @ 2.5mm F	Penetration %	4.5	Sampled By	EW -	Tamworth	
Percentage of sample re	tained on 19mm Sieve	0	Tested By	EW -	Tamworth	
Oversize retained on the 19	9mm sieve was not include	ed in CBR test samples				
Comments:						
			Simon	ı.		1
A			Signed			Sec. A.

 ACCREDITED FOR
 Signed:
 Approved Signatory

 ACCREDITED FOR
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 Date of Issue: 11-Mar-20
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East West Enviroag Pty Limited

82 Plain Street Tamworth NSW 2340

eastwest ABN 82 125 442 382 124 ph 02 6762 1733 fax 02 6765 9109

# SOIL CLASSIFICATION TEST REPORT

**AUSTRALIAN STANDARDS METHODS** 

CLIENT: Regiona	al Geotechr	nical Solution	S				
CLIENT ADDRESS:	Unit 14, 2	5-27 Hurley Dr	ive, COFFS H	ARBOUR NSW 2450	REPORT NO:	EW225313-3	
PROJECT:	Hospital I	Redevelopme	ent		PROJECT NO:	EW225313	
SITE LOCATION:	Glen Inne	es RGS 35093	UR				
DATE OF TESTING	: 28/06/20	22			DATE OF REPORT:	6/07/2022	
TECHNICIAN:	W.S.				DATE SAMPLED:	27/06/2022	
Sampled By Client, result	ts apply to sam	ples as received.					
	SAMPLE N	o:		3	4	5	
	SAMPLE LO	OCATION:		BH 3	BH 4	BH 5	
	DEPTH:			0.5 - 0.95m	0.5 - 0.95m	0.5 - 0.95m	
	MATERIAL	DESCRIPTION	:	Gravelly clay	Gravelly clay	Gravelly clay	
	WASHED/	UNWASHED		-	-	-	
AS1289.3.8.1	1 Water Typ	e & Temperat	ure:				
TEST METHOD	TI	EST DESCRIPTION	ON				
AS1289.3.6.1			75.0mm				
			63.0mm				
			53.0mm				
			37.5mm				
			26.5mm				
			19.0mm				
			13.2mm				
SAMPLING	% Passing		9.5mm				
METHOD	Sieve		6.7mm				
	Analysis		4.75mm				
AS1289.1.2.1.6.4			2.36mm				
AS1289.1.2.1.6.5.1			1.18mm				
AS1289.1.2.1.6.5.3			600µm				
AS1289.1.2.1.6.5.4			425µm				
			300µm				
			150µm				
			75µm				
AS1289.3.8.1	EMERSON	CLASS NO:					
AS1289.2.1.1	MOISTURE	CONTENT:	%	36.2	37.8	27.4	
	T		CODE				
AS1289.3.1.1	LIQUID LIN	1IT %					
AS1289.3.1.2	LIQUID LIN	1IT %	2,4	49	40	51	
AS1289.3.2.1	PLASTIC LI	MIT %	2,4	22	24	31	
AS1289.3.3.1	PLASTICITY	INDEX %	2,4	27	16	20	
AS1289.3.4.1	LINEAR SH	RINKAGE %	2,4	8	9	9.5	
CODES USED			-				
Sample history	for plastic	ty tests		Method of preparation for plasticity tests			
Air Dried		1		Dry s	sieved	4	
Low temperature oven (<	50°) dried	2		Wet sieved 5			
Other/Unknown		3		Nat	tural	6	



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Signed: .....

0 .....

6

Approved Signatory

Signatory Name: S Mitchell Document ID: REP-102 Issue No: 2 Date of Issue: 24-Apr-13 Page 1 of 1



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# ANALYSIS REPORT SOIL

PROJECT	NO: EW221210	Date of Issue:	06/07/2022
Customer:	Geo Lab	Report No:	1
Address:	82 Plain St TAMWORTH NSW 2340	Date Received:	28/06/2022
		Matrix:	Soil
Attention:	Steve Mitchell	Location:	225313
Phone:		Sampler ID:	Client
Fax:		Date of Sampling:	27/06/2022
Email:	steve.m@eastwestonline.com.au	Sample Condition:	Acceptable

Results apply to the samples as submitted. All pages of this report have been checked and approved for release.

Signed:

Stephanie Cameron Laboratory Operations Manager



NATA Accredited Laboratory 15708 Accredited for compliance with ISO/IEC 17025 - Testing

This analysis relates to the sample submitted and it is the client's responsibility to make certain the sample is representative of the matrix to be tested.

Samples will be discarded one month after the date of this report. Please advise if you wish to have your sample/s returned.

Document ID:REP-01Issue No:3Issued By:S. CameronDate of Issue:16/12/2019

results you can rely on



# **ANALYSIS REPORT**

# PROJECT NO: EW221210 Location: 225313

		CLIEN	NT SAMPL	BH4	BH3		
			DE	PTH	1.5-1.95m	2.5-2.95m	
Test Parameter	Method Description	Method Reference	Units	LOR	221210-1	221210-2	
pH (1:5 in CaCl2)	Electrode	R&L4B2	pH units	na	5.99	5.93	
Chloride Soluble	DA	DAP-06	mg/kg	2	29.5	107	
Electrical Conductivity	Electrode	R&L 3A1	dS/m	0.01	0.04	0.02	
Sulphate-Sulphur	KCI40/ICP	R&L 10D1	mg/kg	3	5.59	5.16	

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Soils are air dried at  $40^{\circ}$ C and ground <2mm.

NB: LOR is the Lowest Obtainable Reading.

Document ID

Issue No: Issued By REP-01

S. Cameron

## DOCUMENT END



### **TABLE 1 PAVEMENT THICKNESS RECOMMENDATIONS**

Traffic Frequency and Pavement Type	Asphaltic Concrete Wearing Course Thickness (mm)	Base Thickness (mm)	Subbase Thickness (mm)	Select Subgrade Thickness (mm)	Total Pavement Thickness (mm)
1 x 10⁵ ESAs	40	200	240	-	480
1 x 10⁵ ESAs	30	120	150	200	500

### NOTES

1. The Asphaltic Concrete wearing course comprises AC14 compacted in a single layer and in accordance with the requirements of TfNSW QA Specification R116.

2. A 7mm primer seal is to be used between the base course and the AC.

3. All Base material to be crushed rock to TfNSW QA specification 3051 (2018) DGB20.

4. All Subbase to be crushed rock to TfNSW QA specification 3051 (2018) DGS40 or DGS20.

- 5. The base and subbase are to be placed and compacted in accordance with the requirements of TfNSW QA Specification R71
- 6. The above pavement thicknesses are based on a design CBR value of 3%, and assume that good surface and subsurface drainage is provided.
- 7. Surface level for the AC is to be at or above design surface.
- 8. All layer thicknesses are minimum thicknesses. Appropriate tolerances to be allowed for by contractor.

**JK**Geotechnics

Report No. 35093UR

Table 1





Client: Project: Location:	HI PROPOSE 94 TAYLOI	D ALTER	ATIONS AND ADDITIONS Γ, GLEN INNES				
Job No.: 350 Date: 8/6/22 Plant Type:	093UR : TS350	M	ethod: SPIRAL AUGER		<b>R.L. Surface:</b> ≈ 1067.9m <b>Datum:</b> AHD		
Groundwater Record <u>ES</u> DS SAMPLES	Field Tests Depth (m)	Graphic Log Unified	Classification DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET- ION	0		FILL: Silty clay, medium plasticity, dark brown and red brown, with basalt cobbles.	w>PL			GRASS COVER SCREEN: 10.19kg 0-0.1m NO FCF
		CI-	CH Silty CLAY: medium to high plasticity, red brown, with fine to medium grained extremely weathered to highly	w>PL	(St)		0.1-0.6m NO FCF
	N > 25 1 · 8,25/		- weathered basalt gravel. / Extremely Weathered BASALT:	XW	(Hd)		- RESIDUAL MAYBOLE
RIGHT	100mm EFUSAL 2 - 3 - 4 - 5 - 6 -		LGravelly CLAY, medium plasticity,				- VOLCAINICS - 'TC' BIT REFUSAL 

Borehole No. BH2 1/1 SDUP1: 0-0.1m

Client: HI Project: Pf Location: 94	I ROPOSED ALTI 4 TAYLOR STRE	ERATIONS AND ADDITIONS EET, GLEN INNES	
Job No.: 35093 Date: 8/6/22 Plant Type: TS3	UR 350	Method: SPIRAL AUGER Logged/Checked by: R.G.S./P.R.	<b>R.L. Surface:</b> ≈ 1068.25m <b>Datum:</b> AHD
Groundwater Record ES US0 DS DS SAMPLES Field Tests	Depth (m) Graphic Log	Unified DESCRIPTION Class sification	Moisture Condition/ Weathering Strength/ Rel. Density Penetrometer Readings (kPa.)
	SPT SPT SAL 2- - - - - - - - - - - - - -	CH       Silty CLAY: high plasticity, red brown and brown, with basalt cobbles and boulders, high strength.         Silty CLAY: high plasticity, red brown and brown, with basalt cobbles and boulders, high strength with bands of extremely weathered basalt.         END OF BOREHOLE AT 1.6m	20 >         0 m         1 L L m           w>PL         St



Client: Project: Location:	HI PROP 94 TA`	OSED ALT	ERAT EET, C	IONS AND ADDITIONS GLEN INNES				
Job No.: Date: 8/6 Plant Typ	35093UR 5/22 9 <b>:</b> TS350		Meth Log	od: SPIRAL AUGER ged/Checked by: R.G.S./P.R.		<b>R.L. Surface:</b> ≈ 1067.5m <b>Datum:</b> AHD		
Groundwater Record ES DB SAMPLES	DS Field Tests	Depth (m) Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET- ION	N = 8 2,4,4	0	СН	TOPSOIL: Silty clay, medium plasticity, dark brown, with roots. / Silty CLAY: high plasticity, red brown, with fine to medium grained gravel, and iron indurated bands.	w>PL w>PL	St-VSt	180 220	SCREEN: 12.75kg - 0-0.15m NO FCF RESIDUAL
	N = 25 5,10,15 N = 20 7,9,11		CL-CI	Gravelly CLAY: low to medium plasticity, red brown and grey, with basalt gravels, cobble and boulders.	— <u> </u>	VSt	350	- - - - - - - - - - - -
YRIGHT	N > 20 13,20/ 40mm REFUSAL		-	Extremely Weathered basalt: gravelly CLAY, low to medium plasticity, red brown and grey. END OF BOREHOLE AT 4.2m	XW	(Hd)		MAYBOLE VOLCANICS 'TC' BIT REFUSAL

Borehole No. BH4 1/1 SDUP2: 0-0.1m

	Clier Proje	nt: ect:	HI PROF	POSEI	) ALT	ERAT	IONS AND ADDITIONS				
	Loca	ation:	94 TA	YLOF	R STRI	EET, C	GLEN INNES				
	Job No.: 35093UR Date: 8/6/22 Plant Type: TS350						od: SPIRAL AUGER ged/Checked by: R.G.S./P.R		R D	.L. Surf	<b>ace:</b> ≈ 1067.15m AHD
	Groundwater Record	ES U50 DB SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
	DRY ON COMPLET ION		N = 14 4,6,8	0		СН	FILL: Silty clay, medium plasticity, dark brown and red brown, with basalt <u>cobbles, and fibre cement fragments</u> / Silty CLAY: high plasticity, red brown, with fine to coarse grained ironstone and basalt gravel, and basalt cobbles.	w>PL w>PL	VSt	220	GRASS COVER TOP 100mm ROOT AFFECTED SCREEN: 10.55kg 0-0.1m FCF1 TO FCF20
				1						230	<ul> <li>SCREEN: 9.43kg</li> <li>0.1-0.25m</li> <li>FCF21 &amp; FCF22</li> <li>RESIDUAL</li> </ul>
			N = 32 8,18,14	2-			END OF BOREHOLE AT 2.2m				- 
				- - - 3 -			END OF BOREHOLE AT 2.211				- - -
				- - 4 -							- - -
				- - 5 -							- -  -
				- - 6 — -							- - -
COPYRIGHT				- 7_							-



	Clier	nt:		HI								
	Proje Loca	ect: itio	n:	PROF 94 TA	POSEI VLOF	IONS AND ADDITIONS GLEN INNES						
	Job	No.	: 3	35093UR			Meth	od: SPIRAL AUGER		R	.L. Surf	a <b>ce:</b> ≈ 1067.2m
	Date: 9/6/22 Plant Type: TS350							ned/Checked by: RGS/PR		D	atum:	AHD
			ທ ມ				9:				a.)	
	Groundwater Record	ES U50 2.151	DB SAMPL	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kP	Remarks
	DRY ON				0	XX		FILL: Silty clay, medium plasticity, $\Box$ dark brown, with fine to coarse $\Box$	w>PL	\/S+		SCREEN: 10.63kg 0-0.1m
	ION			N = 9 4,3,6	-			\grained gravel, and roots.	W>rL	vət	240	NO FCF SCREEN: 2.95kg 0.1-0.2m NO FCF RESIDUAL
					1- - -	X						
				N = 27 11,12,15	- - 2	X					350	-
					-	X						-
				N > 22 12,22/ 100mm REFUSAI	- - 3 -			as above, but with extremely weathered basalt bands.			320	• •
								END OF BOREHOLE AT 3.2m				'TC' BIT REFUSAL
					-							-
					4							-
					-							-
					- 5 —							-
					-							-
					- 6 -							-
OPYRIGHT												-



Clier	nt:	НІ								
Proje	ect:			D ALTI	ERATI	ONS AND ADDITIONS				
	No : 25		TLOP		Moth				I Surf	$aco: \sim 1067.2m$
Date	: 9/6/22	<u>2</u>			WEU	DIAMOND CORING		D	atum:	AHD
Plan	t Type:	TS350			Logg	jed/Checked by: R.G.S./P.R.				
Groundwater Record	ES U50 DS SAMPLES	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET ION			0			FILL: Silty clay, medium plasticity, dark brown, with fine to coarse grained gravel, cobbles, and root	w <pl< td=""><td></td><td></td><td>SCREEN: 10.55kg - 0-0.1m NO FCF</td></pl<>			SCREEN: 10.55kg - 0-0.1m NO FCF
		N = 14 5,7,7	- - 1 — -		СН	\fibres. // Silty CLAY: high plasticity, red brown, with fine to coarse grained ironstone and basalt gravel and cobbles.	w>PL	St-VSt		SCREEN: 8.15kg 0.1-0.4m NO FCF RESIDUAL
			- - 2 - - - - - - - - - - - - - - - - -		-	Extremely Weathered basalt: gravelly CLAY, medium plasticity, red brown and grey, with bands of medium to high strength basalt.	XW	Hd		MAYBOLE VOLCANICS BELOW 1.3m DEPTH BOREHOLE EXTENDED USING NMLC CORE BARREL AND WATER FLUSH -POOR RECOVERY
OPYRIGHT						END OF BOREHOLE AT 3.12				

# **JKGeotechnics** TEST PIT LOG

Test Pit No. TP1 1/1 SDUP4: 0-0.1m

Γ	Clier	nt:		HI									
	Project: PROP Location: 94 TA				YLOF	N STRI	ERAT EET, C	GLEN INNES					
	Job Date Plan	No.: : 9/ t Ty	350 6/22 <b>pe:</b>	093UR -			Meth Logo	od: 5T EXCAVATOR ged/Checked by: R.G.S./P.R		<b>R.L. Surface:</b> ≈ 1068.2m <b>Datum:</b> AHD			
	Groundwater Record	ES U50 SAMPLES	DNB	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks	
C	ORY ON OMPLE TION				0	X		FILL: Silty clay, medium plasticity, brown, red brown, with fine to coarse grained gravel, and roots, trace of briek frogments	w>PL	_,,		SCREEN: 10.69kg 0-0.1m NO FCF	
					- - 1 –		Сн	Silty CLAY: high plasticity, red brown, with fine to coarse grained ironstone and basalt gravel.	_ W <pl< td=""><td>vSt</td><td>250</td><td>- \0.1-0.4m - \0.1-0.4m - <u>\NO FCF</u> RESIDUAL</td></pl<>	vSt	250	- \0.1-0.4m - \0.1-0.4m - <u>\NO FCF</u> RESIDUAL	
					-			END OF TEST PIT AT 1.1m				-	
					2	-						-	
					-	-						-	
					3-	-						- - -	
					-	-						-	
					4	-						-	
					-	-						-	
					5	-						-	
					- - 6 —	-						- - -	
OPYRIGHT					- - - 7	-						-	

# **JKGeotechnics** TEST PIT LOG



Client: Project: Location:	HI PROPOSE 94 TAYLOI	D ALTE R STRE	ERATI	ONS AND ADDITIONS GLEN INNES				
Job No.: 3 Date: 9/6/2 Plant Type:	5093UR 2 -		Meth Logg	od: 5T EXCAVATOR jed/Checked by: R.G.S./P.R.		<b>R.L. Surface:</b> ≈ 1068.2m <b>Datum:</b> AHD		
Groundwater Record ES DB DS SAMPLES	Field Tests Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE- TION	0		СН	FILL: Clayey cobbles, brown, medium plasticity clay, with fine to coarse grained gravel. Silty CLAY: high plasticity, red brown, with fine to coarse grained ironstone, and basalt gravel and cobbles.	M w <pl< th=""><th>VSt</th><th>220</th><th>SCREEN: 11.75kg - 0-0.1m NO FCF SCREEN: 12.45kg - 0.1-0.4m NO FCF RESIDUAL</th></pl<>	VSt	220	SCREEN: 11.75kg - 0-0.1m NO FCF SCREEN: 12.45kg - 0.1-0.4m NO FCF RESIDUAL
	1 - 2 - 3 - 4 -			END OF TEST PIT AT 1.1m			250	
DPYRIGHT	6 -	-						- - - - - - - - -



Report No:

35093UR

**JK**Geotechnics

Figure No:

1

This plan should be read in conjunction with the JK Geotechnics report.

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LEG	END								
$\bullet$	BOREHOLE	0	8	16	24	32	40	Location:	94 TA`
	TEST PIT	SCA	LE	1:80	00 @A3	ME	TRES	Report No:	3509
		This plan s	bould be re	ad in conjur	action with th	ne IK Gente	achnics report		_



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# **REPORT EXPLANATION NOTES**

### INTRODUCTION

These notes have been provided to amplify the geotechnical report in regard to classification methods, field procedures and certain matters relating to the Comments and Recommendations section. Not all notes are necessarily relevant to all reports.

The ground is a product of continuing natural and man-made processes and therefore exhibits a variety of characteristics and properties which vary from place to place and can change with time. Geotechnical engineering involves gathering and assimilating limited facts about these characteristics and properties in order to understand or predict the behaviour of the ground on a particular site under certain conditions. This report may contain such facts obtained by inspection, excavation, probing, sampling, testing or other means of investigation. If so, they are directly relevant only to the ground at the place where and time when the investigation was carried out.

#### DESCRIPTION AND CLASSIFICATION METHODS

The methods of description and classification of soils and rocks used in this report are based on Australian Standard 1726:2017 *'Geotechnical Site Investigations'*. In general, descriptions cover the following properties – soil or rock type, colour, structure, strength or density, and inclusions. Identification and classification of soil and rock involves judgement and the Company infers accuracy only to the extent that is common in current geotechnical practice.

Soil types are described according to the predominating particle size and behaviour as set out in the attached soil classification table qualified by the grading of other particles present (eg. sandy clay) as set out below:

Soil Classification	Particle Size
Clay	< 0.002mm
Silt	0.002 to 0.075mm
Sand	0.075 to 2.36mm
Gravel	2.36 to 63mm
Cobbles	63 to 200mm
Boulders	> 200mm

Non-cohesive soils are classified on the basis of relative density, generally from the results of Standard Penetration Test (SPT) as below:

Relative Density	SPT 'N' Value (blows/300mm)
Very loose (VL)	< 4
Loose (L)	4 to 10
Medium dense (MD)	10 to 30
Dense (D)	30 to 50
Very Dense (VD)	> 50

Cohesive soils are classified on the basis of strength (consistency) either by use of a hand penetrometer, vane shear, laboratory testing and/or tactile engineering examination. The strength terms are defined as follows.

Classification	Unconfined Compressive Strength (kPa)	Indicative Undrained Shear Strength (kPa)	
Very Soft (VS)	≤25	≤12	
Soft (S)	> 25 and $\leq$ 50	> 12 and $\leq$ 25	
Firm (F)	> 50 and $\leq$ 100	> 25 and $\leq$ 50	
Stiff (St)	$>$ 100 and $\leq$ 200	> 50 and $\leq$ 100	
Very Stiff (VSt)	$>$ 200 and $\leq$ 400	$>$ 100 and $\leq$ 200	
Hard (Hd)	> 400	> 200	
Friable (Fr)	Strength not attainable – soil crumbles		

Rock types are classified by their geological names, together with descriptive terms regarding weathering, strength, defects, etc. Where relevant, further information regarding rock classification is given in the text of the report. In the Sydney Basin, 'shale' is used to describe fissile mudstone, with a weakness parallel to bedding. Rocks with alternating inter-laminations of different grain size (eg. siltstone/claystone and siltstone/fine grained sandstone) is referred to as 'laminite'.

### SAMPLING

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

Disturbed samples taken during drilling provide information on plasticity, grain size, colour, moisture content, minor constituents and, depending upon the degree of disturbance, some information on strength and structure. Bulk samples are similar but of greater volume required for some test procedures.

Undisturbed samples are taken by pushing a thin-walled sample tube, usually 50mm diameter (known as a U50), into the soil and withdrawing it with a sample of the soil contained in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shrinkswell behaviour, strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

Details of the type and method of sampling used are given on the attached logs.



#### INVESTIGATION METHODS

The following is a brief summary of investigation methods currently adopted by the Company and some comments on their use and application. All methods except test pits, hand auger drilling and portable Dynamic Cone Penetrometers require the use of a mechanical rig which is commonly mounted on a truck chassis or track base.

**Test Pits:** These are normally excavated with a backhoe or a tracked excavator, allowing close examination of the insitu soils and 'weaker' bedrock if it is safe to descend into the pit. The depth of penetration is limited to about 3m for a backhoe and up to 6m for a large excavator. Limitations of test pits are the problems associated with disturbance and difficulty of reinstatement and the consequent effects on close-by structures. Care must be taken if construction is to be carried out near test pit locations to either properly recompact the backfill during construction or to design and construct the structure so as not to be adversely affected by poorly compacted backfill at the test pit location.

Hand Auger Drilling: A borehole of 50mm to 100mm diameter is advanced by manually operated equipment. Refusal of the hand auger can occur on a variety of materials such as obstructions within any fill, tree roots, hard clay, gravel or ironstone, cobbles and boulders, and does not necessarily indicate rock level.

**Continuous Spiral Flight Augers:** The borehole is advanced using 75mm to 115mm diameter continuous spiral flight augers, which are withdrawn at intervals to allow sampling and insitu testing. This is a relatively economical means of drilling in clays and in sands above the water table. Samples are returned to the surface by the flights or may be collected after withdrawal of the auger flights, but they can be very disturbed and layers may become mixed. Information from the auger sampling (as distinct from specific sampling by SPTs or undisturbed samples) is of limited reliability due to mixing or softening of samples by groundwater, or uncertainties as to the original depth of the samples. Augering below the groundwater table is of even lesser reliability than augering above the water table.

**Rock Augering:** Use can be made of a Tungsten Carbide (TC) bit for auger drilling into rock to indicate rock quality and continuity by variation in drilling resistance and from examination of recovered rock cuttings. This method of investigation is quick and relatively inexpensive but provides only an indication of the likely rock strength and predicted values may be in error by a strength order. Where rock strengths may have a significant impact on construction feasibility or costs, then further investigation by means of cored boreholes may be warranted.

**Wash Boring:** The borehole is usually advanced by a rotary bit, with water being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be assessed from the cuttings, together with some information from "feel" and rate of penetration.

**Mud Stabilised Drilling:** Either Wash Boring or Continuous Core Drilling can use drilling mud as a circulating fluid to stabilise the borehole. The term 'mud' encompasses a range of products ranging from bentonite to polymers. The mud tends to mask the cuttings and reliable identification is only possible from intermittent intact sampling (eg. from SPT and U50 samples) or from rock coring, etc.

**Continuous Core Drilling:** A continuous core sample is obtained using a diamond tipped core barrel. Provided full core recovery is achieved (which is not always possible in very low strength rocks and granular soils), this technique provides a very reliable (but relatively expensive) method of investigation. In rocks, NMLC or HQ triple tube core barrels, which give a core of about 50mm and 61mm diameter, respectively, is usually used with water flush. The length of core recovered is compared to the length drilled and any length not recovered is shown as NO CORE. The location of NO CORE recovery is determined on site by the supervising engineer; where the location is uncertain, the loss is placed at the bottom of the drill run.

**Standard Penetration Tests:** Standard Penetration Tests (SPT) are used mainly in non-cohesive soils, but can also be used in cohesive soils, as a means of indicating density or strength and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289.6.3.1–2004 (R2016) 'Methods of Testing Soils for Engineering Purposes, Soil Strength and Consolidation Tests – Determination of the Penetration Resistance of a Soil – Standard Penetration Test (SPT)'.

The test is carried out in a borehole by driving a 50mm diameter split sample tube with a tapered shoe, under the impact of a 63.5kg hammer with a free fall of 760mm. It is normal for the tube to be driven in three successive 150mm increments and the 'N' value is taken as the number of blows for the last 300mm. In dense sands, very hard clays or weak rock, the full 450mm 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 150mm of, say, 4, 6 and 7 blows, as

Ν	= 13	
4,	6, 7	

 In a case where the test is discontinued short of full penetration, say after 15 blows for the first 150mm and 30 blows for the next 40mm, as

> N > 30 15, 30/40mm

The results of the test can be related empirically to the engineering properties of the soil.

A modification to the SPT is where the same driving system is used with a solid 60° tipped steel cone of the same diameter as the SPT hollow sampler. The solid cone can be continuously driven for some distance in soft clays or loose sands, or may be used where damage would otherwise occur to the SPT. The results of this Solid Cone Penetration Test (SCPT) are shown as 'N<sub>c</sub>' on the borehole logs, together with the number of blows per 150mm penetration.



**Cone Penetrometer Testing (CPT) and Interpretation:** The cone penetrometer is sometimes referred to as a Dutch Cone. The test is described in Australian Standard 1289.6.5.1–1999 (R2013) 'Methods of Testing Soils for Engineering Purposes, Soil Strength and Consolidation Tests – Determination of the Static Cone Penetration Resistance of a Soil – Field Test using a Mechanical and Electrical Cone or Friction-Cone Penetrometer'.

In the tests, a 35mm or 44mm diameter rod with a conical tip is pushed continuously into the soil, the reaction being provided by a specially designed truck or rig which is fitted with a hydraulic ram system. Measurements are made of the end bearing resistance on the cone and the frictional resistance on a separate 134mm or 165mm long sleeve, immediately behind the cone. Transducers in the tip of the assembly are electrically connected by wires passing through the centre of the push rods to an amplifier and recorder unit mounted on the control truck. The CPT does not provide soil sample recovery.

As penetration occurs (at a rate of approximately 20mm per second), the information is output as incremental digital records every 10mm. The results given in this report have been plotted from the digital data.

The information provided on the charts comprise:

- Cone resistance the actual end bearing force divided by the cross sectional area of the cone – expressed in MPa. There are two scales presented for the cone resistance. The lower scale has a range of 0 to 5MPa and the main scale has a range of 0 to 50MPa. For cone resistance values less than 5MPa, the plot will appear on both scales.
- Sleeve friction the frictional force on the sleeve divided by the surface area – expressed in kPa.
- Friction ratio the ratio of sleeve friction to cone resistance, expressed as a percentage.

The ratios of the sleeve resistance to cone resistance will vary with the type of soil encountered, with higher relative friction in clays than in sands. Friction ratios of 1% to 2% are commonly encountered in sands and occasionally very soft clays, rising to 4% to 10% in stiff clays and peats. Soil descriptions based on cone resistance and friction ratios are only inferred and must not be considered as exact.

Correlations between CPT and SPT values can be developed for both sands and clays but may be site specific.

Interpretation of CPT values can be made to empirically derive modulus or compressibility values to allow calculation of foundation settlements.

Stratification can be inferred from the cone and friction traces and from experience and information from nearby boreholes etc. Where shown, this information is presented for general guidance, but must be regarded as interpretive. The test method provides a continuous profile of engineering properties but, where precise information on soil classification is required, direct drilling and sampling may be preferable. There are limitations when using the CPT in that it may not penetrate obstructions within any fill, thick layers of hard clay and very dense sand, gravel and weathered bedrock. Normally a 'dummy' cone is pushed through fill to protect the equipment. No information is recorded by the 'dummy' probe.

**Flat Dilatometer Test:** The flat dilatometer (DMT), also known as the Marchetti Dilometer comprises a stainless steel blade having a flat, circular steel membrane mounted flush on one side.

The blade is connected to a control unit at ground surface by a pneumatic-electrical tube running through the insertion rods. A gas tank, connected to the control unit by a pneumatic cable, supplies the gas pressure required to expand the membrane. The control unit is equipped with a pressure regulator, pressure gauges, an audio-visual signal and vent valves.

The blade is advanced into the ground using our CPT rig or one of our drilling rigs, and can be driven into the ground using an SPT hammer. As soon as the blade is in place, the membrane is inflated, and the pressure required to lift the membrane (approximately 0.1mm) is recorded. The pressure then required to lift the centre of the membrane by an additional 1mm is recorded. The membrane is then deflated before pushing to the next depth increment, usually 200mm down. The pressure readings are corrected for membrane stiffness.

The DMT is used to measure material index (I<sub>D</sub>), horizontal stress index (K<sub>D</sub>), and dilatometer modulus (E<sub>D</sub>). Using established correlations, the DMT results can also be used to assess the 'at rest' earth pressure coefficient (K<sub>o</sub>), over-consolidation ratio (OCR), undrained shear strength (C<sub>u</sub>), friction angle ( $\phi$ ), coefficient of consolidation (C<sub>h</sub>), coefficient of permeability (K<sub>h</sub>), unit weight ( $\gamma$ ), and vertical drained constrained modulus (M).

The seismic dilatometer (SDMT) is the combination of the DMT with an add-on seismic module for the measurement of shear wave velocity ( $V_s$ ). Using established correlations, the SDMT results can also be used to assess the small strain modulus ( $G_o$ ).

**Portable Dynamic Cone Penetrometers:** Portable Dynamic Cone Penetrometer (DCP) tests are carried out by driving a 16mm diameter rod with a 20mm diameter cone end with a 9kg hammer dropping 510mm. The test is described in Australian Standard 1289.6.3.2–1997 (R2013) 'Methods of Testing Soils for Engineering Purposes, Soil Strength and Consolidation Tests – Determination of the Penetration Resistance of a Soil – 9kg Dynamic Cone Penetrometer Test'.

The results are used to assess the relative compaction of fill, the relative density of granular soils, and the strength of cohesive soils. Using established correlations, the DCP test results can also be used to assess California Bearing Ratio (CBR).

Refusal of the DCP can occur on a variety of materials such as obstructions within any fill, tree roots, hard clay, gravel or ironstone, cobbles and boulders, and does not necessarily indicate rock level.



**Vane Shear Test:** The vane shear test is used to measure the undrained shear strength  $(C_u)$  of typically very soft to firm fine grained cohesive soils. The vane shear is normally performed in the bottom of a borehole, but can be completed from surface level, the bottom and sides of test pits, and on recovered undisturbed tube samples (when using a hand vane).

The vane comprises four rectangular blades arranged in the form of a cross on the end of a thin rod, which is coupled to the bottom of a drill rod string when used in a borehole. The size of the vane is dependent on the strength of the fine grained cohesive soils; that is, larger vanes are normally used for very low strength soils. For borehole testing, the size of the vane can be limited by the size of the casing that is used.

For testing inside a borehole, a device is used at the top of the casing, which suspends the vane and rods so that they do not sink under selfweight into the 'soft' soils beyond the depth at which the test is to be carried out. A calibrated torque head is used to rotate the rods and vane and to measure the resistance of the vane to rotation.

With the vane in position, torque is applied to cause rotation of the vane at a constant rate. A rate of 6° per minute is the common rotation rate. Rotation is continued until the soil is sheared and the maximum torque has been recorded. This value is then used to calculate the undrained shear strength. The vane is then rotated rapidly a number of times and the operation repeated until a constant torque reading is obtained. This torque value is used to calculate the remoulded shear strength. Where appropriate, friction on the vane rods is measured and taken into account in the shear strength calculation.

#### LOGS

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

The terms and symbols used in preparation of the logs are defined in the following pages.

Interpretation of the information shown on the logs, and its application to design and construction, should therefore take into account the spacing of boreholes or test pits, the method of drilling or excavation, the frequency of sampling and testing and the possibility of other than 'straight line' variations between the boreholes or test pits. Subsurface conditions between boreholes or test pits may vary significantly from conditions encountered at the borehole or test pit locations.

#### GROUNDWATER

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

- Although groundwater may be present, in low permeability soils it may enter the hole slowly or perhaps not at all during the time it 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 and may not be the same at the time of construction.
- 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 be washed out of the hole or 'reverted' chemically if reliable water observations are to be made.

More reliable measurements can be made by installing standpipes which are read after the groundwater level has stabilised at intervals ranging from several days to 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 perched water tables or surface water.

### FILL

The presence of fill materials can often be determined only by the inclusion of foreign objects (eg. bricks, steel, etc) or by distinctly unusual colour, texture or fabric. Identification of the extent of fill materials will also depend on investigation methods and frequency. Where natural soils similar to those at the site are used for fill, it may be difficult with limited testing and sampling to reliably assess the extent of the fill.

The presence of fill materials is usually regarded with caution as the possible variation in density, strength and material type is much greater than with natural soil deposits. Consequently, there is an increased risk of adverse engineering characteristics or behaviour. If the volume and quality of fill is of importance to a project, then frequent test pit excavations are preferable to boreholes.

### LABORATORY TESTING

Laboratory testing is normally carried out in accordance with Australian Standard 1289 '*Methods of Testing Soils for Engineering Purposes*' or appropriate NSW Government Roads & Maritime Services (RMS) test methods. Details of the test procedure used are given on the individual report forms.

### ENGINEERING REPORTS

Engineering reports are prepared by qualified personnel and are based on the information obtained and on current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal (eg. a three storey building) the information and interpretation may not be relevant if the design proposal is changed (eg. to a twenty storey building). If this happens, the Company will be pleased to review the report and the sufficiency of the investigation work.



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

- Unexpected variations in ground conditions the potential for this will be partially dependent on borehole spacing and sampling frequency as well as investigation technique.
- Changes in policy or interpretation of policy by statutory authorities.
- The actions of persons or contractors responding to commercial pressures.
- Details of the development that the Company could not reasonably be expected to anticipate.

If these occur, the Company will be pleased to assist with investigation or advice to resolve any problems occurring.

### 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, the Company requests that it immediately be notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

# REPRODUCTION OF INFORMATION FOR CONTRACTUAL PURPOSES

Where information obtained from this investigation 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. The Company would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

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#### **REVIEW OF DESIGN**

Where major civil or structural developments are proposed <u>or</u> where only a limited investigation has been completed <u>or</u> where the geotechnical conditions/constraints are quite complex, it is prudent to have a joint design review which involves an experienced geotechnical engineer/engineering geologist.

#### SITE INSPECTION

The Company will always be pleased to provide engineering inspection services for geotechnical aspects of work to which this report is related.

Requirements could range from:

- a site visit to confirm that conditions exposed are no worse than those interpreted, to
- a visit to assist the contractor or other site personnel in identifying various soil/rock types and appropriate footing or pile founding depths, or
- iii) full time engineering presence on site.



## SYMBOL LEGENDS



## **CLASSIFICATION OF COARSE AND FINE GRAINED SOILS**

Ma	jor Divisions	Group Symbol	Typical Names	Field Classification of Sand and Gravel	Laboratory Cl	assification
ianis	GRAVEL (more than half	GW Gravel and gravel-sand mixtures, V little or no fines e		Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	C <sub>u</sub> >4 1 <c<sub>c&lt;3</c<sub>
rsize fract	fraction is larger than 2.36mm	GP	Gravel and gravel-sand mixtures, little or no fines, uniform gravels	Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	Fails to comply with above
lucing ove )		GM Gravel-silt mixtures and gravel- sand-silt mixtures		'Dirty' materials with excess of non-plastic fines, zero to medium dry strength	≥ 12% fines, fines are silty	Fines behave as silt
of sail excl		GC	Gravel-clay mixtures and gravel- sand-clay mixtures	'Dirty' materials with excess of plastic fines, medium to high dry strength	≥ 12% fines, fines are clayey	Fines behave as clay
than 65% sater thar	SAND (more than half	SW	Sand and gravel-sand mixtures, little or no fines	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	Cu>6 1 <cc<3< td=""></cc<3<>
iai (mare gr	of coarse fraction is smaller than	SP	Sand and gravel-sand mixtures, little or no fines	Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	Fails to comply with above
graineds	2.36mm)	SM	Sand-silt mixtures	'Dirty' materials with excess of non-plastic fines, zero to medium dry strength	≥ 12% fines, fines are silty	
Coairs		SC	Sand-clay mixtures	'Dirty' materials with excess of plastic fines, medium to high dry strength	≥ 12% fines, fines are clayey	N/A

Major Divisions		Group			Laboratory Classification		
		Symbol	Typical Names	Dry Strength	Dilatancy	Toughness	% < 0.075mm
ding	SILT and CLAY (low to medium	ML	Inorganic silt and very fine sand, rock flour, silty or clayey fine sand or silt with low plasticity	None to low	Slow to rapid	Low	Below A line
of sail exdu 0.075mm)	plasticity)	CL, CI	Inorganic clay of low to medium plasticity, gravelly clay, sandy clay	Medium to high	None to slow	Medium	Above A line
an 35% ssthan		OL	Organic silt	Low to medium	Slow	Low	Below A line
bretha	SILT and CLAY	MH	Inorganic silt	Low to medium	None to slow	Low to medium	Below A line
soils (m te fracti	(high plasticity)	СН	Inorganic clay of high plasticity	High to very high	None	High	Above A line
re grained: oversiz		OH	Organic clay of medium to high plasticity, organic silt	Medium to high	None to very slow	Low to medium	Below A line
.=	Highly organic soil	Pt	Peat, highly organic soil	-	-	-	-

### Laboratory Classification Criteria

A well graded coarse grained soil is one for which the coefficient of uniformity Cu > 4 and the coefficient of curvature  $1 < C_c < 3$ . Otherwise, the soil is poorly graded. These coefficients are given by:

$$C_U = \frac{D_{60}}{D_{10}}$$
 and  $C_C = \frac{(D_{30})^2}{D_{10} D_{60}}$ 

Where  $D_{10}$ ,  $D_{30}$  and  $D_{60}$  are those grain sizes for which 10%, 30% and 60% of the soil grains, respectively, are smaller.

### NOTES:

- 1 For a coarse grained soil with a fines content between 5% and 12%, the soil is given a dual classification comprising the two group symbols separated by a dash; for example, for a poorly graded gravel with between 5% and 12% silt fines, the classification is GP-GM.
- 3 Clay soils with liquid limits > 35% and ≤ 50% may be classified as being of medium plasticity.
- 4 The U line on the Modified Casagrande Chart is an approximate upper bound for most natural soils.





## LOG SYMBOLS

Log Column	Symbol	Definition				
Groundwater Record		Standing water level. Time delay following completion of drilling/excavation may be shown.				
	<u> </u>	Extent of borehole/test pit collapse shortly after drilling/excavation.				
		Groundwater seepage into borehole or test pit noted during drilling or excavation.				
Samples	ES	Sample taken over depth indicated, for environmental analysis.				
	U50	Undisturbed 50mm diameter tube sample taken over depth indicated.				
	DR	Bulk disturbed sample taken over depth indicated.				
	ASB	Soil sample taken over depth indicated, for asbestos analysis.				
	ASS	Soil sample taken over depth indicated, for acid sulfate soil analysis.				
	SAL	Soil sample taken over depth indicated, for salinity analysis.				
Field Tests	N = 17	Standard Penetration Test (SPT) performed between depths indicated by lines. Individual				
	4, 7, 10	figures show blows per 150mm penetration. 'Refusal' refers to apparent hammer refusal within the corresponding 150mm depth increment.				
	N <sub>c</sub> = 5	Solid Cone Penetration Test (SCPT) performed between depths indicated by lines. Individual				
	7	figures show blows per 150mm penetration for 60° solid cone driven by SPT hammer. 'R' reters to apparent hammer refusal within the corresponding 150mm depth increment.				
	3R					
	VNS = 25	Vane shear reading in kPa of undrained shear strength.				
	PID = 100	Photoionisation detector reading in ppm (soil sample headspace test).				
Moisture Condition	w > PL	Moisture content estimated to be greater than plastic limit.				
(Fine Grained Soils)	w≈PL	Moisture content estimated to be approximately equal to plastic limit.				
	W < PL	Moisture content estimated to be less than plastic limit. Moisture content estimated to be near liquid limit				
	w≈u w>LL	Moisture content estimated to be near liquid limit.				
(Coarse Grained Soils)	D	DRY – runs freelv through fingers.				
	M	MOIST – does not run freely but no free water visible on soil surface.				
	W	WET – free water visible on soil surface.				
Strength (Consistency)	VS	VERY SOFT $-$ unconfined compressive strength $\leq 25$ kPa.				
Cohesive Soils	S	SOFT – unconfined compressive strength > 25kPa and $\leq$ 50kPa.				
	F	FIRM – unconfined compressive strength > 50kPa and $\leq$ 100kPa.				
	St Vs+	STIFF – unconfined compressive strength > $100$ kPa and $\leq 200$ kPa.				
	Hd	VERY STIFF – unconfined compressive strength > 200kPa and $\leq$ 400kPa.				
	Fr	HAKD – UNCONTINED COMPLESSIVE SUPERIOUS AUDICE A.				
	( )	Bracketed symbol indicates estimated consistency based on tactile examination or other				
		assessment.				
Density Index/ Relative Density		Density Index (I <sub>D</sub> ) SPT 'N' Value Range Range (%) (Blows/300mm)				
(Cohesionless Soils)	VL	VERY LOOSE $\leq 15$ 0-4				
	L	LOOSE > 15 and $\leq$ 35 4 - 10				
	MD	MEDIUM DENSE > 35 and $\leq 65$ 10 - 30				
	D	DENSE > 65 and $\le 85$ 30 - 50				
	VD	VERY DENSE > 85 > 50				
	()	Bracketed symbol indicates estimated density based on ease of drilling or other assessment.				
Hand Penetrometer Readings	300 250	Measures reading in kPa of unconfined compressive strength. Numbers indicate individual test results on representative undisturbed material unless noted otherwise.				

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**JK**Geotechnics



Log Column	Symbol	Definition	
Remarks	'V' bit	Hardened steel 'V	" shaped bit.
	'TC' bit	Twin pronged tun	gsten carbide bit.
	$T_{60}$	Penetration of au without rotation of	ger string in mm under static load of rig applied by drill head hydraulics of augers.
	Soil Origin	The geological ori	gin of the soil can generally be described as:
		RESIDUAL	<ul> <li>soil formed directly from insitu weathering of the underlying rock.</li> <li>No visible structure or fabric of the parent rock.</li> </ul>
		EXTREMELY WEATHERED	<ul> <li>soil formed directly from insitu weathering of the underlying rock.</li> <li>Material is of soil strength but retains the structure and/or fabric of the parent rock.</li> </ul>
		ALLUVIAL	- soil deposited by creeks and rivers.
		ESTUARINE	<ul> <li>soil deposited in coastal estuaries, including sediments caused by inflowing creeks and rivers, and tidal currents.</li> </ul>
		MARINE	- soil deposited in a marine environment.
		AEOLIAN	<ul> <li>soil carried and deposited by wind.</li> </ul>
		COLLUVIAL	<ul> <li>soil and rock debris transported downslope by gravity, with or without the assistance of flowing water. Colluvium is usually a thick deposit formed from a landslide. The description 'slopewash' is used for thinner surficial deposits.</li> </ul>
		LITTORAL	<ul> <li>beach deposited soil.</li> </ul>



## **Classification of Material Weathering**

Term		Abbre	viation	Definition		
Residual Soil		F	ß	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	х	W	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	Distinctly Weathered	HW	DW	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	(Note 1)	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	S	W	Rock is partially discoloured with staining or bleaching along joints but shows little or no change of strength from fresh rock.			
Fresh		F	R	Rock shows no sign of decomposition of individual minerals or colour changes.		

**NOTE 1:** The term 'Distinctly Weathered' is used where it is not practicable to distinguish between 'Highly Weathered' and 'Moderately Weathered' rock. 'Distinctly Weathered' is defined as follows: '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 weathering products in pores'. There is some change in rock strength.

## **Rock Material Strength Classification**

			Guide to Strength		
Term	Abbreviation	Uniaxial Compressive Strength (MPa)	Point Load Strength Index Is <sub>(50)</sub> (MPa)	Field Assessment	
Very Low Strength	VL	0.6 to 2	0.03 to 0.1	Material crumbles under firm blows with sharp end of pick; can be peeled with knife; too hard to cut a triaxial sample by hand. Pieces up to 30mm thick can be broken by finger pressure.	
Low Strength	L	2 to 6	0.1 to 0.3	Easily scored with a knife; indentations 1mm to 3mm show in the specimen with firm blows of the pick point; has dull sound under hammer. A piece of core 150mm long by 50mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling.	
Medium Strength	М	6 to 20	0.3 to 1	Scored with a knife; a piece of core 150mm long by 50mm diameter can be broken by hand with difficulty.	
High Strength	н	20 to 60	1 to 3	A piece of core 150mm long by 50mm diameter cannot be broken by hand but can be broken by a pick with a single firm blow; rock rings under hammer.	
Very High Strength	VH	60 to 200	3 to 10	Hand specimen breaks with pick after more than one blow; rock rings under hammer.	
Extremely High Strength	EH	> 200	> 10	Specimen requires many blows with geological pick to break through intact material; rock rings under hammer.	



# Abbreviations Used in Defect Description

Cored Borehole Log Column		Symbol Abbreviation	Description	
Point Load Strength Index		• 0.6	Axial point load strength index test result (MPa)	
		x 0.6	Diametral point load strength index test result (MPa)	
Defect Details – Type		Ве	Parting – bedding or cleavage	
		CS	Clay seam	
		Cr	Crushed/sheared seam or zone	
		J	Joint	
		Jh	Healed joint	
		il	Incipient joint	
		XWS	Extremely weathered seam	
	– Orientation	Degrees	Defect orientation is measured relative to normal to the core axis (ie. relative to the horizontal for a vertical borehole)	
	– Shape	Р	Planar	
		с	Curved	
		Un	Undulating	
		St	Stepped	
		lr	Irregular	
	– Roughness	Vr	Very rough	
		R	Rough	
		S	Smooth	
		Ро	Polished	
		SI	Slickensided	
	– Infill Material	Ca	Calcite	
		Cb	Carbonaceous	
		Clay	Clay	
		Fe	Iron	
		Qz	Quartz	
		Ру	Pyrite	
	– Coatings	Cn	Clean	
		Sn	Stained – no visible coating, surface is discoloured	
		Vn	Veneer – visible, too thin to measure, may be patchy	
		Ct	Coating $\leq$ 1mm thick	
		Filled	Coating > 1mm thick	
	– Thickness	mm.t	Defect thickness measured in millimetres	



REPORT TO HEALTH INFRASTRUCTURE

ON PRELIMINARY (STAGE 1) SITE INVESTIGATION

FOR PROPOSED GLEN INNES HOSPITAL REDEVELOPMENT

AT 94 TAYLOR STREET, GLEN INNES, NSW

Date: 19 August 2022 Ref: E35093UPDrpt

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### **DOCUMENT REVISION RECORD**

Report Reference	Report Status	Report Date
E35093UPDrpt	Final Report	19 August 2022

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# **Executive Summary**

Health Infrastructure ('the client') commissioned JK Environments (JKE) to undertake a Preliminary (Stage 1) Site Investigation (PSI) for the proposed hospital redevelopment at Glen Innes Hospital, 94 Taylor Street, Glen Innes, NSW. The purpose of the investigation is to make a preliminary assessment of site contamination. For the purposes of the PSI 'the site' refers to the known proposed new alterations additions in the south-west section of the hospital grounds, as identified in the master plan documentation. The site location is shown on Figure 1 and the investigation was confined to the site boundaries as shown on Figure 2.

This report has been prepared to support the lodgement of a Development Application (DA) for the proposed hospital redevelopment, with regards to State Environmental Planning Policy (Resilience and Hazards) 2021 (formerly known as SEPP55).

The primary aims of the investigation were to identify any past or present potentially contaminating activities at the site, identify the potential for site contamination, and make a preliminary assessment of the soil and groundwater contamination conditions. The objectives were to:

- Provide an appraisal of the past site use(s) based on a review of historical records;
- Assess the current site conditions and use(s) via a site walkover inspection;
- Identify potential contamination sources/areas of environmental concern (AEC) and contaminants of potential concern (CoPC);
- Assess the soil contamination conditions via implementation of a preliminary sampling and analysis program;
- Prepare a conceptual site model (CSM);
- Assess the potential risks posed by contamination to the receptors identified in the CSM (Tier 1 assessment);
- Provide a preliminary waste classification for off-site disposal of soil;
- Assess whether the site is suitable or can be made suitable for the proposed development (from a contamination viewpoint); and
- Assess whether further intrusive investigation and/or remediation is required.

The investigation included a review of historical information and sampling from six boreholes and two testpits. The potential contamination sources/AEC include: Fill material; Use of pesticides; Hazardous building materials; and Historical firefighting activity.

The PSI identified fill at most locations. The asbestos containing materials (ACM) concentration in the fill profile from BH4 (0-0.1m) was above the human health Site Assessment Criteria (SAC). Surface ACM were also encountered within the hospital grounds to the east of the site. There is a potential for further ACM in fill and at the surface at the site and in the general hospital grounds. The PSI indicated that remediation will be required in relation to asbestos (as a minimum).

Per- and polyfluoroalkyl substances (PFAS), the compounds potentially associated with historical firefighting activities at the site, were not assessed under the scope of the PSI.

Based on the findings of the investigation, JKE is of the opinion that the site can be made suitable for the proposed development described in Section 1.1. A Detailed Site Investigation (DSI) will be required to establish extent of remediation. Based on the preliminary data and the asbestos contamination, at this stage we consider that the site could be made suitable via relatively straight-forward remediation processes such as 'excavation/disposal' and 'cap and contain'.

We recommend the following:

- Prepare and implement an Asbestos Management Plan (AMP) for asbestos in soil;
- Undertake a DSI to address the data gaps identified in Section 10.4. The extent of 'the site' for the DSI should be confirmed by the client as it is noted that not all areas of the hospital are being redeveloped. In our view, it would be reasonable to limit the DSI to broadly capture the proposed development footprint; and
- Following completion of the DSI, prepare and implement a Remediation Action Plan (RAP) to document the remediation and validation requirements for the site; and
- Validate the remediation works and prepare of a Validation Assessment report at the completion of remediation.


The conclusions and recommendations should be read in conjunction with the limitations presented in the body of this report.



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## Attachments

Appendix A: Report Figures

- Appendix B: Site Information and Site History
- Appendix C: Laboratory Results Summary Tables
- Appendix D: Borehole and Test pit Logs
- Appendix E: Laboratory Report(s) & COC Documents
- Appendix F: Report Explanatory Notes
- Appendix G: Data (QA/QC) Evaluation
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# Abbreviations

Asbestos Fines/Fibrous Asbestos	AF/FA
Ambient Background Concentrations	ABC
Added Contaminant Limits	ACL
Asbestos Containing Material	ACM
Australian Drinking Water Guidelines	ADWG
Area of Environmental Concern	AEC
Australian Height Datum	AHD
Acid Sulfate Soil	ASS
Above-Ground Storage Tank	AST
Below Ground Level	BGL
Benzo(a)pyrene Toxicity Equivalent Factor	BaP TEQ
Bureau of Meteorology	BOM
Benzene, Toluene, Ethylbenzene, Xylene	BTEX
Cation Exchange Capacity	CEC
Contaminated Land Management	CLM
Contaminant(s) of Potential Concern	CoPC
Chain of Custody	COC
Conceptual Site Model	CSM
Development Application	DA
Dial Before You Dig	DBYD
Data Quality Indicator	DQI
Data Quality Objective	DQO
Detailed Site Investigation	DSI
Ecological Investigation Level	EIL
Ecological Screening Level	ESL
Environmental Management Plan	EMP
Excavated Natural Material	ENM
Environment Protection Authority	EPA
Environmental Site Assessment	ESA
Fibre Cement Fragment(s)	FCF
General Approval of Immobilisation	GAI
Health Investigation Level	HILs
Health Screening Level	HSL
Health Screening Level-Site Specific Assessment	HSL-SSA
International Organisation of Standardisation	ISO
JK Environments	JKE
Lab Control Spike	LCS
Light Non-Aqueous Phase Liquid	LNAPL
Map Grid of Australia	MGA
National Association of Testing Authorities	NATA
National Environmental Protection Measure	NEPM
Organochlorine Pesticides	OCP
Organophosphate Pesticides	OPP
Polycyclic Aromatic Hydrocarbons	PAH
Potential ASS	PASS
Polychlorinated Biphenyls	PCBs
Per-and Polyfluoroalkyl Substances	PFAS
Photo-ionisation Detector	PID
Protection of the Environment Operations	POEO
Practical Quantitation Limit	PQL
Quality Assurance	QA
Quality Control	QC
Remediation Action Plan	RAP
Relative Percentage Difference	RPD

# **JK**Environments



Site Assessment Criteria	SAC
Sampling, Analysis and Quality Plan	SAQP
Site Audit Statement	SAS
Site Audit Report	SAR
State Environmental Planning Policy	SEPP
Site Specific Assessment	SSA
Source, Pathway, Receptor	SPR
Specific Contamination Concentration	SCC
Standard Penetration Test	SPT
Standing Water Level	SWL
Trip Blank	ТВ
Toxicity Characteristic Leaching Procedure	TCLP
Total Recoverable Hydrocarbons	TRH
Trip Spike	TS
Upper Confidence Limit	UCL
United States Environmental Protection Agency	USEPA
Underground Storage Tank	UST
Virgin Excavated Natural Material	VENM
Volatile Organic Compounds	VOC
World Health Organisation	WHO
Work Health and Safety	WHS

### Units

Litres	L
Metres BGL	mBGL
Metres	m
Millivolts	mV
Millilitres	ml or mL
micro Siemens per Centimetre	μS/cm
Micrograms per Litre	μg/L
Milligrams per Kilogram	mg/kg
Milligrams per Litre	mg/L
Parts Per Million	ppm
Percentage	%
Percentage weight for weight	%w/w

# **JK**Environments



### 1 INTRODUCTION

Health Infrastructure ('the client') commissioned JK Environments (JKE) to undertake a Preliminary (Stage 1) Site Investigation (PSI) for the proposed hospital redevelopment at Glen Innes Hospital, 94 Taylor Street, Glen Innes, NSW. The purpose of the investigation is to make a preliminary assessment of site contamination. For the purposes of the PSI 'the site' refers to the known proposed new alterations additions in the south-west section of the hospital grounds, as identified in the master plan documentation. The site location is shown on Figure 1 and the investigation was confined to the site boundaries as shown on Figure 2.

This report has been prepared to support the lodgement of a Development Application (DA) for the proposed hospital redevelopment, with regards to State Environmental Planning Policy (Resilience and Hazards) 2021<sup>1</sup> (formerly known as SEPP55).

A geotechnical investigation was undertaken in conjunction with this PSI by JK Geotechnics (JKG). The results of the geotechnical investigation will be presented in a separate report (Ref: 35093URrpt). This report should be read in conjunction with the JKG report.

### 1.1 Proposed Development Details

Based on a review of the provided information, we understand that the proposed development includes alterations and additions which will include the following at the site:

- Demolition of the old nurses' quarters buildings and old maintenance building;
- A new single storey building and a single storey link structure extending north to the existing Main Hospital Building. Due to the variation in site surface levels, it is currently proposed that that the southern portion of the new building is likely to comprise an on-grade concrete slab possibly locally requiring raising of surface levels to for a building platform with engineered fill. The northern portion of the slab is likely to comprise a concrete slab suspended between strip footings supporting masonry walls. A new lift and staircase will be situated to the north of the proposed building;
- Additional car parking areas and access roads will be provided to the south and east of the proposed building;
- Design surface levels have not been provided but we understand that there will be a number of retaining walls formed as well as permanent batter slopes; we have assumed excavation and raising of site surface levels by a maximum of about 1m depth or height, respectively. We also understand that the intent is to achieve balanced cut and fill earthworks; and
- The existing mature trees over the south-western portion of the site will remain. Other landscaping works are presumed; however details are not available at this stage.

The master plan development plans are attached in the appendices. JKE note that the master plan also identifies the potential for staff accommodation budlings may in the east section of the hospital, in additional to the potential ambulance station in the north-east section of the hospital. These potential master plan development areas have been excluded from the PSI site area. However, we note that JKE was previously engaged by Health Infrastructure to undertake a combined PSI and Detailed Site Investigation (DSI) for the



<sup>&</sup>lt;sup>1</sup> State Environmental Planning Policy (Resilience and Hazards) 2021 (NSW) (referred to as SEPP Resilience and Hazards 2021)



potential ambulance station in the north-east section of the hospital grounds. A summary of the JKE investigation results is provided in Section 2.1 and considered in the development of the Conceptual Site Model (CSM) for this PSI.

### 1.2 Aims and Objectives

The primary aims of the investigation were to identify any past or present potentially contaminating activities at the site, identify the potential for site contamination, and make a preliminary assessment of the soil and groundwater contamination conditions. The objectives were to:

- Provide an appraisal of the past site use(s) based on a review of historical records;
- Assess the current site conditions and use(s) via a site walkover inspection;
- Identify potential contamination sources/areas of environmental concern (AEC) and contaminants of potential concern (CoPC);
- Assess the soil contamination conditions via implementation of a preliminary sampling and analysis program;
- Prepare a conceptual site model (CSM);
- Assess the potential risks posed by contamination to the receptors identified in the CSM (Tier 1 assessment);
- Provide a preliminary waste classification for off-site disposal of soil;
- Assess whether the site is suitable or can be made suitable for the proposed development (from a contamination viewpoint); and
- Assess whether further intrusive investigation and/or remediation is required.

### 1.3 Scope of Work

The investigation was undertaken generally in accordance with a JKE proposal Ref: EP56152UPD (RFQ: HI22038) and written acceptance from the client via Contact No. HI22038GU. The scope of work included the following:

- Review of site information, including background and site history information from various sources outlined in the report;
- Preparation of a CSM;
- Design and implementation of a sampling, analysis and quality plan (SAQP);
- Interpretation of the analytical results against the adopted Site Assessment Criteria (SAC);
- Data Quality Assessment; and
- Preparation of a report including a Tier 1 risk assessment.

The scope of work was undertaken with reference to the National Environmental Protection (Assessment of Site Contamination) Measure 1999 as amended (2013)<sup>2</sup>, other guidelines made under or with regards to the Contaminated Land Management Act (1997)<sup>3</sup> and SEPP Resilience and Hazards 2021. A list of reference documents/guidelines is included in the appendices.

<sup>&</sup>lt;sup>2</sup> National Environment Protection Council (NEPC), (2013). National Environmental Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013). (referred to as NEPM 2013)

<sup>&</sup>lt;sup>3</sup> Contaminated Land Management Act 1997 (NSW) (referred to as CLM Act 1997)



### 2 SITE INFORMATION

### 2.1 Background Information - Ambulance Station Investigation by JKE

JKE previously investigated the proposed ambulance station area (2022)<sup>4</sup>. The JKE PSI/DSI for the proposed ambulance station in the north-east section of the hospital grounds included a desktop a review of historical information, soil sampling from four boreholes and five test pits, and installation and groundwater sampling from three monitoring wells.

Imported fill was identified as a potential contamination source. The historical information indicated that the site has formed part of the hospital land and has remained undeveloped.

The boreholes generally encountered fill materials to depths of between approximately 0.1m below ground level (BGL) to 0.6mBGL, underlain by natural residual clayey soils. The fill contained inclusions of igneous and ironstone gravel, brick (whole and fragments), sand, ash and root fibres.

A selection of soil and groundwater samples were analysed for the CoPC identified in the CSM. Elevated concentrations of the CoPC were not encountered above the adopted health or ecological-based SAC in any of the soil samples analysed. Elevated concentrations of zinc were encountered in one groundwater sample. However, this was considered to be a regional issue and was not considered to pose a risk to site receptors.

Based on the findings of the PSI/DSI, JKE was of the opinion that the proposed ambulance site was suitable for the proposed ambulance station development and that remediation was not required. An unexpected finds protocol was detailed in the JKE PSI/DSI to manage any unexpected finds during the ambulance station development.

A geotechnical investigation was undertaken in conjunction with the JKE PSI/DSI by JKG. The results of the geotechnical investigation are presented in a separate report (Ref: 34948RFrpt).

# Table 2-1: Site IdentificationCurrent Site Owner<br/>(certificate of title):Health Administration CorporationSite Address:85 Taylor Street, Glen Innes, NSW<br/>(site address commonly referred to as 94 Taylor Street, Glen Innes, NSW)Lot & Deposited Plan:Part of Lot 2 in DP1208729Current Land Use:Hospital and associated facilitiesProposed Land Use:Continued hospital and associated facilitiesLocal Government Authority:Glen Innes Severn Council

### 2.2 Site Identification



<sup>&</sup>lt;sup>4</sup> JKE, (2022). Report to NSW Health Infrastructure on Preliminary (Stage 1) and Detailed (Stage 2) Site Investigation (DSI) for Proposed Rural Ambulance Infrastructure Reconfiguration (RAIR2) at 94 Taylor Street, Glen Innes, NSW (Ref: E34948PTrpt, dated 25 May 2022) (referred to as the JKE PSI/DSI)



Current Zoning:	R1: General Residential
Ŭ	
Site Area (m²) (approx.):	8,000
RI (AHD in m) (approx.):	1068
	1000
Geographical Location	Latitude: -29.734140
(decimal degrees) (approx.):	
(acciliar acgrees) (approx.).	
	Longitude: 151.731409
Site Location Plan:	Figure 1
Sample Location Plan:	Figure 2
	-

### 2.3 Site Location and Regional Setting

The site is located in a predominantly residential area of Glen Innes and is bound by Macquarie Street to the west and Ferguson Street to the south. The site is located within the south-western portion of the wider Glen Innes District Hospital grounds. Rocky Ponds Creek is located approximately 180m to the east of the site.

### 2.4 Topography

The regional topography is characterised by an east facing hillside that falls towards Rocky Ponds Creek. The site is located towards the crest of the hillside and slopes to the east at approximately  $1^{\circ}-2^{\circ}$ , which is generally in sympathy with the surrounding regional topography. To the east of the site, the slope increases at approximately  $3^{\circ}-4^{\circ}$  sloping towards the east.

### 2.5 Site Inspection

A walkover inspection of the site was undertaken by JKE on 9 June 2022. The inspection was limited to accessible areas of the site and immediate surrounds. An internal inspection of buildings was not undertaken. Selected site photographs obtained during the inspection are attached in the appendices.

A summary of the inspection findings is outlined in the following subsections:

### 2.5.1 Current Site Use and/or Indicators of Former Site Use

At the time of the inspection, the site was occupied by a portion of the Glen Innes District Hospital. The site was located within the 'old hospital' quarters which was generally disused with the exception of onsite vehicle parking and access driveway. Former use of the site included nurses' accommodation and hospital maintenance operations.

### 2.5.2 Buildings, Structures and Roads

The site was occupied by two buildings generally of brick and masonry construction with corrugated metal roofs. Based on a cursory external inspection and the apparent age of construction, the onsite buildings



appeared to potentially contain Asbestos Containing Materials (ACM). At the time of the inspection, the onsite buildings were disused and vacant. Based on discussions with the hospital staff, the buildings were used for nurses' accommodation and former hospital maintenance purposes. Open areas of the site included grassed landscaped areas and asphaltic concrete paved driveways.

A high-level summary of the buildings and other built features observed during the JKE inspection is presented in the table below:

Building/Feature location	Description
Former nurses' accommodation building located within the western area of the site (shown on Figure 2).	Three-storey brick building with corrugated metal roof. The building was 'T' shaped and appeared to be of older construction with potential ACM. At the time of the inspection, this building was sealed, inaccessible and disused.
Former hospital maintenance building located within the eastern area of the site (shown on Figure 2).	Single-storey brick building with corrugated metal roof. The building appeared to be of on-grade construction. ACM was likely to be present within the building based on caution signage affixed to the exterior of the building. The building was irregular shaped with the areas immediately adjacent grassed. Two chimneys were located along the roof of the building.

|--|

### 2.5.3 Boundary Conditions, Soil Stability and Erosion

The site was generally unfenced along the boundaries and open to street frontages or the wider Glen Innes Hospital grounds to the north and east. No significant erosion or soil instability were observed.

### 2.5.4 Presence of Drums/Chemical Storage and Waste

At the time of the inspection, chlorine dioxide solution stored in 10L drums was located on the exterior area of the former maintenance building in the east section of the site. The chemicals were stored on concrete pavement. Chlorine dioxide is generally used for to sanitise water and such small amounts are not considered to pose a contamination risk in the context of the PSI.

### 2.5.5 Evidence of Cut and Fill

Parts of the site appeared to have been filled to accommodate the existing development and to form the building platforms. Filled areas was evident along part of the south-eastern portion of the site as this area appeared to be elevated from the Ferguson Street level to the south.

### 2.5.6 Visible or Olfactory Indicators of Contamination (odours, spills etc)

Visible or olfactory indicators of contamination were not observed onsite during the inspection.



### 2.5.7 Drainage and Services

Excess surface water or overland flow would reasonably be expected to flow towards the east based on the site topography. Onsite or stormwater services located within the wider Glen Innes District Hospital would be expected to be connected to the regional stormwater infrastructure and ultimately discharge into Rocky Pond Creek to the east.

### 2.5.8 Sensitive Environments

Sensitive environments such as wetlands, ponds, creeks or extensive areas of natural vegetation were not identified on site or in the immediate surrounds. Rocky Pond Creek was located approximately 150m to the east and down-gradient of the site and is considered to be a potential receptor.

### 2.5.9 Landscaped Areas and Visible Signs of Plant Stress

Exotic grass covered the majority of the unpaved areas of the site. Native trees of approximately 5m to 10m in height were located along parts of the western and southern site boundary. No stress or dieback were observed within the onsite vegetation based on a cursory, external inspection.

### 2.6 Surrounding Land Use

During the site inspection, JKE observed the following land uses in the immediate surrounds:

- North Wider Glen Innes District Hospital grounds including the following:
  - Main hospital building;
  - Current hospital maintenance building;
  - Laundry building. Indicators of potential dry cleaning were not observed and the building appeared to be used for laundry storage and transport purposes;
  - Waste incinerator;
  - An above ground Diesel generator; and
  - Clinical and general waste storage.
- South Ferguson Street and residential properties beyond;
- East Old hospital grounds currently used as the hospital museum. Various historical agricultural machinery was on display within the hospital museum buildings. The historical machinery did not appear to be operational and were for display purposes. Concrete paved tennis courts were located further to the east, beyond the hospital museum grounds. Surface fibre cement fragments (FCF) were identified approximately 30m to the east of the site as shown on Figure 2 attached in the appendices; and
- West Macquarie Street and residential properties further to the west. A service station (BP Truckstop) and motor mechanics was located approximately 160m to the south-west and up-gradient of the site.

None of the off-site land uses/features were considered to be a potential contamination source to the site. The area to the north and east of the site (within the hospital wider grounds) were generally down gradient of the site. However, the presence of FCF on the surface to the east of site suggests that buildings are likely

6



to have been demolished in this area and further FCF may be encountered on the surface of the site and/or within fill.

### 2.7 Interview with Site Personnel

During the inspection, JKE undertook an interview with the Glen Innes District Hospital maintenance staff. The hospital staff advised JKE the following:

- There had been a fire within the former nurse accommodation building located within the west section of the site. The fire was located within the first floor of the building which occurred 3-4 years prior to the JKE inspection. Hospital staff indicated that firefighting foam was used within the site for fire suppression by the fire brigade. Additionally, as a result of the fire the building had been boarded up preventing access due to structural damage and presence of friable asbestos within the building;
- The hospital no longer keeps Aqueous Film Forming Foam (AFFF) fire extinguishers within the hospital grounds;
- There were no known Underground Storage Tanks (USTs) located within the site; and
- Chemicals kept onsite were limited to small quantities of paints and cleaning chemicals as noted by JKE in the previous sections.

### 2.8 Underground Services

The 'Dial Before You Dig' (DBYD) plans were reviewed for the investigation in order to establish whether any major underground services exist at the site or in the immediate vicinity that could act as a preferential pathway for contamination migration. Major services were not identified that would be expected to act as preferential pathways for contamination migration. Local services (i.e. those not shown on the DBYD plans) exist and could act as preferential pathways for contamination migration migration.



### **3 GEOLOGY AND HYDROGEOLOGY**

### 3.1 Regional Geology

Regional geological information was reviewed for the investigation. The information was sourced from the Lotsearch<sup>5</sup> report attached in the appendices. The report indicates that the site is underlain by Maybole Volcanics dominated by basalt lithology, with alluvial aged deposits located approximately 240m to the north-east of the site.

### 3.2 Acid Sulfate Soil (ASS) Risk and Planning

ASS information presented in the Lotsearch report indicated that the site is no located within an ASS risk area.

### 3.3 Hydrogeology

Hydrogeological information presented in the Lotsearch report indicated that the regional aquifer on-site and in the areas immediately surrounding the site includes porous, extensive aquifers of low to moderate productivity. There was a total of 74 registered bores within the report buffer of 2,000m. In summary:

- The nearest registered bore was located approximately 140m to the north-west of the site. The bore was utilised for stock and domestic purposes;
- The majority of the bores were registered for monitoring or domestic purposes, with the closest domestic bore located approximately 555m upgradient of the site;
- There were a number of bores registered for water supply in the area. The closest water supply bore was located approximately 410m to the south and cross gradient of the site. The nearest presumed downgradient water supply bore (ref: 10017555) was located over 1,000m to the north-east of the site; and
- The drillers log information from the closest registered bores typically identified sandy clay soil to depths of 3.5-4mBGL, underlain by basalt bedrock. Standing water levels (SWLs) in the bores ranged from 3.0mBGL to 5.0mBGL.

The information reviewed for the investigation indicates that the subsurface conditions at the site are likely to consist of relatively low permeability (residual) soils overlying shallow bedrock. Groundwater is utilised as a resource in the areas surrounding the site, primarily for stock watering. Use of groundwater is not proposed as part of the development.

It is understood based on the Glenn Innes Severn Council Drinking Water Management System (2019)<sup>6</sup> that under normal operating conditions, the Glen Innes drinking water supply system's primary water sources are Beardy Waters Weir and Red Range Road Bore. The Red Range Road bore draws water from 56m and 85m below ground.

Considering the local topography and surrounding land features, JKE anticipate groundwater to flow towards the east. However, this has not been confirmed within the scope of this PSI.

<sup>&</sup>lt;sup>5</sup> It is noted that the area defined in the Lotsearch report captures the Glen Innes hospital grounds rather than the site/proposed development area as defined the Figures in Appendix A

<sup>&</sup>lt;sup>6</sup> Glenn Innes Severn Council, (2019). *Glenn Innes Severn Council Drinking Water Management System* 



### 3.4 Receiving Water Bodies

The site location and regional topography indicates that excess surface water flows have the potential to enter the Rocky Ponds Creek. Rocky Ponds Creek is located approximately 210m east of the site at its closest point, with the closest down-gradient section of the creek located approximately 365m to the north-east of the site. This water body is a potential receptor.



### 4 SITE HISTORY INFORMATION

### 4.1 Review of Historical Aerial Photographs

Historical aerial photographs were reviewed for the investigation. The information was sourced from the Lotsearch report. JKE has reviewed the photographs and summarised relevant information in the following table:

Table 4-1: Summai	y of Historical Aerial	Photographs
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Year	Details
1955	<b>On-site:</b> The site appeared to primarily be occupied by a 'T" shaped building in the central and west sections of the site. Smaller, freestanding buildings were also located in the east sections of the site.
	<b>Off-site:</b> The surrounding area to the south and west of the site appeared to be occupied for low density residential purposes. The surrounding area to the north was primarily occupied by a large rectangular building with interconnecting smaller and detached buildings. The surrounding area to the east was occupied by a number of small to medium sized detached buildings, with a number of tennis courts located beyond West Avenue.
1964	<b>On-site:</b> The site appeared generally similar to the previous aerial photograph. However, one of the small buildings to the east of the 'T" shaped building appeared to have been demolished.
	On-site. The surrounds generally appeared similar to the previous aerial photograph.
1974	The site and surrounding features appeared generally similar to the previous aerial photograph.
1985	The site and surrounding features appeared generally similar to the previous aerial photograph.
1993	<b>On-site:</b> The site appeared generally similar to the previous aerial photograph. However, the colour aerial photograph appeared to show an asphaltic concrete driveway and on grade car parking in the central and east sections of the site.
	Off-site: The surrounds generally appeared similar to the previous aerial photograph.
2006	<b>On-site:</b> The site appeared generally similar to the previous aerial photograph. However, the small building in the easts section of the site appeared to have been extended to the north.
	<b>Off-site:</b> The surrounds generally appeared similar to the previous aerial photograph.
2013	The site and surrounding features appeared generally similar to the previous aerial photograph.
2021	The site and surrounding features appeared generally similar to the previous aerial photograph.

### 4.2 SafeWork NSW Records

SafeWork NSW records in relation to the registered storage of dangerous goods were reviewed for the investigation. Copies of relevant documents are attached in the appendices. The search did not identify any licences to store dangerous goods including USTs, above ground storage tanks (ASTs) or chemicals at the site.



### 4.3 NSW EPA and Department of Defence Records

A review of the NSW EPA and Department of Defence databases was undertaken for the PSI. Information from the following databases were sourced from the Lotsearch report:

- Records maintained in relation to contaminated land under Section 58 of the CLM Act 1997;
- Records of sites notified in accordance with the Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997 (2015)<sup>7</sup>;
- Licensed activities under the Protection of the Environment Operations Act (1997)<sup>8</sup>;
- Sites being investigated under the NSW EPA per-and polyfluoroalkyl substances (PFAS) investigation program;
- Sites being investigated by the Department of Defence for PFAS contamination; and
- Sites being managed by the Department of Defence for PFAS contamination.

The search included the site and surrounding areas in the report buffer. A summary of the information is provided below:

Records	On-site	Off-site
Records under Section 58 of the CLM Act 1997	None	One property was listed in the report buffer. The property was a former gas works and located approximately 930m to the south of the site. However, due to the regional geology/hydrogeology and distance from the site, the property was not considered to represent off-site sources of contamination.
Records under the Duty to Report Contamination under Section 60 of the CLM Act 1997	None	There were seven properties listed in the report buffer. All properties were located over 245m from the site with four considered to be potentially upgradient. However, due to the regional geology/hydrogeology and distance from the site, the property none of the properties are considered to represent off-site sources of contamination.
Licences under the POEO Act 1997	The site was formerly licenced by the NSW EPA (Licence No. 11322) for activities associated with <i>"Hazardous, Industrial or</i> <i>Group A Waste Generation or</i> <i>Storage"</i> . This activity is considered unlikely to pose a contamination risk to the site or represent a source of contamination in the context of the PSI. It is assumed that this licence relates to medical waste which is typical for a hospital.	Current and historical licenses were identified for several properties within the report buffer, including railway systems activities and the application of herbicides along waterways. However, these activities are considered unlikely to pose a contamination risk to the site or represent an off-site source of contamination.

### Table 4-2: NSW EPA and Department of Defence Records

<sup>&</sup>lt;sup>7</sup> NSW EPA, (2015). *Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997.* (referred to as Duty to Report Contamination)

<sup>&</sup>lt;sup>8</sup> Protection of the Environment Operations Act 1997 (NSW) (referred to as POEO Act 1997)



Records	On-site	Off-site
Records relating to the NSW EPA PFAS Investigation Program	None	None
Records relating to the Department of Defence PFAS management and investigation programs	None	None

### 4.4 Historical Business Directory and Additional Lotsearch Information

Historical business records and other relevant information were reviewed for the investigation. The information was sourced from the Lotsearch report and summarised in the following table:

Records	On-site	Off-site
Historical dry cleaners, motor garages and service stations	None	There were 10 service station businesses and one dry cleaner listed within 500m of the site. Only one of the service station businesses was located potentially upgradient and approximately 160m to the west of the site, which corresponds to the BP service station and mechanical workshop observed during the JKE site inspection (see Section 2.6). Due to the regional geology/hydrogeology and distance from the site, the service station and dry cleaner properties are considered to represent off-site sources of contamination.
Other historical businesses that could represent potential sources of contamination	None	None
National waste management site database	None	None
Mapped heritage items	The Land of the Beardies Museum (former hospital complex) was listed onsite. This listing is likely connected to the Glen Innes & District Historical Society, located to the east of the site and is not considered to have any relevance in the context of the PSI objectives.	Various heritage items were mapped in the report buffer. These are not considered to have any relevance in the context of the PSI objectives.

Table 4-3: Historical Business Directory and other Records



Records	On-site	Off-site
Mapped ecological constraints	None	Various ecological items were mapped in the report buffer. These are not considered to have any relevance in the context of the PSI objectives.
Mapped naturally occurring asbestos	None	None

### 4.5 Summary of Site History Information

A time line summary of the historical land uses and activities is presented in the following table. The information presented in the table is based on a weight of evidence assessment of the site history documentation and observations made by JKE.

Table 4-4: Summary of Historical Land Uses / Activities

Year(s)	On-site - Potential Land Use / Activities	Off-site - Potential Land Use / Activities
At least 1956 - current	<ul> <li>Likely earthworks prior to 1956 to create level ground for existing and former buildings;</li> <li>Use as Hospital grounds, including former nurses' accommodation and maintenance workshop;</li> <li>Demolition of small building in the east section of the site, sometime between approximately 1955 and 1964; and</li> <li>There was a fire incident at the nurses' accommodation around 2019-2020 and the fire was reportedly supressed using firefighting foam.</li> </ul>	<ul> <li>Extended hospital grounds and nursing home to the north;</li> <li>School to the west; and</li> <li>Low density residential to the east and south.</li> </ul>

### 4.6 Integrity of Site History Information

The majority of the site history information was obtained from government organisations as outlined in the relevant sections of this report. The veracity of the information from these sources is considered to be relatively high. A certain degree of information loss can be expected given the lack of specific land use details over time. JKE has relied upon the Lotsearch report and have not independently verified any information contained within. However, it is noted that the Lotsearch report is generated based on databases maintained by various government agencies and is expected to be reliable.



### 5 CONCEPTUAL SITE MODEL

NEPM (2013) defines a CSM as a representation of site related information regarding contamination sources, receptors and exposure pathways between those sources and receptors. The CSM for the site is presented in the following sub-sections and is based on the site information (including the site inspection information) and the review of site history information. Reference should also be made to the figures attached in the appendices.

A review of the CSM in relation to source, pathway and receptor (SPR) linkages has been undertaken as part of the Tier 1 risk assessment process, as outlined in Section 10.

### 5.1 Potential Contamination Sources/AEC and CoPC

The potential contamination sources/AEC and CoPC are presented in the following table:

Source / AEC	CoPC
<u>Fill material</u> – The site appears to have been historically filled to achieve the existing levels. The fill may have been imported from various sources and could be contaminated.	Heavy metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc), petroleum hydrocarbons (referred to as total recoverable hydrocarbons – TRHs), benzene, toluene, ethylbenzene and xylene (BTEX), polycyclic aromatic hydrocarbons (PAHs), organochlorine pesticides (OCPs), organophosphate pesticides (OPPs), polychlorinated biphenyls (PCBs) and asbestos.
Use of pesticides – Pesticides may have been used beneath the buildings and/or around the site.	Heavy metals, OCPs and PCBs.
Hazardous Building Material – Hazardous building materials may be present in or on soil as a result of former building and demolition activities. Signage on the former maintenance building in the east section of the site suggested that the building materials contained ACM. Additionally, anecdotal evidence suggests that the ACM including friable asbestos was present in the former nurse's accommodation building in the west section of the site.	Asbestos, lead and PCBs.
<ul> <li><u>Historical Fire Fighting Activity</u> – Anecdotal evidence suggests that fire fighting foam was used by the NSW Fire and Rescue to supress a fire at the nurses' accommodation building sometime between approximately 2019 and 2020.</li> <li>Under the Protection of the Environment Operations (General) Amendment (PFAS Firefighting Foam) Regulation 2021, the use of Per-and poly-fluoroalkyl substance (PFAS) containing firefighting foams were to</li> </ul>	PFAS.

### Table 5-1: Potential (and/or known) Contamination Sources/AEC and Contaminants of Potential Concern



Source / AEC	СоРС
be progressively banned from 1 April 2021. Further information can be found on the NSW EPA website <sup>9</sup> .	
Based on the above time line there is consider to a potential for PFAS-containing Firefighting Foams to have been used during the fire suppression.	

### 5.2 Mechanism for Contamination, Affected Media, Receptors and Exposure Pathways

The mechanisms for contamination, affected media, receptors and exposure pathways relevant to the potential contamination sources/AEC are outlined in the following CSM table:

Table 5-2: CSM	
Potential mechanism for contamination	The potential mechanisms for contamination are most likely to include 'top-down' impacts and spills. There is a potential for sub-surface releases to have occurred if deep fill (or other buried industrial infrastructure) is present, although this is considered to be the least likely mechanism for contamination.
Affected media	Soil and groundwater have been identified as the potentially affected media.
Receptor identification	Human receptors include site occupants/users (including adults and children), construction workers and intrusive maintenance workers. Off-site human receptors include adjacent land users (including adults and children in a sensitive land use scenario).
	(including the proposed landscaped areas), off-site stock that is watered from bore water, and freshwater ecology in Rocky Ponds Creek.
Potential exposure pathways	Potential exposure pathways relevant to the human receptors include ingestion, dermal absorption and inhalation of dust (all contaminants) and vapours (volatile TRH, naphthalene and BTEX). The potential for exposure would typically be associated with the construction and excavation works, and future use of the site. Potential exposure pathways for ecological receptors include primary/direct contact and ingestion.
	Exposure during future site use could occur via direct contact with soil in unpaved areas such as gardens, inhalation of airborne asbestos fibres during soil disturbance, or inhalation of vapours within enclosed spaces such as buildings.
	Potential exposure pathways to groundwater (for human receptors) would be via vapour intrusion, potential primary/secondary contact with groundwater entering the nearby water course (Rocky Ponds Creek) which could be utilised for recreation,



<sup>&</sup>lt;sup>9</sup> https://www.epa.nsw.gov.au/your-environment/contaminated-land/regulation-of-pfas-firefighting-foams, visited 17 August 2022



	potential ingestion via consumption of groundwater sourced from local bores, or possible primary/secondary contract with groundwater during stock watering.	
	Exposure to ecological receptors could also occur in the water course, however the groundwater to surface water relationship is not known at this stage.	
	Exposure to shallow groundwater via the drinking water supply is not considered to be a plausible exposure pathway based on review of the hydrogeological information presented in Section 3.3.	
Potential exposure mechanisms	<ul> <li>The following have been identified as potential exposure mechanisms for site contamination:</li> <li>Vapour intrusion into the existing or proposed buildings (either from soil contamination or volatilisation of contaminants from groundwater);</li> <li>Contact (dermal, ingestion or inhalation) with exposed soils in landscaped areas and/or unpaved areas;</li> <li>Migration of groundwater off-site and into nearby water bodies, including aquatic ecosystems and those being used for recreation; and</li> <li>Migration of groundwater off-site into areas where groundwater has the potential to be utilised as a resource (i.e. for irrigation or drinking water).</li> </ul>	



### 6 SAMPLING, ANALYSIS AND QUALITY PLAN

### 6.1 Data Quality Objectives (DQO)

Data Quality Objectives (DQOs) were developed to define the type and quality of data required to achieve the project objectives outlined in Section 1.2. The DQOs were prepared with reference to the process outlined in Schedule B2 of NEPM (2013). The seven-step DQO approach for this project is outlined in the following sub-sections.

The DQO process is validated in part by the Data Quality Assurance/Quality Control (QA/QC) Evaluation. The Data (QA/QC) Evaluation is summarised in Section 8.1 and the detailed evaluation is provided in the appendices.

### 6.1.1 Step 1 - State the Problem

The CSM identified potential sources of contamination/AEC at the site that may pose a risk to human health and the environment. Investigation data is required to assess the contamination status of the site, assess the risks posed by the contaminants in the context of the proposed development/intended land use, and assess whether remediation is required.

A waste classification is required prior to off-site disposal of excavated soil/bedrock.

The investigation was constrained by the client nominated sampling locations and testpit sampling depths of 1mBGL.

### 6.1.2 Step 2 - Identify the Decisions of the Study

The objectives of the investigation are outlined in Section 1.2. The decisions to be made reflect these objectives and are as follows:

- Did the site inspection, or does the historical information identify potential contamination sources/AEC at the site?
- Are any results above the SAC?
- Do potential risks associated with contamination exist, and if so, what are they?
- Is remediation required?
- Is the site characterisation sufficient to provide adequate confidence in the above decisions?
- Is the site suitable for the proposed development, or can the site be made suitable subject to further characterisation and/or remediation?

### 6.1.3 Step 3 - Identify Information Inputs

The primary information inputs required to address the decisions outlined in Step 2 include the following:

- Site information, including site observations and site history documentation;
- Sampling of potentially affected media, including soil and FCF if encountered;
- Observations of sub-surface variables such as soil type, photo-ionisation detector (PID) concentrations, odours and staining;
- Laboratory analysis of soils and FCF for the CoPC identified in the CSM; and





• Field and laboratory QA/QC data.

### 6.1.4 Step 4 - Define the Study Boundary

The sampling will be confined to the site boundaries as shown in Figure 2 and will be limited vertically to a depth of sampling at each borehole/testpit (spatial boundary). The sampling was completed between 8-9 June 2022 (temporal boundary). The assessment of potential risk to adjacent land users has been made based on data collected within the site boundary.

Sampling was undertaken from the sampling locations nominated by the client. None of the nominated sampling locations were positioned within the existing building footprints due to access constraints.

### 6.1.5 Step 5 - Develop an Analytical Approach (or Decision Rule)

### 6.1.5.1 Tier 1 Screening Criteria

The laboratory data will be assessed against relevant Tier 1 screening criteria (referred to as SAC), as outlined in Section 7. Exceedances of the SAC do not necessarily indicate a requirement for remediation or a risk to human health and/or the environment. Exceedances are considered in the context of the CSM and valid SPR-linkages.

For this investigation, the individual results have been assessed as either above or below the SAC. Statistical evaluation of the dataset via calculation of mean values and/or 95% upper confidence limit (UCL) values has not been undertaken due to the spatial distribution of the data (i.e. non-probabilistic sample design) and the number of samples submitted for analysis.

### 6.1.5.2 Field and Laboratory QA/QC

Field QA/QC included analysis of inter-laboratory duplicates, intra-laboratory duplicates, trip spike, trip blank and rinsate samples. Further details regarding the sampling and analysis undertaken, and the acceptable limits adopted, is provided in the Data Quality (QA/QC) Evaluation in the appendices.

The suitability of the laboratory data is assessed against the laboratory QA/QC criteria which is outlined in the attached laboratory reports. These criteria were developed and implemented in accordance with the laboratory's National Association of Testing Authorities, Australia (NATA) accreditation and align with the acceptable limits for QA/QC samples as outlined in NEPM (2013) and other relevant guidelines.

In the event that acceptable limits are not met by the laboratory analysis, other lines of evidence are reviewed (e.g. field observations of samples, preservation, handling etc) and, where required, consultation with the laboratory is undertaken in an effort to establish the cause of the non-conformance. Where uncertainty exists, JKE typically adopt the most conservative concentration reported (or in some cases, consider the data from the affected sample as an estimate).



### 6.1.5.3 Appropriateness of Practical Quantitation Limits (PQLs)

The PQLs of the analytical methods are considered in relation to the SAC to confirm that the PQLs are less than the SAC. In cases where the PQLs are greater than the SAC, a discussion of this is provided.

### 6.1.6 Step 6 – Specify Limits on Decision Errors

To limit the potential for decision errors, a range of quality assurance processes are adopted. A quantitative assessment of the potential for false positives and false negatives in the analytical results is undertaken with reference to Schedule B(3) of NEPM (2013) using the data quality assurance information collected.

Decision errors can be controlled through the use of hypothesis testing. The test can be used to show either that the baseline condition is false or that there is insufficient evidence to indicate that the baseline condition is false. The null hypothesis is an assumption that is assumed to be true in the absence of contrary evidence. For this investigation, the null hypothesis has been adopted which is that, there is considered to be a complete SPR linkage for the CoPC identified in the CSM unless this linkage can be proven not to (or unlikely to) exist. The null hypothesis has been adopted for this investigation.

Quantitative limits on decision errors were not established as the sample plan was not probabilistic.

Statistical analysis will not apply to asbestos and therefore these data will be assessed based on a multiple lines of evidence and risk-based approach.

Data Quality Indicators (DQI) for field and laboratory QA/QC samples are defined in the QA/QC Data Evaluation in the appendices. An assessment of the DQI's was made in relation to precision, accuracy, representativeness, completeness and comparability.

### 6.1.7 Step 7 - Optimise the Design for Obtaining Data

The most resource-effective design will be used in an optimum manner to achieve the investigation objectives and considering the constraints imposed by the client outlined in Section 6.1.1.

For this investigation, the design was optimised via consideration of the various lines of evidence used to select the media being sampled, and also by the way in which the data were collected.

The sampling plan and methodology are outlined in the following sub-sections.

### 6.2 Soil Sampling Plan and Methodology

The soil sampling plan and methodology adopted for this investigation is outlined in the table below:

Aspect	Input
Sampling	Samples for the PSI were collected from six boreholes and two test pits locations nominated by
Density	the client, as shown on the attached Figure 2. The sampling plan was not designed to meet the
	minimum sampling density for hotspot identification, as outlined in the NSW EPA Contaminated

### Table 6-1: Soil Sampling Plan and Methodology



Aspect	Input		
	Sites Sampling Design Guidelines (1995) <sup>10</sup> (we note this guideline was recently updated in August 2022, following the PSI fieldwork) and the Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia (2021) <sup>11</sup> (endorsed in NEPM 2013).		
Sampling Plan	The sampling locations were placed on a judgemental sampling plan at the locations nominated by the client. The sampling locations were broadly positioned for coverage, taking into consideration the proposed development details and areas that were not easily accessible. This sampling plan was considered suitable to make a preliminary assessment of potential risks associated with the AEC and CoPC identified in the CSM, and assess whether further investigation is warranted.		
Set-out and Sampling	Sampling locations were set out using a tape measure. In-situ sampling locations were checked for underground services by an external contractor prior to sampling.		
Lquipment	Samples were collected from borehole locations BH1 to BH6 using a drill rig equipped with spiral flight augers (150mm diameter). Soil samples were obtained from a Standard Penetration Test (SPT) split-spoon sampler or directly from the auger.		
	Samples were collected from testpit locations TP1 and TP2 using an excavator. Samples were obtained from the test pit walls or directly from the bucket by hand. Where sampling occurred from the bucket, JKE collected samples from the central portion of large soil clods, or from material that was unlikely to have come into contact with the bucket.		
Sample Collection and	Soil samples were obtained between 8 and 9 June 2022 in accordance with our standard field procedures. Soil samples were collected from the fill and natural profiles based on field		
	Samples were placed in glass jars with plastic caps and teflon seals with minimal headspace. Samples for asbestos analysis were placed in zip-lock plastic bags. During sampling, soil at selected depths was split into primary and duplicate samples for field QA/QC analysis. The field splitting procedure included alternately filling the sampling containers to obtain a representative split sample.		
Field Screening	A portable Photoionisation Detector (PID) fitted with a 10.6mV lamp was used to screen the samples for the presence of volatile organic compounds (VOCs). PID screening for VOCs was undertaken on soil samples using the soil sample headspace method. VOC data was obtained from partly filled zip-lock plastic bags following equilibration of the headspace gases. PID calibration records are maintained on file by JKE.		
	<ul> <li>The field screening for asbestos quantification included the following:</li> <li>A representative bulk sample was collected from fill at 1m intervals within fill, or from each distinct fill profile. The quantity of material for each sample varied based on whatever return could be achieved using the auger. The bulk sample intervals are shown on the attached borehole/test pit logs;</li> <li>Each sample was weighed using an electronic scale;</li> </ul>		

<sup>&</sup>lt;sup>10</sup> NSW EPA, (1995), *Contaminated Sites Sampling Design Guidelines*. (referred to as EPA Sampling Design Guidelines 1995)

<sup>&</sup>lt;sup>11</sup> Western Australian (WA) Department of Health (DoH), (2021). *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia*. (referred to as WA DoH 2021)



Aspect	Input
	<ul> <li>Each bulk sample was passed through a sieve with a 7.1mm aperture and inspected for the presence of fibre cement;</li> <li>The condition of fibre cement or any other suspected asbestos materials was noted on the field records; and</li> <li>If observed, any fragments of fibre cement in the bulk sample were collected, placed in a ziplock bag and assigned a unique identifier. Calculations for asbestos content were undertaken based on the requirements outlined in Schedule B1 of NEPM (2013), as summarised in Section 7.1.</li> </ul>
Decontami-	Sampling personnel used disposable nitrile gloves during sampling activities. Re-usable sampling
nation and	equipment was decontaminated using Decon and potable water.
Sample	
Preservation	Soil samples were preserved by immediate storage in an insulated sample container with ice. On completion of the fieldwork, the samples were stored in eskys and the ice was replenished before being delivered in the insulated sample container to a NATA registered laboratory for analysis under standard chain of custody (COC) procedures.

### 6.2.1 Laboratory Analysis

Samples were analysed by an appropriate, NATA Accredited laboratory using the analytical methods detailed in Schedule B(3) of NEPM 2013. Reference should be made to the laboratory reports attached in the appendices for further details.

### Table 6-2: Laboratory Details

Samples	Laboratory	Report Reference
All primary samples and field QA/QC samples including (intra-laboratory duplicate, trip blank, trip spike and field rinsate samples)	Envirolab Services Pty Ltd NSW, NATA Accreditation Number – 2901 (ISO/IEC 17025 compliance)	297802 and 297802-A
Inter-laboratory duplicates	Envirolab Services Pty Ltd VIC, NATA Accreditation Number – 2901 (ISO/IEC 17025 compliance)	31971 and 31971-A



### 7 SITE ASSESSMENT CRITERIA (SAC)

The SAC were derived from the NEPM 2013 and other guidelines as discussed in the following sub-sections. The guideline values for individual contaminants are presented in the attached report tables and further explanation of the various criteria adopted is provided in the appendices.

### 7.1 Soil

Soil data were compared to relevant Tier 1 screening criteria in accordance with NEPM (2013) as outlined below.

### 7.1.1 Human Health

- Health Investigation Levels (HILs) for a 'public open space, secondary schools and footpaths' exposure scenario (HIL-C). We consider these HILs to be appropriate Tier 1 criteria as the HIL-D (commercial/industrial criteria) do not consider children who are the most sensitive receptors identified in the CSM, HIL-B (residential with limited access to soil) are not protective enough in light of the extent of unpaved areas across the site, and HIL-A (residential with accessible soils) are overly conservative for a hospital land use scenario;
- Health Screening Levels (HSLs) for a 'low-high density residential' exposure scenario (HSL-A & HSL-B). We consider these HSLs are appropriate Tier 1 criteria as HSL-C does not adequately consider the presence of buildings and HSL-D is not protective of children who are the most sensitive receptors identified in the CSM. HSLs were calculated based on conservative assumptions including a 'sand' type and a depth interval of 0m to 1m;
- HSLs for direct contact presented in the CRC Care Technical Report No. 10 Health screening levels for hydrocarbons in soil and groundwater Part 1: Technical development document (2011)<sup>12</sup>; and
- Asbestos was assessed against the HSL-C criteria. A summary of the asbestos criteria is provided in the table below:

Guideline	Applicability						
Asbestos in Soil	The HSL-C criteria were adopted for the assessment of asbestos in soil. The SAC adopted for						
	asbestos were derived from the NEPM 2013 and are based on WA DoH 2021. The SAC include						
	the following:						
	No visible asbestos at the surface/in the top 10cm of soil;						
	<ul> <li>&lt;0.02% w/w bonded asbestos containing material (ACM) in soil; and</li> </ul>						
	• <0.001% w/w asbestos fines/fibrous asbestos (AF/FA) in soil.						
	Concentrations for bonded ACM concentrations in soil are based on the following equation which is presented in Schedule B1 of NEPM (2013):						
	% w/w asbestos in soil = % asbestos content x bonded ACM (kg)						
	Soil volume (L) x soil density (kg/L)						
	However, we are of the opinion that the actual soil volume in a 10L bucket varies considerably						
	due to the presence of voids, particularly when assessing cohesive soils. Therefore, each						

### Table 7-1: Details for Asbestos SAC

<sup>&</sup>lt;sup>12</sup> Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC Care), (2011). Technical Report No. 10 - *Health screening levels for hydrocarbons in soil and groundwater Part 1: Technical development document* 



Guideline	Applicability				
	bucket sample was weighed using electronic scales and the above equation was adju follows (we note that the units have also converted to grams):				
	% w/w asbestos in soil =	% asbestos content x bonded ACM (g) Soil weight (g)			

### 7.1.2 Environment (Ecological – terrestrial ecosystems)

- Ecological Investigation Levels (EILs) and Ecological Screening Levels (ESLs) for an 'urban residential and public open space' (URPOS) exposure scenario. These have only been applied to the top 2m of soil as outlined in NEPM (2013). The criterion for benzo(a)pyrene has been increased from the value presented in NEPM (2013) based on the Canadian Soil Quality Guidelines<sup>13</sup>;
- ESLs were adopted based on the soil type; and
- EILs for selected metals were calculated based on the most conservative added contaminant limit (ACL) values presented in Schedule B(1) of NEPM (2013) and published ambient background concentration (ABC) values presented in the document titled Trace Element Concentrations in Soils from Rural and Urban Areas of Australia (1995)<sup>14</sup>. Additionally, for one representative sample, EILs for selected metals were calculated using site specific soil parameters for pH, cation exchange capacity and clay content. These data were used to select the added contaminant limit (ACL) values presented in Schedule B(1) of NEPM (2013), and published ambient background concentration (ABC) presented in the document titled Trace Element Concentrations in Soils from Rural and Urban Areas of Australia (1995)<sup>15</sup>. This method is considered to be adequate for the Tier 1 screening.

### 7.1.3 Management Limits for Petroleum Hydrocarbons

Management limits for petroleum hydrocarbons (as presented in Schedule B1 of NEPM 2013) were considered.

### 7.1.4 Waste Classification

Data for the waste classification assessment were assessed in accordance with the Waste Classification Guidelines, Part 1: Classifying Waste (2014)<sup>16</sup> as outlined in the following table:

Category	Description
General Solid Waste (non-putrescible)	<ul> <li>If Specific Contaminant Concentration (SCC) ≤ Contaminant Threshold (CT1) then Toxicity Characteristics Leaching Procedure (TCLP) not needed to classify the soil as general solid waste; and</li> <li>If TCLP ≤ TCLP1 and SCC ≤ SCC1 then treat as general solid waste.</li> </ul>

Table	7-2:	Waste	Categories
Tuble	,	vvuste	cutegones



<sup>&</sup>lt;sup>13</sup> Canadian Council of Ministers of the Environment, (1999). *Canadian soil quality guidelines for the protection of environmental and human health: Benzo(a)Pyrene (1997)* (referred to as the Canadian Soil Quality Guidelines)

 <sup>&</sup>lt;sup>14</sup> Olszowy, H., Torr, P., and Imray, P., (1995), *Trace Element Concentrations in Soils from Rural and Urban Areas of Australia. Contaminated Sites Monograph Series No. 4.* Department of Human Services and Health, Environment Protection Agency, and South Australian Health Commission
 <sup>15</sup> Olszowy, H., Torr, P., and Imray, P., (1995), *Trace Element Concentrations in Soils from Rural and Urban Areas of Australia. Contaminated Sites Monograph Series No. 4.* Department of Human Services and Health, Environment Protection Agency, and South Australia. *Contaminated Sites Monograph Series No. 4.* Department of Human Services and Health, Environment Protection Agency, and South Australian Health Commission.
 <sup>16</sup> NSW EPA, (2014). *Waste Classification Guidelines, Part 1: Classifying Waste.* (referred to as Waste Classification Guidelines 2014)



Category	Description
Restricted Solid Waste (non-putrescible)	<ul> <li>If SCC ≤ CT2 then TCLP not needed to classify the soil as restricted solid waste; and</li> <li>If TCLP ≤ TCLP2 and SCC ≤ SCC2 then treat as restricted solid waste.</li> </ul>
Hazardous Waste	<ul> <li>If SCC &gt; CT2 then TCLP not needed to classify the soil as hazardous waste; and</li> <li>If TCLP &gt; TCLP2 and/or SCC &gt; SCC2 then treat as hazardous waste.</li> </ul>
Virgin Excavated Natural Material (VENM)	<ul> <li>Natural material (such as clay, gravel, sand, soil or rock fines) that meet the following:</li> <li>That has been excavated or quarried from areas that are not contaminated with manufactured chemicals, or with process residues, as a result of industrial, commercial mining or agricultural activities;</li> <li>That does not contain sulfidic ores or other waste; and</li> <li>Includes excavated natural material that meets such criteria for virgin excavated natural material as may be approved from time to time by a notice published in the NSW Government Gazette.</li> </ul>



### 8 RESULTS

### 8.1 Summary of Data (QA/QC) Evaluation

The data evaluation is presented in the appendices. In summary, JKE is of the opinion that the data are adequately precise, accurate, representative, comparable and complete to serve as a basis for interpretation to achieve the investigation objectives.

### 8.2 Subsurface Conditions

A summary of the subsurface conditions encountered during the investigation is presented in the following table. Reference should be made to the borehole and testpit logs attached in the appendices for further details.

Profile	Description
Surface topsoil/ natural soil	Topsoil approximately 0.15m in thickness was encountered at the surface in BH3. Silty clay was encountered at the surface in BH2.
Fill	Fill was encountered at the surface in boreholes/testpits except BH2 and BH3. The fill extended to depths of between approximately 0.2mBGL (BH5) to 0.6mBGL (BH1). Fill depths are shown on Figure 2.
	The fill typically comprised silty clay and clayey cobbles with inclusions of gravels and basalt cobbles. Numerous FCF (later confirmed to contain asbestos) were encountered in the fill material in borehole BH4 (depths ranging from 0-0.25m).
	Neither staining nor odours were observed in the fill material during the field work.
Natural Soil	Natural silty clay residual soils were encountered beneath the fill, topsoil and at the surface in
(sub-soils)	BH2. The natural soils extended to depths to depths of between approximately 1.0mBGL (BH1) to 3.2mBGL (BH5).
	Neither staining nor odours were observed in the natural soils during the field work.
Bedrock	Weathered basalt bedrock was encountered beneath the natural soils in boreholes BH1, BH3, BH6 at depths of between approximately 1.0mBGL (BH1) to 1.5mBGL (BH3).
Groundwater	Groundwater was not encountered in boreholes or testpits.

### Table 8-1: Summary of Subsurface Conditions

### 8.3 Field Screening

A summary of the field screening results is presented in the following table:

Table	8-2:	Summary	/ of	Field	Screening
TUDIC	0 2.	Sammar	, 01	i iciu	Sercennig

Aspect	Details
PID Screening of Soil	PID soil sample headspace readings are presented in the attached report tables and the
Samples for VOCs	COC documents attached in the appendices. The results ranged from 0ppm to 0.4ppm
	which indicates a lack of PID detectable VOCs.



Aspect	Details
Bulk Screening for Asbestos	The bulk field screening results are summarised in the attached report Table S5. The FCF laboratory results are summarised attached report table S1.
	The asbestos in ACM concentration of 1.3785%w/w in the fill sample BH4 (0-0.1m) was above the human health SAC of 0.02%w/w.
	The asbestos in ACM concentration of 0.01%w/w in the fill sample BH4 (0.1-0.25m) was below the human health SAC of 0.02%w/w.
	ACM was not encountered in the remainder of the boreholes/testpits and therefore all other bulk screening results were also below the SAC.

### 8.4 Soil Laboratory Results

The soil laboratory results were assessed against the SAC presented in Section 7.1. Individual SAC are shown in the report tables attached in the appendices. A summary of the results is presented below:

### 8.4.1 Human Health and Environmental (Ecological) Assessment

Analyte	IN	(mg/kg)	Health SAC	SAC	Comments
Arsenic	8	5	0	0	-
Cadmium	8	<pql< td=""><td>0</td><td>NSL</td><td>-</td></pql<>	0	NSL	-
Chromium (total)	8	170	0	0	-
Copper	8	45	0	0	-
Lead	8	51	0	0	-
Mercury	8	<pql< td=""><td>0</td><td>NSL</td><td>-</td></pql<>	0	NSL	-
Nickel	8	67	0	2	The nickel concentrations for the fill samples BH2 (0-0.1m) of 38mg/kg and BH4 (0-0.1m) of 52mg/kg exceeded the calculated ecological SAC of 35mg/kg. The nickel concentration for the duplicate fill sample TP1 (0-0.1m) of 56mg/kg exceeded the calculated ecological SAC of 35mg/kg. There were no SAC exceedances in the primary sample
Zinc	8	62	0	0	-
		1	1	1	

Table 8-3: Summary of Soil Laboratory Results – Human Health and Environmental (Ecological)



Analyte	N	Max. (mg/kg)	N> Human Health SAC	N> Ecological SAC	Comments
Total PAHs	8	2.3	0	NSL	-
Benzo(a)pyrene	8	0.22	NSL	0	-
Carcinogenic PAHs	8	<pql< td=""><td>0</td><td>NSL</td><td>-</td></pql<>	0	NSL	-
(as BaP TEQ)					
Naphthalene	8	<pql< td=""><td>0</td><td>NSL</td><td>-</td></pql<>	0	NSL	-
DDT+DDE+DDD	8	<pql< td=""><td>0</td><td>NSL</td><td>-</td></pql<>	0	NSL	-
DDT	8	<pql< td=""><td>NSL</td><td>0</td><td>-</td></pql<>	NSL	0	-
Aldrin and dieldrin	8	<pql< td=""><td>0</td><td>NSL</td><td>-</td></pql<>	0	NSL	-
Chlordane	8	<pql< td=""><td>0</td><td>NSL</td><td>-</td></pql<>	0	NSL	-
Heptachlor	8	<pql< td=""><td>0</td><td>NSL</td><td>-</td></pql<>	0	NSL	-
Chlorpyrifos (OPP)	8	<pql< td=""><td>0</td><td>NSL</td><td>-</td></pql<>	0	NSL	-
PCBs	8	<pql< td=""><td>0</td><td>NSL</td><td>-</td></pql<>	0	NSL	-
TRH F1	8	<pql< td=""><td>0</td><td>0</td><td>-</td></pql<>	0	0	-
TRH F2	8	<pql< td=""><td>0</td><td>0</td><td>-</td></pql<>	0	0	-
TRH F3	8	<pql< td=""><td>0</td><td>0</td><td>-</td></pql<>	0	0	-
TRH F4	8	<pql< td=""><td>0</td><td>0</td><td>-</td></pql<>	0	0	-
Benzene	8	<pql< td=""><td>0</td><td>0</td><td>-</td></pql<>	0	0	-
Toluene	8	<pql< td=""><td>0</td><td>0</td><td>-</td></pql<>	0	0	-
Ethylbenzene	8	<pql< td=""><td>0</td><td>0</td><td>-</td></pql<>	0	0	-
Xylenes	8	<pql< td=""><td>0</td><td>0</td><td>-</td></pql<>	0	0	-
Asbestos (in soil) (%w/w)	8	<0.01 ACM <0.001 AF/FA	0	NA	Asbestos was not detected in the soil samples analysed at the laboratory.
Asbestos in fibre cement	2	NA	NA	NA	Asbestos was detected in the FCF that was identified in BH4 in the fill between 0-0.1mBGL.



Analyte	N	Max. (mg/kg)	N> Human Health SAC	N> Ecological SAC	Comments
					Asbestos was detected in the surface FCF23 that was identified to the east of the site.

Notes:

N: Total number (primary samples) NSL: No set limit NL: Not limiting

### 8.4.2 Waste Classification Assessment

The laboratory results were assessed against the criteria presented in Section 7.1.4. The results are presented in the report tables attached in the appendices. A summary of the results is presented in the following table:

Table 8-4: Summary of Soil Laboratory Results Compared to CT and SCC Criteria

Analyte	Ν	N > CT Criteria	N > SCC Criteria	Comments
Arsenic	8	0	0	-
Cadmium	8	0	0	-
Chromium	8	1	0	Chromium concentrations of 170mg/kg for the fill sample BH4 (0-0.1m) exceeded the CT1 criterion of 100mg/kg. The chromium concentrations for the duplicate fill sample (DUP4) from TP1 (0-0.1m) of 120mg/kg and duplicate fill sample (SDUP1) from BH2 (0-0.1m) of 110mg/kg and exceeded the CT1 criterion. There were no CT1 exceedances in the corresponding primary samples.
Copper	8	NSL	NSL	-
Lead	8	0	0	-
Mercury	8	0	0	-
Nickel	8	2	0	The nickel concentrations of 52mg/kg for the fill sample BH4 (0-0.1m) and 67mg/kg for the fill sample BH5 (0-0.1m) exceeded the CT1 criterion of 40mg/kg. The nickel concentration for the duplicate fill sample (DUP4) from TP1 (0-0.1m) of 56mg/kg exceeded the CT1 criterion. There was no CT1 exceedance in the corresponding primary sample.
Zinc	8	NSL	NSL	-



Analyte	Ν	N > CT Criteria	N > SCC Criteria	Comments
TRH (C <sub>6</sub> -C <sub>9</sub> )	8	0	0	-
TRH (C10-C36)	8	0	0	-
BTEX	8	0	0	-
Total PAHs	8	0	0	-
Benzo(a)pyrene	8	0	0	-
OCPs & OPPs	8	0	0	-
PCBs	8	0	0	-
Asbestos	14	-	-	Asbestos was not detected in the soil samples analysed. Asbestos was detected in the FCF collected from the fill material in TP2 (sample ref: FCF1-TP2 (0.1-0.3m)).

N: Total number (primary samples)

NSL: No set limit

### Table 8-5: Summary of Soil Laboratory Results Compared to TCLP Criteria

Analyte	N	N > TCLP Criteria	Comments
Chromium	1	0	The three primary and duplicate fill samples with chromium concentrations above the CT1 criterion were analysed for TCLP chromium. The results were below the TCLP criterion.
Nickel	2	0	The three primary and duplicate fill samples with nickel concentrations above the CT1 criterion were analysed for TCLP nickel. The results were below the TCLP criterion.

N: Total number (primary samples)



### 9 PRELIMIANRY WASTE CLASSIFICATION ASSESSMENT

Based on the results of the preliminary waste classification assessment, and at the time of reporting, the fill material in the vicinity of BH4 is classified as **General Solid Waste (non-putrescible) containing Special Waste (asbestos)**. The remainder of the fill material may be classified as **General Solid Waste (non-putrescible)** subject to further sampling and analysis.

Based on the scope of work undertaken for this assessment there is insufficient data to confirm the natural soil and bedrock at the site meets the definition of **VENM** for off-site disposal or re-use purposes. However, considering the predominantly low contaminant concentrations in the fill, it would not be unreasonable to expect that a VENM classification will be achievable.

Further sampling and analysis are required to further assess and confirm the waste classification prior to offsite disposal of surplus fill. Any final waste classifications must consider the PSI data and must adequately consider PFAS as part of the chemical classification and the occurrence of asbestos.


#### 10 DISCUSSION

#### 10.1 Contamination Sources/AEC and Potential for Site Contamination

Based on the scope of work undertaken for this investigation, JKE identified the following potential contamination sources/AEC:

- Fill material;
- Use of pesticides;
- Hazardous building materials; and
- Historical firefighting activity.

Considering the above, and based on a qualitative assessment of various lines of evidence as discussed throughout this report, JKE is of the opinion that there is a potential for site contamination. The preliminary soil data collected for the investigation is discussed further in the following subsection, as part of the Tier 1 risk assessment.

#### 10.2 Tier 1 Risk Assessment and Review of CSM

For a contaminant to represent a risk to a receptor, the following three conditions must be present:

- 1. Source The presence of a contaminant;
- 2. Pathway A mechanism or action by which a receptor can become exposed to the contaminant; and
- 3. Receptor The human or ecological entity which may be adversely impacted following exposure to contamination.

If one of the above components is missing, the potential for adverse risks is relatively low.

#### 10.2.1 Asbestos and Human Health Risks

The asbestos in ACM concentration in the fill profile from BH4 (0-0.1m) was above the human health SAC, as shown on Figure 3 attached in the appendices. The ACM was encountered within the top 10cm of soil and was below gross cover.

The source of asbestos could be associated with imported fill material or historical onsite building demolition activities. There is a potential for further ACM to occur within the fill. As the ACM is below grass cover and there was no visual ACM at the ground surface within the site, the potential for the ACM to generate airborne fibres and for an exposure to occur is considered to be low whilst the material remains beneath grass and in an undisturbed state. Hence there is not currently considered to be a complete SPR linkage. A complete SPR linkage could occur where the surficial soils are disturbed, therefore asbestos-related risks will need to be addressed.

The PSI also identified surface ACM encountered within the hospital grounds to the east of the site, as shown on Figure 3 attached in the appendices. There is a potential for further ACM in fill and at the surface within the hospital grounds. An Asbestos Management Plan (AMP) should be development and implemented across the entire hospital grounds noting the presence of ACM in fill at BH4, potential for further ACM in fill and on the surface of the site. The AMP should detail the requirement for a regular walkover inspection of the



surface and emu pick for potential surface ACM and procedures/controls for ground disturbance where ACM may be encountered in fill.

Based on the PSI results, the asbestos identified is considered to be bonded (non-friable/bonded) based on the definitions in NEPM 2013.

#### 10.2.2 Heavy metals and Ecological Risks

The nickel concentrations encountered in the fill soil samples BH2 (0-0.1m), BH4 (0-0.1m) and in the duplicate for the fill sample TP1 (0-0.1m) were marginally above the ecological SAC. The nickel results above the ecological SAC are shown on Figure 3 attached in the appendices.

The nickel may be associated with the historically imported fill material. However, it may also be associated with natural background concentrations.

JKE consider that the risk posed by nickel to ecological receptors is negligible considering that the nickel concentrations were only marginally above the SAC and the calculated SAC for these sample was very conservative and would almost certainly increase significantly after adjusting for physiochemical properties (i.e. CEC). We note that the application of the existing CEC data to the remaining samples (which were of the same silty clay soil type) would result in the nickel EIL being 420mg/kg, which is significantly, i.e. nearly an order of magnitude, higher than any of the nickel data.

### **10.2.3** Consideration of other CoPC and the AEC

In relation to the identified AEC and CoPC, and in review of the CSM, we note that:

- Fill was identified at most locations, confirming this as a potential source of contamination;
- The fill was found to contain bonded ACM at one location (possible from imported fill, or from hazardous building materials associated with historical building/demolition) and marginally elevated concentrations of heavy metals;
- Volatile hydrocarbons were not detected; and
- The potential point sources of contamination (ie. potential use of pesticides beneath/around buildings and potential PFAS beneath/around the formers nurses' accommodation building) were not investigated under the scope of the intrusive investigation.

#### **10.3** Decision Statements

The decision statements are addressed below:

Did the site inspection, or does the historical information identify potential contamination sources/AEC at the site?

Yes, as documented in the CSM.



#### Are any results above the SAC?

Yes, asbestos in ACM concentration in the fill profile from BH4 (0-0.1m) was above the human health SAC. Nickel was encountered within the in the fill samples BH2 (0-0.1m), BH4 (0-0.1m) and in the duplicate for the fill sample TP1 (0-0.1m) at concentrations marginally above the ecological SAC.

Do potential risks associated with contamination exist, and if so, what are they?

Potential risks were identified in relation to asbestos in soil, together with potential risks associated with the identified sources of contamination and CoPC. These risks require further assessment.

Is remediation required?

Yes, remediation will be required to address the asbestos contamination at BH4. Prior to remediation, further investigation is required to address the data gaps identified in Section 10.4.

Is the site characterisation sufficient to provide adequate confidence in the above decisions?

Yes. However, a DSI should be undertaken to address the relevant data gaps identified in Section 10.4.

*Is the site suitable for the proposed development, or can the site be made suitable subject to further characterisation and/or remediation?* 

JKE is of the opinion that the site can be made suitable for the proposed developed. A DSI will be required to establish extent of remediation. Based on the preliminary data and the asbestos contamination, at this stage we consider that the site could be made suitable via relatively straight-forward remediation processes such as 'excavation/disposal' and 'cap and contain'. This assessment of suitability will need to be confirmed in the DSI report.

### 10.4 Data Gaps

An assessment of data gaps is provided in the following table:

Data Gap	Assessment
Soil sampling density below minimum guideline density	The PSI soil sampling at the site was limited to approximately 42% of the minimum sampling density recommended in the EPA Sampling Design Guidelines 1995 and sampling did not occur via a probabilistic sampling plan.
	Since completion of the PSI fieldwork, the NSW EPA Sampling Design Guidelines 1995 have been superseded by the NSW EPA Sampling design part 1 – application (2022) guidelines. The DSI must consider the sampling requirements of the updated guidelines.
	The PSI identified asbestos (ACM) within fill at BH4. In accordance with Table 4 of the WA DoH (2021) guidelines, further assessment should be undertaken at a density to meet the <i>"known"</i> likelihood of asbestos in soil. The DSI must also consider the sampling requirements of the WA DoH (2021) guidelines.

Table 10-1: Data Gap Assessment





Data Gap	Assessment
Potential for groundwater contamination	Groundwater investigation was outside the scope of the PSI. Considering the contaminant concentrations assessed in soil under the scope of the PSI, thes CoPC (excluding PFAS) are considered unlikely to impact groundwater. However, PFAS was identified as CoPC and soil samples were not analysed for PFAS under the scope of the PSI. PFAS can pose a significant risk to groundwater environments due to their fate and transport properties. Therefore, the potential for groundwater contamination cannot be discounted and should be assessed under the scope of the DSI.
Potential for use of PFAS containing firefighting foams	As reported in Section 5.1, anecdotal evidence suggests that fire fighting foam potentially was used by the NSW Fire and Rescue to supress a fire at the nurse's accommodation building sometime between approximately 2019 and 2020. The fire fighting foam used has the potential to contain PFAS compounds. The DSI must consider the PFAS as a CoPC for the soil and groundwater sampling.
Hazardous building materials	There is a potential for hazardous building materials in the existing buildings. JKE has been engaged by the client to undertake a hazardous building materials (HAZMAT) survey at the site. Removal of hazardous building materials must be undertaken by suitably licensed contractors and in accordance with the relevant standards.



#### 11 CONCLUSIONS AND RECOMMENDATIONS

The investigation included a review of historical information and sampling from six boreholes and two testpits. The AEC include:

- Fill material;
- Use of pesticides;
- Hazardous building materials; and
- Historical firefighting activity.

The PSI identified fill at most locations. Asbestos in ACM concentration in the fill profile from BH4 (0-0.1m) was above the human health SAC. Nickel was encountered within the in the fill samples BH2 (0-0.1m), BH4 (0-0.1m) and in the duplicate for the fill sample TP1 (0-0.1m) at concentrations marginally above the ecological SAC.

Based on the findings of the investigation, JKE is of the opinion that the site can be made suitable for the proposed development described in Section 1.1. A DSI will be required to establish extent of remediation. Based on the preliminary data and the asbestos contamination, at this stage we consider that the site could be made suitable via relatively straight-forward remediation processes such as 'excavation/disposal' and 'cap and contain'.

We recommend the following:

- Prepare and implement an Asbestos Management Plan (AMP) for asbestos in soil;
- Undertake a DSI to address the data gaps identified in Section 10.4. The extent of 'the site' for the DSI should be confirmed by the client as it is noted that not all areas of the hospital are being redeveloped.
  In our view, it would be reasonable to limit the DSI to broadly capture the proposed development footprint; and
- Following completion of the DSI, prepare and implement a Remediation Action Plan (RAP) to document the remediation and validation requirements for the site; and
- Validate the remediation works and prepare of a Validation Assessment report at the completion of remediation.

At this stage, JKE consider that there is no requirement to report any site contamination to the NSW EPA under the NSW EPA Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997 (2015)<sup>17</sup>, provided that the recommendations provided above are implemented.

JKE consider that the report objectives outlined in Section 1.1 have been addressed.

<sup>&</sup>lt;sup>17</sup> NSW EPA, (2015). *Guidelines on the Duty to Report Contamination under Section 60 of the CLM Act 1997* (referred to as Duty to Report Contamination)



#### 12 LIMITATIONS

The report limitations are outlined below:

- JKE accepts no responsibility for any unidentified contamination issues at the site. Any unexpected problems/subsurface features that may be encountered during development works should be inspected by an environmental consultant as soon as possible;
- Previous use of this site may have involved excavation for the foundations of buildings, services, and similar facilities. In addition, unrecorded excavation and burial of material may have occurred on the site. Backfilling of excavations could have been undertaken with potentially contaminated material that may be discovered in discrete, isolated locations across the site during construction work;
- This report has been prepared based on site conditions which existed at the time of the investigation; scope of work and limitation outlined in the JKE proposal; and terms of contract between JKE and the client (as applicable);
- The conclusions presented in this report are based on investigation of conditions at specific locations, chosen to be as representative as possible under the given circumstances, visual observations of the site and immediate surrounds and documents reviewed as described in the report;
- Subsurface soil and rock conditions encountered between investigation locations may be found to be different from those expected. Groundwater conditions may also vary, especially after climatic changes;
- The investigation and preparation of this report have been undertaken in accordance with accepted practice for environmental consultants, with reference to applicable environmental regulatory authority and industry standards, guidelines and the assessment criteria outlined in the report;
- Where information has been provided by third parties, JKE has not undertaken any verification process, except where specifically stated in the report;
- JKE has not undertaken any assessment of off-site areas that may be potential contamination sources or may have been impacted by site contamination, except where specifically stated in the report;
- JKE accept no responsibility for potentially asbestos containing materials that may exist at the site. These materials may be associated with demolition of pre-1990 constructed buildings or fill material at the site;
- JKE have not and will not make any determination regarding finances associated with the site;
- Additional investigation work may be required in the event of changes to the proposed development or landuse. JKE should be contacted immediately in such circumstances;
- Material considered to be suitable from a geotechnical point of view may be unsatisfactory from a soil contamination viewpoint, and vice versa; and
- This report has been prepared for the particular project described and no responsibility is accepted for the use of any part of this report in any other context or for any other purpose.



# **Important Information About This Report**

These notes have been prepared by JKE to assist with the assessment and interpretation of this report.

#### The Report is based on a Unique Set of Project Specific Factors

This report has been prepared in response to specific project requirements as stated in the JKE proposal document which may have been limited by instructions from the client. This report should be reviewed, and if necessary, revised if any of the following occur:

- The proposed land use is altered;
- The defined subject site is increased or sub-divided;
- The proposed development details including size, configuration, location, orientation of the structures or landscaped areas are modified;
- The proposed development levels are altered, eg addition of basement levels; or
- Ownership of the site changes.

JKE will not accept any responsibility whatsoever for situations where one or more of the above factors have changed since completion of the investigation. If the subject site is sold, ownership of the investigation report should be transferred by JKE to the new site owners who will be informed of the conditions and limitations under which the investigation was undertaken. No person should apply an investigation for any purpose other than that originally intended without first conferring with the consultant.

#### Changes in Subsurface Conditions

Subsurface conditions are influenced by natural geological and hydrogeological process and human activities. Groundwater conditions are likely to vary over time with changes in climatic conditions and human activities within the catchment (e.g. water extraction for irrigation or industrial uses, subsurface waste water disposal, construction related dewatering). Soil and groundwater contaminant concentrations may also vary over time through contaminant migration, natural attenuation of organic contaminants, ongoing contaminating activities and placement or removal of fill material. The conclusions of an investigation report may have been affected by the above factors if a significant period of time has elapsed prior to commencement of the proposed development.

#### This Report is based on Professional Interpretations of Factual Data

Site investigations identify actual subsurface conditions at the actual sampling locations at the time of the investigation. Data obtained from the sampling and subsequent laboratory analyses, available site history information and published regional information is interpreted by geologists, engineers or environmental scientists and opinions are drawn about the overall subsurface conditions, the nature and extent of contamination, the likely impact on the proposed development and appropriate remediation measures.

Actual conditions may differ from those inferred, because no professional, no matter how qualified, and no subsurface exploration program, no matter how comprehensive, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than an investigation indicates. Actual conditions in areas not sampled may differ from predictions. Nothing can be done to prevent the unanticipated, but steps can be taken to help minimise the impact. For this reason, site owners should retain the services of their consultants throughout the development stage of the project, to identify variances, conduct additional tests which may be needed, and to recommend solutions to problems encountered on site.

#### **Investigation Limitations**

Although information provided by a site investigation can reduce exposure to the risk of the presence of contamination, no environmental site investigation can eliminate the risk. Even a rigorous professional investigation may not detect all contamination on a site. Contaminants may be present in areas that were not surveyed or sampled, or may migrate to areas which showed no signs of contamination when sampled. Contaminant analysis cannot possibly cover every type of contaminant which may occur; only the most likely contaminants are screened.



#### Misinterpretation of Site Investigations by Design Professionals

Costly problems can occur when other design professionals develop plans based on misinterpretation of an investigation report. To minimise problems associated with misinterpretations, the environmental consultant should be retained to work with appropriate professionals to explain relevant findings and to review the adequacy of plans and specifications relevant to contamination issues.

#### Logs Should not be Separated from the Investigation Report

Borehole and test pit logs are prepared by environmental scientists, engineers or geologists based upon interpretation of field conditions and laboratory evaluation of field samples. Logs are normally provided in our reports and these should not be re-drawn for inclusion in site remediation or other design drawings, as subtle but significant drafting errors or omissions may occur in the transfer process. Photographic reproduction can eliminate this problem, however contractors can still misinterpret the logs during bid preparation if separated from the text of the investigation. If this occurs, delays, disputes and unanticipated costs may result. In all cases it is necessary to refer to the rest of the report to obtain a proper understanding of the investigation. Please note that logs with the 'Environmental Log' header are not suitable for geotechnical purposes as they have not been peer reviewed by a Senior Geotechnical Engineer.

To reduce the likelihood of borehole and test pit log misinterpretation, the complete investigation should be available to persons or organisations involved in the project, such as contractors, for their use. Denial of such access and disclaiming responsibility for the accuracy of subsurface information does not insulate an owner from the attendant liability. It is critical that the site owner provides all available site information to persons and organisations such as contractors.

#### Read Responsibility Clauses Closely

Because an environmental site investigation is based extensively on judgement and opinion, it is necessarily less exact than other disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, model clauses have been developed for use in written transmittals. These are definitive clauses designed to indicate consultant responsibility. Their use helps all parties involved recognise individual responsibilities and formulate appropriate action. Some of these definitive clauses are likely to appear in the environmental site investigation, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to any questions.



**Appendix A: Report Figures** 





ERIAL IMAGE SOURCE: MAPS.SIX.NSW.GOV.AU	The:	SITE LOCATION PL	AN		
	Location:	94 TAYLOR STREET, GLENN INNES,	, NSW		
	Project No:	E35093UPD	Figure No:	1	
his plan should be read in conjunction with the Environmental report.		<b>JK</b> Environmer	nts		

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T PLOT





This plan should be read in conjunction with the Environmental report.

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# **Appendix B: Site Information and Site History**





**Proposed Development Plans** 



# GLEN INNES DISTRICT HOSPITAL UPGRADE **MASTERPLAN** FOR HEALTH INFRASTRUCTURE NSW

7104GI01



MP-100	TITLE PAGE
MP-101	RELATIONSHIP DIAG
MP-102	DESIGN PRINCIPLES
MP-103	EXISTING SITE PLAN
MP-104	MASTERPLAN OPTIC
MP-105	MASTERPLAN OPTIC
MP-106	MASTERPLAN OPTIC
MP-107	MASTERPLAN OPTIC
MP-108	MASTERPLAN OPTIC



Health Hunter New England Local Health District





# **fulton trotter ARCHITECTS**

ON 5 - MASSING

ON 5 - ZONAL PLAN FUTURE

ON 5 - FUTURE WORKS SITE PLAN

ON 5 - ZONAL PLAN - GROUND FLOOR

ON 5 - PROPOSED SITE PLAN

GRAMS - OVERALL SITE



fulton trotter





**DESIGN FOR DIGNITY** 



**DESIGN FOR** WELLBEING



**DESIGN FOR EFFICIENT & FLEXIBLE DELIVERY OF CARE** 



**DESIGN FOR** LONGEVITY & RESILIANCE



**DESIGN FOR SUSTAINABILITY** 





**DESIGN WITH COUNTRY** 

**DESIGN FOR THE NEIGHBOURHOOD &** SURROUNDING ENVIRONMENT

**DESIGN FOR** CONNECTION

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fulton trotter ARCHITECTS

- GI01 Hospital Building
- GI02 Old Laundry Building
- GI03 Mortuary
- GI04 Old Maintenance Building
- GI05 Storage Shed
- GI06 Old Hospital / Museum
- GI07 Medical Records / Maintenance Shed
- GI08 Old Nurse's Quarters
- GI09 Old Hospital / Museum
- GI10 Existing Staff Accommodation
- GI11 Aboriginal Shade Shelter
  - Main Hospital Building
  - Main Site Entry / Drop Off
  - Ambulance Access
  - **Public Parking**
  - Staff Parking
  - Main Kitchen Facilities





ARCHITECTS

GI01 - Hospital Building GI02 - Old Laundry Building GI04 - Old Maintenance Building GI05 - Storage Shed GI06 - Old Hospital / Museum GI07 - Medical Records / Maintenance Shed GI08 - Old Nurse's Quarters GI09 - Old Hospital / Museum GI10 - Existing Staff Accommodation GI11 - Aboriginal Shade Shelter

**New Building** 

Link to Existing Building

Potential Staff Accommodation

**Potential Ambulance Station** 

Main Site Entry / Drop Off

**Ambulance Access** 

**Public Parking** 

**Staff Parking** 

Possible Future Development

# GLEN INNES DISTRICT HOSPITAL UPGRADE for HEALTH INFRASTRUCTURE N



MASTERPLAN OPTION 5 - ZONAL PLAN - GROU

fulton trotter

# JAL PLAN – GROUND FLOOR GLEN INNES DISTRICT HOSPITAL UPGRADE FOR HEALTH INFRASTRUCTURE NSW



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ARCHITECTS

( )

GI01 - Hospital Building GI02 - Old Laundry Building GI04 - Old Maintenance Building GI05 - Storage Shed GI06 - Old Hospital / Museum GI07 - Medical Records / Maintenance Shed GI08 - Old Nurse's Quarters GI09 - Old Hospital / Museum GI10 - Existing Staff Accommodation GI11 - Aboriginal Shade Shelter

**New Building** 

- Possible Future Development
- Potential Staff Accommodation
- **Potential Ambulance Station**
- Main Site Entry / Drop Off
- **Ambulance Access**
- **Public Parking**
- Staff Parking





# fulton trotter

### MASTERPLAN OPTION 5 - ZONAL PLAN FU RE GLEN INNES DISTRICT HOSPITAL UPGRADE for HEALTH INFRASTRUCTURE NSW





# **OPTION 5 AA SECTION E-W**

SCALE: 1:500



## LEGEND

- GI01 Hospital Building
- GI02 Old Laundry Building
- GI03 Mortuary
- GI04 Old Maintenance Building
- GI05 Storage Shed
- GI06 Old Hospital / Museum
- GI07 Medical Records / Maintenance Shed
- GI08 Old Nurse's Quarters
- GI09 Old Hospital / Museum
- GI10 Existing Staff Accommodation
- GI11 Aboriginal Shade Shelter
- 1 New Building
- 2 Link to Existing Building
- 3 Potential Staff Accommodation
- 4 Potential Ambulance Station
- 5 Main Site Entry / Drop Off
- 6 Ambulance Access
- 7 Public Parking
- 8 Staff Parking
- 9 Possible Future Expansion





# Lotsearch Environmental Risk and Planning Report





# Date: 20 May 2022 08:40:04 Reference: LS032438 EP Address: 85 Taylor Street, Glen Innes, NSW 2370

Disclaimer:

The purpose of this report is to provide an overview of some of the site history, environmental risk and planning information available, affecting an individual address or geographical area in which the property is located. It is not a substitute for an on-site inspection or review of other available reports and records. It is not intended to be, and should not be taken to be, a rating or assessment of the desirability or market value of the property or its features. You should obtain independent advice before you make any decision based on the information within the report. The detailed terms applicable to use of this report are set out at the end of this report.

# **Dataset Listing**

Datasets contained within this report, detailing their source and data currency:

Dataset Name	Custodian	Supply Date	Currency Date	Update Frequency	Dataset Buffer (m)	No. Features On-site	No. Features within 100m	No. Features within Buffer
Cadastre Boundaries	NSW Department of Customer Service - Spatial Services	06/04/2022	06/04/2022	Quarterly	-	-	-	-
Topographic Data	NSW Department of Customer Service - Spatial Services	25/06/2019	25/06/2019	Annually	-	-	-	-
List of NSW contaminated sites notified to EPA	Environment Protection Authority	19/04/2022	11/04/2022	Monthly	1000m	0	0	7
Contaminated Land Records of Notice	Environment Protection Authority	10/05/2022	10/05/2022	Monthly	1000m	0	0	1
Former Gasworks	Environment Protection Authority	02/03/2022	14/07/2021	Quarterly	1000m	0	0	1
National Waste Management Facilities Database	Geoscience Australia	12/05/2021	07/03/2017	Annually	1000m	0	0	0
National Liquid Fuel Facilities	Geoscience Australia	15/02/2021	13/07/2012	Annually	1000m	0	0	3
EPA PFAS Investigation Program	Environment Protection Authority	03/05/2022	14/07/2021	Monthly	2000m	0	0	0
Defence PFAS Investigation & Management Program - Investigation Sites	Department of Defence	11/05/2022	11/05/2022	Monthly	2000m	0	0	0
Defence PFAS Investigation & Management Program - Management Sites	Department of Defence	11/05/2022	11/05/2022	Monthly	2000m	0	0	0
Airservices Australia National PFAS Management Program	Airservices Australia	11/05/2022	11/05/2022	Monthly	2000m	0	0	0
Defence 3 Year Regional Contamination Investigation Program	Department of Defence	03/03/2022	03/03/2022	Quarterly	2000m	0	0	0
EPA Other Sites with Contamination Issues	Environment Protection Authority	16/02/2022	13/12/2018	Annually	1000m	0	0	0
Licensed Activities under the POEO Act 1997	Environment Protection Authority	10/05/2022	10/05/2022	Monthly	1000m	0	0	1
Delicensed POEO Activities still regulated by the EPA	Environment Protection Authority	10/05/2022	10/05/2022	Monthly	1000m	1	1	1
Former POEO Licensed Activities now revoked or surrendered	Environment Protection Authority	10/05/2022	10/05/2022	Monthly	1000m	0	0	3
UBD Business Directories (Premise & Intersection Matches)	Hardie Grant			Not required	150m	4	17	50
UBD Business Directories (Road & Area Matches)	Hardie Grant			Not required	150m	-	49	54
UBD Business Directory Dry Cleaners & Motor Garages/Service Stations (Premise & Intersection Matches)	Hardie Grant			Not required	500m	0	0	18
UBD Business Directory Dry Cleaners & Motor Garages/Service Stations (Road & Area Matches)	Hardie Grant			Not required	500m	-	0	7
Points of Interest	NSW Department of Customer Service - Spatial Services	19/08/2021	19/08/2021	Quarterly	1000m	2	6	53
Tanks (Areas)	NSW Department of Customer Service - Spatial Services	19/08/2021	19/08/2021	Quarterly	1000m	0	0	0
Tanks (Points)	NSW Department of Customer Service - Spatial Services	19/08/2021	19/08/2021	Quarterly	1000m	0	0	0
Major Easements	NSW Department of Customer Service - Spatial Services	19/08/2021	19/08/2021	Quarterly	1000m	0	0	2
State Forest	Forestry Corporation of NSW	25/02/2021	14/02/2021	Annually	1000m	0	0	0
NSW National Parks and Wildlife Service Reserves	NSW Office of Environment & Heritage	10/02/2022	31/12/2021	Annually	1000m	0	0	0
Hydrogeology Map of Australia	Commonwealth of Australia (Geoscience Australia)	08/10/2014	17/03/2000	Annually	1000m	1	1	1
Temporary Water Restriction (Botany Sands Groundwater Source) Order 2018	NSW Department of Planning, Industry and Environment	28/03/2022	23/02/2018	Annually	1000m	0	0	0
National Groundwater Information System (NGIS) Boreholes	Bureau of Meteorology; Water NSW	24/01/2022	24/01/2022	Annually	2000m	0	0	73

Dataset Name	Custodian	Supply Date	Currency Date	Update Frequency	Dataset Buffer (m)	No. Features On-site	No. Features within 100m	No. Features within Buffer
NSW Seamless Geology Single Layer: Rock Units	Department of Regional NSW	17/02/2022	01/05/2021	Annually	1000m	1	1	2
NSW Seamless Geology – Single Layer: Trendlines	Department of Regional NSW	17/02/2022	01/05/2021	Annually	1000m	0	0	0
NSW Seamless Geology – Single Layer: Geological Boundaries and Faults	Department of Regional NSW	17/02/2022	01/05/2021	Annually	1000m	0	0	0
Naturally Occurring Asbestos Potential	NSW Dept. of Industry, Resources & Energy	04/12/2015	24/09/2015	Unknown	1000m	0	0	0
Atlas of Australian Soils	Australian Bureau of Agriculture and Resource Economics and Sciences (ABARES)	19/05/2017	17/02/2011	As required	1000m	1	2	3
Environmental Planning Instrument Acid Sulfate Soils	NSW Department of Planning, Industry and Environment	06/04/2022	18/02/2022	Monthly	500m	0	-	-
Atlas of Australian Acid Sulfate Soils	CSIRO	19/01/2017	21/02/2013	As required	1000m	1	1	1
Dryland Salinity - National Assessment	National Land and Water Resources Audit	18/07/2014	12/05/2013	None planned	1000m	0	0	0
Mining Subsidence Districts	NSW Department of Customer Service - Subsidence Advisory NSW	19/08/2021	05/08/2021	Quarterly	1000m	0	0	0
Current Mining Titles	NSW Department of Industry	20/04/2022	20/04/2022	Monthly	1000m	0	0	0
Mining Title Applications	NSW Department of Industry	20/04/2022	20/04/2022	Monthly	1000m	0	0	0
Historic Mining Titles	NSW Department of Industry	20/04/2022	20/04/2022	Monthly	1000m	5	5	6
Environmental Planning Instrument SEPP State Significant Precincts	NSW Department of Planning, Industry and Environment	15/11/2021	07/12/2018	Monthly	1000m	0	0	0
Environmental Planning Instrument Land Zoning	NSW Department of Planning, Industry and Environment	15/11/2021	05/11/2021	Monthly	1000m	1	2	23
Commonwealth Heritage List	Australian Government Department of the Agriculture, Water and the Environment	18/05/2021	20/11/2019	Annually	1000m	0	0	1
National Heritage List	Australian Government Department of the Agriculture, Water and the Environment	18/05/2021	20/11/2019	Annually	1000m	0	0	0
State Heritage Register - Curtilages	NSW Department of Planning, Industry and Environment	19/08/2021	25/06/2021	Quarterly	1000m	0	0	2
Environmental Planning Instrument Local Heritage	NSW Department of Planning, Industry and Environment	06/04/2022	25/03/2022	Monthly	1000m	1	3	127
Bush Fire Prone Land	NSW Rural Fire Service	16/05/2022	08/12/2021	Weekly	1000m	0	0	2
Eastern Bushland Database (North Region)	NSW Office of Environment & Heritage	24/07/2016	01/01/1991	None planned	1000m	0	0	0
Ramsar Wetlands of Australia	Australian Government Department of Agriculture, Water and the Environment	28/03/2022	19/03/2020	Annually	1000m	0	0	0
Groundwater Dependent Ecosystems	Bureau of Meteorology	14/08/2017	15/05/2017	Annually	1000m	0	0	1
Inflow Dependent Ecosystems Likelihood	Bureau of Meteorology	14/08/2017	15/05/2017	Unknown	1000m	0	0	1
NSW BioNet Species Sightings	NSW Office of Environment & Heritage	16/05/2022	16/05/2022	Weekly	10000m	-	-	-

# Site Diagram

85 Taylor Street, Glen Innes, NSW 2370





# **Contaminated Land**

85 Taylor Street, Glen Innes, NSW 2370





# **Contaminated Land**

85 Taylor Street, Glen Innes, NSW 2370

# List of NSW contaminated sites notified to EPA

Records from the NSW EPA Contaminated Land list within the dataset buffer:

Map Id	Site	Address	Suburb	Activity	Management Class	Status	Location Confidence	Dist	Direction
504	Former Caltex Depot, Glen innes	Lot 1 DP785636 Lambeth Street	Glen Innes	Other Petroleum	Regulation under CLM Act not required	Current EPA List	Premise Match	245m	South West
506	Telstra Depot Glen Innes	126 Lambeth Street	Glen Innes	Unclassified	Regulation under CLM Act not required	Current EPA List	Premise Match	275m	South West
499	Ambulance Station	106 Bourke Street	Glen Innes	Unclassified	Regulation under CLM Act not required	Current EPA List	Premise Match	363m	South
505	Former Shell Depot	Lambeth Street	Glen Innes	Other Petroleum	Regulation under CLM Act not required	Current EPA List	Premise Match	416m	South West
501	Caltex Glen Innes Service Station	Meade Street, corner Church STREET	Glen Innes	Service Station	Regulation under CLM Act not required	Current EPA List	Premise Match	567m	South East
502	Caltex Service Station	Cnr Taylor Street & Church Street	Glen Innes	Service Station	Regulation under CLM Act not required	Current EPA List	Premise Match	572m	East
503	Council- owned Laneway	Lot 2 Lang Street	Glen Innes	Gasworks	Regulation under CLM Act not required	Current EPA List	Premise Match	930m	South

The values within the EPA site management class in the table above, are given more detailed explanations in the table below:

EPA site management class	Explanation
Contamination being managed via the planning process (EP&A Act)	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation. The contamination of this site is managed by the consent authority under the Environmental Planning and Assessment Act 1979 (EP&A Act) planning approval process, with EPA involvement as necessary to ensure significant contamination is adequately addressed. The consent authority is typically a local council or the Department of Planning and Environment.
Contamination currently regulated under CLM Act	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation under the Contaminated Land Management Act 1997 (CLM Act). Management of the contamination is regulated by the EPA under the CLM Act. Regulatory notices are available on the EPA's Contaminated Land Public Record of Notices.
Contamination currently regulated under POEO Act	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation. Management of the contamination is regulated under the Protection of the Environment Operations Act 1997 (POEO Act). The EPA's regulatory actions under the POEO Act are available on the POEO public register.
Contamination formerly regulated under the CLM Act	The EPA has determined that the contamination is no longer significant enough to warrant regulation under the Contaminated Land Management Act 1997 (CLM Act). The contamination was addressed under the CLM Act.
Contamination formerly regulated under the POEO Act	The EPA has determined that the contamination is no longer significant enough to warrant regulation. The contamination was addressed under the Protection of the Environment Operations Act 1997 (POEO Act).
Contamination was addressed via the planning process (EP&A Act)	The EPA has determined that the contamination is no longer significant enough to warrant regulation. The contamination was addressed by the appropriate consent authority via the planning process under the Environmental Planning and Assessment Act 1979 (EP&A Act).
Ongoing maintenance required to manage residual contamination (CLM Act)	The EPA has determined that ongoing maintenance, under the Contaminated Land Management Act 1997 (CLM Act), is required to manage the residual contamination. Regulatory notices under the CLM Act are available on the EPA's Contaminated Land Public Record of Notices.

EPA site management class	Explanation
Regulation being finalised	The EPA has completed an assessment of the contamination and decided that the contamination is significant enough to warrant regulation under the Contaminated Land Management Act 1997. A regulatory approach is being finalised.
Regulation under the CLM Act not required	The EPA has completed an assessment of the contamination and decided that regulation under the Contaminated Land Management Act 1997 is not required.
Under assessment	The contamination is being assessed by the EPA to determine whether regulation is required. The EPA may require further information to complete the assessment. For example, the completion of management actions regulated under the planning process or Protection of the Environment Operations Act 1997. Alternatively, the EPA may require information via a notice issued under s77 of the Contaminated Land Management Act 1997 or issue a Preliminary Investigation Order.

NSW EPA Contaminated Land List Data Source: Environment Protection Authority © State of New South Wales through the Environment Protection Authority

# **Contaminated Land**

85 Taylor Street, Glen Innes, NSW 2370

# **Contaminated Land: Records of Notice**

Record of Notices within the dataset buffer:

Map Id	Name	Address	Suburb	Notices	Area No	Location Confidence	Distance	Direction
118	Council-owned Laneway	Lot 2 Lang Street	Glen Innes	2 former	3105	Premise Match	930m	South

Contaminated Land Records of Notice Data Source: Environment Protection Authority © State of New South Wales through the Environment Protection Authority Terms of use and disclaimer for Contaminated Land: Record of Notices, please visit http://www.epa.nsw.gov.au/clm/clmdisclaimer.htm

# **Former Gasworks**

#### Former Gasworks within the dataset buffer:

Map Id	Location	Council	Further Info	Location Confidence	Distance	Direction
39	West Avenue, Glen Innes	Glen Innes Severn Shire Council	Search record of EPA notices	Premise Match	990m	South

Former Gasworks Data Source: Environment Protection Authority

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# Waste Management & Liquid Fuel Facilities

85 Taylor Street, Glen Innes, NSW 2370





# **Waste Management & Liquid Fuel Facilities**

85 Taylor Street, Glen Innes, NSW 2370

# National Waste Management Site Database

Sites on the National Waste Management Site Database within the dataset buffer:

Site Id	Owner	Name	Address	Suburb	Class	Landfill	Reprocess	Transfer	Comments	Loc Conf	Dist	Direction
N/A	No records in buffer											

Waste Management Facilities Data Source: Geoscience Australia

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# **National Liquid Fuel Facilities**

#### National Liquid Fuel Facilties within the dataset buffer:

Map Id	Owner	Name	Address	Suburb	Class	Operational Status	Operator	Revision Date	Loc Conf	Dist	Direction
3375	Shell	West End	143-145 Lambeth Street	Glen Innes	Petrol Station	Operational		25/07/2011	Premise Match	162m	South West
3797	Caltex	Caltex Glen Innes	140-142 Meade Street	Glen Innes	Petrol Station	Operational		25/07/2011	Premise Match	567m	South East
3796	Caltex	Woolworths Caltex Glen Innes	150-152 Taylor Street	Glen Innes	Petrol Station	Operational		25/07/2011	Premise Match	572m	East

National Liquid Fuel Facilities Data Source: Geoscience Australia

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# **PFAS Investigation & Management Programs**

85 Taylor Street, Glen Innes, NSW 2370

# **EPA PFAS Investigation Program**

Sites that are part of the EPA PFAS investigation program, within the dataset buffer:

Map ID	Site	Address	Loc Conf	Dist	Dir
N/A	No records in buffer				

EPA PFAS Investigation Program: Environment Protection Authority © State of New South Wales through the Environment Protection Authority

# **Defence PFAS Investigation Program**

Sites being investigated by the Department of Defence for PFAS contamination within the dataset buffer:

Map ID	Base Name	Address	Loc Conf	Dist	Dir
N/A	No records in buffer				

Defence PFAS Investigation Program Data Custodian: Department of Defence, Australian Government

# Defence PFAS Management Program

#### Sites being managed by the Department of Defence for PFAS contamination within the dataset buffer:

Map ID	Base Name	Address	Loc Conf	Dist	Dir
N/A	No records in buffer				

Defence PFAS Management Program Data Custodian: Department of Defence, Australian Government

# **Airservices Australia National PFAS Management Program**

Sites being investigated or managed by Airservices Australia for PFAS contamination within the dataset buffer:

Map ID	Site Name	Impacts	Loc Conf	Dist	Dir
N/A	No records in buffer				

Airservices Australia National PFAS Management Program Data Custodian: Airservices Australia

# **Defence Sites**

85 Taylor Street, Glen Innes, NSW 2370

# **Defence 3 Year Regional Contamination Investigation Program**

Sites which have been assessed as part of the Defence 3 Year Regional Contamination Investigation Program within the dataset buffer:

Property ID	Base Name	Address	Known Contamination	Loc Conf	Dist	Dir
N/A	No records in buffer					

Defence 3 Year Regional Contamination Investigation Program, Data Custodian: Department of Defence, Australian Government
# **EPA Other Sites with Contamination Issues**

85 Taylor Street, Glen Innes, NSW 2370

#### **EPA Other Sites with Contamination Issues**

This dataset contains other sites identified on the EPA website as having contamination issues. This dataset currently includes:

- James Hardie asbestos manufacturing and waste disposal sites
- Radiological investigation sites in Hunter's Hill
- Pasminco Lead Abatement Strategy Area

Sites within the dataset buffer:

Site Id	Site Name	Site Address	Dataset	Comments	Location Confidence	Distance	Direction
N/A	No records in buffer						

EPA Other Sites with Contamination Issues: Environment Protection Authority © State of New South Wales through the Environment Protection Authority

#### **Current EPA Licensed Activities**





# **EPA Activities**

85 Taylor Street, Glen Innes, NSW 2370

### Licensed Activities under the POEO Act 1997

Licensed activities under the Protection of the Environment Operations Act 1997, within the dataset buffer:

EPL	Organisation	Name	Address	Suburb	Activity	Loc Conf	Distance	Direction
13421	UGL REGIONAL LINX PTY LTD		COUNTRY REGIONAL NETWORK, ORANGE, NSW 2800		Railway systems activities	Network of Features	300m	West

POEO Licence Data Source: Environment Protection Authority

© State of New South Wales through the Environment Protection Authority

#### **Delicensed & Former Licensed EPA Activities**





# **EPA Activities**

85 Taylor Street, Glen Innes, NSW 2370

#### **Delicensed Activities still regulated by the EPA**

Delicensed activities still regulated by the EPA, within the dataset buffer:

Licence No	Organisation	Name	Address	Suburb	Activity	Loc Conf	Distance	Direction
11322	HUNTER AND NEW ENGLAND AREA HEALTH SERVICE	GLEN INNES HOSPITAL	TAYLOR STREET	GLEN INNES	Hazardous, Industrial or Group A Waste Generation or Storage	Premise Match	0m	On-site

Delicensed Activities Data Source: Environment Protection Authority © State of New South Wales through the Environment Protection Authority

# Former Licensed Activities under the POEO Act 1997, now revoked or surrendered

Former Licensed activities under the Protection of the Environment Operations Act 1997, now revoked or surrendered, within the dataset buffer:

Licence No	Organisation	Location	Status	Issued Date	Activity	Loc Conf	Distance	Direction
4653	LUHRMANN ENVIRONMENT MANAGEMENT PTY LTD	WATERWAYS THROUGHOUT NSW	Surrendered	06/09/2000	Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	111m	North East
4838	Robert Orchard	Various Waterways throughout New South Wales - SYDNEY NSW 2000	Surrendered	07/09/2000	Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	111m	North East
6630	SYDNEY WEED & PEST MANAGEMENT PTY LTD	WATERWAYS THROUGHOUT NSW - PROSPECT, NSW, 2148	Surrendered	09/11/2000	Other Activities / Non Scheduled Activity - Application of Herbicides	Network of Features	111m	North East

Former Licensed Activities Data Source: Environment Protection Authority © State of New South Wales through the Environment Protection Authority

# **Historical Business Directories**





## **Historical Business Directories**

85 Taylor Street, Glen Innes, NSW 2370

#### Business Directory Records 1950-1991 Premise or Road Intersection Matches

Universal Business Directory records from years 1991, 1982, 1970, 1961 & 1950, mapped to a premise or road intersection within the dataset buffer:

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
1	HOSPITALS &/OR HEALTH CENTRES	Glen Innes District Hospital, Taylor St., Glen Innes 2370	100096	1982	Premise Match	0m	On-site
	HOSPITALS &HEALTH CENTRES	Glen Innes District Hospital, Taylor St., Glen Innes 2370	649064	1970	Premise Match	Om	On-site
	HOSPITALS & HEALTH CENTRES	Glen innes District Hospital, Taylor St., Glen Innes	151165	1961	Premise Match	0m	On-site
	HOSPITALS	Glen Innes District Hospital, Macquarie St., Glen Innes	182199	1950	Premise Match	0m	On-site
2	MOTOR BUS SERVICES	Glen Innes Bus Services, 116 Macquarie St., Glen Innes 2370	100169	1982	Premise Match	30m	West
3	FUNERAL DIRECTORS	Lightfoot, R. T. and Co., 219 Ferguson St., Glen Innes	182144	1950	Premise Match	30m	South
4	BATHS - SWIMMING	Glen Innes Municipal Baths, West Ave., Glen Innes 2370	99905	1982	Premise Match	36m	North East
5	VETERINARY SURGEONS	O'Hara, H., 148 West St., Glen Innes	183623	1950	Premise Match	59m	South East
6	PLUMBERS, GASFITTERS & DRAINLAYERS	Sleigh, H. J., 75 Manns Lane, Glen Innes 2370	649240	1970	Premise Match	70m	North East
	PLUMBERS, GASFITTERS & DRAINLAYERS	Sleigh, H. J., 75 Manns Lane, Glen Innes	151354	1961	Premise Match	70m	North East
	PLUMBERS, GASFITTERS & DRAINLAYERS	Sleigh, H. J., 75 Manns Lane, Glen Innes	183530	1950	Premise Match	70m	North East
7	BUILDERS & BUILDING CONTRACTORS	Zeller, C. A., 180 West Ave., Glen Innes 2370	648925	1970	Premise Match	70m	North East
8	CONTRACTORS GENERAL	Hodge, E. J., 77 Healeys La., Glen Innes 2370	99991	1982	Premise Match	71m	West
9	FLOOR SANDING &/OR POLISHING CONTRACTORS	McKenzie, C. E., 182 West Ave., Glen Innes 2370	649016	1970	Premise Match	90m	North East
	FRENCH POLISHERS	McKenzie, C. E., 182 West Ave., Glen Innes 2370	649020	1970	Premise Match	90m	North East
	TILE FIXERS-FLOOR & WALL	McKenzie, C. E., 182 West Ave., Glen Innes 2370	649329	1970	Premise Match	90m	North East
10	BUILDERS &/OR BUILDING CONTRACTORS	Zeller, C. A. & Co., 135 Macquarie St., Glen Innes 2370	99930	1982	Premise Match	91m	North
11	BUTCHERS - RETAIL.	Penn E J & Co., 204 Ferguson St	207061	1991	Premise Match	118m	West
	BUTCHERS RETAIL	Penn, E. J. & Co., 204 Ferguson St., Glen Innes 2370	99937	1982	Premise Match	118m	West
	BUTCHERS-RETAIL	Penn, T., 204 Ferguson St., Glen Innes 2370	648930	1970	Premise Match	118m	West
	BUTCHERS-RETAIL	Davy Bros., 204 Ferguson St., Glen Innes	150989	1961	Premise Match	118m	West
	BUTCHERS-RETAIL	Davy, A. G., 204 Ferguson St., Glen Innes	182021	1950	Premise Match	118m	West
12	BUILDERS SUPPLIES	Glen Innes Timber & Hardware., 207 Ferguson St	207055	1991	Premise Match	122m	South West
	DOOR MFRS. &/OR DISTS. &/OR INSTALLERS	Glen Innes Timber & Hardware., 207 Ferguson St	207109	1991	Premise Match	122m	South West
	GLASS MERCHANTS &/OR GLAZIERS.	Glen Innes Timber & Hardware., 207 Ferguson St	207157	1991	Premise Match	122m	South West
	HARDWARE - RETAIL	Glen Innes Timber & Hardware., 207 Ferguson St	207182	1991	Premise Match	122m	South West

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
12	HEATING EQUIPMENT &/OR SYSTEMS MFRS. &/OR DISTS. &/OR INSTALLERS	Glen Innes Timber & Hardware., 207 Ferguson St	207187	1991	Premise Match	122m	South West
	JOINERY MANUFACTURERS &/OR MERCHANTS.	Glen Innes Timber & Hardware., 207 Ferguson St	207206	1991	Premise Match	122m	South West
	KITCHEN UNITS MFRS. &/OR DISTS. &/OR INSTALLERS	Glen Innes Timber & Hardware., 207 Ferguson St	207209	1991	Premise Match	122m	South West
	TILE - FLOOR &/OR WALL - MFRS. &/OR IMPS. &/OR MERCHANTS.	Glen Innes Timber & Hardware., 207 Ferguson St	207358	1991	Premise Match	122m	South West
	TILERS &/OR SLATERS - ROOF.	Glen Innes Timber & Hardware., 207 Ferguson St	207359	1991	Premise Match	122m	South West
	TIMBER MERCHANTS &/OR SAWMILLERS	Glen Innes Timber & Hardware., 207 Ferguson St	207361	1991	Premise Match	122m	South West
	WINDOW FRAME MFRS. &/OR DISTS ALUMINIUM.	Glen Innes Timber & Hardware., 207 Ferguson St	207378	1991	Premise Match	122m	South West
	WINDOW FRAME MFRS. &/OR DISTS ALUMINIUM.	Glen Innes Timber & Hardware., 207 Ferguson St Glen Innes	207377	1991	Premise Match	122m	South West
	SHOP &/OR OFFICE FITTERS	Glen Tones Timber & Hardware., 207 Ferguson St	207343	1991	Premise Match	122m	South West
	SECURITY DOORS &/OR WINDOWS &/OR GRILLES	Glen Tones Timber A Hardware., 207 Ferguson St	207340	1991	Premise Match	122m	South West
	ALUMINIUM WINDOW FRAME MFRS. &/OR DISTS	Glen Innes Timber & Joinery Works, 207 Ferguson St., Glen Innes 2370	99834	1982	Premise Match	122m	South West
	GLASS MERCHANTS &/OR GLAZIERS	Glen Innes Timber & Joinery Works, 207 Ferguson St., Glen Innes 2370	100060	1982	Premise Match	122m	South West
	HARDWARE &/OR BUILDERS SUPPLIES	Glen Innes Timber & Joinery Works, 207 Ferguson St., Glen Innes 2370	100082	1982	Premise Match	122m	South West
	JOINERY MANUFACTURERS	Glen Innes Timber & Joinery Works, 207 Ferguson St., Glen Innes 2370	100110	1982	Premise Match	122m	South West
	SHOP &/OR OFFICE FITTERS	Glen Innes Timber & Joinery Works, 207 Ferguson St., Glen Innes 2370	100327	1982	Premise Match	122m	South West
	TILE MFRS. &/OR DISTS FLOOR &/OR WALL	Glen Innes Timber & Joinery Works, 207 Ferguson St., Glen Innes 2370	100364	1982	Premise Match	122m	South West
	TILERS - ROOF &/OR SLATERS	Glen Innes Timber & Joinery Works, 207 Ferguson St., Glen Innes 2370	100366	1982	Premise Match	122m	South West
	TIMBER MERCHANTS &/OR SAWMILLERS.	Glen lanes Timber & Joinery Works, 207 Ferguson St., Glen Innes 2370	100367	1982	Premise Match	122m	South West
	TILERS - ROOF &/OR SLATERS	Roof Tilers 207 Ferguson St., Glen Innes 2370	100350	1982	Premise Match	122m	South West
	JOINERY MANUFACTURERS	Glen Innes Timber & Joinery Works, 205 Ferguson St., Glen Innes 2370	649092	1970	Premise Match	122m	South West
	SHOP & OFFICE FITTERS	Glen Innes Timber & Joinery Works, 205 Ferguson St., Glen Innes 2370	649284	1970	Premise Match	122m	South West
	TIMBER MERCHANTS & SAWMILLERS	Glen Innes Timber & Joinery Works, 205 Ferguson St., Glen Innes 2370	649331	1970	Premise Match	122m	South West
	HARDWARE & BUILDERS SUPPLIES	Glen Miles Timber & Joinery Works, 205 Ferguson St., Glen Innes 2370	649056	1970	Premise Match	122m	South West
13	MILK VENDORS	Blunt, C. A., 175 Lambeth St., Glen Innes	182258	1950	Premise Match	149m	North West

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#### Business Directory Records 1950-1991 Road or Area Matches

Universal Business Directory records from years 1991, 1982, 1970, 1961 & 1950, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published:

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Road Corridor or Area
14	ENGINEERS-GENERAL	Hope Metal Industries., Ferguson St	207132	1991	Road Match	0m
	STEEL MERCHANTS- GENERAL	Hope Metal Industries., Ferguson St	207349	1991	Road Match	0m
	ART GALLERIES &/OR MUSEUMS	Land Of The Beardies History House., Ferguson St	207017	1991	Road Match	0m
	INFORMATION SERVICES	Land Of The Beardies History House., Ferguson St	207198	1991	Road Match	0m
	MOTOR OIL, SPIRIT & GREASE MFRS. &/OR IMPS. &/OR DISTS.	Ryan D J & D O Pty Ltd., Ferguson St	207272	1991	Road Match	Om
	MOTOR OIL &/OR SPIRIT MERCHANTS.	Shell West End Service Station., Ferguson St Glen Innes	207273	1991	Road Match	0m
	ELECTRICAL APPLIANCE REPAIR &/OR SERVICE AGENTS.	Thom & Pollock Installations., Ferguson St	207118	1991	Road Match	Om
	ELECTRICAL CONTRACTORS	Thom & Pollock Installations., Ferguson St	207121	1991	Road Match	0m
	PUMP & PUMPING EQUIPMENT MFRS. &/OR DISTS.	Thom & Pollock Installations., Ferguson St	207309	1991	Road Match	Om
	SIGNS - NEON &/OR ILLUMINATED.	Thom & Pollock Installations., Ferguson St	207344	1991	Road Match	0m
	POWER TOOL REPAIRERS.	Thom & Pollock Tastalla Sons., Ferguson St	207304	1991	Road Match	0m
	STEEL FABRICATORS	Hope, R, G. & J. J., Ferguson Rd., Glen Innes 2370	100352	1982	Road Match	0m
	CARPET &/OR FLOOR COVERING RETAILERS &/OR SPECIALISTS	Hope, R. G. & J. J., Ferguson Rd., Glen Innes 2370	99958	1982	Road Match	0m
	ART GALLERIES &/OR MUSEUMS	Land of The Beardies History House, Ferguson St., Glen Innes 2370	99837	1982	Road Match	0m
	BUTTER MANUFACTURERS & WHOLESALERS	Glen Innes Co-op Dairy Society Ltd., Ferguson St., Glen Innes 2370	648932	1970	Road Match	0m
	ICE MANUFACTURER & VENDOR	Glen Innes Co-op Dairy Society Ltd., Ferguson St., Glen Innes 2370	649071	1970	Road Match	0m
	INSURANCE AGENTS	Glen Innes Co-op Dairy Society Ltd., Ferguson St., Glen Innes 2370	649078	1970	Road Match	0m
	DAIRY MACHINERY MFRS. &/OR DISTS.	Glen Ione, Co-op Dairy Society Ltd., Ferguson St., Glen Innes 2370	648969	1970	Road Match	0m
	MOTOR OIL & SPIRIT DEPOTS	Mobil Oil Australia Ltd., Ferguson St., Glen Innes 2370	649187	1970	Road Match	0m
	MIXED BUSINESSES	S. h. De Jersey, Ferguson Street, Glen Innes 2370	649232	1970	Road Match	0m
	GLASS MERCHANTS	Glen Innes Timber & Joinery Works, Ferguson St., Glen Innes	151130	1961	Road Match	0m
	GLAZIERS	Glen Innes Timber & Joinery Works, Ferguson St., Glen Innes	151133	1961	Road Match	0m
	JOINERY MANUFACTURERS	Glen innes Timber & Joinery Works, Ferguson St., Glen Innes	151203	1961	Road Match	0m
	SHOP & OFFICE FITTERS	Glen Innes Timber & Joinery Works, Ferguson St., Glen Innes	151404	1961	Road Match	Om
	TIMBER MERCHANTS & SAWMILLERS	Glen Innes Timber & Joinery Works, Ferguson St., Glen Innes	151450	1961	Road Match	Om
	BUILDERS' SUPPLIERS	Glen Nines Timber & Joinery Works, Ferguson St., Glen Innes	150981	1961	Road Match	0m
	MOTOR OIL & SPIRIT DEPOTS	Vacuum Oil Co. Pty. Ltd., Ferguson St., Glen Innes	151298	1961	Road Match	Om

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Road Corridor or Area
14	UPHOLSTERERS	Cannes, D., Ferguson St., Glen Innes	183617	1950	Road Match	0m
	UPHOLSTERERS	Des. Cannen Ferguson St., Glen Innes	183638	1950	Road Match	0m
	MOTOR TRIMMERS	Knight, J. W., Neil and Ferguson Sts., Glen Innes	182312	1950	Road Match	0m
	UPHOLSTERERS	Knight, J., Ferguson St., Glen Innes	183619	1950	Road Match	0m
	MOTOR OIL & SPIRIT DEPOTS	Vacuum Oil Co. Pty. Ltd., Ferguson St., Glen Innes	182303	1950	Road Match	0m
15	ASSOCIATIONS &/OR SOCIETIES,	Amateur Swimming Club, West Ave., Glen Innes 2370	99839	1982	Road Match	0m
	ASSOCIATIONS &/OR SOCIETIES,	Glen Innes District Tennis Association, West Ave., Glen Innes 2370	99856	1982	Road Match	0m
	INSURANCE BROKERS	Samuel, Richard Insurance Broker, West Ave., Glen Innes 2370	100104	1982	Road Match	0m
	SHEARING CONTRACTORS	Callaghan, J., West Ave., Glen Innes	151399	1961	Road Match	0m
	CARRIERS & CARTAGE CONTRACTORS	Fenton, A., 166 West St., Glen Innes	182034	1950	Road Match	0m
	CARRIERS & CARTAGE CONTRACTORS	Kiehne, R., West Ave., Glen Innes	182041	1950	Road Match	0m
	TIMBER MERCHANTS	Mangleson and Son, West Ave., Glen Innes	183614	1950	Road Match	0m
16	MOTOR BUS SERVICES	Black & White Motor Services, Taylor St., Glen Innes 2370	100168	1982	Road Match	0m
	CARRIERS &/OR CARTAGE CONTRACTORS	McLeans Transport, Taylor St., Glen Innes 2370	99966	1982	Road Match	0m
	ROAD TRANSPORT SERVICES - INTERSTATE	McLeans Transport, Taylor St., Glen Innes 2370	100297	1982	Road Match	0m
	ROAD TRANSPORT SERVICES - INTRASTATE	McLeans Transport, Taylor St., Glen Innes 2370	100300	1982	Road Match	0m
	MOTOR BUS SERVICES	Black & White Motor Services, Taylor St., Glen Innes 2370	649152	1970	Road Match	0m
	BUILDERS & CONTRACTORS	Marr, Hardy Construction Co., Taylor St., Glen Innes	150974	1961	Road Match	0m
	INSURANCE AGENTS	Smith, L. B., Taylor St., Glen Innes	151192	1961	Road Match	0m
	MILK VENDORS	Stiles, K., Taylor St., Glen Innes	151235	1961	Road Match	0m
17	MOTOR BUS SERVICES	Glen Innes Bus Service, Macquarie St., Glen Innes 2370	649153	1970	Road Match	0m
	BUILDERS. & BUILDING CONTRACTORS	Lawrence, N., Macquarie St., Glen Innes	182009	1950	Road Match	0m
18	ΤΑΧΙ	Ross, J. A., 46 Healy Lane, Glen Innes	183609	1950	Road Match	111m
19	ASSOCIATIONS &/OR SOCIETIES,	Town & Country Club, East Ave., Glen Innes 2370	99886	1982	Road Match	144m
	MOTOR BUS SERVICES	Black & White Motor Services, East Ave., Glen Innes	151261	1961	Road Match	144m
	MOTOR OIL & SPIRIT DEPOTS	Total Oil Co., East Ave., Glen Innes	151297	1961	Road Match	144m
	MOTOR CAR & TRUCK DEALERS	Boughton, T. J., East Ave., Glen Innes	182273	1950	Road Match	144m

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# **Dry Cleaners, Motor Garages & Service Stations**





## **Historical Business Directories**

85 Taylor Street, Glen Innes, NSW 2370

#### Dry Cleaners, Motor Garages & Service Stations Premise or Road Intersection Matches

Dry Cleaners, Motor Garages & Service Stations from UBD Business Directories, mapped to a premise or road intersection, within the dataset buffer.

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Property Boundary or Road Intersection	Direction
1	MOTOR GARAGES & SERVICE STATIONS.	Shell West End Service Station., 203 Ferguson St., Glen Innes	207268	1991	Premise Match	162m	West
	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	BP West End Service Station, 203 Ferguson St., Glen Innes 2370	100188	1982	Premise Match	162m	West
	MOTOR SERVICE STATIONS-PETROL, OIL, ETC.	West End Service Station, Cnr. Ferguson & Lambeth Sts., Glen Innes 2370	649208	1970	Premise Match	162m	West
	MOTOR GARAGES & ENGINEERS	Rendell, D. E., 145 Lambeth St., Glen Innes	182293	1950	Premise Match	162m	West
2	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Halliday's Toyota, 65 East St., Glen Innes 2370	100197	1982	Premise Match	259m	South East
	MOTOR GARAGES & ENGINEERS	Boughton, T. J., 65 East Ave., Glen Innes	182280	1950	Premise Match	259m	South East
	MOTOR GARAGES & ENGINEERS	Wharton's Garage, 65 East Ave., Glen Innes	182294	1950	Premise Match	259m	South East
3	MOTOR GARAGES & ENGINEERS	Currie, D. H., Cnr. Grey & Taylor Sts., Glen Innes 2370	649176	1970	Premise Match	265m	East
	MOTOR GARAGES & ENGINEERS	Byrne Motors, 404 Grey St., Glen Innes	151280	1961	Premise Match	265m	East
4	MOTOR GARAGES & ENGINEERS	Dunns Garage, 352 Grey St., Glen Innes	151282	1961	Premise Match	317m	South East
	MOTOR SERVICE STATIONS-PETROL, OILS, ETC.	Dunns Garage, 352 Grey St., Glen Innes	151303	1961	Premise Match	317m	South East
	MOTOR GARAGES & ENGINEERS	Dunn's Garage, 352 Grey St., Glen Innes	182283	1950	Premise Match	317m	South East
5	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	BP Elm Service Station, 373 Grey St., Glen Innes 2370	100186	1982	Premise Match	349m	East
	MOTOR SERVICE STATIONS-PETROL, OIL, ETC.	BP Elm Service Station, 373 Grey St., Glen Innes 2370	649197	1970	Premise Match	349m	East
	MOTOR GARAGES & ENGINEERS	Elm Service Station, 373 Grey St., Glen Innes	151283	1961	Premise Match	349m	East
	MOTOR GARAGES & ENGINEERS	Elm Service Station, 373 Grey St., Glen Innes	182284	1950	Premise Match	349m	East
	MOTOR GARAGES & ENGINEERS	Morton, J., 373 Grey St., Glen Innes	182292	1950	Premise Match	349m	East
6	DRY CLEANERS, PRESSERS & DYERS	Ohara, Lloyd, 288 Grey St., Glen Innes 2370	648982	1970	Premise Match	470m	South East

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#### Dry Cleaners, Motor Garages & Service Stations Road or Area Matches

Dry Cleaners, Motor Garages & Service Stations from UBD Business Directories, mapped to a road or an area, within the dataset buffer. Records are mapped to the road when a building number is not supplied, cannot be found, or the road has been renumbered since the directory was published.

Map Id	Business Activity	Premise	Ref No.	Year	Location Confidence	Distance to Road Corridor or Area
7	MOTOR SERVICE STATIONS-PETROL, OIL, ETC.	B.P. Glen Service Station, Meade St., Glen Innes 2370	649198	1970	Road Match	192m
	MOTOR GARAGES & ENGINEERS	Alcocks Garage and Service Station, Meade St, Glen Innes	182278	1950	Road Match	192m
8	MOTOR SERVICE STATIONS	Phill Archer's Free Shell Delivery Service, Lambeth Street, Glen Innes 2370	649213	1970	Road Match	192m
9	MOTOR GARAGES & ENGINEERS	Boughton, T. J., Grey St., Glen Innes	151279	1961	Road Match	307m
	MOTOR SERVICE STATIONS-PETROL, OILS, ETC.	Boughton, T. J., Grey St., Glen Innes	151302	1961	Road Match	307m
10	MOTOR GARAGES &/OR ENGINEERS &/OR SERVICE STATIONS.	Paul, L. (Golden Fleece), Railway St., Glen Innes 2370	100206	1982	Road Match	424m
11	MOTOR GARAGES & ENGINEERS	Chaffey, J. F. and Son Pty. Ltd., Bourke St., Glen Innes	182282	1950	Road Match	424m

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#### **Aerial Imagery 2021**





#### **Aerial Imagery 2013**





#### **Aerial Imagery 2006**





Aerial Imagery 1993 85 Taylor Street, Glen Innes, NSW 2370





Aerial Imagery 1985 85 Taylor Street, Glen Innes, NSW 2370





Aerial Imagery 1974 85 Taylor Street, Glen Innes, NSW 2370





Aerial Imagery 1964 85 Taylor Street, Glen Innes, NSW 2370





Aerial Imagery 1955 85 Taylor Street, Glen Innes, NSW 2370





#### **Topographic Map 2015**





#### Historical Map 1972





### **Topographic Features**





# **Topographic Features**

85 Taylor Street, Glen Innes, NSW 2370

#### **Points of Interest**

What Points of Interest exist within the dataset buffer?

Map Id	Feature Type	Label	Distance	Direction
49087	Integrated Health Service	GLEN INNES DISTRICT HEALTH SERVICE	0m	On-site
49858	Community Medical Centre	GLEN INNES DHS COMMUNITY HEALTH CENTRE	0m	On-site
49081	Museum	LAND OF THE BEARDIES MUSEUM	41m	South East
49076	Sports Court	TENNIS COURTS	52m	East
49061	Swimming Pool Facility	Swimming Pool Facility	87m	North East
49060	Park	CORONATION PARK	90m	East
49901	Retirement Village	GLENWOOD GARDENS	104m	North West
49062	Place Of Worship	HOLY TRINITY ANGLICAN CHURCH	141m	South
49931	Roadside Rest Area	LIONS PARK REST AREA	149m	South East
49838	Monument	DECEASED LIONS MONUMENT	154m	South East
49499	Community Home	RFBI GLEN INNES MASONIC VILLAGE	211m	North West
49083	Sports Court	NETBALL COURTS	215m	North East
49059	Park	VENESS PARK	220m	South East
49085	Sports Field	PLAYING FIELDS	267m	East
49082	Sports Field	WILSON PARK	299m	North East
49533	Community Facility	CAMERON MEMORIAL HALL	378m	South West
49058	Park	ANZAC PARK	385m	South
49940	Firestation - Bush	GLEN INNES SEVERN FIRE CONTROL CENTRE	402m	South West
49067	Place Of Worship	CAMERON MEMORIAL UNITING CHURCH	407m	South West
49842	Community Facility	NORTHSKATE GLEN INNES SKATING RINK	412m	South West
49068	Ambulance Station	GLEN INNES AMBULANCE STATION	413m	South
49835	Sports Field	RUGBY PARK	423m	North East
49086	Court House	GLEN INNES COURT HOUSE	440m	South East
49073	Post Office	GLEN INNES POST OFFICE	454m	South East
49084	Sports Field	PLAYING FIELD	462m	North East
49072	Police Station	GLEN INNES POLICE STATION	511m	South East
49841	Community Facility	GLEN INSPORTS ARENA	522m	East
49839	Community Facility	GLEN INNES AND DISTRICT COMMUNITY CENTRE	527m	South East
49906	Club	NEW ENGLAND CLUB (THE)	545m	South
49057	Park	KING EDWARD PARK	567m	South
49832	Community Facility	GLEN INNES TOWN HALL	576m	South East

Map Id	Feature Type	Label	Distance	Direction
49080	Local Government Chambers	GLEN INNES SEVERN COUNCIL	577m	South East
49933	Roadside Rest Area	REST AREA	593m	East
49029	Primary School	GLEN INNES PUBLIC SCHOOL	594m	East
49007	Town	GLEN INNES	641m	South East
49023	Park	O'SHEA PARK	655m	South West
49030	Primary School	ST JOSEPH'S PRIMARY SCHOOL	664m	South East
49074	Tourist Information Centre	GLEN INNES VISITOR INFORMATION CENTRE	664m	South East
49077	Place Of Worship	ST PATRICKS CATHOLIC CHURCH	677m	South East
49353	Sports Field	BOWLING GREEN	689m	South
49840	Community Facility	GLEN INNES SCOUTS	694m	South
49063	Club	GLEN INNES BOWLING CLUB	719m	South
49071	Railway Station	GLEN INNES RAILWAY STATION	722m	South West
49056	Park	KING GEORGE V PARK	726m	South
49516	Park	MELLINGS PARK	750m	South West
49078	Fire Station	GLEN INNES FIRE STATION	751m	South East
49354	Sports Field	BOWLING GREENS	766m	South
49939	Community Facility	GLEN INNES RESCUE SQUAD	802m	South East
49355	Sports Field	KING GEORGE OVAL	815m	South
49031	Primary School	GLEN INNES WEST INFANTS SCHOOL	841m	South West
49900	Tourist Park / Home Village	BLUE SAPPHIRE VILLAGE	875m	North East
49054	Place Of Worship	GLEN INNES BAPTIST CHURCH	898m	South East
49088	Club	GLEN INNES AND DISTRICT SERVICES CLUB	927m	South

Topographic Data Source: © Land and Property Information (2015)

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# **Topographic Features**

85 Taylor Street, Glen Innes, NSW 2370

### Tanks (Areas)

What are the Tank Areas located within the dataset buffer?

Note. The large majority of tank features provided by LPI are derived from aerial imagery & are therefore primarily above ground tanks.

Map Id	Tank Type	Status	Name	Feature Currency	Distance	Direction
N/A	No records in buffer					

### Tanks (Points)

What are the Tank Points located within the dataset buffer? Note. The large majority of tank features provided by LPI are derived from aerial imagery & are therefore primarily above ground tanks.

Map Id	Tank Type	Status	Name	Feature Currency	Distance	Direction
N/A	No records in buffer					

Tanks Data Source: © Land and Property Information (2015)

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#### **Major Easements**

What Major Easements exist within the dataset buffer?

Note. Easements provided by LPI are not at the detail of local governments. They are limited to major easements such as Right of Carriageway, Electrical Lines (66kVa etc.), Easement to drain water & Significant subterranean pipelines (gas, water etc.).

Map Id	Easement Class	Easement Type	Easement Width	Distance	Direction
178634229	Primary	Right of way	6 & 5.5 wide	647m	West
150987217	Primary	Right of way	5	807m	South West

Easements Data Source: © Land and Property Information (2015)

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# **Topographic Features**

85 Taylor Street, Glen Innes, NSW 2370

#### **State Forest**

What State Forest exist within the dataset buffer?

State Forest Number	State Forest Name	Distance	Direction
N/A	No records in buffer		

State Forest Data Source: © NSW Department of Finance, Services & Innovation (2018) Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en

# National Parks and Wildlife Service Reserves

What NPWS Reserves exist within the dataset buffer?

Reserve Number	Reserve Type	Reserve Name	Gazetted Date	Distance	Direction
N/A	No records in buffer				

NPWS Data Source: © NSW Department of Finance, Services & Innovation (2018) Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en **Elevation Contours (m AHD)** 





# Hydrogeology & Groundwater

85 Taylor Street, Glen Innes, NSW 2370

### Hydrogeology

Description of aquifers within the dataset buffer:

Description	Distance	Direction
Fractured or fissured, extensive aquifers of low to moderate productivity	0m	On-site

Hydrogeology Map of Australia : Commonwealth of Australia (Geoscience Australia)

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#### Temporary Water Restriction (Botany Sands Groundwater Source) Order 2018

Temporary water restrictions relating to the Botany Sands aquifer within the dataset buffer:

Prohibition Area No.	Prohibition	Distance	Direction
N/A	No records in buffer		

Temporary Water Restriction (Botany Sands Groundwater Source) Order 2018 Data Source : NSW Department of Primary Industries

#### **Groundwater Boreholes**





# Hydrogeology & Groundwater

85 Taylor Street, Glen Innes, NSW 2370

#### **Groundwater Boreholes**

#### Boreholes within the dataset buffer:

NGIS Bore ID	NSW Bore ID	Bore Type	Status	Drill Date	Bore Depth (m)	Reference Elevation	Height Datum	Salinity (mg/L)	Yield (L/s)	SWL (mbgl)	Distance	Direction
10111403	GW967267	Stock and Domestic	Unknown				AHD				141m	North West
10098452	GW969970	Monitoring	Functional	10/04/2005	9.00		AHD		4.300		178m	West
10103809	GW969969	Monitoring	Functional	10/04/2005	9.00		AHD		4.300		180m	South West
10028380	GW969968	Monitoring	Functional	10/04/2005	9.00		AHD			4.30	194m	South West
10104169	GW969860	Monitoring	Functional	25/09/2009	9.00		AHD			3.50	398m	South West
10022552	GW969859	Monitoring	Functional	25/09/2009	9.00		AHD			3.70	402m	South West
10063796	GW965812	Water Supply	Unknown	31/10/2002	32.00		AHD		2.260	5.00	411m	South
10066966	GW969855	Monitoring	Functional	25/09/2009	9.00		AHD			3.60	427m	South West
10036614	GW969858	Monitoring	Functional	24/09/2009	9.00		AHD			3.70	439m	South West
10027100	GW969856	Monitoring	Functional	23/09/2009	9.00		AHD			3.50	448m	South West
10096092	GW969857	Monitoring	Functional	24/09/2009	9.00		AHD			3.50	460m	South West
10036406	GW966287	Water Supply	Unknown	15/06/1994	36.00		AHD				476m	North West
10097447	GW966813	Water Supply	Unknown	09/10/2003	42.00		AHD		0.500	3.00	482m	South
10043660	GW965823	Water Supply	Unknown	05/08/2002	23.00		AHD		1.134	6.00	586m	South
10072735	GW967783	Monitoring	Unknown	11/08/2006	47.00		AHD			11.00	625m	South East
10073067	GW054918	Water Supply	Unknown	01/02/1982	39.60		AHD	Good			655m	West
10015991	GW060942	Water Supply	Unknown	01/03/1985	53.30		AHD				678m	South West
10099866	GW068607	Water Supply	Unknown				AHD				684m	South West
10011800	GW965497	Other	Unknown	28/01/1997	44.00		AHD				742m	South
10020513	GW058839	Water Supply	Functioning	01/11/1982	25.90		AHD	Good			750m	West
10026746	GW965842	Water Supply	Unknown	10/11/2002	55.00		AHD		2.520	1.00	754m	North
10118099	GW071319	Water Supply	Unknown	29/06/1993	21.00		AHD	350			767m	North
10004266	GW037658	Water Supply	Unknown		10.60		AHD				777m	North
10004172	GW053336	Other	Unknown	01/02/1981	66.80		AHD				796m	South
10011829	GW052012	Irrigation	Unknown	01/11/1980	70.00		AHD	Fresh			796m	South
10012824	GW054909	Water Supply	Unknown	01/02/1981	20.10		AHD	Good			796m	South
10013427	GW054447	Water Supply	Unknown	01/01/1981	13.70		AHD	Good			796m	South
10018020	GW052107	Water Supply	Unknown	01/02/1981	67.00		AHD				796m	South
10024719	GW052406	Water Supply	Unknown	01/01/1981	18.90		AHD	Good			796m	South
10040531	GW052610	Unknown	Functioning		12.20		AHD	Hard			796m	South

NGIS Bore ID	NSW Bore ID	Bore Type	Status	Drill Date	Bore Depth (m)	Reference Elevation	Height Datum	Salinity (mg/L)	Yield (L/s)	SWL (mbgl)	Distance	Direction
10069692	GW054916	Water Supply	Unknown	01/04/1981	44.50		AHD	Good			796m	South
10070921	GW053216	Irrigation	Unknown	01/02/1981	44.20		AHD	Good			796m	South
10090898	GW051361	Unknown	Functioning		54.30		AHD				796m	South
10090934	GW052338	Water Supply	Unknown	01/02/1981	21.30		AHD				796m	South
10098316	GW054925	Water Supply	Unknown	01/02/1981	16.80		AHD	Good			796m	South
10123582	GW053020	Irrigation	Unknown	01/11/1980	25.20		AHD	501-1000 ppm			796m	South
10132920	GW054440	Water Supply	Unknown	01/10/1980	19.80		AHD	0-500 ppm			796m	South
10143192	GW070905	Commercial and Industrial	Unknown	20/06/1993	11.00	1070.00	AHD	270			796m	South
10111306	GW965781	Water Supply	Unknown	18/10/2002	32.00		AHD		2.520	7.00	813m	North West
10044227	GW071323	Unknown	Unknown	01/01/1993	51.00		AHD		0.160	13.00	826m	South East
10014248	GW967992	Monitoring	Functional	15/01/2007	5.80		AHD			3.50	999m	South
10101479	GW967994	Monitoring	Functional	12/06/2007	7.50		AHD			4.50	1003m	South
10024645	GW061130	Stock and Domestic	Unknown	01/04/1985	25.90		AHD				1005m	North East
10064897	GW967993	Monitoring	Functional	16/01/2007	7.50		AHD			5.50	1024m	South
10062440	GW967995	Monitoring	Functional	17/01/2007	6.50		AHD			3.50	1027m	South
10006746	GW901663	Water Supply	Unknown	18/02/1999	30.00		AHD	Good	0.875	12.00	1058m	South East
10017555	GW967723	Water Supply	Unknown	23/09/2006	30.00		AHD				1069m	North East
10114730	GW966144	Water Supply	Unknown	24/11/2003	32.00		AHD		2.520	3.00	1081m	West
10151674	GW904328	Stock and Domestic	Functioning	02/03/2020	43.00		AHD				1118m	North West
10119374	GW071317	Water Supply	Unknown	30/06/1993	25.00		AHD	500			1122m	South West
10039040	GW965800	Water Supply	Unknown	28/10/2002	32.00		AHD		1.890	1.00	1142m	North West
10016756	GW970809	Water Supply	Functioning	17/02/2014	30.00		AHD		1.500	5.70	1143m	West
10105261	GW970505	Monitoring	Functional	14/11/2011	6.00		AHD				1179m	South
10015258	GW970503	Monitoring	Functional	14/11/2011	10.00		AHD				1184m	South
10103661	GW970504	Monitoring	Functional	14/11/2011	8.50		AHD				1187m	South
10023387	GW068055	Unknown	Unknown	24/05/1989	36.10		AHD		1.071	5.24	1237m	North East
10013820	GW967286	Water Supply	Unknown	26/07/2005	54.00		AHD		1.134	14.00	1259m	South East
10053833	GW966832	Water Supply	Unknown	09/10/1995	35.00		AHD				1291m	South East
10105227	GW965939	Water Supply	Unknown	11/11/2002	32.00		AHD		0.490	6.30	1308m	East
10067775	GW970282	Water Supply	Functioning	09/03/2012	23.00		AHD		3.150	4.00	1359m	North East
10067362	GW967166	Water Supply	Unknown	21/07/2005	32.00		AHD			6.00	1363m	South West
10091635	GW968055	Water Supply	Functioning	27/04/2007	19.00		AHD		1.260	6.00	1374m	North
10088479	GW058552	Water Supply	Unknown	01/04/1982	21.90		AHD	Good			1511m	South
10117619	GW071318	Water Supply	Unknown	28/06/1993	48.00		AHD	250			1575m	West
10086389	GW901638	Water Supply	Unknown	22/05/1998	30.50		AHD	Potable	0.630	9.20	1592m	South
10015089	GW902771	Water Supply	Unknown	30/09/1995	48.00		AHD	0.36			1601m	South

NGIS Bore ID	NSW Bore ID	Bore Type	Status	Drill Date	Bore Depth (m)	Reference Elevation	Height Datum	Salinity (mg/L)	Yield (L/s)	SWL (mbgl)	Distance	Direction
10068220	GW902323	Water Supply	Removed	22/03/1995	50.30		AHD		0.015		1638m	South
10071359	GW059077	Irrigation	Unknown	01/11/1982	43.00		AHD	Good			1696m	South East
10124855	GW052806	Water Supply	Unknown	01/07/1980	75.30		AHD	0-500 ppm			1746m	East
10031568	GW053916	Irrigation	Unknown	01/10/1980	42.70		AHD	Fresh			1819m	South East
10023386	GW965766	Water Supply	Unknown	15/09/2002	106.00		AHD				1936m	South East
10069149	GW967589	Water Supply	Unknown	08/03/2002	112.20		AHD				1973m	East
10039196	GW967811	Water Supply	Unknown	25/10/2006	60.00		AHD				1989m	South East

Borehole Data Source: Bureau of Meteorology; Water NSW. Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en

# Hydrogeology & Groundwater

85 Taylor Street, Glen Innes, NSW 2370

# **Driller's Logs**

Drill log data relevant to the boreholes within the dataset buffer:

NGIS Bore ID	Drillers Log	Distance	Direction
10098452	0.00m-3.50m Sandy Clay 3.50m-5.50m Basalt, weathered, grey 5.50m-9.00m Basalt, fresh, hard	178m	West
10103809	0.00m-3.50m Sandy Clay, hard, dry 3.50m-5.50m Basalt, weathered 5.50m-9.00m Basalt, grey, fresh	180m	South West
10028380	0.00m-3.50m Sandy Clay, hard, dry 3.50m-5.50m Basalt, weathered 5.50m-9.00m Basalt, grey, fresh	194m	South West
10104169	0.00m-1.00m Gravel, grey, medium grained, firmly packed 1.00m-1.50m Clay, dark brown, soft, with red mottles 1.50m-2.50m Clay, dark brown, soft 2.50m-4.00m Clay, Gravelly; dark brown, medium grained 4.00m-9.00m Basalt/Volcanic, dark brown, weathered, highly fractured	398m	South West
10022552	0.00m-1.50m Clay, brown, <10% medium grained gravel, soft clay 1.50m-5.50m Clay, grey, soft 5.50m-9.00m Basalt/Volcanic, dark green, very hard, fractured	402m	South West
10063796	0.00m-3.00m topsoil/black 3.00m-8.00m clay/brown 8.00m-15.00m fractured basalt 15.00m-24.00m basalt/dark 24.00m-31.00m basalt/water bearing 31.00m-32.00m sand	411m	South
10066966	0.00m-1.50m Fill; darkg rey to light brown clay, some gravel 1.50m-3.00m Fill; stiff brown clay, with medium grained 3.00m-4.00m Silty Clay, stiff, dark brown 4.00m-4.50m Silty Clay, dark brown, very fine grained 4.50m-6.00m Gravel, Clayey; dark brown, coarse grained weathered rock 6.00m-9.00m Rock, angular, weathered	427m	South West
10036614	0.00m-1.00m Clay, grey, fine grained, soft 1.00m-1.80m Clay, dark brown, very fine grained 1.80m-2.30m Clay, grey, firm 2.30m-3.50m Clay, Gravelly; brown, medium grained 3.50m-5.50m Basalt, dark brown, fractured, some coarse gravel 5.50m-9.00m Basalt, dark brown, highly fractured	439m	South West
10027100	0.00m-4.00m Clay, dark brown, very fine, soft, <10% subrounded gravel 4.00m-9.00m Clay, Gravelly; brown, medium grained, fine clay	448m	South West
10096092	0.00m-1.00m Clay, brown, very fine grained, soft 1.00m-2.50m Clay, grey, very fine grained, <10% gravel 2.50m-4.50m Clay, Gravelly; dark grey, medium grained, soft clay, mottled 4.50m-5.50m Clay, Gravelly; as above, no more mottles 5.50m-9.00m Basalt/Westhered Rock/ dark brown/grey, fractured	460m	South West
10036406	0.00m-1.00m TOPSOIL 1.00m-6.00m RED CLAY 6.00m-9.00m BASALT 9.00m-13.00m CLAY 13.00m-18.00m BASALT 18.00m-20.00m BASALT 20.00m-28.00m BASALT 28.00m-30.00m BASALT 30.00m-36.00m BASALT	476m	North West
10097447	0.00m-0.30m topsoil 0.30m-10.00m clay 10.00m-18.00m basalt 18.00m-30.00m basalt 30.00m-42.00m basalt	482m	South
10043660	0.00m-2.00m top soil black 2.00m-6.00m clay/brown 6.00m-15.00m clay/sandy soft 15.00m-17.00m basalt/soft porous 17.00m-23.00m basalt/water bearing	586m	South

NGIS Bore ID	Drillers Log	Distance	Direction
10072735	0.00m-3.00m topsoil 3.00m-15.00m basalt 15.00m-16.00m basalt 16.00m-17.00m water bearing basalt 17.00m-30.00m basalt 30.00m-33.00m grey clay /basalt 33.00m-35.00m basalt 35.00m-41.00m water bearing basalt 41.00m-47.00m basalt	625m	South East
10073067	0.00m-0.91m Topsoil 0.91m-4.87m Clay Stoney 4.87m-18.59m Basalt 18.59m-18.89m Basalt Soft Water Supply 18.89m-20.12m Driller 20.12m-34.13m Basalt 34.13m-34.72m Basalt Porous Water Supply 34.72m-39.62m Rock	655m	West
10020513	0.00m-0.91m Topsoil 0.91m-8.22m Basalt Broken 8.22m-24.07m Basalt Hard 24.07m-24.38m Basalt Soft Water Bearing 24.38m-25.90m Basalt Hard	750m	West
10026746	0.00m-2.00m topsoil/black 2.00m-18.00m caly/soft red 18.00m-52.00m basalt/hard dark 52.00m-55.00m sand/ water	754m	North
10118099	0.00m-1.00m TOPSOIL & CLAY 1.00m-4.00m BROWN STONEY CLAY 4.00m-9.00m BLACK BROKEN BASALT 9.00m-15.00m FRESH BLACK BASALT 15.00m-18.00m BROKEN BASALT 18.00m-21.00m FRESH BLACK BASALT	767m	North
10004172	0.00m-0.30m Topsoil 0.30m-0.90m Clay 0.90m-4.50m Basalt 4.50m-7.30m Clay 7.30m-9.10m Basalt 9.10m-12.80m Basalt Decomposed 12.80m-17.30m Clay Gravel 17.30m-18.80m Conglomerate 18.80m-22.80m Basalt Water Supply 22.80m-25.90m Clay 25.90m-41.30m Clay Basalt Water Supply 41.30m-66.80m Granite Water Supply	796m	South
10011829	0.00m-2.00m Topsoil 2.00m-15.00m Clay 15.00m-20.00m Basalt Decomposed 20.00m-70.00m Basalt	796m	South
10012824	0.00m-1.21m Topsoil 1.21m-11.58m Basalt Hard 11.58m-13.71m Basalt Soft 13.71m-14.02m Clay Yellow 14.02m-14.32m Sand Water Supply 14.32m-20.11m Clay Red	796m	South
10013427	0.00m-0.91m Topsoil 0.91m-4.57m Basalt Decomposed 4.57m-8.83m Basalt Soft 8.83m-9.44m Basalt Soft Broken Water Supply 9.44m-10.66m Basalt Hard 10.66m-11.58m Basalt Soft Water Supply 11.58m-12.49m Basalt Hard 12.49m-13.71m Clay Red	796m	South
10024719	0.00m-0.60m Topsoil 0.60m-5.18m Rock Yellow 5.18m-5.48m Basalt Broken 5.48m-11.58m Basalt 11.58m-11.89m Basalt Broken Coloured Water Supply	796m	South
10069692	0.00m-0.60m Topsoil 0.60m-1.52m Clay 1.52m-5.18m Basalt Broken 5.18m-15.54m Basalt Hard 15.54m-15.84m Basalt Soft Water Supply 15.84m-24.68m Basalt Hard 24.68m-24.99m Basalt Soft Water Supply 24.99m-44.49m Basalt Hard	796m	South
NGIS Bore ID	Drillers Log	Distance	Direction
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10070921	0.00m-0.60m Topsoil 0.60m-7.01m Basalt 7.01m-7.31m Basalt Soft 7.31m-17.06m Basalt Hard 17.06m-17.37m Basalt Soft Water Bearing 17.37m-42.06m Basalt Hard 42.06m-42.36m Basalt Soft 42.36m-44.19m Basalt Hard	796m	South
10090934	0.00m-0.40m Topsoil 0.40m-0.90m Clay Black 0.90m-4.20m Clay 4.20m-9.70m Basalt 9.70m-10.90m Basalt Loose Clay 10.90m-14.60m Basalt Loose Water Supply 14.60m-21.30m Basalt	796m	South
10098316	0.00m-0.91m Topsoil 0.91m-8.22m Basalt 8.22m-14.63m Basalt Soft 14.63m-15.54m Basalt Porous Water Supply 15.54m-16.76m Basalt	796m	South
10123582	0.00m-0.50m Topsoil 0.50m-2.00m Gravel Clay 2.00m-4.00m Basalt 4.00m-8.50m Clay Red Buff 8.50m-12.50m Basalt 12.50m-24.00m Clay Yellow Gritty Water Supply 24.00m-25.15m Sandstone Water Supply	796m	South
10132920	0.00m-0.60m Topsoil 0.60m-6.10m Rock Broken 6.10m-9.40m Basalt Clay Bands Water Supply 9.40m-19.80m Basalt Water Supply	796m	South
10143192	0.00m-1.00m topsoil/clay 1.00m-5.00m black clay 5.00m-6.00m gravelly clay 6.00m-11.00m coarse gravel mix	796m	South
10111306	0.00m-4.00m top soil/black 4.00m-8.00m basalt/brown 8.00m-18.00m basalt/medium 18.00m-25.00m basalt/softer 25.00m-26.00m sandy bar 26.00m-32.00m basalt/porous	813m	North West
10014248	0.00m-0.60m Sand 0.60m-5.80m Clay	999m	South
10101479	0.00m-0.30m Silt 0.30m-7.50m Clay	1003m	South
10024645	0.00m-3.05m Topsoil 3.05m-15.24m Clay Red Yellow Grey Water Bearing 15.24m-18.29m Shale Water Bearing 18.29m-25.91m Rock Black Hard	1005m	North East
10064897	0.00m-0.40m Gravel 0.40m-7.50m Clay	1024m	South
10062440	0.00m-0.30m Silt 0.30m-0.70m Sand 0.70m-6.50m Clay	1027m	South
10006746	0.00m-30.00m (	1058m	South East
10017555	0.00m-5.00m topsoil 5.00m-7.00m brown clay 7.00m-8.00m basalt 8.00m-21.00m grey clay 21.00m-25.00m water bearing basalt 25.00m-26.00m grey clay 26.00m-27.00m sandstone 27.00m-29.00m brown clay 29.00m-30.00m sand	1069m	North East
10114730	0.00m-10.00m clay/soft brown 10.00m-17.00m basalt/black 17.00m-26.00m basalt/water bearing porous 26.00m-32.00m basalt/fractured dark	1081m	West
10119374	0.00m-1.00m TOPSOIL & CLAY 1.00m-4.00m CLAYEY WEATHERED BASALT 4.00m-6.00m BROWN WEATHERED BASALT 6.00m-14.00m BLACK BASALT 14.00m-22.00m FRACTURED BASALT 22.00m-25.00m BLACK BASALT	1122m	South West

NGIS Bore ID	Drillers Log	Distance	Direction
10039040	0.00m-1.00m topsoil/brown 1.00m-6.00m clay/brown 6.00m-20.00m basalt/dark 20.00m-30.00m clay/grey 30.00m-32.00m sand/fine - water	1142m	North West
10016756	0.00m-0.50m Topsoil 0.50m-3.00m Clay 3.00m-13.00m Clay, & Basalt, soak 13.00m-22.00m Basalt 22.00m-23.00m Basalt; broken 23.00m-26.00m Clay 26.00m-30.00m Basalt	1143m	West
10105261	0.00m-0.50m Silt, Gravelly; trace roots, brown, dry 0.50m-1.50m Silty Clay; brown, dry, @ 1m trace roots 1.50m-4.50m Silty Clay; brown, dry 4.50m-5.50m Silt, Clayey; light brown, dry, @ 5m trace gravel, brown 5.50m-6.00m Silt, Gravelly; trace clay, brown, dry	1179m	South
10015258	0.00m-0.50m Fill; Concrete 0.50m-1.00m Sand, Silty; brown, moist 1.00m-7.00m Silty Clay; brown, moist, @ 2m wet, @ 3m moist, @ 5.5m light brown, @ 6m trace sand 7.00m-10.00m Silty Clay; brown, dry, @ 9.5m trace gravel, @ 10m silty Gravel, difficult penetration	1184m	South
10103661	0.00m-0.50m Silt, Clayey; brown, trace gravel, dry 0.50m-5.00m Silty Clay; brown, slightly moist 5.00m-6.00m Silt, Clayey; light brown, trace sand, dry 6.00m-7.50m Silt, Sandy; trace clay, tight brown, dry 7.50m-8.50m Gravel, silty; trace clay, light brown, dry	1187m	South
10023387	0.00m-12.40m Black Mud 12.40m-13.40m Rotten Rock 13.40m-36.10m Black Basalt Even Broken From 32.14 - 33.45	1237m	North East
10013820	0.00m-2.00m topsoil 2.00m-4.00m fractured basalt 4.00m-6.00m brown clay 6.00m-12.00m fractured basalt 12.00m-47.00m basalt 47.00m-50.00m basalt 50.00m-52.00m water bearing basalt 52.00m-54.00m red clay	1259m	South East
10053833	0.00m-0.30m topsoil 0.30m-1.80m clay 1.80m-6.70m rock and clay 6.70m-12.10m basalt 12.10m-28.00m basalt 28.00m-29.50m basalt 29.50m-35.05m basalt	1291m	South East
10105227	0.00m-0.30m Top soil 0.30m-6.00m clay 6.00m-12.40m basalt rocks 12.40m-13.70m water bearing basalt 13.70m-19.80m basalt 19.80m-20.70m water bearing basalt 20.70m-23.10m caly white 23.10m-32.00m basalt	1308m	East
10067775	0.00m-4.00m Topsoil, black 4.00m-12.00m Clay, brown 12.00m-18.00m Basalt, weathered/fractured 18.00m-21.00m Basalt, hard, dark 21.00m-23.00m Basalt, porous, dark	1359m	North East
10067362	0.00m-6.00m topsoil 6.00m-7.00m gravel 7.00m-12.00m basalt 12.00m-14.00m basalt 14.00m-17.00m clay 17.00m-30.00m basalt 30.00m-32.00m clay	1363m	South West
10091635	0.00m-5.00m Topsoil, black 5.00m-11.00m Fractured Basalt 11.00m-13.00m Fractured Basalt, large, black, water bearing 13.00m-19.00m Basalt, even drilling, dark	1374m	North
10088479	0.00m-0.91m Topsoil 0.91m-6.70m Clay Stoney 6.70m-18.28m Basalt 18.28m-19.50m Basalt Soft 19.50m-20.42m Basalt Porous Water Supply 20.42m-21.94m Basalt Hard	1511m	South

NGIS Bore ID	Drillers Log	Distance	Direction
10117619	0.00m-1.00m IRONSTONE 1.00m-2.00m BROWN CLAY 2.00m-5.00m BROWN/YELLOW CLAY 5.00m-11.00m GREY/ BLACK BASALT 11.00m-19.00m BROWN /RED CLAY 19.00m-23.00m GREY SOFT BASALT 23.00m-48.00m BLACK BASALT	1575m	West
10086389	0.00m-0.30m topsoil 0.30m-15.80m basalt - broken 15.80m-30.50m basalt	1592m	South
10015089	0.00m-6.00m Red brown clay 6.00m-15.00m Brown weathered basalt 15.00m-23.00m Black basalt 23.00m-24.00m Brown weathered basalt 24.00m-38.00m Black basalt 38.00m-40.00m Brown weathered basalt 40.00m-48.00m Black basalt	1601m	South
10068220	0.00m-0.60m Sandy Topsoil 0.60m-1.21m Grey Clay 1.21m-6.09m Weathered Basalt & Gravel 6.09m-16.76m Soft Weathered Basalt 16.76m-32.01m Dark Basalt 32.01m-50.30m Hard Dark Basalt	1638m	South
10071359	0.00m-1.00m Topsoil 1.00m-12.00m Clay Coloured 12.00m-14.00m Basalt Decomposed Water Bearing 14.00m-32.00m Basalt Hard 32.00m-33.00m Basalt Porous Water Bearing 33.00m-43.00m Basalt Hard	1696m	South East
10124855	0.00m-15.24m Soft 15.24m-16.76m Basalt 16.76m-18.29m Clay Red Yellow Volcanic Wet Interlayere 18.29m-27.43m Basalt Soft Patchy 27.43m-60.96m Stones Or Basalt 60.96m-75.29m Basalt Water Bearing	1746m	East
10031568	0.00m-0.61m Topsoil 0.61m-6.10m Clay 6.10m-10.67m Basalt Decomposed 10.67m-42.67m Basalt Water Supply	1819m	South East
10023386	0.00m-2.00m top soil/brown 2.00m-13.00m basalt/decomposed 13.00m-18.00m basalt/hard 18.00m-29.00m clay/brown 29.00m-49.00m basalt/med.drilling 49.00m-62.00m clay/dk. brown 62.00m-68.00m basalt/dk.hard 68.00m-82.00m basalt/porous - 0.151@water 82.00m-93.00m basalt/brorous - 0.140@water 93.00m-95.00m basalt/water bearing - 0.44@water 95.00m-100.00m basalt/porous 100.00m-105.00m basalt/porous 105.00m-106.00m sand/fine - 2.25@water	1936m	South East
10069149	0.00m-0.30m TOPSOIL 0.30m-12.20m BASALT 12.20m-15.20m BASALT 15.20m-46.30m RED CLAY 46.30m-112.20m BASALT	1973m	East
10039196	0.00m-0.30m topsoil 0.30m-4.00m clay 4.00m-6.00m basalt 6.00m-12.00m basalt 12.00m-18.00m basalt 18.00m-24.00m basalt 24.00m-30.00m basalt 30.00m-36.00m basalt 36.00m-42.00m basalt 42.00m-48.00m basalt 42.00m-60.00m basalt	1989m	South East

Drill Log Data Source: Bureau of Meteorology; Water NSW. Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en

## Geology





# Geology

85 Taylor Street, Glen Innes, NSW 2370

### **Geological Units**

What are the Geological Units within the dataset buffer?

Unit Code	Unit Name	Description	Unit Stratigraphy	Age	Dominant Lithology	Distance
GEmam	Maybole Volcanics	Undersaturated to transitional alkali olivine basalts with minor lithic sapphire and corundum bearing volcaniclastic and epiclastic units. Rare plugs, dykes and sills. Some interbedded non- volcanogenic sediments.	/Maybole Volcanic Suite//Maybole Volcanics//	Lutetian (base) to Priabonian (top)	Basalt	Om
Q_av	Alluvial valley deposits	Silt, clay, (fluvially deposited) lithic to quartz- lithic sand, gravel.	/Alluvium//Alluvial valley deposits//	Quaternary (base) to Now (top)	Clastic sediment	190m

### **Linear Geological Structures**

What are the Dyke, Sill, Fracture, Lineament and Vein trendlines within the dataset buffer?

Map ID	Feature Description	Map Sheet Name	Distance
No Features			

# What are the Faults, Shear zones or Schist zones, Intrusive boundaries & Marker beds within the dataset buffer?

Map ID	Boundary Type	Description	Map Sheet Name	Distance
No Features				

Geological Data Source: Statewide Seamless Geology v2.1, Department of Regional NSW Creative Commons 4.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/4.0/au/deed.en

# **Naturally Occurring Asbestos Potential**

85 Taylor Street, Glen Innes, NSW 2370

## **Naturally Occurring Asbestos Potential**

Naturally Occurring Asbestos Potential within the dataset buffer:

Potential	Sym	Strat Name	Group	Formation	Scale	Min Age	Max Age	Rock Type	Dom Lith	Description	Dist	Dir
No records in buffer												

Naturally Occurring Asbestos Potential Data Source: © State of New South Wales through NSW Department of Industry, Resources & Energy

## **Atlas of Australian Soils**





## Soils

85 Taylor Street, Glen Innes, NSW 2370

## **Atlas of Australian Soils**

Soil mapping units and Australian Soil Classification orders within the dataset buffer:

Map Unit Code	Soil Order	Map Unit Description	Distance	Direction
Kd4	Vertosol	Valley plains of dark cracking clays (Ug5.15 and Ug5.16). Associated are hillocks and valley side slopes of (Dr2) and (Dy3) soils; and soils locally peculiar to the various adjoining units. As mapped, the size of some areas of this unit tends to be exaggerated.	0m	On-site
Rh4	Chromosol	Dissected basaltic plateauundulating to low hilly: chief soils are friable brown soils (Db3.12) with (Dr4.12) and shallow variants of (Gn3.12) on ridge crests, slopes, and undulating areas. Associated are (i) (Um6.2) soils on ridges; (ii) cracking clays such as (Ug5.13 and Ug5.14) on flanking slopes of ridges; and (iii) various (D) soils, such as (Dy3.2) and (Db1.2) often containing ironstone gravels, on the flatter areas. As mapped, areas of unit Kd4 are included.	67m	South East
Rh6	Chromosol	Dissected basaltic plateaulow hilly to hilly: chief soils are friable brown soils (Db3.12) and hard neutral yellow mottled soils (Dy3.42). The area is essentially similar to unit Rh5 but with a much larger area covered by the soils of unit Ub56.	906m	West

Atlas of Australian Soils Data Source: CSIRO

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# **Acid Sulfate Soils**

85 Taylor Street, Glen Innes, NSW 2370

### **Environmental Planning Instrument - Acid Sulfate Soils**

What is the on-site Acid Sulfate Soil Plan Class that presents the largest environmental risk?

Soil Class	Description	EPI Name
N/A		

If the on-site Soil Class is 5, what other soil classes exist within 500m?

Soil Class	Description	EPI Name	Distance	Direction
N/A				

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## Atlas of Australian Acid Sulfate Soils





# **Acid Sulfate Soils**

85 Taylor Street, Glen Innes, NSW 2370

#### **Atlas of Australian Acid Sulfate Soils**

Atlas of Australian Acid Sulfate Soil categories within the dataset buffer:

Class	Description	Distance	Direction
С	Extremely low probability of occurrence. 1-5% chance of occurrence with occurrences in small localised areas.	0m	On-site

Atlas of Australian Acid Sulfate Soils Data Source: CSIRO

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# **Dryland Salinity**

85 Taylor Street, Glen Innes, NSW 2370

## **Dryland Salinity - National Assessment**

Is there Dryland Salinity - National Assessment data onsite?

#### No

Is there Dryland Salinity - National Assessment data within the dataset buffer?

#### No

#### What Dryland Salinity assessments are given?

Assessment 2000	Assessment 2020	Assessment 2050	Distance	Direction
N/A	N/A	N/A		

Dryland Salinity Data Source : National Land and Water Resources Audit

The Commonwealth and all suppliers of source data used to derive the maps of "Australia, Forecast Areas Containing Land of High Hazard or Risk of Dryland Salinity from 2000 to 2050" do not warrant the accuracy or completeness of information in this product. Any person using or relying upon such information does so on the basis that the Commonwealth and data suppliers shall bear no responsibility or liability whatsoever for any errors, faults, defects or omissions in the information. Any persons using this information do so at their own risk.

In many cases where a high risk is indicated, less than 100% of the area will have a high hazard or risk.

## Mining

85 Taylor Street, Glen Innes, NSW 2370

## **Mining Subsidence Districts**

#### Mining Subsidence Districts within the dataset buffer:

District	Distance	Direction
There are no Mining Subsidence Districts within the report buffer		

Mining Subsidence District Data Source: © Land and Property Information (2016) Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en

## **Mining & Exploration Titles**





# Mining

85 Taylor Street, Glen Innes, NSW 2370

### **Current Mining & Exploration Titles**

#### Current Mining & Exploration Titles within the dataset buffer:

Title Ref	Holder	Grant Date	Expiry Date	Last Renewed	Operation	Resource	Minerals	Dist	Dir
N/A	No records in buffer								

Current Mining & Exploration Titles Data Source: © State of New South Wales through NSW Department of Industry

## **Current Mining & Exploration Title Applications**

Current Mining & Exploration Title Applications within the dataset buffer:

Application Ref	Applicant	Application Date	Operation	Resource	Minerals	Dist	Dir
N/A	No records in buffer						

Current Mining & Exploration Title Applications Data Source: © State of New South Wales through NSW Department of Industry

# Mining

85 Taylor Street, Glen Innes, NSW 2370

## **Historical Mining & Exploration Titles**

Historical Mining & Exploration Titles within the dataset buffer:

Title Ref	Holder	Start Date	End Date	Resource	Minerals	Dist	Dir
EL0208	AUSTRALIAN OIL & GAS CORPORATION LIMITED	01 Oct 1969	01 Dec 1972	MINERALS	Mo Bi Sn W	0m	On-site
EL7670	PARNOSA PTY LTD	15 Nov 2011	16 Dec 2014	MINERALS	Sapphire Corundum Diamond Gemstone	0m	On-site
EL3001	MINSTOCK EXPLORATION LTD	15 Jan 1988	14 Jan 1994	MINERALS	Sapphire	0m	On-site
PSPAUTH34	PANGAEA OIL & GAS PTY LIMITED	11/11/2009	11/11/2010	PETROLEUM	Petroleum	0m	On-site
EL6982	AUSTRALIAN GEMSTONE RESOURCES PTY LTD	11 Dec 2007	26 Sep 2011	MINERALS	Sapphire	0m	On-site
EL1930	AMAX IRON ORE CORPORATION	01 Sep 1982	01 Jun 1984	MINERALS	Sn	336m	South

Historical Mining & Exploration Titles Data Source: © State of New South Wales through NSW Department of Industry

# **State Environmental Planning Policy**

85 Taylor Street, Glen Innes, NSW 2370

## **State Significant Precincts**

What SEPP State Significant Precincts exist within the dataset buffer?

Map Id	Precinct	EPI Name	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
N/A	No records in buffer							

State Environment Planning Policy Data Source: NSW Crown Copyright - Planning & Environment Creative Commons 4.0 © Commonwealth of Australia https://creativecommons.org/licenses/by/4.0/

**EPI Planning Zones** 85 Taylor Street, Glen Innes, NSW 2370





# **Environmental Planning Instrument**

85 Taylor Street, Glen Innes, NSW 2370

## Land Zoning

What EPI Land Zones exist within the dataset buffer?

Zone	Description	Purpose	EPI Name	Published Date	Commenced Date	Currency Date	Amendment	Distance	Direction
R1	General Residential		Glen Innes Severn Local Environmental Plan 2012	05/04/2019	05/04/2019	05/04/2019	Amendment No 3	0m	On-site
RE1	Public Recreation		Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	05/04/2019		23m	East
IN1	General Industrial		Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	05/04/2019		122m	South West
B2	Local Centre		Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	05/04/2019		166m	South East
IN1	General Industrial		Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	05/04/2019		224m	South West
SP2	Infrastructure	Railway Infrastructure Facilities	Glen Innes Severn Local Environmental Plan 2012	15/05/2015	15/05/2015	05/04/2019	Amendment No 2	295m	North West
IN2	Light Industrial		Glen Innes Severn Local Environmental Plan 2012	15/05/2015	15/05/2015	05/04/2019	Amendment No 2	297m	South West
IN1	General Industrial		Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	05/04/2019		326m	West
R1	General Residential		Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	05/04/2019		338m	West
B4	Mixed Use		Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	05/04/2019		353m	South West
IN1	General Industrial		Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	05/04/2019		415m	West
B6	Enterprise Corridor		Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	05/04/2019		438m	East
RE2	Private Recreation		Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	05/04/2019		494m	South
RE2	Private Recreation		Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	05/04/2019		666m	South
RE1	Public Recreation		Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	05/04/2019		703m	South West
IN1	General Industrial		Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	05/04/2019		723m	West
RU1	Primary Production		Glen Innes Severn Local Environmental Plan 2012	15/05/2015	15/05/2015	05/04/2019	Amendment No 2	775m	North
IN1	General Industrial		Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	05/04/2019		775m	North
IN1	General Industrial		Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	05/04/2019		827m	North
IN1	General Industrial		Glen Innes Severn Local Environmental Plan 2012	15/05/2015	15/05/2015	05/04/2019	Amendment No 2	864m	North West
SP2	Infrastructure	Railway	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	05/04/2019		915m	South West
RE1	Public Recreation		Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	05/04/2019		938m	South West
IN1	General Industrial		Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	05/04/2019		990m	South

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#### **Heritage Items**





## Heritage

85 Taylor Street, Glen Innes, NSW 2370

### **Commonwealth Heritage List**

What are the Commonwealth Heritage List Items located within the dataset buffer?

Place Id	Name	Address	Place File No	Class	Status	Register Date	Distance	Direction
105494	Glen Innes Post Office	319 Grey St, Glen Innes NSW	1/02/152/0008	Historic	Listed place	08/11/2011	435m	South East

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### **National Heritage List**

What are the National Heritage List Items located within the dataset buffer? Note. Please click on Place Id to activate a hyperlink to online website.

Place Id	Name	Address	Place File No	Class	Status	Register Date	Distance	Direction
N/A	No records in buffer							

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#### **State Heritage Register - Curtilages**

#### What are the State Heritage Register Items located within the dataset buffer?

Map Id	Name	Address	LGA	Listing Date	Listing No	Plan No	Distance	Direction
5012020	Glen Innes Railway station	Main Northern railway, Glenn Innes	GLEN INNES SEVERN	02/04/1999	01149	2780	245m	South West
5044753	Glen Innes Post and Telegraph Office	Grey Street, Glen Innes	GLEN INNES SEVERN	23/06/2000	01406	3115	435m	South East

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#### **Environmental Planning Instrument - Heritage**

#### What are the EPI Heritage Items located within the dataset buffer?

Map Id	Name	Classification	Significance	EPI Name	Published Date	Commenced Date	Currency Date	Distance	Direction
1076	Land of the Beardies Museum (former hospital complex)	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	0m	On-site
1144	House	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	29m	North

Map Id	Name	Classification	Significance	EPI Name	Published Date	Commenced Date	Currency Date	Distance	Direction
1145	House -'Doonayr'	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	42m	North West
1176	Church	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	110m	South
1147	House	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	111m	North
1148	House	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	115m	North West
1073	Veness Park	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	127m	South East
1152	Anglican Vicarage	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	139m	South
1143	House	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	154m	South West
1121	House	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	193m	North
1153	House	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	222m	South
1207	Cottage	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	17/04/2020	17/04/2020	17/04/2020	222m	West
1142	House - 'Doonee'	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	224m	South West
1130	House	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	242m	North West
1123	Glen Innes Railway Station Group	Item - General	State	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	245m	South West
1070	Anzac Park	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	254m	South
1082	Commercial building-Boot Factory	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	282m	South East
1129	House	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	287m	South West
1117	Commercial building	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	292m	South East
1141	House	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	299m	South
1116	Commercial building -'Meyers Bakery Building'	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	300m	South East
1140	House	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	304m	South West
1075	Glen Innes Butter Factory	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	326m	West
1120	House	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	337m	East
1128	House	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	340m	South West
1127	Shop and house	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	344m	South West

Map Id	Name	Classification	Significance	EPI Name	Published Date	Commenced Date	Currency Date	Distance	Direction
1119	House -'San Karo'	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	344m	East
1118	Commercial building	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	347m	South East
1135	Christina Cameron Memorial Hall	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	364m	South West
1081	Royal Hotel	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	366m	South East
1115	Commercial building (former Pastures Protection Board)	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	366m	South East
1113	Imperial Hotel	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	371m	South East
1109	Shop	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	374m	South East
1106	Shop	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	376m	South East
1114	Commercial building -'Milners Building'	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	381m	South East
1126	Former 'Glen Innes Boxing & Fitness Gymnasium'	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	381m	South West
1039	St John's Ambulance Station	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	384m	South
1139	Church	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	17/04/2020	17/04/2020	17/04/2020	384m	South West
1038	The Railway Tavern	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	410m	South West
1079	Court house	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	414m	South East
1112	Commercial building (former Bank of NSW)	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	422m	South East
1037	Memorial gates	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	431m	South
1084	Boer War Memorial	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	431m	South East
1083	Glen Innes Post and Telegraph Office	Item - General	State	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	435m	South East
1065	House -'Lochiel'	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	439m	East
1149	Highwood Garden	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	442m	North
1099	Commercial School of Arts	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	450m	South East
1138	Uniting Church Manse	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	455m	South
1040	House	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	455m	South
1098	Commercial building	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	461m	South East

Map Id	Name	Classification	Significance	EPI Name	Published Date	Commenced Date	Currency Date	Distance	Direction
1154	Police station	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	469m	South East
1071	King Edward VII Park	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	472m	South
1111	Central Hotel	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	473m	South East
1103	Commercial building -bank	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	474m	South East
1096	Shop and residence (former 'Paragon Cafe')	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	475m	South East
1146	Commercial building	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	478m	South East
1104	Commercial building -'Supreme building'	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	479m	South East
1110	Victorian shop	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	487m	South East
1066	House	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	494m	East
1061	Residential flats	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	498m	East
1108	The Central Building-offices	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	499m	South East
1107	Shop and office - 'Healey's Building'	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	502m	South East
1102	Commercial building (former stationers)	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	507m	South East
1175	New England Club (former house)	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	515m	South
1105	Commercial building-bank	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	518m	South East
1054	Masonic Hall	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	522m	South East
1172	Rotunda Bandstand	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	525m	South
1041	Former laundry	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	527m	South
1043	Commercial building - 'Glen Innes Examiner'	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	534m	South East
1101	Shops	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	538m	South East
1155	House -'Dunvegan'	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	541m	South East
1042	Shop and residence	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	558m	South
1100	Town Hall	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	17/04/2020	17/04/2020	17/04/2020	558m	South East
1095	Commercial building - 'Hutchison's Buildings'	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	565m	South East

Map Id	Name	Classification	Significance	EPI Name	Published Date	Commenced Date	Currency Date	Distance	Direction
1093	Commercial building-bank	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	573m	South East
1062	Glen Innes Public School - assembly hall	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	576m	East
1064	Glen Innes Public School-infants building	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	577m	East
1174	House	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	578m	South
1169	House	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	581m	South
1170	House	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	581m	South
1168	House	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	581m	South
1063	Glen Innes Public School	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	582m	East
1060	House	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	585m	East
1097	Bank	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	585m	South East
1059	House	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	589m	East
1205	Underground Brick Culvert	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	17/04/2020	17/04/2020	17/04/2020	591m	South East
1094	Commercial building-bank	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	592m	South East
1125	House -'Glenburn'	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	595m	South West
1137	House	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	597m	South
1173	House - 'Terrichuel'	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	598m	South
1091	Shop -'Kwong Sing & Co Emporium'	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	599m	South
1197	Queenswood	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	17/04/2020	17/04/2020	17/04/2020	600m	South
1057	St Joseph's Sisters of Mercy Convent	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	603m	South East
1056	St Patrick's Chapel	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	624m	South East
1203	Grey Street Culvert	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	17/04/2020	17/04/2020	17/04/2020	625m	North East
1055	St Patrick's Church	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	635m	South East
1080	Commercial building-Mackenzie Mall	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	636m	South East
1053	Old Power Station	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	636m	South East

Map Id	Name	Classification	Significance	EPI Name	Published Date	Commenced Date	Currency Date	Distance	Direction
1090	Shops -'Phoenix Buildings'	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	637m	South
1171	Private home (former CWA Mountain Home)	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	666m	South
1178	Grandstand	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	678m	South
1072	King George V Park	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	678m	South
1058	St Joseph's School	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	687m	South East
1044	The Old Mill - stone grist mill	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	706m	South East
1122	House (former Stationmaster's cottage)	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	706m	South West
1092	Shop	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	709m	South East
1046	Glen Innes Fire Station	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	716m	South East
1156	Roman Catholic Presbytery	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	719m	East
1067	Glen Innes West Public School	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	729m	South West
1132	Memorial Gate	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	730m	South
1045	Former Severn Shire Council Chambers	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	739m	South East
1089	Commercial building (former Grand Cinema)	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	743m	South
1088	Shops	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	756m	South East
1086	Club Hotel	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	762m	South
1087	Butcher shop	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	765m	South East
1052	Chapel Theatre (former Methodist Chapel)	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	771m	South East
1151	House	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	780m	West
1150	House	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	787m	South
1124	House	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	802m	South West
1051	House	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	806m	South East
1204	Grey Street Culvert	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	17/04/2020	17/04/2020	17/04/2020	836m	North East
1050	House	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	889m	South East

Map Id	Name	Classification	Significance	EPI Name	Published Date	Commenced Date	Currency Date	Distance	Direction
1136	House	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	897m	South
1133	House	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	912m	South West
1134	House	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	953m	South
1157	House	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	972m	South East
1078	House -'Balnagowen'	Item - General	Local	Glen Innes Severn Local Environmental Plan 2012	14/09/2012	14/09/2012	17/04/2020	991m	North East

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#### **Natural Hazards - Bush Fire Prone Land**





# **Natural Hazards**

85 Taylor Street, Glen Innes, NSW 2370

## **Bush Fire Prone Land**

What are the nearest Bush Fire Prone Land Categories that exist within the dataset buffer?

Bush Fire Prone Land Category	Distance	Direction
Vegetation Buffer	231m	North East
Vegetation Category 3	261m	North East

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# **Ecological Constraints**

85 Taylor Street, Glen Innes, NSW 2370

## Vegetation - Eastern Bushland Database (North Region)

#### What Vegetation exists within the dataset buffer?

Veg Code	Veg Desc	NVISCode	NVISDesc	Distance	Direction
N/A	No records in buffer				

Vegetation Eastern Bushland Database Data Source: NSW Office of Environment and Heritage Creative Commons 3.0 © Commonwealth of Australia http://creativecommons.org/licenses/by/3.0/au/deed.en

## **Ramsar Wetlands**

#### What Ramsar Wetland areas exist within the dataset buffer?

Map Id	Ramsar Name	Wetland Name	Designation Date	Source	Distance	Direction
N/A	No records in buffer					

Ramsar Wetlands Data Source: © Commonwealth of Australia - Department of Agriculture, Water and the Environment

#### **Ecological Constraints - Groundwater Dependent Ecosystems Atlas**





# **Ecological Constraints**

85 Taylor Street, Glen Innes, NSW 2370

## **Groundwater Dependent Ecosystems Atlas**

Туре	GDE Potential	Geomorphology	Ecosystem Type	Aquifer Geology	Distance	Direction
Terrestrial	High potential GDE - from regional studies	Undulating granitic plateau with higher residuals including basalt cappings.	Vegetation		419m	North East

Groundwater Dependent Ecosystems Atlas Data Source: The Bureau of Meteorology

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## **Ecological Constraints - Inflow Dependent Ecosystems Likelihood**

85 Taylor Street, Glen Innes, NSW 2370

Scale:

Meters



Data Sources: Property Boundaries & Topographic Data: © Department Finance, Services & Innovation 2022 Date: 20 May 2022

Coordinate System: GDA 1994 MGA Zone 56

# **Ecological Constraints**

85 Taylor Street, Glen Innes, NSW 2370

## Inflow Dependent Ecosystems Likelihood

Туре	IDE Likelihood	Geomorphology	Ecosystem Type	Aquifer Geology	Distance	Direction
Terrestrial	7	Undulating granitic plateau with higher residuals including basalt cappings.	Vegetation		419m	North East

Inflow Dependent Ecosystems Likelihood Data Source: The Bureau of Meteorology

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# **Ecological Constraints**

85 Taylor Street, Glen Innes, NSW 2370

### **NSW BioNet Atlas**

Species on the NSW BioNet Atlas that have a NSW or federal conservation status, a NSW sensitivity status, or are listed under a migratory species agreement, and are within 10km of the site?

			-				
Kingdom	Class	Scientific	Common	NSW Conservation Status	NSW Sensitivity Class	Federal Conservation Status	Migratory Species Agreements
Animalia	Aves	Artamus cyanopterus cyanopterus	Dusky Woodswallow	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Calidris melanotos	Pectoral Sandpiper	Not Listed	Not Sensitive	Not Listed	ROKAMBA;JAMBA
Animalia	Aves	Calyptorhynchus banksii samueli	Red-tailed Black- Cockatoo (inland subspecies)	Vulnerable	Category 2	Not Listed	
Animalia	Aves	Ephippiorhynchus asiaticus	Black-necked Stork	Endangered	Not Sensitive	Not Listed	
Animalia	Aves	Gallinago hardwickii	Latham's Snipe	Not Listed	Not Sensitive	Not Listed	ROKAMBA;JAMBA
Animalia	Aves	Glossopsitta pusilla	Little Lorikeet	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Haliaeetus leucogaster	White-bellied Sea-Eagle	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Hieraaetus morphnoides	Little Eagle	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Oxyura australis	Blue-billed Duck	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Ptilinopus magnificus	Wompoo Fruit- Dove	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Stagonopleura guttata	Diamond Firetail	Vulnerable	Not Sensitive	Not Listed	
Animalia	Aves	Tringa stagnatilis	Marsh Sandpiper	Not Listed	Not Sensitive	Not Listed	ROKAMBA;CAMBA; JAMBA
Animalia	Mammalia	Dasyurus maculatus	Spotted-tailed Quoll	Vulnerable	Not Sensitive	Endangered	
Animalia	Mammalia	Falsistrellus tasmaniensis	Eastern False Pipistrelle	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Miniopterus orianae oceanensis	Large Bent- winged Bat	Vulnerable	Not Sensitive	Not Listed	
Animalia	Mammalia	Phascolarctos cinereus	Koala	Vulnerable	Not Sensitive	Endangered	
Animalia	Mammalia	Pteropus poliocephalus	Grey-headed Flying-fox	Vulnerable	Not Sensitive	Vulnerable	
Animalia	Reptilia	Myuchelys bellii	Western Sawshelled Turtle, Bell's Turtle	Endangered	Not Sensitive	Vulnerable	
Plantae	Flora	Dichanthium setosum	Bluegrass	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Eucalyptus nicholii	Narrow-leaved Black Peppermint	Vulnerable	Not Sensitive	Vulnerable	
Plantae	Flora	Thesium australe	Austral Toadflax	Vulnerable	Not Sensitive	Vulnerable	

Data does not include NSW category 1 sensitive species.

NSW BioNet: © State of NSW and Office of Environment and Heritage

# **Location Confidences**

Where Lotsearch has had to georeference features from supplied addresses, a location confidence has been assigned to the data record. This indicates a confidence to the positional accuracy of the feature. Where applicable, a code is given under the field heading "LC" or "LocConf". These codes lookup to the following location confidences:

LC Code	Location Confidence
Premise Match	Georeferenced to the site location / premise or part of site
Area Match	Georeferenced to an approximate or general area
Road Match	Georeferenced to a road or rail corridor
Road Intersection	Georeferenced to a road intersection
Buffered Point	A point feature buffered to x metres
Adjacent Match	Land adjacent to a georeferenced feature
Network of Features	Georeferenced to a network of features
Suburb Match	Georeferenced to a suburb boundary
As Supplied	Spatial data supplied by provider
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SafeWork NSW Records



### **Mitchell Delaney**

From: Sent: To: Subject: Licensing licensing@safework.nsw.gov.au> Tuesday, 19 July 2022 10:22 AM Mitchell Delaney SafeWork NSW: 00722747 –Site Search application – Result not found [ref:\_ 00D281hl6J.\_5004a8lvFE:ref]

## Security Classification: Sensitive Personal Please do not amend the subject line of this email

Dear Mitch

## Re: Site Search for Schedule 11 Hazardous Chemicals on premises Application – Result not found

I refer to your application for a Site Search for Schedule 11 Hazardous Chemicals on premises for the following site: 85 Taylor Street Glen Innes NSW 2370.

A search of the records held by SafeWork NSW has not located any records pertaining to the above-mentioned premises.

If you have any further information or if you have any questions, please use one of the following options, quoting the SafeWork NSW enquiry reference number: 00722747

- Email: <a href="mailto:licensing@safework.nsw.gov.au">licensing@safework.nsw.gov.au</a>
- Phone: 13 10 50

Kind regards

Gabriela Draper Licensing Representative SafeWork NSW | Better Regulation Division Department of Customer Service p- 13 10 50 e- licensing@safework.nsw.gov.au | www.customerservice.nsw.gov.au Level 3, 32 Mann Street, Gosford, NSW 2250



We are always looking for ways that we can improve our services. You may be contacted by email in the next few weeks to complete a short survey and provide us with your feedback on what we did well and where we can improve. If you do not wish to participate in our surveys, please email us at: <u>licensingQA@customerservice.nsw.gov.au</u> and we will ensure that you are not contacted.



ref:\_00D281hl6J.\_5004a8lvFE:ref



### **Appendix C: Laboratory Results Summary Tables**





### ABBREVIATIONS AND EXPLANATIONS

#### Abbreviations used in the Tables:

ABC:	Ambient Background Concentration	PCBs:	Polychlorinated Biphenyls
ACM:	Asbestos Containing Material	PCE:	Perchloroethylene (Tetrachloroethylene or Teterachloroethene)
ADWG:	AustralianDrinking Water Guidelines	рН <sub>ксL</sub> :	pH of filtered 1:20, 1M KCL extract, shaken overnight
AF:	Asbestos Fines	pH <sub>ox</sub> :	pH of filtered 1:20 1M KCl after peroxide digestion
ANZG	Australian and New Zealand Guidelines	PQL:	Practical Quantitation Limit
B(a)P:	Benzo(a)pyrene	RS:	Rinsate Sample
CEC:	Cation Exchange Capacity	RSL:	Regional Screening Levels
CRC:	Cooperative Research Centre	RSW:	Restricted Solid Waste
CT:	Contaminant Threshold	SAC:	Site Assessment Criteria
EILs:	Ecological Investigation Levels	SCC:	Specific Contaminant Concentration
ESLs:	Ecological Screening Levels	S <sub>Cr</sub> :	Chromium reducible sulfur
FA:	Fibrous Asbestos	S <sub>POS</sub> :	Peroxide oxidisable Sulfur
GIL:	Groundwater Investigation Levels	SSA:	Site Specific Assessment
GSW:	General Solid Waste	SSHSLs	Site Specific Health Screening Levels
HILs:	Health Investigation Levels	TAA:	Total Actual Acidity in 1M KCL extract titrated to pH6.5
HSLs:	Health Screening Levels	TB:	Trip Blank
HSL-SSA:	Health Screening Level-SiteSpecific Assessment	TCA:	1,1,1 Trichloroethane (methyl chloroform)
kg/L	kilograms per litre	TCE:	Trichloroethylene (Trichloroethene)
NA:	Not Analysed	TCLP:	Toxicity Characteristics Leaching Procedure
NC:	Not Calculated	TPA:	Total Potential Acidity, 1M KCL peroxide digest
NEPM:	National Environmental Protection Measure	TS:	Trip Spike
NHMRC:	National Health and Medical Research Council	TRH:	Total Recoverable Hydrocarbons
NL:	Not Limiting	TSA:	Total Sulfide Acidity (TPA-TAA)
NSL:	No Set Limit	UCL:	Upper Level Confidence Limit on Mean Value
OCP:	Organochlorine Pesticides	USEPA	United States Environmental Protection Agency
OPP:	Organophosphorus Pesticides	VOCC:	Volatile Organic Chlorinated Compounds
PAHs:	Polycyclic Aromatic Hydrocarbons	WHO:	World Health Organisation
%w/w:	weight per weight		
ppm:	Parts per million		

#### Table Specific Explanations:

#### HIL Tables:

- The chromium results are for Total Chromium which includes Chromium III and VI. For initial screening purposes, we have assumed that the samples contain only Chromium VI unless demonstrated otherwise by additional analysis.
- Carcinogenic PAHs is a toxicity weighted sum of analyte concentrations for a specific list of PAH compounds relative to B(a)P. It is also refered to as the B(a)P Toxic Equivalence Quotient (TEQ).
- Statistical calculations are undertaken using ProUCL (USEPA). Statistical calculation is usually undertaken using data from fill samples.

### EIL/ESL Table:

 ABC Values for selected metals have been adopted from the published background concentrations presented in Olszowy et. al., (1995), Trace Element Concentrations in Soils from Rural and Urban New South Wales (the 25th percentile values for old suburbs with high traffic have been quoted).

#### Waste Classification and TCLP Table:

- Data assessed using the NSW EPA Waste Classification Guidelines, Part 1: Classifying Waste (2014).
- The assessment of Total Moderately Harmful pesticides includes: Dichlorovos, Dimethoate, Fenitrothion, Ethion, Malathion and Parathion.
- Assessment of Total Scheduled pesticides include: HBC, alpha-BHC, gamma-BHC, beta-BHC, Heptachlor, Aldrin, Heptachlor Epoxide, gamma-Chlordane, alpha-chlordane, pp-DDE, Dieldrin, Endrin, pp-DDD, pp-DDT, Endrin Aldehyde.

### QA/QC Table:

- Field blank, Inter and Intra laboratory duplicate results are reported in mg/kg.
- Trip spike results are reported as percentage recovery.
- Field rinsate results are reported in  $\mu$ g/L.

Preliminary (Stage 1) Site Investigation Proposed Glen Innes Hospital Redevelopemnt, 94 Taylor Street, Glen Innes, NSW E35093UPD

### TABLE S1

SOIL LABORATORY RESULTS COMPARED TO NEPM 2013.

HIL-C: 'Public open space; secondary schools; and footpaths'

						HEAVY	METALS				F	PAHs			ORGANOCHI	ORINE PESTI	CIDES (OCPs)			OP PESTICIDES (OPPs)		
All data in mg/kg unless	stated otherw	vise	Arsenic	Cadmium	Chromium	Copper	Lead	Mercurv	Nickel	Zinc	Total	Carcinogenic	HCB	Endosulfan	Methoxychlor	Aldrin &	Chlordane	DDT, DDD	Heptachlor	Chlorpyrifos	TOTAL PCBs	ASBESTOS FIBRES
								,			PAHs	PAHs				Dieldrin		& DDE				
PQL - Envirolab Services			4	0.4	1	1	1	0.1	1	1	-	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	100
Site Assessment Criteria	(SAC)		300	90	300	17000	600	80	1200	30000	300	3	10	340	400	10	70	400	10	250	1	Detected/Not Detected
Sample Reference	Sample Depth	Sample Description																				
TP1	0-0.1	Fill: Silty Clay	<4	<0.4	62	15	34	<0.1	25	32	1.4	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
TP1 (lab replicate)	0-0.1	Fill: Silty Clay	<4	<0.4	70	17	35	<0.1	26	35	1.5	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
TP2	0-0.1	Fill: Clayey Cobbles	<4	<0.4	100	25	43	<0.1	31	48	1.3	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH1	0-0.1	Fill: Silty Clay	<4	<0.4	82	20	14	<0.1	34	35	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH2	0-0.1	Fill: Silty Clay	<4	<0.4	100	23	12	<0.1	38	34	0.4	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
BH3	0-0.15	Fill: Silty Clay	<4	<0.4	82	20	19	<0.1	33	33	0.5	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH4	0-0.1	Fill: Silty Clay	<4	<0.4	170	43	24	<0.1	52	62	2.3	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH4	0.1-0.25	Fill: Silty Clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
BH5	0-0.1	Fill: Silty Clay	<4	<0.4	97	45	8	<0.1	67	42	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
BH6	0-0.1	Fill: Silty Clay	5	<0.4	31	9	20	<0.1	11	31	<0.05	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Not Detected
SDUP1	-	Fill: Silty Clay	<4	<0.4	110	21	12	<0.1	30	31	0.3	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
SDUP1 (lab replicate)	-	Fill: Silty Clay	<4	<0.4	100	18	12	<0.1	26	29	0.4	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
SDUP4	-	Fill: Silty Clay	<4	<0.4	120	28	51	<0.1	56	60	2.2	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
SDUP4 (lab replicate)	-	Fill: Silty Clay	NA	NA	NA	NA	NA	NA	NA	NA	2.2	<0.5	NA	NA	NA	NA	NA	NA	NA	<0.1	NA	NA
FCF1-BH4	0-0.1	Fibre Cement Fragment	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Detected
FCF23	Surface	Fibre Cement Fragment	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Detected
Total Number of Sam	oles		12	12	12	12	12	12	12	12	13	13	12	12	12	12	12	12	12	13	12	10
Maximum Value			5	<pql< td=""><td>170</td><td>45</td><td>51</td><td><pql< td=""><td>67</td><td>62</td><td>2.3</td><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>Detected</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	170	45	51	<pql< td=""><td>67</td><td>62</td><td>2.3</td><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>Detected</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	67	62	2.3	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>Detected</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>Detected</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>Detected</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>Detected</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>Detected</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>Detected</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>Detected</td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td>Detected</td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td>Detected</td></pql<></td></pql<>	<pql< td=""><td>Detected</td></pql<>	Detected
Concentration above the	SAC		VALUE																			
Asbestos Detected	JAL		Detected																			
Concentration above the	PQL		Bold	-																		





SOIL LABORATORY RESULTS COMPARED TO HSLs

All data in mg/kg unless stated otherwise

					C <sub>6</sub> -C <sub>10</sub> (F1)	>C <sub>10</sub> -C <sub>16</sub> (F2)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	Field PID Measurement
PQL - Envirolab Service	s				25	50	0.2	0.5	1	1	1	ppm
NEPM 2013 HSL Land L	Jse Category						HSL-A/B: LC	OW/HIGH DENSITY	RESIDENTIAL			
Sample Reference	Sample Depth	Sample Description	Depth Category	Soil Category								
TP1	0-0.1	Fill: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
TP1 (lab replicate)	0-0.1	Fill: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
TP2	0-0.1	Fill: Clayey Cobbles	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH1	0-0.1	Fill: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH2	0-0.1	Fill: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH3	0-0.15	Fill: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0.4
BH4	0-0.1	Fill: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH5	0-0.1	Fill: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
BH6	0-0.1	Fill: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	0
SDUP1	-	Fill: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	NA
SDUP1 (lab replicate)	-	Fill: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	NA
SDUP4	-	Fill: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	NA
SDUP4 (lab replicate)	-	Fill: Silty Clay	0m to <1m	Sand	<25	<50	<0.2	<0.5	<1	<1	<1	NA
Total Number of Sa	mples				13	13	13	13	13	13	13	10
Maximum Value					<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>0.4</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>0.4</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>0.4</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>0.4</td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td>0.4</td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td>0.4</td></pql<></td></pql<>	<pql< td=""><td>0.4</td></pql<>	0.4
Concentration above th	ne SAC		VALUE									
Concentration above th	ne PQL		Bold	-								
The guideline correspo	nding to the	concentration above the	SAC is highlight	ed in grey in the s	ite Assessment C	riteria Table below						

				HSL SOIL ASSESS	SMENT CRITERIA						
Sample Reference	Sample Depth	Sample Description	Depth Category	Soil Category	C <sub>6</sub> -C <sub>10</sub> (F1)	>C <sub>10</sub> -C <sub>16</sub> (F2)	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene
TP1	0-0.1	Fill: Silty Clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
TP1 (lab replicate)	0-0.1	Fill: Silty Clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
TP2	0-0.1	Fill: Clayey Cobbles	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH1	0-0.1	Fill: Silty Clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH2	0-0.1	Fill: Silty Clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH3	0-0.15	Fill: Silty Clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH4	0-0.1	Fill: Silty Clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH5	0-0.1	Fill: Silty Clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
BH6	0-0.1	Fill: Silty Clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
SDUP1	-	Fill: Silty Clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
SDUP1 (lab replicate)	-	Fill: Silty Clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
SDUP4	-	Fill: Silty Clay	0m to <1m	Sand	45	110	0.5	160	55	40	3
SDUP4 (lab replicate)	-	Fill: Silty Clay	0m to <1m	Sand	45	110	0.5	160	55	40	3



SOIL LABORATORY RESULTS COMPARED TO MANAGEMENT LIMITS All data in mg/kg unless stated otherwise

			C <sub>6</sub> -C <sub>10</sub> (F1) plus	>C <sub>10</sub> -C <sub>16</sub> (F2) plus		
			BTEX	napthalene	>C <sub>16</sub> -C <sub>34</sub> (FS)	>C34-C40 (F4)
PQL - Envirolab Servic	es		25	50	100	100
NEPM 2013 Land Use	Category		RES	SIDENTIAL, PARKLANI	D & PUBLIC OPEN SP	ACE
Sample Reference	Sample Depth	Soil Texture				
TP1	0-0.1	Coarse	<25	<50	<100	<100
TP1 (lab replicate)	0-0.1	Coarse	<25	<50	<100	<100
TP2	0-0.1	Coarse	<25	<50	<100	<100
BH1	0-0.1	Coarse	<25	<50	<100	<100
BH2	0-0.1	Coarse	<25	<50	<100	<100
BH3	0-0.15	Coarse	<25	<50	<100	<100
BH4	0-0.1	Coarse	<25	<50	<100	<100
BH5	0-0.1	Coarse	<25	<50	<100	<100
BH6	0-0.1	Coarse	<25	<50	<100	<100
SDUP1	-	Coarse	<25	<50	<100	<100
SDUP1 (lab replicate)	-	Coarse	<25	<50	<100	<100
SDUP4	-	Coarse	<25	<50	<100	<100
SDUP4 (lab replicate)	-	Coarse	<25	<50	<100	<100
Total Number of Sam	ples		13	13	13	13
Maximum Value			<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""></pql<></td></pql<>	<pql< td=""></pql<>
Concentration above	the SAC		VALUE			
Concentration above	the POI		Bold			

			MANAGEMENT LIM	IT ASSESSMENT CRIT	ERIA	
Sample Reference	Sample Depth	Soil Texture	C <sub>6</sub> -C <sub>10</sub> (F1) plus BTEX	>C <sub>10</sub> -C <sub>16</sub> (F2) plus napthalene	>C <sub>16</sub> -C <sub>34</sub> (F3)	>C <sub>34</sub> -C <sub>40</sub> (F4)
TP1	0-0.1	Coarse	700	1000	2500	10000
TP1 (lab replicate)	0-0.1	Coarse	700	1000	2500	10000
TP2	0-0.1	Coarse	700	1000	2500	10000
BH1	0-0.1	Coarse	700	1000	2500	10000
BH2	0-0.1	Coarse	700	1000	2500	10000
BH3	0-0.15	Coarse	700	1000	2500	10000
BH4	0-0.1	Coarse	700	1000	2500	10000
BH5	0-0.1	Coarse	700	1000	2500	10000
BH6	0-0.1	Coarse	700	1000	2500	10000
SDUP1	-	Coarse	700	1000	2500	10000
SDUP1 (lab replicate)	-	Coarse	700	1000	2500	10000
SDUP4	-	Coarse	700	1000	2500	10000
SDUP4 (lab replicate)	-	Coarse	700	1000	2500	10000



SOIL LABORATORY RESULTS COMPARED TO DIRECT CONTACT CRITERIA All data in mg/kg unless stated otherwise

Analyte		C6-C10	>C <sub>10</sub> -C <sub>16</sub>	>C16-C34	>C <sub>34</sub> -C <sub>40</sub>	Benzene	Toluene	Ethylbenzene	Xylenes	Naphthalene	PID
PQL - Envirolab Services		25	50	100	100	0.2	0.5	1	1	1	
CRC 2011 -Direct contact	Criteria	5,100	3,800	5,300	7,400	120	18,000	5,300	15,000	1,900	
Site Use					RECREATIO	NAL - DIRECT SO	IL CONTACT				
Sample Reference	Sample Depth										
TP1	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
TP1 (lab replicate)	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
TP2	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH1	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH2	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH3	0-0.15	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0.4
BH4	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH5	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
BH6	0-0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
SDUP1	-	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	0
SDUP1 (lab replicate)	-	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	NA
SDUP4	-	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	NA
SDUP4 (lab replicate)	-	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<1	NA
Total Number of Sample	s	13	13	13	13	13	13	13	13	13	10
Maximum Value		<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>0.4</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>0.4</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>0.4</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>0.4</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>0.4</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>0.4</td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td>0.4</td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td>0.4</td></pql<></td></pql<>	<pql< td=""><td>0.4</td></pql<>	0.4
Concentration above the SAC		VALUE									
Concentration above the		Bold									
		2010									

## TABLE SS ASBESTOS QUANTIFICATION - FIELD OBSERVATIONS AND LABORATORY RESULTS HSL-C:Public open space; secondary schools; and footpaths

		FIELD DATA																								
							F	FIELD DATA											LABORATC	ORY DATA						
Date Sampled	Sample reference	Sample Depth	Visible ACM in top 100mm	Approx Volume of Soil (L)	Soil Mass (g)	Mass ACM (g)	Mass Asbestos in ACM (g)	[Asbestos from ACM in soil] (%w/w)	i Mass ACM <7mm (g)	Mass Asbestos in ACM <7mm (g)	[Asbestos from ACM <7mm in soil] (%w/w)	Mass FA (g)	Mass Asbestos in FA (g)	[Asbestos from FA in soil] (%w/w)	Lab Report Number	Sample refeference	Sample Depth	Sample Mass (g)	Asbestos ID in soil (AS4964) >0.1g/kg	Trace Analysis	Total Asbestos (g/kg)	Asbestos ID in soil <0.1g/kg	ACM >7mm Estimation (g)	FA and AF Estimation (g)	ACM >7mm Estimatior %(w/w)	FA and AF Estimatio n %(w/w)
SAC			No					0.02			0.001			0.001											0.02	0.001
9/06/2022	TP1	0-0.1	No	10	10,690	No ACM observed			No ACM <7mm observed			No FA observed			297802	TP1	0-0.1	593.81	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected			<0.01	<0.001
9/06/2022	TP1	0.1-0.4	NA	10	10,780	No ACM observed			No ACM <7mm observed			No FA observed							-							
9/06/2022	TP2	0-0.1	No	10	11,750	No ACM observed			No ACM <7mm observed			No FA observed			297802	TP2	0-0.1	687.23	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected			<0.01	<0.001
9/06/2022	TP2	0.1-0.4	NA	10	12,450	No ACM observed			No ACM <7mm observed			No FA observed							-							
8/06/2022	BH1	0-0.1	No	10	10,190	No ACM observed			No ACM <7mm observed			No FA observed			297802	BH1	0-0.1	611.99	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected			<0.01	<0.001
8/06/2022	BH1	0.1-0.6	NA	NA	781	No ACM observed			No ACM <7mm observed			No FA observed							-							
8/06/2022	BH2	0-0.1	No	10	11,930	No ACM observed			No ACM <7mm observed			No FA observed							-							
8/06/2022	BH2	0.1-0.6	NA	NA	2,930	No ACM observed			No ACM <7mm observed			No FA observed							-							
8/06/2022	BH3	0-0.15	No	10	12,750	No ACM observed			No ACM <7mm observed			No FA observed			297802	BH3	0-0.15	712.31	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected			<0.01	<0.001
8/06/2022	BH4	0-0.1	Yes	10	10,550	969.5	145.43	1.3785	No ACM <7mm observed			No FA observed			297802	BH4	0-0.1	605	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected			<0.01	<0.001
8/06/2022	BH4	0.1-0.25	NA	NA	9,430	6.3	0.9405	0.0100	No ACM <7mm observed			No FA observed			297802	BH4	0.1-0.25	616.75	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected			<0.01	<0.001
9/06/2022	BH5	0-0.1	No	10	10,630	No ACM observed			No ACM <7mm observed			No FA observed			297802	BH5	0-0.1	508.49	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected			<0.01	<0.001
9/06/2022	BH5	0.1-0.2	NA	NA	2,950	No ACM observed			No ACM <7mm observed			No FA observed							-							
9/06/2022	BH6	0-0.1	No	10	10,550	No ACM observed			No ACM <7mm observed			No FA observed			297802	BH6	0-0.1	690.23	No asbestos detected at reporting limit of 0.1g/kg: Organic fibres detected	No asbestos detected	<0.1	No visible asbestos detected			<0.01	<0.001
9/06/2022	BH6	0.1-0.4	NA	NA	8,150	No ACM observed		-	No ACM <7mm observed			No FA observed					-		-							
9/06/2022	BH7	0-0.1	No	10	10,690	No ACM observed			No ACM <7mm observed			No FA observed														
9/06/2022	BH7	0.1-0.4	NA	10	10,780	No ACM observed			No ACM <7mm observed			No FA observed							-							
9/06/2022	BH8	0-0.1	No	10	11,750	No ACM observed			No ACM <7mm observed			No FA observed														
9/06/2022	BH8	0.1-0.5	NA	10	12,450	No ACM observed			No ACM <7mm observed			No FA observed														
Concentration	above the	SAC	VALUE																							



### SOIL LABORATORY RESULTS COMPARED TO NEPM 2013 EILs AND ESLs

All data in mg/kg unless stated otherwise

Land Use Category												URBAN RESIDI	NTIAL AND PUB	LIC OPEN SPACE									
									AGED HEAV	Y METALS-EILs			N RESIDENTIAL A	ND PUBLIC OPEN					ESLs				
				рН	CEC (cmolc/kg)	Clay Content (% clay)	Arsenic	Chromium	Copper	Lead	Nickel	Zinc	Naphthalene	DDT	C <sub>6</sub> -C <sub>10</sub> (F1)	>C <sub>10</sub> -C <sub>16</sub> (F2)	>C <sub>16</sub> -C <sub>34</sub> (F3)	>C <sub>34</sub> -C <sub>40</sub> (F4)	Benzene	Toluene	Ethylbenzene	Total Xylenes	B(a)P
PQL - Envirolab Services	5			-	1	-	4	1	1	1	1	1	1	0.1	25	50	100	100	0.2	0.5	1	1	0.05
Ambient Background Co	oncentration (	(ABC)		-	-	-	NSL	13	28	163	5	122	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL	NSL
Sample Reference	Sample Depth	Sample Description	Soil Texture																				
TP1	0-0.1	Fill: Silty Clay	Fine	NA	NA	NA	<4	62	15	34	25	32	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0.1
TP1 (lab replicate)	0-0.1	Fill: Silty Clay	Fine	NA	NA	NA	<4	70	17	35	26	35	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0.2
TP2	0-0.1	Fill: Clayey Cobbles	Coarse	NA	NA	NA	<4	100	25	43	31	48	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0.2
BH1	0-0.1	Fill: Silty Clay	Fine	NA	NA	NA	<4	82	20	14	34	35	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH2	0-0.1	Fill: Silty Clay	Fine	NA	NA	NA	<4	100	23	12	38	34	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0.1
BH3	0-0.15	Fill: Silty Clay	Fine	NA	NA	NA	<4	82	20	19	33	33	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0.09
BH4	0-0.1	Fill: Silty Clay	Fine	NA	NA	NA	<4	170	43	24	52	62	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0.2
BH5	0-0.1	Fill: Silty Clay	Fine	6.8	36	33	<4	97	45	8	67	42	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
BH6	0-0.1	Fill: Silty Clay	Fine	NA	NA	NA	5	31	9	20	11	31	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	<0.05
SDUP1	-	Fill: Silty Clay	Fine	NA	NA	NA	<4	110	21	12	30	31	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0.05
SDUP1 (lab replicate)	-	Fill: Silty Clay	Fine	NA	NA	NA	<4	100	18	12	26	29	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0.09
SDUP4	-	Fill: Silty Clay	Fine	NA	NA	NA	<4	120	28	51	56	60	<1	<0.1	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0.22
SDUP4 (lab replicate)	-	Fill: Silty Clay	Fine	NA	NA	NA	NA	NA	NA	NA	NA	NA	<1	NA	<25	<50	<100	<100	<0.2	<0.5	<1	<1	0.21
Total Number of Samp	es			1	1	1	11	11	11	11	11	11	12	11	12	12	12	12	12	12	12	12	12
Maximum Value				6.8	36	33	5	170	45	51	67	62	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>0.22</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>0.22</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>0.22</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>0.22</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>0.22</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>0.22</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>0.22</td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td>0.22</td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td>0.22</td></pql<></td></pql<>	<pql< td=""><td>0.22</td></pql<>	0.22

Concentration above the SAC



Concentration above the PQL The guideline corresponding to the elevated value is highlighted in grey in the EIL and ESL Assessment Criteria Table below

									EIL AND ESL AS	EIL AND ESL ASSESSMENT CRITERIA														
TP1	0-0.1	Fill: Silty Clay	Fine	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20	
TP1 (lab replicate)	0-0.1	Fill: Silty Clay	Fine	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20	
TP2	0-0.1	Fill: Clayey Cobbles	Coarse	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20	
BH1	0-0.1	Fill: Silty Clay	Fine	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20	
BH2	0-0.1	Fill: Silty Clay	Fine	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20	
BH3	0-0.15	Fill: Silty Clay	Fine	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20	
BH4	0-0.1	Fill: Silty Clay	Fine	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20	
BH5	0-0.1	Fill: Silty Clay	Fine	6.8	36	33	100	410	250	1300	420	1000	170	180	180	120	300	2800	50	85	70	105	20	
BH6	0-0.1	Fill: Silty Clay	Fine	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20	
SDUP1	-	Fill: Silty Clay	Fine	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20	
SDUP1 (lab replicate)	-	Fill: Silty Clay	Fine	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20	
SDUP4	-	Fill: Silty Clay	Fine	NA	NA	NA	100	200	90	1300	35	190	170	180	180	120	300	2800	50	85	70	105	20	
SDUP4 (lab replicate)	-	Fill: Silty Clay	Fine	NA	NA	NA							170		180	120	300	2800	50	85	70	105	20	



SOIL LABORATORY RESULTS COMPARED TO WASTE CLASSIFICATION GUIDELINES

All data in mg/kg unless stated otherwise

						HEAVY	METALS				P	AHs		OC/OP	PESTICIDES		Total			TRH				BTEX CO	MPOUNDS		
											Total	B(a)P	Total	Chloropyrifos	Total Moderately	Total	PCBs	C.C.	CurCu	C	C	Total	Benzene	Toluene	Ethyl	Total	ASBESTOS FIBRES
			Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc	PAHs	D(d)F	Endosulfans	chioropyrilos	Harmful	Scheduled	1 685	C6-C9	C10-C14	C15-C28	C29-C36	Cu-Cu	Denzene	Toluelle	henzene	Xvlenes	
POI - Envirolab Services			4	0.4	1	1	1	0.1	1	1	-	0.05	0.1	0.1	0.1	0.1	01	25	50	100	100	50	0.2	0.5	1	1	100
Conoral Solid Wasto CT1	1		100	20	100	NICI	100	4	40	NCI	200	0.0	60	4	250	5.0	E0	650		NCI		10.000	10	200	600	1 000	
General Solid Waste CT1	L		100	20	100	INSL	100	4	40	INSL	200	0.8	60	4	250	50	50	050		INSL		10,000	10	288	600	1,000	-
General Solid Waste SCC	.1		500	100	1900	NSL	1500	50	1050	NSL	200	10	108	7.5	250	50	50	650		NSL		10,000	18	518	1,080	1,800	-
Restricted Solid Waste C	CT2		400	80	400	NSL	400	16	160	NSL	800	3.2	240	16	1000	50	50	2600		NSL		40,000	40	1,152	2,400	4,000	-
Restricted Solid Waste S	CC2		2000	400	7600	NSL	6000	200	4200	NSL	800	23	432	30	1000	50	50	2600		NSL		40,000	72	2,073	4,320	7,200	-
Sample Reference	Sample Depth	Sample Description																									
TP1	0-0.1	Fill: Silty Clay	<4	<0.4	62	15	34	<0.1	25	32	1.4	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
TP1 (lab replicate)	0-0.1	Fill: Silty Clay	<4	<0.4	70	17	35	<0.1	26	35	1.5	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
TP2	0-0.1	Fill: Clayey Cobbles	<4	<0.4	100	25	43	<0.1	31	48	1.3	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH1	0-0.1	Fill: Silty Clay	<4	<0.4	82	20	14	<0.1	34	35	<0.05	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH2	0-0.1	Fill: Silty Clay	<4	<0.4	100	23	12	<0.1	38	34	0.4	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
BH3	0-0.15	Fill: Silty Clay	<4	<0.4	82	20	19	<0.1	33	33	0.5	0.09	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH4	0-0.1	Fill: Silty Clay	<4	<0.4	170	43	24	<0.1	52	62	2.3	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH4	0.1-0.25	Fill: Silty Clay	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Not Detected
BH5	0-0.1	Fill: Silty Clay	<4	<0.4	97	45	8	<0.1	67	42	<0.05	< 0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
BH6	0-0.1	Fill: Silty Clay	5	<0.4	31	9	20	<0.1	11	31	<0.05	< 0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	Not Detected
SDUP1	-	Fill: Silty Clay	<4	<0.4	110	21	12	<0.1	30	31	0.3	0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
SDUP1 (lab replicate)	-	Fill: Silty Clay	<4	<0.4	100	18	12	<0.1	26	29	0.4	0.09	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
SDUP4	-	Fill: Silty Clay	<4	<0.4	120	28	51	<0.1	50	60	2.2	0.22	<0.1	<0.1	<0.1	<0.1	<0.1	<25	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA
	-	Fill: Silty Clay	NA NA	NA NA	NA	NA NA	NA NA	NA NA	NA	NA	2.2	0.21	NA NA	<0.1	<0.1	<0.1	NA NA	<25 NIA	<50	<100	<100	<50	<0.2	<0.5	<1	<1	NA Detected
FCF1-BH4 FCF23	0-0.1 Surface	Fibre Cement Fragment	NA NA	NA	NA	NA	NA	NA	NA	NA	NA NA	NA NA	NA NA	NA	NA	NA NA	NA	NA NA	NA	NA	NΑ	NΑ	NΔ	NΔ	NA NA	NΔ	Detected
10123	Surface	Tible Cement Hagment	107.	147.1	116	114	116	10/1	114	114		na -	107	107	101	107		10/1	10/1	147.1	147.1	10/1					Dettetted
Total Number of Sam	ples		12	12	12	12	12	12	12	12	13	13	12	13	13	13	12	13	13	13	13	13	13	13	13	13	10
Maximum Value			5	<pql< td=""><td>170</td><td>45</td><td>51</td><td><pql< td=""><td>67</td><td>62</td><td>2.3</td><td>0.22</td><td><pql< td=""><td><pql< td=""><td>Detected</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	170	45	51	<pql< td=""><td>67</td><td>62</td><td>2.3</td><td>0.22</td><td><pql< td=""><td><pql< td=""><td>Detected</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	67	62	2.3	0.22	<pql< td=""><td><pql< td=""><td>Detected</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td>Detected</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td>Detected</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td>Detected</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>Detected</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>Detected</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>Detected</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>Detected</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>Detected</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>Detected</td></pql<></td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td><pql< td=""><td>Detected</td></pql<></td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td><pql< td=""><td>Detected</td></pql<></td></pql<></td></pql<>	<pql< td=""><td><pql< td=""><td>Detected</td></pql<></td></pql<>	<pql< td=""><td>Detected</td></pql<>	Detected
Concentration above the Concentration above SC Concentration above the Concentration above PQ	e CT1 C1 e SCC2 QL			VALUE VALUE VALUE Bold							-																





### SOIL LABORATORY TCLP RESULTS

All data in mg/L unless stated otherwise

			Chromium	Nickel
PQL - Envirola	b Services		0.01	0.02
TCLP1 - Gener	al Solid Wast	.e	5	2
TCLP2 - Restrie	cted Solid Wa	aste	20	8
TCLP3 - Hazar	dous Waste		>20	>8
Sample Reference	Sample Depth	Sample Description		
BH4	0-0.1	Fill: Silty Clay	<0.01	<0.02
BH5	0-0.1	Fill: Silty Clay	NA	<0.02
SDUP1	-	Fill: Silty Clay	<0.01	NA
SDUP4	-	Fill: Silty Clay	<0.01	0.02
Total Numb	er of samples	5	3	3
Maximum V	/alue		<pql< td=""><td>0.02</td></pql<>	0.02
General Solid	Waste		VALUE	
Restricted Soli	id Waste	/	VALUE	
Hazardous Wa	aste	/	VALUE	
Concentration	i above PQL		Bold	

TABLE S	39 A/QC SUMI	MARY																																																																	
				TRH C6 - C10	TRH >C10-C16	TRH >C16-C34	TRH >C34-C40	Benzene	i ouene Ethvibenzene	m+p-xylene	o-Xylene	Naphthalene	Acenaphthylene	Acenaph-thene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b.j+k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-c,d)pyrene	Dibenzo(a.h)anthra-cene	Banan (n h i)nenvlene	HCB	alnha- RHC	damma- BHC	beta- BHC	Hontochior	Heptachior	delta- BHC	Alarin Lamashar Enaxide	Heptacnior Epoxiue	Gamma- Critoruarie	alpria- unoruero Endosulfan I		pp- UUE Dialetrin	Footin	Endrin	pp- DDD	Endosulfan II	pp- DDT	Endrin Aldehyde	Endosulfan Sulphate	Methoxychlor	Azinphos-methyl (Guthion)	Chlorovrinhos	Critorpyriprice Chlorovribhos-methyl	Critorpyripricanicury. Diazinon	Dichloryos	Dimethoate	Ethion	Fenitrothion	Malathion	Parathion	Ronnel	Total PCBS	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
	PQL E	nvirolab S	YD	25	50	100	100 C	0.2 0	.5 1	2	1	0.1	0.1	. 0.1	. 0.1	. 0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.05	i 0.1	. 0.1	1 0.1	1 0.	0.	1 0.	1 0.	1 0.	.1 0	.1 0.	.1 0.	.1 0	.1 0.	.1 0.1	1 0.	.1 0.	1 0.	0.1 0	0.1 0.	0.1 0	0.1	0.1 0	0.1 0	0.1 (	0.1 0	.1 0.	.1 0.1	.1 0.1	1 0.1	1 0.1	. 0.1	. 0.1	0.1	0.1	0.1	0.1	4	0.4	1	1	1	0.1	1	1
	PQL E	nvirolab V	IC	25	50	100	100 C	0.2 0	.5 1.0	0 2.0	1.0	0.1	0.1	. 0.1	. 0.1	. 0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	. 0.1	. 0.1	1 0.	1 0.	0.	1 0.	1 0.	1 0.	.1 0	.1 0.	.1 0.	.1 0	.1 0.	1 0.1	1 0.	.1 0.	1 0.	0.1 0	0.1 0.	0.1 0	0.1	0.1 0	0.1 0	0.1 (	0.1 0	.1 0.	.1 0.1	.1 0.	1 0.1	1 0.1	. 0.1	. 0.1	0.1	0.1	0.1	0.1	4.0	0.4	1.0	) 1.0	J 1.C	/ 0.1	1.0	1.0
						_										_	_				_												_	_																	_	_		_					$\square$			_	_		_		
Intra	BH2	0-0.	1	<25	<50 <	<100 <	<100 </th <th>:0.2 &lt;0</th> <th>0.5 &lt;1</th> <th>1 &lt;2</th> <th>&lt;1</th> <th>&lt;0.1</th> <th>4 &lt;0.1</th> <th>1 &lt;0.1</th> <th>1 &lt;0.1</th> <th>1 &lt;0.1</th> <th>. &lt;0.1</th> <th>. 0.2</th> <th>0.1</th> <th>&lt;0.1</th> <th>&lt;0.1</th> <th>. &lt;0.2</th> <th>2 0.1</th> <th>. &lt;0.1</th> <th>1 &lt;0.</th> <th>.1 &lt;0</th> <th>.1 &lt;0</th> <th>1 &lt;0</th> <th>.1 &lt;0</th> <th>.1 &lt;0</th> <th>.1 &lt;0</th> <th>J.1 &lt;ſ</th> <th>J.1 &lt;0</th> <th><i>i</i>.1 &lt;0</th> <th>J.1 &lt;0</th> <th>J.1 &lt;0</th> <th>.1 &lt;0</th> <th>0.1 &lt;0</th> <th>0.1 &lt;0</th> <th>0.1 &lt;0</th> <th>0.1 &lt;</th> <th>&lt;0.1 &lt;0</th> <th>:0.1 &lt;</th> <th>&lt;0.1 &lt;</th> <th>&lt;0.1 &lt;</th> <th>&lt;0.1 &lt;</th> <th>&lt;0.1 &lt;</th> <th>&lt;0.1 &lt;</th> <th>0.1 &lt;0</th> <th><i>s</i>.1 &lt;0.</th> <th><i>s</i>.1 &lt;0</th> <th>.1 &lt;0.</th> <th>.1 &lt;0.1</th> <th>1 &lt;0.</th> <th>1 &lt; 0.1</th> <th>&lt;0.1</th> <th>&lt; 0.1</th> <th>1 &lt;0.1</th> <th>&lt;0.1</th> <th>&lt;4</th> <th>&lt;0.4</th> <th>, 100</th> <th>J 23</th> <th>i 12</th> <th>&lt;0.1</th> <th>. 38</th> <th>34</th>	:0.2 <0	0.5 <1	1 <2	<1	<0.1	4 <0.1	1 <0.1	1 <0.1	1 <0.1	. <0.1	. 0.2	0.1	<0.1	<0.1	. <0.2	2 0.1	. <0.1	1 <0.	.1 <0	.1 <0	1 <0	.1 <0	.1 <0	.1 <0	J.1 <ſ	J.1 <0	<i>i</i> .1 <0	J.1 <0	J.1 <0	.1 <0	0.1 <0	0.1 <0	0.1 <0	0.1 <	<0.1 <0	:0.1 <	<0.1 <	<0.1 <	<0.1 <	<0.1 <	<0.1 <	0.1 <0	<i>s</i> .1 <0.	<i>s</i> .1 <0	.1 <0.	.1 <0.1	1 <0.	1 < 0.1	<0.1	< 0.1	1 <0.1	<0.1	<4	<0.4	, 100	J 23	i 12	<0.1	. 38	34
laboratory	y SDUP1	-		<25	<50 <	<100	<100 </th <th>:0.2 &lt;0</th> <th>0.5 &lt;1</th> <th>1 &lt;2</th> <th>&lt;1</th> <th>&lt;0.1</th> <th>i &lt;0.1</th> <th>1 &lt;0.1</th> <th>1 &lt;0.1</th> <th>1 &lt;0.1</th> <th>. &lt;0.1</th> <th>⊥ 0.1</th> <th>0.1</th> <th>&lt; 0.1</th> <th>&lt; 0.1</th> <th>. &lt;0.2</th> <th>2 0.0</th> <th>5 &lt;0.1</th> <th>1 &lt;0.</th> <th>.1 &lt;0</th> <th>.1 &lt;0</th> <th>1 &lt;0</th> <th>.1 &lt;0</th> <th>.1 &lt;0</th> <th>.1 &lt;0</th> <th>J.1 &lt;ſ</th> <th>J.1 &lt;0</th> <th>J.1 &lt;0</th> <th>J.1 <r< th=""><th>J.1 &lt;0</th><th>J.1 &lt;0</th><th>.1 &lt;0</th><th>0.1 &lt;0</th><th>0.1 &lt;0</th><th>0.1 &lt;</th><th>&lt;0.1 &lt;0</th><th>:0.1 &lt;</th><th>&lt;0.1 &lt;</th><th>&lt; 0.1 &lt;</th><th>&lt; 0.1 &lt;</th><th>&lt;0.1 &lt;</th><th>&lt;0.1 &lt;</th><th>0.1 &lt;0</th><th>J.1 &lt;0</th><th>J.1 &lt;0</th><th>.1 &lt;0.</th><th>.1 &lt;0.</th><th>1 &lt;0.1</th><th>1 &lt; 0.1</th><th>&lt;0.1</th><th>&lt; 0.1</th><th>1 &lt;0.1</th><th>&lt; 0.1</th><th>&lt;4</th><th>&lt; 0.4</th><th>+ 110</th><th>J 21</th><th>1 12</th><th>. &lt;0.1</th><th><u> </u></th><th>31</th></r<></th>	:0.2 <0	0.5 <1	1 <2	<1	<0.1	i <0.1	1 <0.1	1 <0.1	1 <0.1	. <0.1	⊥ 0.1	0.1	< 0.1	< 0.1	. <0.2	2 0.0	5 <0.1	1 <0.	.1 <0	.1 <0	1 <0	.1 <0	.1 <0	.1 <0	J.1 <ſ	J.1 <0	J.1 <0	J.1 <r< th=""><th>J.1 &lt;0</th><th>J.1 &lt;0</th><th>.1 &lt;0</th><th>0.1 &lt;0</th><th>0.1 &lt;0</th><th>0.1 &lt;</th><th>&lt;0.1 &lt;0</th><th>:0.1 &lt;</th><th>&lt;0.1 &lt;</th><th>&lt; 0.1 &lt;</th><th>&lt; 0.1 &lt;</th><th>&lt;0.1 &lt;</th><th>&lt;0.1 &lt;</th><th>0.1 &lt;0</th><th>J.1 &lt;0</th><th>J.1 &lt;0</th><th>.1 &lt;0.</th><th>.1 &lt;0.</th><th>1 &lt;0.1</th><th>1 &lt; 0.1</th><th>&lt;0.1</th><th>&lt; 0.1</th><th>1 &lt;0.1</th><th>&lt; 0.1</th><th>&lt;4</th><th>&lt; 0.4</th><th>+ 110</th><th>J 21</th><th>1 12</th><th>. &lt;0.1</th><th><u> </u></th><th>31</th></r<>	J.1 <0	J.1 <0	.1 <0	0.1 <0	0.1 <0	0.1 <	<0.1 <0	:0.1 <	<0.1 <	< 0.1 <	< 0.1 <	<0.1 <	<0.1 <	0.1 <0	J.1 <0	J.1 <0	.1 <0.	.1 <0.	1 <0.1	1 < 0.1	<0.1	< 0.1	1 <0.1	< 0.1	<4	< 0.4	+ 110	J 21	1 12	. <0.1	<u> </u>	31
duplicate	. MEAN			nc	nc	nc	nc r	nc r	nc no	c nc	nc	nc	nc	. nc	. nc	. nc	nc	0.15	, 0.1	nc	nc	nc	0.07	5 nc	. nr	2 n/	c n	. n	: n	: n	c n	.1C r	IC IV	/C IV	IC P	IC D	.c nr	с п	nc n	c n	nc	nc n	nc i	nc	nc	nc	nc	nc r	ic n	,c nr	ر n	c nr	2 nc	: nc	nc	nc	nc	nc	nc	nc	nc	105	22 ذ	2 12	. nc	34	32.5
	RPD %			nc	nc	nc	nc r	nc r	nc no	c nc	nc	nc	nc	. nc	. nc	. nc	nc	67%	0%	nc	nc	nc	679	6 nc	. nr	с п <sup>,</sup>	c n	: n	c n	c n	c n	IC r	IC II	/C II	IC F	ic n	.c nr	c n	nc n	c n	nc	nc n	nc i	nc	nc	nc	nc	nc r	ic n	ic nr	ic ni	e nr	a no	; nc	nc	nc	nc	nc	nc	nc	nc	10%	6 9%	6 0%	ه nc	24%	s 9%
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Inter	TP1	0-0.3	1	<25	<50 <	<100	<100 <	0.2 <0	).5 <1	1 <2	<1	< 0.1	1 <0.1	1 <0.1	1 <0.1	1 0.1	< 0.1	i 0.3	0.3	0.1	0.1	0.2	. 0.1	. <0.	1 <0	.1 <0	.1 <0	1 <0	.1 <0	.1 <0	.1 <0	J.1 <	J.1 <0	J.1 <0	J.1 <ſ	J.1 <0	1.1 <0	.1 <0	0.1 <0	.1 <0	0.1 <	<0.1 <0	0.1 <	<0.1 <	<0.1 <	< 0.1 <	< 0.1 <	:0.1 <0	0.1 <0	J.1 <0	J.1 <0	.1 <0	.1 <0.	1 <0.	1 <0.1	<0.1	< 0.1	1 <0.1	< 0.1	<4	<0.4	+ 62	. 15	34 ز	< < 0.1	25	32
laboratory	y SDUP4	-		<25	<50 <	<100 ·	<100 <	0.2 <0	).5 <1	1 <2	<1	< 0.1	1 <0.1	1 <0.1	1 <0.1	1 0.2	< 0.1	i 0.4	0.4	0.2	0.2	0.4	. 0.2	2 0.7	2 <0	.1 0.	2 <0	1 <0	.1 <0	.1 <0	.1 <0	J.1 </th <th>J.1 &lt;0</th> <th>J.1 &lt;0</th> <th>J.1 &lt;ſ</th> <th>J.1 &lt;0</th> <th>1.1 &lt;0</th> <th>.1 &lt;0</th> <th>0.1 &lt;0</th> <th>0.1 &lt;0</th> <th>0.1 &lt;</th> <th>&lt;0.1 &lt;0</th> <th>0.1 &lt;</th> <th>&lt;0.1 &lt;</th> <th>&lt; 0.1 &lt;</th> <th>&lt; 0.1 &lt;</th> <th>&lt; 0.1 &lt;</th> <th>:0.1 &lt;0</th> <th>0.1 &lt;0</th> <th>J.1 &lt;0</th> <th>J.1 &lt;0</th> <th>.1 &lt;0</th> <th>.1 &lt;0.</th> <th>.1 &lt;0.</th> <th>1 &lt;0.1</th> <th>&lt;0.1</th> <th>&lt; 0.1</th> <th>1 &lt;0.1</th> <th>&lt; 0.1</th> <th>&lt;4</th> <th>&lt;0.4</th> <th>+ 120</th> <th>J 28</th> <th>3 51</th> <th>. &lt;0.1</th> <th>ء 56</th> <th>60</th>	J.1 <0	J.1 <0	J.1 <ſ	J.1 <0	1.1 <0	.1 <0	0.1 <0	0.1 <0	0.1 <	<0.1 <0	0.1 <	<0.1 <	< 0.1 <	< 0.1 <	< 0.1 <	:0.1 <0	0.1 <0	J.1 <0	J.1 <0	.1 <0	.1 <0.	.1 <0.	1 <0.1	<0.1	< 0.1	1 <0.1	< 0.1	<4	<0.4	+ 120	J 28	3 51	. <0.1	ء 56	60
duplicate	. MEAN			nc	nc	nc	nc r	nc r	nc no	c nc	nc	nc	nc	. nc	. nc	. 0.15	nc د	0.35	0.35 ز	0.15	0.15	0.3 ز	i 0.1	6 0.17	25 nr	c 0.1	25 n	. n	c n	c n	c n	лс г	nc n	ic n	nc n	лс п	C II	c n	nc n	c n	nc	nc n	nc i	nc	nc	nc	nc	nc r	ic n	ic nr	ic n'	c nr	c nr	a ne	nc	nc	nc	nc	nc	nc	nc	91	21	.5 42.	5 nc	40.5	46 ز
	RPD %			nc	nc	nc	nc	nc r	nc no	c nc	nc	nc	nc	. nc	. nc	. <mark>67%</mark>	nc	29%	29%	· 67%	67%	<mark>. 67%</mark>	<mark>6 75</mark> %	<mark>6 120</mark> ′	<mark>%</mark> nr	с <mark>12</mark>	<mark>)%</mark> n	: n	: n	: n	c n	лс г	nc n	ic n	nc n	лс п	/c n/	c n	nc n	c n	nc	nc n	nc i	nc	nc	nc	nc	nc r	ic n	ic nr	ic n'	c nr	e nr	2 nc	nc	nc	nc	nc	nc	nc	nc	64%	<mark>/60</mark> °	<mark>% 40</mark> ?	6 nc	77%	<mark>61%</mark>
Field	TB-S1	mg/	kg	NA	NA	NA	NA <	0.2 <0	).5 <1	1 <2	<1	NA	NA NA	< NA	< NA	< NA	NA	NA	NA	NA	NA	NA	. NA	< NA	4 N/	A N	A N	N N	A N	A N	A N	A P	A N	A N	A N	A N	A N	A N	IA N	A N	NA I	NA N	NA M	NA	NA I	NA I	NA	NA N	IA N	iA N/	A N	A N/	A N/	A NA	A NA	NA	NA	NA	NA	NA	. NA	. NA	4 N/	A NA	< NA	. NA	NA
Blank	8/06/2	2																																																																	
Field	FR-S1-S	5PT μg/L	_	NA	NA	NA	NA ·	<1 <	1 <1	1 <2	<1	NA	NA NA	NA NA	NA NA	NA NA	NA	. NA	. NA	NA	NA	NA	N/	< NA	4 N/	A N	A N	A N	A N	A N	A N	A A	A N	A N	NA N	A N	A N	A N	IA N	A N	NA I	NA N	NA M	NA	NA I	NA I	NA	NA N	IA N	A N	IA N	A N/	A N/	A NA	A NA	NA	NA	NA	NA	NA	. NA	. NA	4 N/	A NA	NA NA	. NA	NA
Rinsate	8/06/21	2																																																																	
Trip	TS-S1			-	-	-	- 10	08% 10	5% 99	% 1039	% 103	% -	-	-	-	-	-	-	-	-	-	-	-	-	-				-	-		-			-						-		-	-	-	-	-	-					-	-	-	-	-	-	-	-	-	-	-		-	-	/
Spike	8/06/2	2																																																																	
	Result	outside of (	QA/QC ac	cceptance	criteria		_																																																												

Preliminary (Stage 1) Site Investigation Glen Innes Hospital, 94 Taylor Street, Glen Innes, NSW E35093UPD





## Appendix D: Borehole and Test pit Logs





	Clier Proje Loca	nt: ect: ition	:	HI PROP 94 TA	POSEI YLOF	D ALTI R STRE	ERATI EET, C	IONS AND ADDITIONS GLEN INNES				
	Job I Date Plan	No.: : 8/6 t Typ	350 6/22 <b>5e:</b>	093UR TS350			Meth Logg	od: SPIRAL AUGER ged/Checked by: R.G.S./P.R.		R D	.L. Surf atum:	<b>ace:</b> ≈ 1067.9m AHD
	Groundwater Record	ES U50 SAMPLES	DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
C	DRY ON OMPLET ION	ſ-			0 -			FILL: Silty clay, medium plasticity, dark brown and red brown, with basalt cobbles.	w>PL			GRASS COVER SCREEN: 10.19kg 0-0.1m NO FCF
					-		CI-CH	Silty CLAY: medium to high plasticity, red brown, with fine to medium grained extremely weathered to highly	w>PL	(St)		O.1-0.6m NO FCF
			<b>-</b>	N > 25 8,25/ 100mm	-	$\sim \sim $	-	\weathered basalt gravel. / Extremely Weathered BASALT: T\Gravelly CLAY, medium plasticity. //	XW	(Hd)		MAYBOLE VOLCANICS
			R	EFUSAL	- 2 - - - - - - - - - - - - - - - - -			END OF BOREHOLE AT 1.3m				- 'TC' BIT REFUSAL
OPYRIGHT					- 6- - - - 7							-

Borehole No. BH2 1/1 SDUP1: 0-0.1m

Client: HI Project: PRO	POSED ALTERA	TIONS AND ADDITIONS		
Job No.: 35093UR Date: 8/6/22 Plant Type: TS350	Me Lo	gged/Checked by: R.G.S./P.R.	R	<b>.L. Surface:</b> ≈ 1068.25m atum: AHD
Groundwater Record ES DS DS DS Field Tests	Depth (m) Graphic Log Unified	DESCRIPTION	Moisture Condition/ Weathering Strength/ Rel. Density	Hand Penetrometer Readings (kPa.) KPa.)
DRY ON COMPLET- ION I I I I I I I I I I I I I I I I I I		I       Silty CLAY: high plasticity, red brown and brown, with basalt cobbles and boulders, high strength.         Silty CLAY: high plasticity, red brown and brown, with basalt cobbles and boulders, high strength with bands of extremely weathered basalt.         END OF BOREHOLE AT 1.6m	w>PL St VSt	GRASS COVER TOP 100mm ROOT AFFECTED SCREEN: 11.93kg 0-0.1m NO FCF SCREEN: 2.93kg 0.1-0.6m NO FCF RESIDUAL TC' BIT REFUSAL - - - - - - - - - - - - -



[	Clier	nt:	HI								
	Proje	ect:	PROF	POSEI	D ALT	ERAT	ONS AND ADDITIONS				
	Loca	tion:	94 TA	YLOF	R STRI	EET, C	GLEN INNES				
	Job	No.:	35093UR			Meth	od: SPIRAL AUGER		R	.L. Surf	ace: ≈ 1067.5m
	Plan	: 8/6/ t <b>Tvp</b>	/22 e: TS350			Load	ed/Checked by: R.G.S./P.R.		U	atum:	АНО
		 				92				( i	
	Groundwater Record	ES U50 DB SAMPLI	DS   Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa	Remarks
	DRY ON	r-   _		0		СН	TOPSOIL: Silty clay, medium \plasticity, dark brown, with roots.	w>PL w>PL	St-VSt		SCREEN: 12.75kg
	ION			-			Silty CLAY: high plasticity, red brown, with fine to medium grained gravel,			400	NO FCF RESIDUAL
			N = 8 2,4,4	- - 1 -			and iron indurated bands.			220	-
				-	$\square$	CL-CI	Gravelly CLAY: low to medium	<u>-</u>	VSt	350	- 
			N = 25 5,10,15	-	2 5		plasticity, red brown and grey, with basalt gravels, cobble and boulders.				-
				2 -							-
				-	30						-
			N = 20 7 9 11	-	0					350	-
			7,9,11	3 –	p p						-
				-	2						-
				-	6						-
				-							-
			N > 20 13,20/	4		-	Extremely Weathered basalt: gravelly $T_{\rm L}$ CLAY, low to medium plasticity, red	XW	(Hd)		MAYBOLE
			40mm REFUSAL	-			brown and grey. END OF BOREHOLE AT 4.2m				TC' BIT REFUSAL
				-							-
				5 -							_
				-							-
				-							-
				- 6 —						·	-
				-							-
⊢				-							-
YRIGH				_							-
ğ				7							_

Borehole No. BH4 1/1 SDUP2: 0-0.1m

	Clien Proje Locat	t: ct: tion:	HI PROF 94 TA	POSEI YLOF	D ALT R STRI	ERAT EET, C	IONS AND ADDITIONS GLEN INNES				
ľ	Job N Date: Plant	lo.: 3 8/6/2 Type:	5093UR 22 : TS350			Meth Log	od: SPIRAL AUGER ged/Checked by: R.G.S./P.R		R D	L. Surf	<b>ace:</b> ≈ 1067.15m AHD
	Groundwater Record	ES U50 DB SAMPLES	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
C	DRY ON COMPLET ION		N = 14 4,6,8	0 - - - 1 -		СН	FILL: Silty clay, medium plasticity, dark brown and red brown, with basalt cobbles, and fibre cement fragments/ Silty CLAY: high plasticity, red brown, with fine to coarse grained ironstone and basalt gravel, and basalt cobbles.	w>PL w>PL	VSt	220	GRASS COVER TOP 100mm ROOT AFFECTED - SCREEN: 10.55kg 0-0.1m FCF1 TO FCF20 - SCREEN: 9.43kg 0.1-0.25m FCF21 & FCF22
			N = 32 8,18,14							230	RESIDUAL
				3 -			END OF BOREHOLE AT 2.211				
				- - - - -							- - - -
				- - - - -							- 
COPYRIGHT				6 - - - - - - - - - -	-						-



	Client: Project	:	HI PROP	POSEI	) ALTI	ERATI	ONS AND ADDITIONS				
	Locatio	n:	94 TA	YLOR	STR	EET, G	GLEN INNES				
ſ	Job No.	.: 35	093UR			Meth	od: SPIRAL AUGER		R	.L. Surf	ace: ≈ 1067.2m
	Date: 9	)/6/22	2 TS350			Logo	red/Checked by: RGS/PR		D	atum:	AHD
		ທ ທີ	13330			LUGĘ	Jeu/Checkeu by. R.G.S./F.R.			$\widehat{}$	
	Groundwater Record ES	DB SAMPLE	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa	Remarks
	DRY ON			0	X	<u>с</u> ц	FILL: Silty clay, medium plasticity, $\Box$ dark brown, with fine to coarse $\Box$	w>PL	\/ <u></u> \$+		SCREEN: 10.63kg
	ION		N = 9 4,3,6	-		Сп	\grained gravel, and roots. Silty CLAY: high plasticity, red brown, with ironstone and basalt gravel.	W>PL	vət	240	NO FCF SCREEN: 2.95kg 0.1-0.2m NO FCF RESIDUAL
				1							-
			N = 27 11,12,15	2-						350	-
			N > 22	-			as above, but with extremely weathered basalt			320	-
		R	100mm REFUSAL	3 -	X		END OF BOREHOLE AT 3 2m				
				-			END OF BOREHOLE AT 3.211				- -
				- 4 —							-
				-							-
				5 —							-
				-							-
				6 —							-
OPYRIGHT				- - - 7_							-



Clier	nt:	HI								
Proje Loca	ect: ntion:	PROP 94 TA	YLOR	S ALTI STRE	ERATI EET, G	IONS AND ADDITIONS GLEN INNES				
Job Date	<b>No.</b> : 35 : 9/6/22	093UR			Meth	od: SPIRAL AUGER AND DIAMOND CORING		R D	.L. Surf atum:	<b>ace:</b> ≈ 1067.2m AHD
Plan	t Type:	TS350			Logo	ged/Checked by: R.G.S./P.R.				
Groundwater Record	ES U50 DS SAMPLES	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE <sup>-</sup> ION			0 -	XX	СН	FILL: Silty clay, medium plasticity, dark brown, with fine to coarse grained gravel, cobbles, and root \fibres.	w <pl w&gt;PL</pl 	St-VSt		SCREEN: 10.55kg - 0-0.1m NO FCF SCREEN: 8.15kg
		N = 14 5,7,7	- 1 — -			Silty CLAY: high plasticity, red brown, with fine to coarse grained ironstone and basalt gravel and cobbles.				- \0.1-0.4m NO FCF RESIDUAL
			- - - - - - - - - - - - - - - - - - -	$\langle \langle \rangle \rangle$	_	Extremely Weathered basalt: gravelly CLAY, medium plasticity, red brown and grey, with bands of medium to high strength basalt.	XW	Hd		<ul> <li>MAYBOLE VOLCANICS</li> <li>BELOW 1.3m DEPTH BOREHOLE</li> <li>EXTENDED USING</li> <li>NMLC CORE BARREL AND</li> <li>WATER FLUSH</li> <li>-POOR RECOVERY</li> </ul>
OPYRIGHT			- - - - - - - - - - - - - - - - - - -			END OF BOREHOLE AT 3.12				

## JKGeotechnics TEST PIT LOG

Test Pit No. TP1 1/1 SDUP4: 0-0.1m

Client:	HI							
Project: Location:	94 TAYLOF	R STREE	ET, G	LEN INNES				
Job No.: 350 Date: 9/6/22 Plant Type:	093UR -	r	Metho Logg	od: 5T EXCAVATOR ed/Checked by: R.G.S./P.R.		R D	.L. Surf atum:	<b>ace:</b> ≈ 1068.2m AHD
Groundwater Record ES U50 SAMPLES DS	Field Tests Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLE- TION	0		СН	FILL: Silty clay, medium plasticity, brown, red brown, with fine to coarse grained gravel, and roots, trace of \brick fragments.	w>PL w <pl< th=""><th>VSt</th><th></th><th>SCREEN: 10.69kg - 0-0.1m NO FCF SCREEN: 10.78kg</th></pl<>	VSt		SCREEN: 10.69kg - 0-0.1m NO FCF SCREEN: 10.78kg
				Silty CLAY: high plasticity, red brown, with fine to coarse grained ironstone and basalt gravel.			250	NO FCF RESIDUAL
COPYRIGHT				END OF TEST PIT AT 1.1m				

## JKGeotechnics TEST PIT LOG



Client: Project:	HI PROPOSEI	D ALTER/	TIONS AND ADDITIONS				
Location:	94 TAYLOR	STREET	GLEN INNES				
Job No.: 350	93UR	M	thod: 5T EXCAVATOR		R	.L. Surf	ace: ≈ 1068.2m
Date: 9/6/22 Plant Type:	_		nged/Checked by: RGS/PR		D	atum:	AHD
	- 					-	
Groundwater Record ES DS SAMPLE DS	Field Tests Depth (m)	Graphic Log Unified	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa	Remarks
DRY ON COMPLE- TION	0		FILL: Clayey cobbles, brown, medium plasticity clay, with fine to coarse grained gravel.	М			SCREEN: 11.75kg 0-0.1m NO FCF
	-	CI	Silty CLAY: high plasticity, red brown, with fine to coarse grained ironstone, and basalt gravel and cobbles.	w <pl< td=""><td>VSt</td><td>220</td><td>SCREEN: 12.45kg 0.1-0.4m NO FCF</td></pl<>	VSt	220	SCREEN: 12.45kg 0.1-0.4m NO FCF
	1 -					<u>250</u> _,	RESIDUAL
YRGHT							



### **ENVIRONMENTAL LOGS EXPLANATION NOTES**

### INTRODUCTION

These notes have been provided to amplify the environmental report in regard to classification methods, field procedures and certain matters relating to the logging of soil and rock. Not all notes are necessarily relevant to all reports.

Where geotechnical borehole logs are utilised for environmental purpose, reference should also be made to the explanatory notes included in the geotechnical report. Environmental logs are not suitable for geotechnical purposes.

The ground is a product of continuing natural and man-made processes and therefore exhibits a variety of characteristics and properties which vary from place to place and can change with time. Environmental studies include gathering and assimilating limited facts about these characteristics and properties in order to understand or predict the behaviour of the ground on a particular site under certain conditions. This report may contain such facts obtained by inspection, excavation, probing, sampling, testing or other means of investigation. If so, they are directly relevant only to the ground at the place where and time when the investigation was carried out.

#### DESCRIPTION AND CLASSIFICATION METHODS

The methods of description and classification of soils and rocks used in this report are based on Australian Standard 1726:2017 *'Geotechnical Site Investigations'*. In general, descriptions cover the following properties – soil or rock type, colour, structure, strength or density, and inclusions. Identification and classification of soil and rock involves judgement and the Company infers accuracy only to the extent that is common in current geoenvironmental practice.

Soil types are described according to the predominating particle size and behaviour as set out in the attached soil classification table qualified by the grading of other particles present (eg. sandy clay) as set out below:

Soil Classification	Particle Size
Clay	< 0.002mm
Silt	0.002 to 0.075mm
Sand	0.075 to 2.36mm
Gravel	2.36 to 63mm
Cobbles	63 to 200mm
Boulders	> 200mm

Non-cohesive soils are classified on the basis of relative density, generally from the results of Standard Penetration Test (SPT) as below:

Relative Density	SPT 'N' Value (blows/300mm)
Very loose (VL)	< 4
Loose (L)	4 to 10
Medium dense (MD)	10 to 30
Dense (D)	30 to 50
Very Dense (VD)	> 50

Cohesive soils are classified on the basis of strength (consistency) either by use of a hand penetrometer, vane shear, laboratory testing and/or tactile engineering examination. The strength terms are defined as follows.

Classification	Unconfined Compressive Strength (kPa)	Indicative Undrained Shear Strength (kPa)
Very Soft (VS)	≤25	≤12
Soft (S)	> 25 and $\leq$ 50	> 12 and $\leq$ 25
Firm (F)	> 50 and $\leq$ 100	> 25 and $\leq$ 50
Stiff (St)	$>$ 100 and $\leq$ 200	$> 50$ and $\leq 100$
Very Stiff (VSt)	$>$ 200 and $\leq$ 400	$>$ 100 and $\leq$ 200
Hard (Hd)	> 400	> 200
Friable (Fr)	Strength not attainable	– soil crumbles

Rock types are classified by their geological names, together with descriptive terms regarding weathering, strength, defects, etc. Where relevant, further information regarding rock classification is given in the text of the report. In the Sydney Basin, 'shale' is used to describe fissile mudstone, with a weakness parallel to bedding. Rocks with alternating inter-laminations of different grain size (eg. siltstone/claystone and siltstone/fine grained sandstone) are referred to as 'laminite'.

### INVESTIGATION METHODS

The following is a brief summary of investigation methods currently adopted by the Company and some comments on their use and application. All methods except test pits, hand auger drilling and portable Dynamic Cone Penetrometers require the use of a mechanical rig which is commonly mounted on a truck chassis or track base.

**Test Pits:** These are normally excavated with a backhoe or a tracked excavator, allowing close examination of the insitu soils and 'weaker' bedrock if it is safe to descend into the pit. The depth of penetration is limited to about 3m for a backhoe and up to 6m for a large excavator. Limitations of test pits are the problems associated with disturbance and difficulty of reinstatement and the consequent effects on close-by structures. Care must be taken if construction is to be carried out near test pit locations to either properly recompact the backfill during construction or to design and construct the



structure so as not to be adversely affected by poorly compacted backfill at the test pit location.

Hand Auger Drilling: A borehole of 50mm to 100mm diameter is advanced by manually operated equipment. Refusal of the hand auger can occur on a variety of materials such as obstructions within any fill, tree roots, hard clay, gravel or ironstone, cobbles and boulders, and does not necessarily indicate rock level.

**Continuous Spiral Flight Augers:** The borehole is advanced using 75mm to 115mm diameter continuous spiral flight augers, which are withdrawn at intervals to allow sampling and insitu testing. This is a relatively economical means of drilling in clays and in sands above the water table. Samples are returned to the surface by the flights or may be collected after withdrawal of the auger flights, but they can be very disturbed and layers may become mixed. Information from the auger sampling (as distinct from specific sampling by SPTs or undisturbed samples) is of limited reliability due to mixing or softening of samples by groundwater, or uncertainties as to the original depth of the samples. Augering below the groundwater table is of even lesser reliability than augering above the water table.

**Rock Augering:** Use can be made of a Tungsten Carbide (TC) bit for auger drilling into rock to indicate rock quality and continuity by variation in drilling resistance and from examination of recovered rock cuttings. This method of investigation is quick and relatively inexpensive but provides only an indication of the likely rock strength and predicted values may be in error by a strength order. Where rock strengths may have a significant impact on construction feasibility or costs, then further investigation by means of cored boreholes may be warranted.

**Wash Boring:** The borehole is usually advanced by a rotary bit, with water being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be assessed from the cuttings, together with some information from "feel" and rate of penetration.

**Mud Stabilised Drilling:** Either Wash Boring or Continuous Core Drilling can use drilling mud as a circulating fluid to stabilise the borehole. The term 'mud' encompasses a range of products ranging from bentonite to polymers. The mud tends to mask the cuttings and reliable identification is only possible from intermittent intact sampling (eg. from SPT and U50 samples) or from rock coring, etc.

**Continuous Core Drilling:** A continuous core sample is obtained using a diamond tipped core barrel. Provided full core recovery is achieved (which is not always possible in very low strength rocks and granular soils), this technique provides a very reliable (but relatively expensive) method of investigation. In rocks, NMLC or HQ triple tube core barrels, which give a core of about 50mm and 61mm diameter, respectively, is usually used with water flush. The length of core recovered is compared to the length drilled and any length not recovered is shown as NO CORE. The location of NO CORE recovery is determined on site by the supervising engineer; where the location is uncertain, the loss is placed at the bottom of the drill run.

**Standard Penetration Tests:** Standard Penetration Tests (SPT) are used mainly in non-cohesive soils, but can also be used in cohesive soils, as a means of indicating density or strength and also of obtaining a relatively undisturbed sample. The test procedure is

described in Australian Standard 1289.6.3.1–2004 (R2016) 'Methods of Testing Soils for Engineering Purposes, Soil Strength and Consolidation Tests – Determination of the Penetration Resistance of a Soil – Standard Penetration Test (SPT)'.

The test is carried out in a borehole by driving a 50mm diameter split sample tube with a tapered shoe, under the impact of a 63.5kg hammer with a free fall of 760mm. It is normal for the tube to be driven in three successive 150mm increments and the 'N' value is taken as the number of blows for the last 300mm. In dense sands, very hard clays or weak rock, the full 450mm 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 150mm of, say, 4, 6 and 7 blows, as

N = 13 4, 6, 7

 In a case where the test is discontinued short of full penetration, say after 15 blows for the first 150mm and 30 blows for the next 40mm, as

> N > 30 15, 30/40mm

The results of the test can be related empirically to the engineering properties of the soil.

A modification to the SPT is where the same driving system is used with a solid  $60^{\circ}$  tipped steel cone of the same diameter as the SPT hollow sampler. The solid cone can be continuously driven for some distance in soft clays or loose sands, or may be used where damage would otherwise occur to the SPT. The results of this Solid Cone Penetration Test (SCPT) are shown as 'N<sub>c</sub>' on the borehole logs, together with the number of blows per 150mm penetration.

#### LOGS

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

The terms and symbols used in preparation of the logs are defined in the following pages.

Interpretation of the information shown on the logs, and its application to design and construction, should therefore take into account the spacing of boreholes or test pits, the method of drilling or excavation, the frequency of sampling and testing and the possibility of other than 'straight line' variations between the boreholes or test pits. Subsurface conditions between boreholes or test pits may vary significantly from conditions encountered at the borehole or test pit locations.



#### GROUNDWATER

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

- Although groundwater may be present, in low permeability soils it may enter the hole slowly or perhaps not at all during the time it 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 and may not be the same at the time of construction.
- 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 be washed out of the hole or 'reverted' chemically if reliable water observations are to be made.

More reliable measurements can be made by installing standpipes which are read after the groundwater level has stabilised at intervals ranging from several days to 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 perched water tables or surface water.

#### FILL

The presence of fill materials can often be determined only by the inclusion of foreign objects (eg. bricks, steel, etc) or by distinctly unusual colour, texture or fabric. Identification of the extent of fill materials will also depend on investigation methods and frequency. Where natural soils similar to those at the site are used for fill, it may be difficult with limited testing and sampling to reliably assess the extent of the fill.

The presence of fill materials is usually regarded with caution as the possible variation in density and material type is much greater than with natural soil deposits. Consequently, there is an increased risk of adverse environmental characteristics or behaviour. If the volume and nature of fill is of importance to a project, then frequent test pit excavations are preferable to boreholes.

#### LABORATORY TESTING

Laboratory testing has not been undertaken to confirm the soil classification and rock strengths indicated on the environmental logs unless noted in the report.



### SYMBOL LEGENDS



### **CLASSIFICATION OF COARSE AND FINE GRAINED SOILS**

Ma	jor Divisions	Group Symbol	Typical Names	Field Classification of Sand and Gravel	Laboratory Cl	assification	
ianis	GRAVEL (more than half	GW	Gravel and gravel-sand mixtures, little or no fines	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	C <sub>u</sub> >4 1 <c<sub>c&lt;3</c<sub>	
:grained soil (more than 65% of soil excluding oversize fract) greater than 0.075mm)	of coarse fraction is larger than 2.36mm	GP	Gravel and gravel-sand mixtures, little or no fines, uniform gravels	Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	Fails to comply with above	
		GM	Gravel-silt mixtures and gravel- sand-silt mixtures	'Dirty' materials with excess of non-plastic fines, zero to medium dry strength	≥ 12% fines, fines are silty	Fines behave as silt	
		GC	Gravel-clay mixtures and gravel- sand-clay mixtures	'Dirty' materials with excess of plastic fines, medium to high dry strength	≥ 12% fines, fines are clayey	Fines behave as clay	
	SAND (more than half	SW	Sand and gravel-sand mixtures, little or no fines	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	Cu>6 1 <cc<3< td=""></cc<3<>	
	of coarse fraction is smaller than	SP	Sand and gravel-sand mixtures, little or no fines	Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength	≤ 5% fines	Fails to comply with above	
	2.36mm)	2.36mm)	2.36mm)	SM	Sand-silt mixtures	'Dirty' materials with excess of non-plastic fines, zero to medium dry strength	≥ 12% fines, fines are silty
Coairs		SC	Sand-clay mixtures	'Dirty' materials with excess of plastic fines, medium to high dry strength	≥ 12% fines, fines are clayey	N/A	

Major Divisions		Group			Laboratory Classification		
		Symbol	Typical Names	Dry Strength	Dilatancy	Toughness	% < 0.075mm
Bupr	SILT and CLAY ML Inc (low to medium cla		Inorganic silt and very fine sand, rock flour, silty or clayey fine sand or silt with low plasticity	None to low	Slow to rapid	Low	Below A line
are than 35% of soil exclu on is less than 0.075mm)	plasticity)	CL, CI	Inorganic clay of low to medium plasticity, gravelly clay, sandy clay	Medium to high	None to slow	Medium	Above A line
		OL	Organic silt	Low to medium	Slow	Low	Below A line
	SILT and CLAY	MH	Inorganic silt	Low to medium	None to slow	Low to medium	Below A line
soils (m te fracti	(high plasticity)	СН	Inorganic clay of high plasticity	High to very high	None	High	Above A line
e grained s oversize		OH	Organic clay of medium to high plasticity, organic silt	Medium to high	None to very slow	Low to medium	Below A line
,	Highly organic soil	Pt	Peat, highly organic soil	-	-	-	-

### Laboratory Classification Criteria

A well graded coarse grained soil is one for which the coefficient of uniformity Cu > 4 and the coefficient of curvature  $1 < C_c < 3$ . Otherwise, the soil is poorly graded. These coefficients are given by:

$$C_U = \frac{D_{60}}{D_{10}}$$
 and  $C_C = \frac{(D_{30})^2}{D_{10}D_{60}}$ 

Where  $D_{10}$ ,  $D_{30}$  and  $D_{60}$  are those grain sizes for which 10%, 30% and 60% of the soil grains, respectively, are smaller.

### NOTES:

- 1 For a coarse grained soil with a fines content between 5% and 12%, the soil is given a dual classification comprising the two group symbols separated by a dash; for example, for a poorly graded gravel with between 5% and 12% silt fines, the classification is GP-GM.
- 3 Clay soils with liquid limits > 35% and ≤ 50% may be classified as being of medium plasticity.
- 4 The U line on the Modified Casagrande Chart is an approximate upper bound for most natural soils.



### **JK**Environments



### LOG SYMBOLS

Log Column	Symbol	Definition				
Groundwater Record		Standing water level. Time delay following completion of drilling/excavation may be shown.				
	—- <b>c</b> —	Extent of borehole/test pit collapse shortly after drilling/excavation.				
▶		Groundwater seepage into borehole or test pit noted during drilling or excavation.				
Samples	ES U50 DB	Sample taken over depth indicated, for environmental analysis. Undisturbed 50mm diameter tube sample taken over depth indicated. Bulk disturbed sample taken over depth indicated.				
	DS	Small disturbed bag sample taken over depth indicated. Soil sample taken over depth indicated, for asbestos analysis.				
	ASB					
	ASS	Soil sample taken over depth indicated, for acid sulfate soil analysis.				
	SAL	Soil sample taken over depth indicated, for salinity analysis.				
Field Tests	N = 17 4, 7, 10	Standard Penetration Test (SPT) performed between depths indicated by lines. Individual figures show blows per 150mm penetration. 'Refusal' refers to apparent hammer refusal within the corresponding 150mm depth increment.				
	N <sub>c</sub> = 5	Solid Cone Penetration Test (SCPT) performed between depths indicated by lines. Individual				
	7	figures show blows per 150mm penetration for 60° solid cone driven by SPT hammer. 'R' refers				
	3R	to apparent nammer rerusal within the corresponding 150mm depth increment.				
	VNS = 25	Vane shear reading in kPa of undrained shear strength.				
	PID = 100	Photoionisation detector reading in ppm (soil sample headspace test).				
Moisture Condition	w > PL	Moisture content estimated to be greater than plastic limit.				
(Fine Grained Soils)	$w \approx PL$	Moisture content estimated to be approximately equal to plastic limit.				
	w < PL	Moisture content estimated to be less than plastic limit.				
	w≈LL w>LL	Moisture content estimated to be near liquid limit.				
(Coarse Grained Soils)	D	DRY – runs freely through fingers.				
ζ γ	M	MOIST – does not run freely but no free water visible on soil surface.				
	W	WET – free water visible on soil surface.				
Strength (Consistency)	VS	VERY SOFT – unconfined compressive strength $\leq$ 25kPa.				
Cohesive Soils	S	SOFT – unconfined compressive strength > 25kPa and $\leq$ 50kPa.				
	F	FIRM – unconfined compressive strength > 50kPa and $\leq$ 100kPa.				
	St	STIFF – unconfined compressive strength > 100kPa and $\leq$ 200kPa.				
	VSL Hd	VERY STIFF – unconfined compressive strength > 200kPa and $\leq$ 400kPa.				
	Fr	HARD – uncontined compressive strength > 400kPa.				
	( )	FRIABLE – strength not attainable, soil crumbles. Bracketed symbol indicates estimated consistency based on tactile examination or other assessment.				
Density Index/ Relative Density		Density Index (I <sub>D</sub> ) SPT 'N' Value Range Range (%) (Blows/300mm)				
(Cohesionless Soils)	VL	VERY LOOSE $\leq 15$ 0-4				
	L	LOOSE > 15 and $\leq$ 35 4 - 10				
	MD	MEDIUM DENSE > 35 and $\leq 65$ 10 - 30				
	D VD	DENSE > 65 and ≤ 85 30 - 50				
		VERY DENSE > 85 > 50 Brackated symbol indicates estimated density based on ease of drilling or other associated				
	\ /	bracketed symbol indicates estimated density based on ease of drilling or other assessment.				
Hand Penetrometer Readings	300 250	Measures reading in kPa of unconfined compressive strength. Numbers indicate individual test results on representative undisturbed material unless noted otherwise.				

6



Log Column	Symbol	Definition				
Remarks	'V' bit	Hardened steel 'V	' shaped bit.			
	'TC' bit	Twin pronged tun	gsten carbide bit.			
	$T_{60}$	Penetration of auger string in mm under static load of rig applied by drill head hydraulics without rotation of augers.				
	Soil Origin	The geological ori	gin of the soil can generally be described as:			
		RESIDUAL	<ul> <li>soil formed directly from insitu weathering of the underlying rock.</li> <li>No visible structure or fabric of the parent rock.</li> </ul>			
		EXTREMELY WEATHERED	<ul> <li>soil formed directly from insitu weathering of the underlying rock.</li> <li>Material is of soil strength but retains the structure and/or fabric of the parent rock.</li> </ul>			
		ALLUVIAL	- soil deposited by creeks and rivers.			
		ESTUARINE	<ul> <li>soil deposited in coastal estuaries, including sediments caused by inflowing creeks and rivers, and tidal currents.</li> </ul>			
		MARINE	<ul> <li>soil deposited in a marine environment.</li> </ul>			
		AEOLIAN	<ul> <li>soil carried and deposited by wind.</li> </ul>			
		COLLUVIAL	<ul> <li>soil and rock debris transported downslope by gravity, with or without the assistance of flowing water. Colluvium is usually a thick deposit formed from a landslide. The description 'slopewash' is used for thinner surficial deposits.</li> </ul>			
		LITTORAL	<ul> <li>beach deposited soil.</li> </ul>			



### **Classification of Material Weathering**

Term	Abbreviation		Definition	
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	Distinctly Weathered	HW	HW DW	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	(Note 1)	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		Rock shows no sign of decomposition of individual minerals or colour changes.

**NOTE 1:** The term 'Distinctly Weathered' is used where it is not practicable to distinguish between 'Highly Weathered' and 'Moderately Weathered' rock. 'Distinctly Weathered' is defined as follows: '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 weathering products in pores'. There is some change in rock strength.

### **Rock Material Strength Classification**

			Guide to Strength			
Term	Abbreviation	Uniaxial Compressive Strength (MPa)	Point Load Strength Index Is <sub>(50)</sub> (MPa)	Field Assessment		
Very Low Strength	VL	0.6 to 2	0.03 to 0.1	Material crumbles under firm blows with sharp end of pick; can be peeled with knife; too hard to cut a triaxial sample by hand. Pieces up to 30mm thick can be broken by finger pressure.		
Low Strength	L	2 to 6	0.1 to 0.3	Easily scored with a knife; indentations 1mm to 3mm show in the specimen with firm blows of the pick point; has dull sound under hammer. A piece of core 150mm long by 50mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling.		
Medium Strength	М	6 to 20	0.3 to 1	Scored with a knife; a piece of core 150mm long by 50mm diameter can be broken by hand with difficulty.		
High Strength	н	20 to 60	1 to 3	A piece of core 150mm long by 50mm diameter cannot be broken by hand but can be broken by a pick with a single firm blow; rock rings under hammer.		
Very High Strength	VH	60 to 200	3 to 10	Hand specimen breaks with pick after more than one blow; rock rings under hammer.		
Extremely High Strength	EH	> 200	> 10	Specimen requires many blows with geological pick to break through intact material; rock rings under hammer.		



## **Appendix E: Laboratory Report(s) & COC Documents**





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### **CERTIFICATE OF ANALYSIS 297802**

Client Details	
Client	JK Environments
Attention	Mitchell Delaney
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details	
Your Reference	E35093UPD, Glen Innes
Number of Samples	29 Soil, 24 Material, 1 Water
Date samples received	10/06/2022
Date completed instructions received	10/06/2022

### **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 by21/06/2022Date of Issue21/06/2022

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### Asbestos Approved By

Analysed by Asbestos Approved Analyst: Wonnie Condos,Nyovan Moonean Authorised by Asbestos Approved Signatory: Matt Mansfield **Results Approved By** Dragana Tomas, Senior Chemist Kyle Gavrily, Senior Chemist Loren Bardwell, Development Chemist Matt Mansfield, QHSE manager

Steven Luong, Senior Chemist

Authorised By

Nancy Zhang, Laboratory Manager



### Client Reference: E35093UPD, Glen Innes

vTRH(C6-C10)/BTEXN in Soil						
Our Reference		297802-1	297802-5	297802-8	297802-11	297802-13
Your Reference	UNITS	TP1	TP2	BH1	BH2	BH3
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.15
Date Sampled		9/06/2022	9/06/2022	8/06/2022	8/06/2022	8/06/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	15/06/2022	15/06/2022	15/06/2022	15/06/2022	15/06/2022
Date analysed	-	18/06/2022	18/06/2022	18/06/2022	18/06/2022	18/06/2022
TRH C <sub>6</sub> - C <sub>9</sub>	mg/kg	<25	<25	<25	<25	<25
TRH C6 - C10	mg/kg	<25	<25	<25	<25	<25
vTPH C <sub>6</sub> - C <sub>10</sub> less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Naphthalene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	105	88	106	109	108
vTRH(C6-C10)/BTEXN in Soil						
vTRH(C6-C10)/BTEXN in Soil Our Reference		297802-16	297802-19	297802-22	297802-25	297802-52
vTRH(C6-C10)/BTEXN in Soil Our Reference Your Reference	UNITS	297802-16 BH4	297802-19 BH5	297802-22 BH6	297802-25 SDUP1	297802-52 TB-S1
<b>vTRH(C6-C10)/BTEXN in Soil</b> Our Reference Your Reference Depth	UNITS	297802-16 BH4 0-0.1	297802-19 BH5 0-0.1	297802-22 BH6 0-0.1	297802-25 SDUP1 -	297802-52 TB-S1 -
vTRH(C6-C10)/BTEXN in Soil Our Reference Your Reference Depth Date Sampled	UNITS	297802-16 BH4 0-0.1 8/06/2022	297802-19 BH5 0-0.1 9/06/2022	297802-22 BH6 0-0.1 9/06/2022	297802-25 SDUP1 - 8/06/2022	297802-52 TB-S1 - 9/06/2022
vTRH(C6-C10)/BTEXN in Soil Our Reference Your Reference Depth Date Sampled Type of sample	UNITS	297802-16 BH4 0-0.1 8/06/2022 Soil	297802-19 BH5 0-0.1 9/06/2022 Soil	297802-22 BH6 0-0.1 9/06/2022 Soil	297802-25 SDUP1 - 8/06/2022 Soil	297802-52 TB-S1 - 9/06/2022 Soil
vTRH(C6-C10)/BTEXN in Soil Our Reference Your Reference Depth Date Sampled Type of sample Date extracted	UNITS	297802-16 BH4 0-0.1 8/06/2022 Soil 15/06/2022	297802-19 BH5 0-0.1 9/06/2022 Soil 15/06/2022	297802-22 BH6 0-0.1 9/06/2022 Soil 15/06/2022	297802-25 SDUP1 - 8/06/2022 Soil 15/06/2022	297802-52 TB-S1 - 9/06/2022 Soil 15/06/2022
vTRH(C6-C10)/BTEXN in Soil Our Reference Your Reference Depth Date Sampled Type of sample Date extracted Date analysed	UNITS - -	297802-16 BH4 0-0.1 8/06/2022 Soil 15/06/2022 18/06/2022	297802-19 BH5 0-0.1 9/06/2022 Soil 15/06/2022 18/06/2022	297802-22 BH6 0-0.1 9/06/2022 Soil 15/06/2022 18/06/2022	297802-25 SDUP1 - 8/06/2022 Soil 15/06/2022 18/06/2022	297802-52 TB-S1 - 9/06/2022 Soil 15/06/2022 18/06/2022
VTRH(C6-C10)/BTEXN in Soil Our Reference Your Reference Depth Date Sampled Type of sample Date extracted Date analysed TRH C6 - C9	UNITS - - mg/kg	297802-16 BH4 0-0.1 8/06/2022 Soil 15/06/2022 18/06/2022 <25	297802-19 BH5 0-0.1 9/06/2022 Soil 15/06/2022 18/06/2022 <25	297802-22 BH6 0-0.1 9/06/2022 Soil 15/06/2022 18/06/2022 <25	297802-25 SDUP1 - 8/06/2022 Soil 15/06/2022 18/06/2022 <25	297802-52 TB-S1 - 9/06/2022 Soil 15/06/2022 18/06/2022 [NA]
VTRH(C6-C10)/BTEXN in Soil Our Reference Your Reference Depth Date Sampled Type of sample Date extracted Date analysed TRH C6 - C9 TRH C6 - C10	UNITS - mg/kg mg/kg	297802-16 BH4 0-0.1 8/06/2022 Soil 15/06/2022 18/06/2022 <25 <25	297802-19 BH5 0-0.1 9/06/2022 Soil 15/06/2022 18/06/2022 <25 <25	297802-22 BH6 0-0.1 9/06/2022 Soil 15/06/2022 18/06/2022 <25 <25	297802-25 SDUP1 - 8/06/2022 Soil 15/06/2022 18/06/2022 <25 <25	297802-52 TB-S1 - 9/06/2022 Soil 15/06/2022 18/06/2022 [NA] [NA]
VTRH(C6-C10)/BTEXN in Soil Our Reference Your Reference Depth Date Sampled Type of sample Date extracted Date analysed TRH C6 - C9 TRH C6 - C10 VTPH C6 - C10 less BTEX (F1)	UNITS - mg/kg mg/kg mg/kg	297802-16 BH4 0-0.1 8/06/2022 Soil 15/06/2022 18/06/2022 <25 <25 <25	297802-19 BH5 0-0.1 9/06/2022 Soil 15/06/2022 18/06/2022 <25 <25	297802-22 BH6 0-0.1 9/06/2022 Soil 15/06/2022 18/06/2022 <25 <25	297802-25 SDUP1 - 8/06/2022 Soil 15/06/2022 18/06/2022 <25 <25 <25	297802-52 TB-S1 - 9/06/2022 Soil 15/06/2022 18/06/2022 [NA] [NA]
VTRH(C6-C10)/BTEXN in Soil Our Reference Your Reference Depth Date Sampled Date extracted Date analysed TRH C6 - C9 TRH C6 - C10 VTPH C6 - C10 less BTEX (F1) Benzene	UNITS - mg/kg mg/kg mg/kg mg/kg	297802-16 BH4 0-0.1 8/06/2022 Soil 15/06/2022 18/06/2022 <25 <25 <25 <25 <0.2	297802-19 BH5 0-0.1 9/06/2022 Soil 15/06/2022 18/06/2022 <25 <25 <25 <25 <0.2	297802-22 BH6 0-0.1 9/06/2022 Soil 15/06/2022 18/06/2022 <25 <25 <25 <25 <0.2	297802-25 SDUP1 - 8/06/2022 Soil 15/06/2022 18/06/2022 <25 <25 <25 <25 <0.2	297802-52 TB-S1 - 9/06/2022 Soil 15/06/2022 [NA] [NA] [NA] <0.2
vTRH(C6-C10)/BTEXN in SoilOur ReferenceYour ReferenceDepthDate SampledType of sampleDate extractedDate analysedTRH C6 - C9TRH C6 - C10vTPH C6 - C10 less BTEX (F1)BenzeneToluene	UNITS - mg/kg mg/kg mg/kg mg/kg mg/kg	297802-16 BH4 0-0.1 8/06/2022 Soil 15/06/2022 18/06/2022 18/06/2022 <25 <25 <25 <25 <0.2	297802-19 BH5 0-0.1 9/06/2022 Soil 15/06/2022 18/06/2022 <25 <25 <25 <25 <0.2 <0.2	297802-22 BH6 0-0.1 9/06/2022 Soil 15/06/2022 18/06/2022 <25 <25 <25 <25 <0.2	297802-25 SDUP1 - 8/06/2022 Soil 15/06/2022 18/06/2022 18/06/2022 <25 <25 <25 <25 <0.2	297802-52 TB-S1 - 9/06/2022 Soil 15/06/2022 18/06/2022 [NA] [NA] [NA] <0.2 <0.5
vTRH(C6-C10)/BTEXN in SoilOur ReferenceYour ReferenceDepthDate SampledType of sampleDate extractedDate analysedTRH C6 - C9TRH C6 - C10vTPH C6 - C10 less BTEX (F1)BenzeneTolueneEthylbenzene	UNITS - mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg	297802-16 BH4 0-0.1 8/06/2022 Soil 15/06/2022 18/06/2022 (25 <25 <25 <25 <25 <0.2 <0.5 <1	297802-19 BH5 0-0.1 9/06/2022 Soil 15/06/2022 18/06/2022 18/06/2022 <25 <25 <25 <25 <0.2 <0.5 <1	297802-22 BH6 0-0.1 9/06/2022 Soil 15/06/2022 18/06/2022 18/06/2022 <25 <25 <25 <25 <0.2 <0.5 <1	297802-25 SDUP1 - 8/06/2022 Soil 15/06/2022 18/06/2022 18/06/2022 <25 <25 <25 <25 <0.2 <0.5 <1	297802-52 TB-S1 - 9/06/2022 Soil 15/06/2022 18/06/2022 [NA] [NA] [NA] <0.2 <0.5 <1
vTRH(C6-C10)/BTEXN in SoilOur ReferenceYour ReferenceDepthDate SampledType of sampleDate extractedDate analysedTRH C6 - C9TRH C6 - C10vTPH C6 - C10 less BTEX (F1)BenzeneTolueneEthylbenzenem+p-xylene	UNITS - mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg	297802-16 BH4 0-0.1 8/06/2022 Soil 15/06/2022 (18/06/2022 (25 <25 <25 <25 <25 <0.2 <0.2 <0.5 <1	297802-19 BH5 0-0.1 9/06/2022 Soil 15/06/2022 18/06/2022 <25 <25 <25 <25 <0.2 <0.2 <0.5 <1	297802-22 BH6 0-0.1 9/06/2022 Soil 15/06/2022 18/06/2022 <25 <25 <25 <25 <25 <0.2 <0.2 <0.5 <1	297802-25 SDUP1 - 8/06/2022 Soil 15/06/2022 (18/06/2022 (25 <25 <25 <25 <25 <0.2 <0.2 <0.5 <1	297802-52 TB-S1 - 9/06/2022 Soil 15/06/2022 [NA] [NA] (NA] (NA] <0.2 <0.5 <1
VTRH(C6-C10)/BTEXN in SoilOur ReferenceYour ReferenceDepthDate SampledType of sampleDate extractedDate analysedTRH C6 - C9TRH C6 - C10vTPH C6 - C10 less BTEX (F1)BenzeneTolueneEthylbenzenem+p-xyleneo-Xylene	UNITS - - mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg	297802-16 BH4 0-0.1 8/06/2022 Soil 15/06/2022 18/06/2022 (25 <25 <25 <25 <25 <0.2 <0.2 <0.5 <1 <2 <1 <2 <1	297802-19 BH5 0-0.1 9/06/2022 Soil 15/06/2022 18/06/2022 <25 <25 <25 <25 <0.2 <0.2 <0.5 <1 <2 <1 <2 <1	297802-22 BH6 0-0.1 9/06/2022 Soil 15/06/2022 18/06/2022 <25 <25 <25 <25 <0.2 <0.2 <0.5 <1 <2 <1 <2 <1	297802-25 SDUP1 - 8/06/2022 Soil 15/06/2022 18/06/2022 (25 <25 <25 <25 <25 <0.2 <0.2 <0.5 <1 <2 <1 <2 <1	297802-52 TB-S1 - 9/06/2022 Soil 15/06/2022 18/06/2022 (NA] [NA] [NA] (NA] <0.2 <0.5 <1 <1 <2 <1
vTRH(C6-C10)/BTEXN in SoilOur ReferenceYour ReferenceDepthDate SampledType of sampleDate extractedDate analysedTRH C6 - C9TRH C6 - C10vTPH C6 - C10 less BTEX (F1)BenzeneTolueneEthylbenzenem+p-xyleneo-XyleneNaphthalene	UNITS - - mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg	297802-16 BH4 0-0.1 8/06/2022 Soil 15/06/2022 18/06/2022 18/06/2022 <25 <25 <25 <25 <0.2 <0.2 <0.5 <1 <1 <2 <1 <1 <1	297802-19 BH5 0-0.1 9/06/2022 Soil 15/06/2022 18/06/2022 18/06/2022 <25 <25 <25 <25 <0.2 <0.2 <0.2 <0.5 <1 <1 <2 <1 <1	297802-22 BH6 0-0.1 9/06/2022 Soil 15/06/2022 18/06/2022 18/06/2022 <25 <25 <25 <25 <0.2 <0.2 <0.5 <1 <1 <2 <1 <1	297802-25 SDUP1 - 8/06/2022 Soil 15/06/2022 18/06/2022 18/06/2022 25 <25 <25 <25 <0.2 <0.2 <0.5 <1 <1 <2 <1 <1	297802-52 TB-S1 - 9/06/2022 Soil 15/06/2022 18/06/2022 [NA] [NA] (NA] (NA] <0.2 <0.5 <1 <1 <2 <1 <1
vTRH(C6-C10)/BTEXN in SoilOur ReferenceYour ReferenceDepthDate SampledType of sampleDate extractedDate analysedTRH C6 - C9TRH C6 - C10vTPH C6 - C10 less BTEX (F1)BenzeneTolueneEthylbenzenem+p-xyleneo-XyleneNaphthaleneTotal +ve Xylenes	UNITS - mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg	297802-16 BH4 0-0.1 8/06/2022 Soil 15/06/2022 18/06/2022 (25 <25 <25 <25 <25 <0.2 <0.2 <0.2 <0.5 <1 <1 <2 <1 <1 <1 <1	297802-19 BH5 0-0.1 9/06/2022 Soil 15/06/2022 18/06/2022 <18/06/2022 <25 <25 <25 <25 <0.2 <0.2 <0.2 <0.5 <1 <2 <1 <1 <1 <1	297802-22 BH6 0-0.1 9/06/2022 Soil 15/06/2022 18/06/2022 <25 <25 <25 <25 <0.2 <0.2 <0.2 <0.5 <1 <1 <2 <1 <1 <1 <1	297802-25 SDUP1 - 8/06/2022 Soil 15/06/2022 18/06/2022 (25 <25 <25 <25 <25 <0.2 <0.2 <0.2 <0.5 <1 <1 <2 <1 <1 <1 <1	297802-52 TB-S1 - 9/06/2022 Soil 15/06/2022 (NA] (NA] (NA] (NA] (NA] (NA] (NA] (NA]
vTRH(C6-C10)/BTEXN in Soil						
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Our Reference		297802-53				
Your Reference	UNITS	TS-S1				
Depth		-				
Date Sampled		9/06/2022				
Type of sample		Soil				
Date extracted	-	15/06/2022				
Date analysed	-	18/06/2022				
Benzene	mg/kg	108%				
Toluene	mg/kg	105%				
Ethylbenzene	mg/kg	99%				
m+p-xylene	mg/kg	103%				
o-Xylene	mg/kg	103%				
Naphthalene	mg/kg	[NT]				
Total +ve Xylenes	mg/kg	[NT]				
Surrogate aaa-Trifluorotoluene	%	99				

svTRH (C10-C40) in Soil						
Our Reference		297802-1	297802-5	297802-8	297802-11	297802-13
Your Reference	UNITS	TP1	TP2	BH1	BH2	BH3
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.15
Date Sampled		9/06/2022	9/06/2022	8/06/2022	8/06/2022	8/06/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	15/06/2022	15/06/2022	15/06/2022	15/06/2022	15/06/2022
Date analysed	-	16/06/2022	16/06/2022	16/06/2022	16/06/2022	16/06/2022
TRH C <sub>10</sub> - C <sub>14</sub>	mg/kg	<50	<50	<50	<50	<50
TRH C <sub>15</sub> - C <sub>28</sub>	mg/kg	<100	<100	<100	<100	<100
TRH C <sub>29</sub> - C <sub>36</sub>	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50	<50
TRH >C <sub>10</sub> -C <sub>16</sub>	mg/kg	<50	<50	<50	<50	<50
TRH >C <sub>10</sub> - C <sub>16</sub> less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH >C <sub>16</sub> -C <sub>34</sub>	mg/kg	<100	<100	<100	<100	<100
TRH >C <sub>34</sub> -C <sub>40</sub>	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	89	85	84	84	81

SVTRH (C10-C40) IN SOIL					
Our Reference		297802-16	297802-19	297802-22	297802-25
Your Reference	UNITS	BH4	BH5	BH6	SDUP1
Depth		0-0.1	0-0.1	0-0.1	-
Date Sampled		8/06/2022	9/06/2022	9/06/2022	8/06/2022
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	15/06/2022	15/06/2022	15/06/2022	15/06/2022
Date analysed	-	16/06/2022	16/06/2022	16/06/2022	16/06/2022
TRH C <sub>10</sub> - C <sub>14</sub>	mg/kg	<50	<50	<50	<50
TRH C <sub>15</sub> - C <sub>28</sub>	mg/kg	<100	<100	<100	<100
TRH C <sub>29</sub> - C <sub>36</sub>	mg/kg	<100	<100	<100	<100
Total +ve TRH (C10-C36)	mg/kg	<50	<50	<50	<50
TRH >C10 -C16	mg/kg	<50	<50	<50	<50
TRH >C <sub>10</sub> - C <sub>16</sub> less Naphthalene (F2)	mg/kg	<50	<50	<50	<50
TRH >C <sub>16</sub> -C <sub>34</sub>	mg/kg	<100	<100	<100	<100
TRH >C <sub>34</sub> -C <sub>40</sub>	mg/kg	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50
Surrogate o-Terphenyl	%	88	88	82	82

PAHs in Soil						
Our Reference		297802-1	297802-5	297802-8	297802-11	297802-13
Your Reference	UNITS	TP1	TP2	BH1	BH2	BH3
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.15
Date Sampled		9/06/2022	9/06/2022	8/06/2022	8/06/2022	8/06/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	15/06/2022	15/06/2022	15/06/2022	15/06/2022	15/06/2022
Date analysed	-	17/06/2022	17/06/2022	17/06/2022	17/06/2022	17/06/2022
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.3	0.3	<0.1	0.2	0.2
Pyrene	mg/kg	0.3	0.3	<0.1	0.1	0.2
Benzo(a)anthracene	mg/kg	0.1	0.2	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.1	0.2	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	0.2	0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	0.1	0.2	<0.05	0.1	0.09
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	1.4	1.3	<0.05	0.4	0.5
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	98	98	95	96	98

PAHs in Soil					
Our Reference		297802-16	297802-19	297802-22	297802-25
Your Reference	UNITS	BH4	BH5	BH6	SDUP1
Depth		0-0.1	0-0.1	0-0.1	-
Date Sampled		8/06/2022	9/06/2022	9/06/2022	8/06/2022
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	15/06/2022	15/06/2022	15/06/2022	15/06/2022
Date analysed	-	17/06/2022	17/06/2022	17/06/2022	17/06/2022
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.2	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.5	<0.1	<0.1	0.1
Pyrene	mg/kg	0.4	<0.1	<0.1	0.1
Benzo(a)anthracene	mg/kg	0.2	<0.1	<0.1	<0.1
Chrysene	mg/kg	0.2	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	0.3	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	0.2	<0.05	<0.05	0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	0.1	<0.1	<0.1	<0.1
Total +ve PAH's	mg/kg	2.3	<0.05	<0.05	0.3
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5
Surrogate p-Terphenyl-d14	%	105	100	93	94

Organochlorine Pesticides in soil						
Our Reference		297802-1	297802-5	297802-8	297802-11	297802-13
Your Reference	UNITS	TP1	TP2	BH1	BH2	BH3
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.15
Date Sampled		9/06/2022	9/06/2022	8/06/2022	8/06/2022	8/06/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	15/06/2022	15/06/2022	15/06/2022	15/06/2022	15/06/2022
Date analysed	-	17/06/2022	17/06/2022	17/06/2022	17/06/2022	17/06/2022
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
НСВ	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	%	92	93	86	88	89

Organochlorine Pesticides in soil					
Our Reference		297802-16	297802-19	297802-22	297802-25
Your Reference	UNITS	BH4	BH5	BH6	SDUP1
Depth		0-0.1	0-0.1	0-0.1	-
Date Sampled		8/06/2022	9/06/2022	9/06/2022	8/06/2022
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	15/06/2022	15/06/2022	15/06/2022	15/06/2022
Date analysed	-	17/06/2022	17/06/2022	17/06/2022	17/06/2022
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
НСВ	mg/kg	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	96	90	84	86

Organophosphorus Pesticides in Soil						
Our Reference		297802-1	297802-5	297802-8	297802-11	297802-13
Your Reference	UNITS	TP1	TP2	BH1	BH2	BH3
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.15
Date Sampled		9/06/2022	9/06/2022	8/06/2022	8/06/2022	8/06/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	15/06/2022	15/06/2022	15/06/2022	15/06/2022	15/06/2022
Date analysed	-	17/06/2022	17/06/2022	17/06/2022	17/06/2022	17/06/2022
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	%	92	93	86	88	89

Organophosphorus Pesticides in Soil					
Our Reference		297802-16	297802-19	297802-22	297802-25
Your Reference	UNITS	BH4	BH5	BH6	SDUP1
Depth		0-0.1	0-0.1	0-0.1	-
Date Sampled		8/06/2022	9/06/2022	9/06/2022	8/06/2022
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	15/06/2022	15/06/2022	15/06/2022	15/06/2022
Date analysed	-	17/06/2022	17/06/2022	17/06/2022	17/06/2022
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	96	90	84	86

PCBs in Soil						
Our Reference		297802-1	297802-5	297802-8	297802-11	297802-13
Your Reference	UNITS	TP1	TP2	BH1	BH2	BH3
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.15
Date Sampled		9/06/2022	9/06/2022	8/06/2022	8/06/2022	8/06/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	15/06/2022	15/06/2022	15/06/2022	15/06/2022	15/06/2022
Date analysed	-	17/06/2022	17/06/2022	17/06/2022	17/06/2022	17/06/2022
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	92	93	86	88	89

PUBS IN SOIL					
Our Reference		297802-16	297802-19	297802-22	297802-25
Your Reference	UNITS	BH4	BH5	BH6	SDUP1
Depth		0-0.1	0-0.1	0-0.1	-
Date Sampled		8/06/2022	9/06/2022	9/06/2022	8/06/2022
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	15/06/2022	15/06/2022	15/06/2022	15/06/2022
Date analysed	-	17/06/2022	17/06/2022	17/06/2022	17/06/2022
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	96	90	84	86

Acid Extractable metals in soil						
Our Reference		297802-1	297802-5	297802-8	297802-11	297802-13
Your Reference	UNITS	TP1	TP2	BH1	BH2	BH3
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.15
Date Sampled		9/06/2022	9/06/2022	8/06/2022	8/06/2022	8/06/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	16/06/2022	16/06/2022	16/06/2022	16/06/2022	16/06/2022
Date analysed	-	17/06/2022	17/06/2022	17/06/2022	17/06/2022	17/06/2022
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	62	100	82	100	82
Copper	mg/kg	15	25	20	23	20
Lead	mg/kg	34	43	14	12	19
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	25	31	34	38	33
Zinc	mg/kg	32	48	35	34	33

Acid Extractable metals in soil					
Our Reference		297802-16	297802-19	297802-22	297802-25
Your Reference	UNITS	BH4	BH5	BH6	SDUP1
Depth		0-0.1	0-0.1	0-0.1	-
Date Sampled		8/06/2022	9/06/2022	9/06/2022	8/06/2022
Type of sample		Soil	Soil	Soil	Soil
Date prepared	-	16/06/2022	16/06/2022	16/06/2022	16/06/2022
Date analysed	-	20/06/2022	17/06/2022	17/06/2022	17/06/2022
Arsenic	mg/kg	<4	<4	5	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	170	97	31	110
Copper	mg/kg	43	45	9	21
Lead	mg/kg	24	8	20	12
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	52	67	11	30
Zinc	mg/kg	62	42	31	31

Moisture						
Our Reference		297802-1	297802-5	297802-8	297802-11	297802-13
Your Reference	UNITS	TP1	TP2	BH1	BH2	BH3
Depth		0-0.1	0-0.1	0-0.1	0-0.1	0-0.15
Date Sampled		9/06/2022	9/06/2022	8/06/2022	8/06/2022	8/06/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	15/06/2022	15/06/2022	15/06/2022	15/06/2022	15/06/2022
Date analysed	-	16/06/2022	16/06/2022	16/06/2022	16/06/2022	16/06/2022
Moisture	%	11	17	19	23	16
Moisture						
Our Reference		297802-16	297802-19	297802-22	297802-25	
Your Reference	UNITS	BH4	BH5	BH6	SDUP1	
Depth		0-0.1	0-0.1	0-0.1	-	
Date Sampled		8/06/2022	9/06/2022	9/06/2022	8/06/2022	
Type of sample		Soil	Soil	Soil	Soil	
Date prepared	-	15/06/2022	15/06/2022	15/06/2022	15/06/2022	
Date analysed	-	16/06/2022	16/06/2022	16/06/2022	16/06/2022	
Moisture	%	23	21	15	21	

Asbestos ID - soils NEPM - ASB-001						
Our Reference		297802-1	297802-5	297802-8	297802-13	297802-16
Your Reference	UNITS	TP1	TP2	BH1	BH3	BH4
Depth		0-0.1	0-0.1	0-0.1	0-0.15	0-0.1
Date Sampled		9/06/2022	9/06/2022	8/06/2022	8/06/2022	8/06/2022
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	21/06/2022	21/06/2022	21/06/2022	21/06/2022	21/06/2022
Sample mass tested	g	593.81	687.23	611.99	712.31	605
Sample Description	-	Brown coarse- grained soil & rocks				
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg				
		Organic fibres detected				
Trace Analysis	-	No asbestos detected				
Total Asbestos <sup>#1</sup>	g/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Asbestos ID in soil <0.1g/kg*	-	No visible asbestos detected				
ACM >7mm Estimation*	g	-	-	-	-	-
FA and AF Estimation*	g	-	-	-	-	-
ACM >7mm Estimation*	%(w/w)	<0.01	<0.01	<0.01	<0.01	<0.01
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001	<0.001	<0.001

Asbestos ID - soils NEPM - ASB-001				
Our Reference		297802-17	297802-19	297802-22
Your Reference	UNITS	BH4	BH5	BH6
Depth		0.1-0.25	0-0.1	0-0.1
Date Sampled		8/06/2022	9/06/2022	9/06/2022
Type of sample		Soil	Soil	Soil
Date analysed	-	21/06/2022	21/06/2022	21/06/2022
Sample mass tested	g	616.75	508.49	690.23
Sample Description	-	Brown coarse- grained soil & rocks	Brown clayey soil & rocks	Brown coarse- grained soil & rocks
Asbestos ID in soil (AS4964) >0.1g/kg	-	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg	No asbestos detected at reporting limit of 0.1g/kg
		Organic fibres detected	Organic fibres detected	Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected
Total Asbestos <sup>#1</sup>	g/kg	<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
ACM >7mm Estimation*	g	_	_	-
FA and AF Estimation*	g	-	-	-
ACM >7mm Estimation*	%(w/w)	<0.01	<0.01	<0.01
FA and AF Estimation*#2	%(w/w)	<0.001	<0.001	<0.001

Asbestos ID - materials			
Our Reference		297802-28	297802-50
Your Reference	UNITS	FCF1-BH4	FCF23
Depth		0-0.1	Surface
Date Sampled		8/06/2022	9/06/2022
Type of sample		Material	Material
Date analysed	-	16/06/2022	16/06/2022
Mass / Dimension of Sample	-	970g	35g
Sample Description	-	Beige fibre cement material	Beige fibre cement material
Asbestos ID in materials	-	Chrysotile asbestos detected	Chrysotile asbestos detected
Trace Analysis	-	[NT]	[NT]

BTEX in Water		
Our Reference		297802-54
Your Reference	UNITS	FR-S1-SPT
Depth		-
Date Sampled		9/06/2022
Type of sample		Water
Date extracted	-	16/06/2022
Date analysed	-	17/06/2022
Benzene	µg/L	<1
Toluene	μg/L	<1
Ethylbenzene	µg/L	<1
m+p-xylene	μg/L	<2
o-xylene	µg/L	<1
Surrogate Dibromofluoromethane	%	95
Surrogate toluene-d8	%	100
Surrogate 4-BFB	%	101

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.
	<b>NOTE</b> <sup>#1</sup> Total Asbestos g/kg was analysed and reported as per Australian Standard AS4964 (This is the sum of ACM >7mm, <7mm and FA/AF)
	<b>NOTE</b> <sup>#2</sup> 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 actually="" and="" approach="" are="" at="" be="" calculation="" can="" conservative="" contribute="" false="" give="" given="" is="" may="" most="" not="" pahs="" positive="" pql.="" present.<br="" teq="" teqs="" that="" the="" this="" to="">2. 'EQ zero'values are assuming all contributing PAHs reported as <pql and="" approach="" are="" below="" but="" calculation="" conservative="" contribute="" false="" is="" least="" more="" negative="" pahs="" pql.<br="" present="" susceptible="" teq="" teqs="" that="" the="" this="" to="" when="" zero.="">3. 'EQ half PQL'values are assuming all contributing PAHs reported as <pql a="" above.<br="" and="" approaches="" are="" between="" conservative="" half="" hence="" least="" mid-point="" most="" pql.="" stipulated="" the="">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.</pql></pql></pql>
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 CONT	ROL: vTRH	(C6-C10)	/BTEXN in Soil		Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-12	297802-5
Date extracted	-			15/06/2022	1	15/06/2022	15/06/2022		15/06/2022	15/06/2022
Date analysed	-			18/06/2022	1	18/06/2022	18/06/2022		18/06/2022	18/06/2022
TRH C <sub>6</sub> - C <sub>9</sub>	mg/kg	25	Org-023	<25	1	<25	<25	0	95	98
TRH C <sub>6</sub> - C <sub>10</sub>	mg/kg	25	Org-023	<25	1	<25	<25	0	95	98
Benzene	mg/kg	0.2	Org-023	<0.2	1	<0.2	<0.2	0	107	109
Toluene	mg/kg	0.5	Org-023	<0.5	1	<0.5	<0.5	0	101	102
Ethylbenzene	mg/kg	1	Org-023	<1	1	<1	<1	0	89	93
m+p-xylene	mg/kg	2	Org-023	<2	1	<2	<2	0	90	93
o-Xylene	mg/kg	1	Org-023	<1	1	<1	<1	0	110	114
Naphthalene	mg/kg	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	103	1	105	107	2	104	111

QUALITY CONTROL: vTRH(C6-C10)/BTEXN in Soil						Du	plicate	Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	25	15/06/2022	15/06/2022			[NT]
Date analysed	-			[NT]	25	18/06/2022	18/06/2022			[NT]
TRH C <sub>6</sub> - C <sub>9</sub>	mg/kg	25	Org-023	[NT]	25	<25	<25	0		[NT]
TRH C <sub>6</sub> - C <sub>10</sub>	mg/kg	25	Org-023	[NT]	25	<25	<25	0		[NT]
Benzene	mg/kg	0.2	Org-023	[NT]	25	<0.2	<0.2	0		[NT]
Toluene	mg/kg	0.5	Org-023	[NT]	25	<0.5	<0.5	0		[NT]
Ethylbenzene	mg/kg	1	Org-023	[NT]	25	<1	<1	0		[NT]
m+p-xylene	mg/kg	2	Org-023	[NT]	25	<2	<2	0		[NT]
o-Xylene	mg/kg	1	Org-023	[NT]	25	<1	<1	0		[NT]
Naphthalene	mg/kg	1	Org-023	[NT]	25	<1	<1	0		[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	[NT]	25	109	100	9	[NT]	[NT]

QUALITY CO	NTROL: svT	RH (C10-	-C40) in Soil			Du	plicate	Spike Re	Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-12	297802-5
Date extracted	-			15/06/2022	1	15/06/2022	15/06/2022		15/06/2022	15/06/2022
Date analysed	-			16/06/2022	1	16/06/2022	16/06/2022		16/06/2022	16/06/2022
TRH C <sub>10</sub> - C <sub>14</sub>	mg/kg	50	Org-020	<50	1	<50	<50	0	122	127
TRH C <sub>15</sub> - C <sub>28</sub>	mg/kg	100	Org-020	<100	1	<100	<100	0	98	103
TRH C <sub>29</sub> - C <sub>36</sub>	mg/kg	100	Org-020	<100	1	<100	<100	0	83	111
TRH >C <sub>10</sub> -C <sub>16</sub>	mg/kg	50	Org-020	<50	1	<50	<50	0	122	127
TRH >C <sub>16</sub> -C <sub>34</sub>	mg/kg	100	Org-020	<100	1	<100	<100	0	98	103
TRH >C <sub>34</sub> -C <sub>40</sub>	mg/kg	100	Org-020	<100	1	<100	<100	0	83	111
Surrogate o-Terphenyl	%		Org-020	80	1	89	87	2	95	85

QUALITY CONTROL: svTRH (C10-C40) in Soil						Duplicate Spike Reco				covery %
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	25	15/06/2022	15/06/2022		[NT]	[NT]
Date analysed	-			[NT]	25	16/06/2022	16/06/2022		[NT]	[NT]
TRH C <sub>10</sub> - C <sub>14</sub>	mg/kg	50	Org-020	[NT]	25	<50	<50	0	[NT]	[NT]
TRH C <sub>15</sub> - C <sub>28</sub>	mg/kg	100	Org-020	[NT]	25	<100	<100	0	[NT]	[NT]
TRH C <sub>29</sub> - C <sub>36</sub>	mg/kg	100	Org-020	[NT]	25	<100	<100	0	[NT]	[NT]
TRH >C <sub>10</sub> -C <sub>16</sub>	mg/kg	50	Org-020	[NT]	25	<50	<50	0	[NT]	[NT]
TRH >C <sub>16</sub> -C <sub>34</sub>	mg/kg	100	Org-020	[NT]	25	<100	<100	0	[NT]	[NT]
TRH >C <sub>34</sub> -C <sub>40</sub>	mg/kg	100	Org-020	[NT]	25	<100	<100	0	[NT]	[NT]
Surrogate o-Terphenyl	%		Org-020	[NT]	25	82	85	4	[NT]	[NT]

QUALITY CONTROL: PAHs in Soil						Du	Spike Re	covery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-12	297802-5
Date extracted	-			15/06/2022	1	15/06/2022	15/06/2022		15/06/2022	15/06/2022
Date analysed	-			17/06/2022	1	17/06/2022	17/06/2022		17/06/2022	17/06/2022
Naphthalene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	101	97
Acenaphthylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	99	95
Fluorene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	103	99
Phenanthrene	mg/kg	0.1	Org-022/025	<0.1	1	0.1	0.1	0	112	106
Anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	<0.1	1	0.3	0.4	29	114	93
Pyrene	mg/kg	0.1	Org-022/025	<0.1	1	0.3	0.3	0	115	98
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	0.1	0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	<0.1	1	0.1	0.1	0	93	79
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	<0.2	1	0.2	0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	<0.05	1	0.1	0.2	67	94	94
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	93	1	98	102	4	93	94

QUALITY CONTROL: PAHs in Soil				Du	Spike Recovery %					
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	25	15/06/2022	15/06/2022		[NT]	[NT]
Date analysed	-			[NT]	25	17/06/2022	17/06/2022		[NT]	[NT]
Naphthalene	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Acenaphthylene	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Acenaphthene	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Fluorene	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Phenanthrene	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Anthracene	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Fluoranthene	mg/kg	0.1	Org-022/025	[NT]	25	0.1	0.2	67	[NT]	[NT]
Pyrene	mg/kg	0.1	Org-022/025	[NT]	25	0.1	0.1	0	[NT]	[NT]
Benzo(a)anthracene	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Chrysene	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Benzo(b,j+k)fluoranthene	mg/kg	0.2	Org-022/025	[NT]	25	<0.2	<0.2	0	[NT]	[NT]
Benzo(a)pyrene	mg/kg	0.05	Org-022/025	[NT]	25	0.05	0.09	57	[NT]	[NT]
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Surrogate p-Terphenyl-d14	%		Org-022/025	[NT]	25	94	98	4	[NT]	[NT]

QUALITY CONTR	OL: Organo	chlorine F	Pesticides in soil			Du	plicate		Spike Re	covery %
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-12	297802-5
Date extracted	-			15/06/2022	1	15/06/2022	15/06/2022		15/06/2022	15/06/2022
Date analysed	-			17/06/2022	1	17/06/2022	17/06/2022		17/06/2022	17/06/2022
alpha-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	100	96
НСВ	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	110	110
gamma-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	103	97
delta-BHC	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	109	103
Heptachlor Epoxide	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	102	97
gamma-Chlordane	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	107	103
Dieldrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	112	106
Endrin	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	103	94
Endosulfan II	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	96	100
Endrin Aldehyde	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	104	103
Methoxychlor	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	86	1	92	93	1	89	90

QUALITY CONTROL: Organochlorine Pesticides in soil					Duplicate				Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-				25	15/06/2022	15/06/2022		[NT]	[NT]
Date analysed	-				25	17/06/2022	17/06/2022		[NT]	[NT]
alpha-BHC	mg/kg	0.1	Org-022/025		25	<0.1	<0.1	0	[NT]	[NT]
НСВ	mg/kg	0.1	Org-022/025		25	<0.1	<0.1	0	[NT]	[NT]
beta-BHC	mg/kg	0.1	Org-022/025		25	<0.1	<0.1	0	[NT]	[NT]
gamma-BHC	mg/kg	0.1	Org-022/025		25	<0.1	<0.1	0	[NT]	[NT]
Heptachlor	mg/kg	0.1	Org-022/025		25	<0.1	<0.1	0	[NT]	[NT]
delta-BHC	mg/kg	0.1	Org-022/025		25	<0.1	<0.1	0	[NT]	[NT]
Aldrin	mg/kg	0.1	Org-022/025		25	<0.1	<0.1	0	[NT]	[NT]
Heptachlor Epoxide	mg/kg	0.1	Org-022/025		25	<0.1	<0.1	0	[NT]	[NT]
gamma-Chlordane	mg/kg	0.1	Org-022/025		25	<0.1	<0.1	0	[NT]	[NT]
alpha-chlordane	mg/kg	0.1	Org-022/025		25	<0.1	<0.1	0	[NT]	[NT]
Endosulfan I	mg/kg	0.1	Org-022/025		25	<0.1	<0.1	0	[NT]	[NT]
pp-DDE	mg/kg	0.1	Org-022/025		25	<0.1	<0.1	0	[NT]	[NT]
Dieldrin	mg/kg	0.1	Org-022/025		25	<0.1	<0.1	0	[NT]	[NT]
Endrin	mg/kg	0.1	Org-022/025		25	<0.1	<0.1	0	[NT]	[NT]
Endosulfan II	mg/kg	0.1	Org-022/025		25	<0.1	<0.1	0	[NT]	[NT]
pp-DDD	mg/kg	0.1	Org-022/025		25	<0.1	<0.1	0	[NT]	[NT]
Endrin Aldehyde	mg/kg	0.1	Org-022/025		25	<0.1	<0.1	0	[NT]	[NT]
pp-DDT	mg/kg	0.1	Org-022/025		25	<0.1	<0.1	0	[NT]	[NT]
Endosulfan Sulphate	mg/kg	0.1	Org-022/025		25	<0.1	<0.1	0	[NT]	[NT]
Methoxychlor	mg/kg	0.1	Org-022/025		25	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	25	86	92	7	[NT]	[NT]

QUALITY CONTROL: Organophosphorus Pesticides in Soil				Duplicate				Spike Recovery %			
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-12	297802-5	
Date extracted	-			15/06/2022	1	15/06/2022	15/06/2022		15/06/2022	15/06/2022	
Date analysed	-			17/06/2022	1	17/06/2022	17/06/2022		17/06/2022	17/06/2022	
Dichlorvos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	86	84	
Dimethoate	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]	
Diazinon	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]	
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]	
Ronnel	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	97	93	
Fenitrothion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	99	101	
Malathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	96	96	
Chlorpyriphos	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	108	106	
Parathion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	93	91	
Bromophos-ethyl	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]	
Ethion	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	94	104	
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	<0.1	1	<0.1	<0.1	0	[NT]	[NT]	
Surrogate TCMX	%		Org-022/025	86	1	92	93	1	89	90	

QUALITY CONTRO		Du		Spike Recovery %						
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]
Date extracted	-			[NT]	25	15/06/2022	15/06/2022		[NT]	[NT]
Date analysed	-			[NT]	25	17/06/2022	17/06/2022		[NT]	[NT]
Dichlorvos	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Dimethoate	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Diazinon	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos-methyl	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Fenitrothion	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Malathion	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Chlorpyriphos	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Parathion	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-022	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-022/025	[NT]	25	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-022/025	[NT]	25	86	92	7	[NT]	[NT]

QUALITY CONTROL: PCBs in Soil						Duplicate			Spike Recovery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-12	297802-5
Date extracted	-			15/06/2022	1	15/06/2022	15/06/2022		15/06/2022	15/06/2022
Date analysed	-			17/06/2022	1	17/06/2022	17/06/2022		17/06/2022	17/06/2022
Aroclor 1016	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1221	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1232	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1242	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1248	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Aroclor 1254	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	122	100
Aroclor 1260	mg/kg	0.1	Org-021	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate TCMX	%		Org-021	86	1	92	93	1	89	90

QUALIT	QUALITY CONTROL: PCBs in Soil						Duplicate				
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]	
Date extracted	-			[NT]	25	15/06/2022	15/06/2022		[NT]	[NT]	
Date analysed	-			[NT]	25	17/06/2022	17/06/2022		[NT]	[NT]	
Aroclor 1016	mg/kg	0.1	Org-021	[NT]	25	<0.1	<0.1	0	[NT]	[NT]	
Aroclor 1221	mg/kg	0.1	Org-021	[NT]	25	<0.1	<0.1	0	[NT]	[NT]	
Aroclor 1232	mg/kg	0.1	Org-021	[NT]	25	<0.1	<0.1	0	[NT]	[NT]	
Aroclor 1242	mg/kg	0.1	Org-021	[NT]	25	<0.1	<0.1	0	[NT]	[NT]	
Aroclor 1248	mg/kg	0.1	Org-021	[NT]	25	<0.1	<0.1	0	[NT]	[NT]	
Aroclor 1254	mg/kg	0.1	Org-021	[NT]	25	<0.1	<0.1	0	[NT]	[NT]	
Aroclor 1260	mg/kg	0.1	Org-021	[NT]	25	<0.1	<0.1	0	[NT]	[NT]	
Surrogate TCMX	%		Org-021	[NT]	25	86	92	7	[NT]	[NT]	

QUALITY CONTROL: Acid Extractable metals in soil						Du		Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-12	297802-5
Date prepared	-			16/06/2022	1	16/06/2022	16/06/2022		16/06/2022	16/06/2022
Date analysed	-			17/06/2022	1	17/06/2022	17/06/2022		17/06/2022	17/06/2022
Arsenic	mg/kg	4	Metals-020	<4	1	<4	<4	0	86	##
Cadmium	mg/kg	0.4	Metals-020	<0.4	1	<0.4	<0.4	0	89	74
Chromium	mg/kg	1	Metals-020	<1	1	62	70	12	84	103
Copper	mg/kg	1	Metals-020	<1	1	15	17	12	82	87
Lead	mg/kg	1	Metals-020	<1	1	34	35	3	83	78
Mercury	mg/kg	0.1	Metals-021	<0.1	1	<0.1	<0.1	0	111	125
Nickel	mg/kg	1	Metals-020	<1	1	25	26	4	84	70
Zinc	mg/kg	1	Metals-020	<1	1	32	35	9	88	#

QUALITY CONT	QUALITY CONTROL: Acid Extractable metals in soil								Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	[NT]	[NT]	
Date prepared	-			[NT]	25	16/06/2022	16/06/2022		[NT]		
Date analysed	-			[NT]	25	17/06/2022	17/06/2022		[NT]		
Arsenic	mg/kg	4	Metals-020	[NT]	25	<4	<4	0	[NT]		
Cadmium	mg/kg	0.4	Metals-020	[NT]	25	<0.4	<0.4	0	[NT]		
Chromium	mg/kg	1	Metals-020	[NT]	25	110	100	10	[NT]		
Copper	mg/kg	1	Metals-020	[NT]	25	21	18	15	[NT]		
Lead	mg/kg	1	Metals-020	[NT]	25	12	12	0	[NT]		
Mercury	mg/kg	0.1	Metals-021	[NT]	25	<0.1	<0.1	0	[NT]		
Nickel	mg/kg	1	Metals-020	[NT]	25	30	26	14	[NT]		
Zinc	mg/kg	1	Metals-020	[NT]	25	31	29	7	[NT]	[NT]	

QUALITY	QUALITY CONTROL: BTEX in Water					Duplicate Spike Reg				
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			15/06/2022	[NT]		[NT]	[NT]	16/06/2022	[NT]
Date analysed	-			18/06/2022	[NT]		[NT]	[NT]	17/06/2022	[NT]
Benzene	µg/L	1	Org-023	<1	[NT]		[NT]	[NT]	116	[NT]
Toluene	µg/L	1	Org-023	<1	[NT]		[NT]	[NT]	111	[NT]
Ethylbenzene	µg/L	1	Org-023	<1	[NT]		[NT]	[NT]	116	[NT]
m+p-xylene	µg/L	2	Org-023	<2	[NT]		[NT]	[NT]	118	[NT]
o-xylene	µg/L	1	Org-023	<1	[NT]		[NT]	[NT]	116	[NT]
Surrogate Dibromofluoromethane	%		Org-023	96	[NT]		[NT]	[NT]	102	
Surrogate toluene-d8	%		Org-023	99	[NT]		[NT]	[NT]	99	[NT]
Surrogate 4-BFB	%		Org-023	104	[NT]	[NT]	[NT]	[NT]	99	[NT]

<b>Result Definiti</b>	ons
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

<b>Quality Control</b>	I 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**

#### 8 metals in soil:

- # Percent recovery is not possible to report due to the inhomogeneous nature of the element/s in the sample/s. However an acceptable recovery was obtained for the LCS.

- ## Low spike recovery was obtained for this sample. Sample matrix interference is suspected. However, an acceptable recovery was obtained for the LCS.

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.



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	JK Environments
Attention	Mitchell Delaney

Sample Login Details	
Your reference	E35093UPD, Glen Innes
Envirolab Reference	297802
Date Sample Received	10/06/2022
Date Instructions Received	10/06/2022
Date Results Expected to be Reported	20/06/2022

Sample Condition	
Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	29 Soil, 24 Material, 1 Water
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	11
Cooling Method	Ice Pack
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:



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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	PCBs in Soil	Acid Extractable metalsin soil	Asbestos ID - soils NEPM - ASB- 001	Asbestos ID - materials	BTEX in Water	On Hold
TP1-0-0.1	$\checkmark$	✓	✓	✓	$\checkmark$	√	√	$\checkmark$			
TP1-0.1-0.4											$\checkmark$
TP1-0.5-0.6											$\checkmark$
TP1-0.9-1.0											$\checkmark$
TP2-0-0.1	$\checkmark$	✓	$\checkmark$	✓	$\checkmark$	$\checkmark$	1	$\checkmark$			
TP2-0.2-0.4											✓
TP2-0.5-0.7											$\checkmark$
BH1-0-0.1	$\checkmark$	✓	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$			
BH1-0.4-0.6											✓
BH1-1.0-1.2											$\checkmark$
BH2-0-0.1	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	✓				
BH2-0.4-0.6											$\checkmark$
BH3-0-0.15	$\checkmark$	✓	$\checkmark$	$\checkmark$	✓	$\checkmark$	✓	$\checkmark$			
BH3-0.5-0.7											✓
BH3-1.5-1.7											✓
BH4-0-0.1	✓	✓	✓	✓	$\checkmark$	✓	✓	✓			
BH4-0.1-0.25								✓			
BH4-0.5-0.7											✓
BH5-0-0.1	✓	✓	✓	✓	$\checkmark$	✓	✓	$\checkmark$			
BH5-0.1-0.2											$\checkmark$
BH5-0.5-0.7											✓
BH6-0-0.1	✓	✓	✓	✓	✓	$\checkmark$	✓	✓			
BH6-0.2-0.4											✓
BH6-0.5-0.95											✓
SDUP1	✓	✓	✓	✓	✓	$\checkmark$	✓				
SDUP2											✓
SDUP3											✓
FCF1-BH4-0-0.1									✓		
FCF2-BH4-0-0.1											✓
FCF3-BH4-0-0.1											✓
FCF4-BH4-0-0.1											✓
FCF5-BH4-0-0.1											$\checkmark$



Envirolab	Services	Pty	Ltd
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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	PCBs in Soil	Acid Extractable metalsin soil	Asbestos ID - soils NEPM - ASB- 001	Asbestos ID - materials	BTEX in Water	On Hold
FCF6-BH4-0-0.1											$\checkmark$
FCF7-BH4-0-0.1											$\checkmark$
FCF8-BH4-0-0.1											$\checkmark$
FCF9-BH4-0-0.1											$\checkmark$
FCF10-BH4-0-0.1											$\checkmark$
FCF11-BH4-0-0.1											$\checkmark$
FCF12-BH4-0-0.1											$\checkmark$
FCF13-BH4-0-0.1											$\checkmark$
FCF14-BH4-0-0.1											$\checkmark$
FCF15-BH4-0-0.1											$\checkmark$
FCF16-BH4-0-0.1											$\checkmark$
FCF17-BH4-0-0.1											$\checkmark$
FCF18-BH4-0-0.1											$\checkmark$
FCF19-BH4-0-0.1											$\checkmark$
FCF20-BH4-0-0.1											$\checkmark$
FCF21-BH4-0.1-0.2											$\checkmark$
FCF22-BH4-0.1-0.2											$\checkmark$
FCF23-Surface									$\checkmark$		
FCF24-Surface											$\checkmark$
TB-S1	$\checkmark$										
TS-S1	$\checkmark$										
FR-S1-SPT										✓	

The '\screw' 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.

# CUC 1016 \$ 16:49

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TO: ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET				JKE Job E35093UPD III								<u>l:</u>		'nv	iro	nm	en	te	
CHATSWOOD P: (02) 99106 F: (02) 99106	) NSW 2 200 201	067		Date Results STANDARD Required:				REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113											
Attention: Ai	leen			Page:		1 of 3					P: 02-9888 5000 F: 02-9888 5001 Attention: Mitch Delaney mdelaney@ikenvironments.com.au								
Location:	Glen In	ines					Sample Preserved in Esky on Ice												
Sampler:	нw			1							T	ests R	equire	ed	- 				
Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 2	Combo 3a	Combo 6	Asbestos (500ml)	8 Metals	PAHS	ткн/втех	BTEX	Asbestos				
9/06/2022	]	TP1	0-0.1	G, A	0	F: Silty Clay			x	х		3			-				
9/06/20 <u>22</u>	2	TP,1	0.1-0.4	G, A	0	F:.Silty.Clay			l:					<u> </u>					
9/06/2022	3	TP1	0.5- <u>0.6</u>	G, A	0	Silty Clay	<u> </u>			_									
9/06/2022	4	TP1	0.9-1.0	G, A	0.	Silty Clay		<u> </u>						. 			$ \rightarrow$		
9/06/2022	5	TP2	0-0.1	G, A	0	F: Clayey Cobbles	_	<u> </u>	X	х									
9/06/2022	d	TP2	0.2-0.4	G, A	0	F: Clayey Cobbles													
9/06/2022 /	7	TP2	0.5-0.7	G, A	0	Silty Clay													
8/06/2022	8	BH1	0-0,1	G, A	0	F: Silty Clay			x	x	:								
8/06/2022	a	BH1	0.4-0.6	G, A	0	F: Silty Clay				_								_	
8/06/2022	10	ВН1	1.0-1.2	G, A	0.1	Gravelly Clay			· ·							-			
8/06/2022	in	BH2	0-0.1	G, A	0	Silty Clay			x										
8/06/2022	12	BH2	0.4-0.6	G, A	0	Silty Clay													
8/05/2022	12	внз	0-0.15	G, A	0.4	Silty Clay	ľ		x	x									
8/06/2022	14	внз	0.5-0.7	G; A	0	Silty Clay													
8/06/2022	15	вна	1.5-1.7	G, A	0	Silty Clay													
8/05/2022	16	BH4	0-0.1	G, A	.0	F: Silty Clay			<b>X</b> ,	X									
8/06/2022	17	вн4	0.1-0.25	G, A	0	F: Silty Clay				x									
8/05/2022	18	BH4	0.5-0.7	G, A	0	Silty Clay													
9/06/2022	19	BH5	0-0.1	G, A	0	F: Silty Clay			x	x								_	
9/06/2022	20	BH5	0.1-0.2	G, A	0	F: Silty Clay													
9/06/2022	71	вня	0.5-0.7	G, A	0	Silty Clay													
9/06/2022	12	вн6	0-0.1	G, A	0	F: Silty Clay			x	x									
9/05/2022	23	вне	0.2-0.4	G, A	0.1	F: Siltÿ Clay													
9/06/2022	24	вна	0.5-0.95	G, A	NA	Silty Clay													
8/06/2022	75	\$DUP1	-	G	NA,	Soil			x										
8/05/2022	zb	SDUP2	-	G	NA	Soil													
Remarks (co	mment	s/detection l Please w	imits required eigh Fibre Cei	l): ment Frag	ments		Sam G - 2 A - Z P - P	ple Co 50mg liplock lastic	ontain Glass Asbe Bag	ers: Jar stos B	ag								
Relinquished By: MD				Date: 10.6.22				Time:				Received By: Date:							

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<u>TO:</u> ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067				JKE Job 'E35093UPD'						JKEnvironments								
P: (02) 99106	200			Date Res	ults	STANDARD					REAR	OF 11	LS WI	CKS RO	DAD			
F: (02) 99106	201			Required	:			MACQUARIE PARK, NSW 2113						5001				
Attention: Ai	leen			Page: 2 of 3						Attention: Mitch Delaney								
											-1- 7		mdel	anev@	jkenv	ironn	ents.	<u>:om.a</u>
Location:	Glen Ir	nnes					Sample Preserved in Esky on Ice Tests Required											
Sampler:	HW:	:									1		-quire					
Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 2	Combo 3a	Combo 6	Asbestos (500ml)	8 Metals	PAHs	ткн/втех	BTEX	Asbestos			
9/06/2022	27	SDUP3	-	G	NA	Soil												
9/06/2022		SDUP4		G	NA	Soil	2		x		Pleas	e sen	d DUP	to En	virola	b VIC		
8/06/2022	28	FCF1-BH4	0-0.1	A	NA	FCF									х			
8/06/2022	29	FCF2-BH4	0-0.1	А	NA	FCF				<b> </b>								
8/06/2022	30	FCF3-BH4	0-0.1	А	NA	FCF		_										
8/05/2022	31	FCF4-BH4	0-0.1	А	NA	FCF												
8/06/2022	32	FCF5-BH4	0-0.1	A	NA	FCF												
8/06/2022	33	FCF6-BH4	0-0.1	A	NA	FCF												
8/06/2022	34	FCF7-BH4	0-0.1	A	NA	FCF									_			<b> </b>
8/06/2022	35	FCF8-BH4	0-0.1	A	NA	FCF												L.
8/06/2022	36	FCF9-BH4	0-0.1	A	NA	FCF				<u> </u>								
8/06/2022	37	FCF10-BH4	0-0.1	A	NA	FCF		<u> </u>							<b> </b>			
8/06/2022	38	FCF11-BH4	0-0.1	A	NA	FCF		Ĺ				<u> </u>						
8/06/2022	39	FCF12-BH4	0-0.1	Α	NA	FCF				ļ		<b> </b>	-		 		 	<b> </b>
8/06/2022	40	FCF13-BH4	0-0.1	A	NA	FCF					<u> </u>	$\vdash$			<u> </u>			
8/06/2022	41	FCF14-BH4	0-0.1	A	NA	FCF											-	<u> </u>
8/06/2022	40	FCF15-BH4	0-0.1	A	NA	FCF				ŀ						ļ		<u> </u>
8/06/2022	47	FCF16-BH4	0-0.1	A	NA	FCF		ļ										
8/06/2022	44	FCF17-BH4	0-0.1	A	NA	FÖF												
8/06/2022	45	FCF18-BH4	0-0.1	A	NA	FCF							<u> </u>	ļ			<u> </u>	
8/06/2022	46	FCF19-BH4	0-0.1	A	ŃA	FCF												
8/06/2022	47	FCF20-BH4	0-0.1	A	NA	FCF											_	
8/06/2022	48	FCF21-BH4	0.1-0.2	Α.	NA	FCF			Ĺ				·	<u> </u>	<u> </u>			
8/06/2022	49	FCF22-BH4	0.1-0.2	A	NA	FCF		i					<u> </u>					
9/06/2022	50	FCF23	Surface	A	NA	FCF	<u> </u>							1	X			
9/06/2022	51	FCF24	Surface	A	NA	FCF				<u> </u>								
Remarks (co	mment	s/detection l Please weigh	imits require 1 Fibre Cemei	d): nt Fragme	nts		Sam G - 2 A - Z P - P	ple Co 50mg iplock lastic	ntain Glass Asbe Bag	ers: ; Jar :stos B	ag		Ŧ	Z9.	78	02		
Relinquished By: MD				Date: 10.6.22			P - Plast <u>ic Bag</u> Time: (bQØ				Received By: Date: Ohustine 101061					22		

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#### SAMPLE AND CHAIN OF CUSTODY FORM

			S	AMPLE	<u>AND</u>	CHAIN OF	<u> </u>	<u>STO</u>	<u>DY I</u>	<u>FOR</u> I	<u>vi</u>							
TO: ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen				JKE Job Number: Date Results Required:														
						STANDARD	· · · · ·				REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001							
				Page: [3 of 3			····	Attention: Mitch Delaney mdelaney@ikenvironments.co									com.a	
Location:	Glen I	nnes	_							Sam	ple Pr	eserv	ed in l	Esky a	n ice			
Sampler:	нw						_				۲ ر	ests R	equire	ed				
Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 2	Combo 3a	Combo 6	Asbestos (500ml)	8 Metals	PAHs	ткн/втех	BTEX	Asbestos			
8-9/06/22	52	TB-S1	-	G	NA	Soil blank								x				
8-9/06/22	53	TS-S1	-	v	NA	Soil spike				ļ				X				
8/06/2022	54	FR-S1-SPT		2x∨	NA	Water								×				
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Relinquished By: MD Date: 10.6.22					<u>P - Plastic Bag</u> Time: [6 C ()				Received By: Christille				Date: 10/06122					



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 297802-A**

Client Details	
Client	JK Environments
Attention	Mitchell Delaney
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details					
Your Reference	E35093UPD, Glen Innes				
Number of Samples	additional analysis				
Date samples received	10/06/2022				
Date completed instructions received	23/06/2022				

#### **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	30/06/2022				
Date of Issue	30/06/2022				
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Accredited for compliance with ISO/IEC 17025 - Testing. Tests not covered by NATA are denoted with *					

**Results Approved By** 

Diego Bigolin, Inorganics Supervisor Giovanni Agosti, Group Technical Manager Hannah Nguyen, Metals Supervisor Jenny He, Senior Chemist Authorised By

Nancy Zhang, Laboratory Manager

Envirolab Reference: 297802-A Revision No: R00



Page | 1 of 12
Metals from Leaching Fluid pH 2.9 or 5				
Our Reference		297802-A-16	297802-A-19	297802-A-25
Your Reference	UNITS	BH4	BH5	SDUP1
Depth		0-0.1	0-0.1	-
Date Sampled		8/06/2022	9/06/2022	8/06/2022
Type of sample		Soil	Soil	Soil
Date extracted	-	30/06/2022	30/06/2022	30/06/2022
Date analysed	-	30/06/2022	30/06/2022	30/06/2022
pH of soil for fluid# determ.	pH units	8.3	8.2	8.1
pH of soil TCLP (after HCl)	pH units	1.7	1.7	1.7
Extraction fluid used		1	1	1
pH of final Leachate	pH units	4.9	4.9	4.9
Chromium	mg/L	<0.01		<0.01
Nickel	mg/L	<0.02	<0.02	[NA]

Misc Inorg - Soil		
Our Reference		297802-A-19
Your Reference	UNITS	BH5
Depth		0-0.1
Date Sampled		9/06/2022
Type of sample		Soil
Date prepared	-	30/06/2022
Date analysed	-	30/06/2022
pH 1:5 soil:water	pH Units	6.8

CEC		
Our Reference		297802-A-19
Your Reference	UNITS	BH5
Depth		0-0.1
Date Sampled		9/06/2022
Type of sample		Soil
Date prepared	-	30/06/2022
Date analysed	-	30/06/2022
Exchangeable Ca	meq/100g	22
Exchangeable K	meq/100g	1.8
Exchangeable Mg	meq/100g	12
Exchangeable Na	meq/100g	0.2
Cation Exchange Capacity	meq/100g	36

Clay 50-120g		
Our Reference		297802-A-19
Your Reference	UNITS	BH5
Depth		0-0.1
Date Sampled		9/06/2022
Type of sample		Soil
Date prepared	-	28/06/2022
Date analysed	-	29/06/2022
Clay in soils <2µm	% (w/w)	33

Method ID	Methodology Summary
AS1289.3.6.3	Particle Size Distribution using in house method INORG-107 by way of sieving and/or hydrometer sedimentation testing. 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.
Inorg-004	Toxicity Characteristic Leaching Procedure (TCLP) using AS 4439 and USEPA 1311.
	Please note that the mass used may be scaled down from default based on sample mass available.
	Samples are stored at 2-6oC before and after leachate preparation.
Metals-020	Determination of various metals by ICP-AES following buffer determination as per USEPA 1311 and hence AS 4439.3. Extraction Fluid 1 refers to the pH 5.0 buffer and Extraction Fluid 2 is the pH 2.9 buffer.
Metals-020	Determination of exchangeable cations and cation exchange capacity in soils using 1M Ammonium Chloride exchange and ICP-OES analytical finish.

QUALITY CONTROL: Metals from Leaching Fluid pH 2.9 or 5					Duplicate			Spike Recovery %		
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date extracted	-			30/06/2022	[NT]		[NT]	[NT]	30/06/2022	[NT]
Date analysed	-			30/06/2022	[NT]		[NT]	[NT]	30/06/2022	[NT]
Chromium	mg/L	0.01	Metals-020	<0.01	[NT]		[NT]	[NT]	93	[NT]
Nickel	mg/L	0.02	Metals-020	<0.02	[NT]		[NT]	[NT]	94	[NT]

QUALITY CONTROL: Misc Inorg - Soil					Duplicate S			Spike Re	covery %	
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date prepared	-			30/06/2022	[NT]		[NT]	[NT]	30/06/2022	
Date analysed	-			30/06/2022	[NT]		[NT]	[NT]	30/06/2022	[NT]
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	[NT]	[NT]	[NT]	[NT]	100	[NT]

QU	ALITY CONT	ROL: CE	EC			Du	plicate		Spike Re	covery %
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-W1	[NT]
Date prepared	-			30/06/2022	19	30/06/2022	30/06/2022		30/06/2022	
Date analysed	-			30/06/2022	19	30/06/2022	30/06/2022		30/06/2022	
Exchangeable Ca	meq/100g	0.1	Metals-020	<0.1	19	22	25	13	127	
Exchangeable K	meq/100g	0.1	Metals-020	<0.1	19	1.8	2.0	11	129	
Exchangeable Mg	meq/100g	0.1	Metals-020	<0.1	19	12	13	8	126	
Exchangeable Na	meq/100g	0.1	Metals-020	<0.1	19	0.2	0.2	0	115	[NT]

<b>Result Definiti</b>	ons
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

<b>Quality Control</b>	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**

MISC\_INORG\_DRY:pH:Sample was out of the recommended holding time for this analysis.



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	JK Environments
Attention	Mitchell Delaney

Sample Login Details	
Your reference	E35093UPD, Glen Innes
Envirolab Reference	297802-A
Date Sample Received	10/06/2022
Date Instructions Received	23/06/2022
Date Results Expected to be Reported	30/06/2022

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

Com	nment
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:



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	pH of soil for fluid#determ.	pH of soil TCLP (after HCI)	Extraction fluid used	pH of final Leachate	Chromium	Nickel	Misc Inorg - Soil	CEC	Clay 50-120g	On Hold
TP1-0-0.1										✓
TP1-0.1-0.4										$\checkmark$
TP1-0.5-0.6										✓
TP1-0.9-1.0										$\checkmark$
TP2-0-0.1										✓
TP2-0.2-0.4										✓
TP2-0.5-0.7										$\checkmark$
BH1-0-0.1										$\checkmark$
BH1-0.4-0.6										✓
BH1-1.0-1.2										✓
BH2-0-0.1										$\checkmark$
BH2-0.4-0.6										✓
BH3-0-0.15										✓
BH3-0.5-0.7										✓
BH3-1.5-1.7										✓
BH4-0-0.1	✓	✓	✓	✓	✓	✓				
BH4-0.1-0.25										$\checkmark$
BH4-0.5-0.7										$\checkmark$
BH5-0-0.1	✓	✓	✓	✓		✓	$\checkmark$	$\checkmark$	$\checkmark$	
BH5-0.1-0.2										$\checkmark$
BH5-0.5-0.7										$\checkmark$
BH6-0-0.1										$\checkmark$
BH6-0.2-0.4										$\checkmark$
BH6-0.5-0.95										$\checkmark$
SDUP1	✓	✓	✓	✓	✓					
SDUP2										$\checkmark$
SDUP3										$\checkmark$
FCF1-BH4-0-0.1										$\checkmark$
FCF2-BH4-0-0.1										$\checkmark$
FCF3-BH4-0-0.1										$\checkmark$
FCF4-BH4-0-0.1										$\checkmark$
FCF5-BH4-0-0.1										$\checkmark$



Envirolab	Services	Pty Ltd
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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	pH of soil for fluid#determ.	pH of soil TCLP (after HCI)	Extraction fluid used	pH of final Leachate	Chromium	Nickel	Misc Inorg - Soil	CEC	Clay 50-120g	On Hold
FCF6-BH4-0-0.1										✓
FCF7-BH4-0-0.1										✓
FCF8-BH4-0-0.1										✓
FCF9-BH4-0-0.1										✓
FCF10-BH4-0-0.1										✓
FCF11-BH4-0-0.1										$\checkmark$
FCF12-BH4-0-0.1										✓
FCF13-BH4-0-0.1										✓
FCF14-BH4-0-0.1										✓
FCF15-BH4-0-0.1										✓
FCF16-BH4-0-0.1										✓
FCF17-BH4-0-0.1										✓
FCF18-BH4-0-0.1										✓
FCF19-BH4-0-0.1										✓
FCF20-BH4-0-0.1										$\checkmark$
FCF21-BH4-0.1-0.2										✓
FCF22-BH4-0.1-0.2										✓
FCF23-Surface										✓
FCF24-Surface										✓
TB-S1										$\checkmark$
TS-S1										$\checkmark$
FR-S1-SPT										✓

The '\screw' 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.

#### Ming To

From:	Mitchell Delaney <mdelaney@jkenvironments.com.au></mdelaney@jkenvironments.com.au>
Sent:	Thursday, 23 June 2022 2:30 PM
То:	Greta Petzold
Cc:	Samplereceipt
Subject:	RE: Results for Registration 297802 E35093UPD, Glen Innes

**Categories:** 

Additional

CAUTION: This email originated from outside of the organisation. Do not act on instructions, click links or open attachments unless you recognise the sender and know the content is authentic and safe.

Hi All,

Can I please schedule the additional analysis as per below:

19	BH5 (0-0.1m)	pH, CEC and Clay content TCLP nickel	
6)	BH4 (0-0.1m)	TCLP chromium and nickel	
25	SDUP1	TCLP chromium	

Pef: 297802-A 7A7: Standard. Dre: 30/06/2022. M1

Many thanks,

Regards Mitchell Delaney Senior Associate | Environmental Scientist



T: +617 3709 9799 D: 0405 140 181 E: <u>MDelaney@jkenvironments.com.au</u> www.jkgeotechnics.com.au Brisbane Office Level 22, 69 Ann Street BRISBANE QLD 4000 Sunshine Coast Office 8 Innovation Parkway BIRTINYA QLD 4575

# **JK**Environments

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From: Greta Petzold <GPetzold@envirolab.com.au> Sent: Tuesday, 21 June 2022 2:48 PM To: Mitchell Delaney <MDelaney@jkenvironments.com.au> Subject: Results for Registration 297802 E35093UPD, Glen Innes

Please refer to attached for: a copy of the Certificate of Analysis a copy of the COC/paperwork received from you an Excel or .csv file containing the results

Please note that a hard copy will not be posted.



#### Envirolab Services Pty Ltd ABN 37 112 535 645 - 002 25 Research Drive Croydon South VIC 3136 ph 03 9763 2500 fax 03 9763 2633 melbourne@envirolab.com.au www.envirolab.com.au

## **CERTIFICATE OF ANALYSIS 31971**

Client Details	
Client	JK Environments
Attention	Mitch Delaney
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details	
Your Reference	E35093UPD
Number of Samples	1 Soil
Date samples received	15/06/2022
Date completed instructions received	15/06/2022

#### **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	21/06/2022		
Date of Issue	21/06/2022		
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Accredited for compliance with ISO/IEC 17025 - Testing. Tests not covered by NATA are denoted with *			

<u>Results Approved By</u> Chris De Luca, Operations Manager

#### Authorised By

Pamela Adams, Laboratory Manager



vTRH(C6-C10)/BTEXN in Soil				
Our Reference		31971-1		
Your Reference	UNITS	SDUP4		
Date Sampled		09/06/2022		
Type of sample		Soil		
Date extracted	-	16/06/2022		
Date analysed	-	16/06/2022		
vTRH C <sub>6</sub> - C <sub>9</sub>	mg/kg	<25		
vTRH C6 - C10	mg/kg	<25		
TRH C <sub>6</sub> - C <sub>10</sub> 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 BTEX	mg/kg	<1		
Total +ve Xylenes	mg/kg	<1		
Surrogate aaa-Trifluorotoluene	%	87		

TPH Soil C40 C40 NEDM					
Our Reference		31971-1			
Vour Reference		SDUPA			
Data Caraniad	UNITS				
Date Sampled		09/06/2022			
Type of sample		Soil			
Date extracted	-	16/06/2022			
Date analysed	-	17/06/2022			
TRH C <sub>10</sub> - C <sub>14</sub>	mg/kg	<50			
TRH C <sub>15</sub> - C <sub>28</sub>	mg/kg	<100			
TRH C <sub>29</sub> - C <sub>36</sub>	mg/kg	<100			
Total +ve TRH (C10-C36)	mg/kg	<50			
TRH >C10 -C16	mg/kg	<50			
TRH >C <sub>10</sub> - C <sub>16</sub> less Naphthalene (F2)	mg/kg	<50			
TRH >C <sub>16</sub> -C <sub>34</sub>	mg/kg	<100			
TRH >C <sub>34</sub> -C <sub>40</sub>	mg/kg	<100			
Total +ve TRH (>C10-C40)	mg/kg	<50			
Surrogate o-Terphenyl	%	88			

PAHs in Soil		l.
Our Reference		31971-1
Your Reference	UNITS	SDUP4
Date Sampled		09/06/2022
Type of sample		Soil
Date extracted	-	16/06/2022
Date analysed	-	17/06/2022
Naphthalene	mg/kg	<0.1
Acenaphthylene	mg/kg	<0.1
Acenaphthene	mg/kg	<0.1
Fluorene	mg/kg	<0.1
Phenanthrene	mg/kg	0.2
Anthracene	mg/kg	<0.1
Fluoranthene	mg/kg	0.4
Pyrene	mg/kg	0.4
Benzo(a)anthracene	mg/kg	0.2
Chrysene	mg/kg	0.2
Benzo(b,j&k)fluoranthene	mg/kg	0.4
Benzo(a)pyrene	mg/kg	0.22
Indeno(1,2,3-c,d)pyrene	mg/kg	0.2
Dibenzo(a,h)anthracene	mg/kg	<0.1
Benzo(g,h,i)perylene	mg/kg	0.2
Total +ve PAH's	mg/kg	2.2
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-d <sub>14</sub>	%	90

OCP in Soil		
Our Reference		31971-1
Your Reference	UNITS	SDUP4
Date Sampled		09/06/2022
Type of sample		Soil
Date extracted	-	16/06/2022
Date analysed	-	17/06/2022
alpha-BHC	mg/kg	<0.1
Hexachlorobenzene	mg/kg	<0.1
beta-BHC	mg/kg	<0.1
gamma-BHC	mg/kg	<0.1
Heptachlor	mg/kg	<0.1
delta-BHC	mg/kg	<0.1
Aldrin	mg/kg	<0.1
Heptachlor Epoxide	mg/kg	<0.1
gamma-Chlordane	mg/kg	<0.1
alpha-chlordane	mg/kg	<0.1
Endosulfan I	mg/kg	<0.1
pp-DDE	mg/kg	<0.1
Dieldrin	mg/kg	<0.1
Endrin	mg/kg	<0.1
Endosulfan II	mg/kg	<0.1
pp-DDD	mg/kg	<0.1
Endrin Aldehyde	mg/kg	<0.1
pp-DDT	mg/kg	<0.1
Endosulfan Sulphate	mg/kg	<0.1
Methoxychlor	mg/kg	<0.1
Total +ve reported Aldrin + Dieldrin	mg/kg	<0.1
Total +ve reported DDT+DDD+DDE	mg/kg	<0.1
Surrogate 2-chlorophenol-d4	%	92

OP in Soil		
Our Reference		31971-1
Your Reference	UNITS	SDUP4
Date Sampled		09/06/2022
Type of sample		Soil
Date extracted	-	16/06/2022
Date analysed	-	17/06/2022
Azinphos-methyl	mg/kg	<0.1
Bromophos-ethyl	mg/kg	<0.1
Chlorpyrifos	mg/kg	<0.1
Chlorpyrifos-methyl	mg/kg	<0.1
Diazinon	mg/kg	<0.1
Dichlorovos	mg/kg	<0.1
Dimethoate	mg/kg	<0.1
Ethion	mg/kg	<0.1
Fenitrothion	mg/kg	<0.1
Malathion	mg/kg	<0.1
Parathion	mg/kg	<0.1
Ronnel	mg/kg	<0.1
Surrogate 2-chlorophenol-d4	%	92

PCBs in Soil		
Our Reference		31971-1
Your Reference	UNITS	SDUP4
Date Sampled		09/06/2022
Type of sample		Soil
Date extracted	-	16/06/2022
Date analysed	-	17/06/2022
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 2-fluorobiphenyl	%	90

Acid Extractable metals in soil		
Our Reference		31971-1
Your Reference	UNITS	SDUP4
Date Sampled		09/06/2022
Type of sample		Soil
Date digested	-	16/06/2022
Date analysed	-	16/06/2022
Arsenic	mg/kg	<4
Cadmium	mg/kg	<0.4
Chromium	mg/kg	120
Copper	mg/kg	28
Lead	mg/kg	51
Mercury	mg/kg	<0.1
Nickel	mg/kg	56
Zinc	mg/kg	60

Moisture		
Our Reference		31971-1
Your Reference	UNITS	SDUP4
Date Sampled		09/06/2022
Type of sample		Soil
Date prepared	-	16/06/2022
Date analysed	-	17/06/2022
Moisture	%	20

Method ID	Methodology Summary
Inorg-008	Moisture content determined by heating at 105°C for a minimum of 12 hours.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Metals-021 CV-AAS	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.
	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-021/022	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD or GC-MS.
	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	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.
Org-022	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.
	Note, For OCs 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.

Method ID	Methodology Summary
Org-022	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
	For soil results:-
	<ol> <li>'EQ PQL'values are assuming all contributing PAHs reported as <pql actually="" and="" approach="" are="" at="" be="" calculation="" can="" conservative="" contribute="" false="" give="" given="" is="" li="" may="" most="" not="" pahs="" positive="" pql.="" present.<="" teq="" teqs="" that="" the="" this="" to=""> <li>'EQ zero'values are assuming all contributing PAHs reported as <pql and="" approach="" are="" below="" but="" calculation="" conservative="" contribute="" false="" is="" least="" li="" more="" negative="" pahs="" pql.<="" present="" susceptible="" teq="" teqs="" that="" the="" this="" to="" when="" zero.=""> <li>'EQ half PQL'values are assuming all contributing PAHs reported as <pql a="" above.<="" and="" approaches="" are="" between="" conservative="" half="" hence="" least="" li="" mid-point="" most="" pql.="" stipulated="" the=""> <li>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.</li> </pql></li></pql></li></pql></li></ol>
Org-022	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.
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. 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						Du	plicate		Spike Re	covery %
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			16/06/2022	1	16/06/2022	16/06/2022		16/06/2022	[NT]
Date analysed	-			16/06/2022	1	16/06/2022	16/06/2022		16/06/2022	[NT]
vTRH C <sub>6</sub> - C <sub>9</sub>	mg/kg	25	Org-023	<25	1	<25	<25	0	84	[NT]
vTRH C <sub>6</sub> - C <sub>10</sub>	mg/kg	25	Org-023	<25	1	<25	<25	0	84	[NT]
Benzene	mg/kg	0.2	Org-023	<0.2	1	<0.2	<0.2	0	84	[NT]
Toluene	mg/kg	0.5	Org-023	<0.5	1	<0.5	<0.5	0	86	[NT]
Ethylbenzene	mg/kg	1	Org-023	<1	1	<1	<1	0	80	[NT]
m+p-xylene	mg/kg	2	Org-023	<2	1	<2	<2	0	86	[NT]
o-Xylene	mg/kg	1	Org-023	<1	1	<1	<1	0	79	[NT]
Naphthalene	mg/kg	1	Org-023	<1	1	<1	<1	0	[NT]	[NT]
Surrogate aaa-Trifluorotoluene	%		Org-023	97	1	87	89	2	89	[NT]

QUALITY COM	QUALITY CONTROL: TRH Soil C10-C40 NEPM					Du	plicate		Spike Re	covery %
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			16/06/2022	1	16/06/2022	16/06/2022		16/06/2022	
Date analysed	-			17/06/2022	1	17/06/2022	17/06/2022		17/06/2022	
TRH C <sub>10</sub> - C <sub>14</sub>	mg/kg	50	Org-020	<50	1	<50	<50	0	91	
TRH C <sub>15</sub> - C <sub>28</sub>	mg/kg	100	Org-020	<100	1	<100	<100	0	90	
TRH C <sub>29</sub> - C <sub>36</sub>	mg/kg	100	Org-020	<100	1	<100	<100	0	93	
TRH >C <sub>10</sub> -C <sub>16</sub>	mg/kg	50	Org-020	<50	1	<50	<50	0	91	
TRH >C <sub>16</sub> -C <sub>34</sub>	mg/kg	100	Org-020	<100	1	<100	<100	0	90	
TRH >C <sub>34</sub> -C <sub>40</sub>	mg/kg	100	Org-020	<100	1	<100	<100	0	93	
Surrogate o-Terphenyl	%		Org-020	84	1	88	81	8	73	[NT]

QUALIT	Y CONTRO	L: PAHs	in Soil			Du	plicate		Spike Re	covery %
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			16/06/2022	1	16/06/2022	16/06/2022		16/06/2022	
Date analysed	-			17/06/2022	1	17/06/2022	17/06/2022		17/06/2022	
Naphthalene	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	104	
Acenaphthylene	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	
Acenaphthene	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	106	
Fluorene	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	102	
Phenanthrene	mg/kg	0.1	Org-022	<0.1	1	0.2	0.2	0	106	
Anthracene	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	
Fluoranthene	mg/kg	0.1	Org-022	<0.1	1	0.4	0.4	0	104	
Pyrene	mg/kg	0.1	Org-022	<0.1	1	0.4	0.4	0	108	
Benzo(a)anthracene	mg/kg	0.1	Org-022	<0.1	1	0.2	0.2	0	[NT]	
Chrysene	mg/kg	0.1	Org-022	<0.1	1	0.2	0.2	0	98	
Benzo(b,j&k)fluoranthene	mg/kg	0.2	Org-022	<0.2	1	0.4	0.3	29	[NT]	
Benzo(a)pyrene	mg/kg	0.05	Org-022	<0.05	1	0.22	0.21	5	112	
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-022	<0.1	1	0.2	0.2	0	[NT]	
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	
Benzo(g,h,i)perylene	mg/kg	0.1	Org-022	<0.1	1	0.2	0.2	0	[NT]	
Surrogate p-Terphenyl-d <sub>14</sub>	%		Org-022	94	1	90	94	4	92	[NT]

QUALI	TY CONTRC	)L: OCP i	n Soil			Du	plicate		Spike Re	covery %
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			16/06/2022	[NT]		[NT]	[NT]	16/06/2022	
Date analysed	-			17/06/2022	[NT]		[NT]	[NT]	17/06/2022	
alpha-BHC	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	98	
Hexachlorobenzene	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	[NT]	
beta-BHC	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	94	
gamma-BHC	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	[NT]	
Heptachlor	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	98	
delta-BHC	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	[NT]	
Aldrin	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	104	
Heptachlor Epoxide	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	90	
gamma-Chlordane	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	88	
alpha-chlordane	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	[NT]	
Endosulfan I	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	[NT]	
pp-DDE	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	98	
Dieldrin	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	94	
Endrin	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	[NT]	
Endosulfan II	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	[NT]	
pp-DDD	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	110	
Endrin Aldehyde	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	[NT]	
pp-DDT	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	[NT]	
Endosulfan Sulphate	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	98	
Methoxychlor	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	[NT]	
Surrogate 2-chlorophenol-d4	%		Org-022	78	[NT]		[NT]	[NT]	84	

QUAL	ITY CONTR	OL: OP ir	n Soil			Du	plicate		Spike Re	covery %
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	31971-1
Date extracted	-			16/06/2022	1	16/06/2022	16/06/2022		16/06/2022	16/06/2022
Date analysed	-			17/06/2022	1	17/06/2022	17/06/2022		17/06/2022	17/06/2022
Azinphos-methyl	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Bromophos-ethyl	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Chlorpyrifos	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	90	79
Chlorpyrifos-methyl	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	102	90
Diazinon	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	102	93
Dichlorovos	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Dimethoate	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ethion	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	100	90
Fenitrothion	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	90	79
Malathion	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Parathion	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Ronnel	mg/kg	0.1	Org-022	<0.1	1	<0.1	<0.1	0	[NT]	[NT]
Surrogate 2-chlorophenol-d4	%		Org-022	78	1	92	94	2	84	88

QUALIT		Du	plicate	Spike Recovery %						
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			16/06/2022	[NT]		[NT]	[NT]	16/06/2022	
Date analysed	-			17/06/2022	[NT]		[NT]	[NT]	17/06/2022	
Aroclor 1016	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	[NT]	
Aroclor 1221	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	[NT]	
Aroclor 1232	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	[NT]	
Aroclor 1242	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	[NT]	
Aroclor 1248	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	[NT]	
Aroclor 1254	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	92	
Aroclor 1260	mg/kg	0.1	Org-022	<0.1	[NT]		[NT]	[NT]	[NT]	
Surrogate 2-fluorobiphenyl	%		Org-022	96	[NT]		[NT]	[NT]	98	

QUALITY CONT		Du	plicate	Spike Recovery %						
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date digested	-			16/06/2022	[NT]		[NT]	[NT]	16/06/2022	
Date analysed	-			16/06/2022	[NT]		[NT]	[NT]	16/06/2022	
Arsenic	mg/kg	4	Metals-020 ICP- AES	<4	[NT]		[NT]	[NT]	107	
Cadmium	mg/kg	0.4	Metals-020 ICP- AES	<0.4	[NT]		[NT]	[NT]	107	
Chromium	mg/kg	1	Metals-020 ICP- AES	<1	[NT]		[NT]	[NT]	106	
Copper	mg/kg	1	Metals-020 ICP- AES	<1	[NT]		[NT]	[NT]	107	
Lead	mg/kg	1	Metals-020 ICP- AES	<1	[NT]		[NT]	[NT]	106	
Mercury	mg/kg	0.1	Metals-021 CV-AAS	<0.1	[NT]		[NT]	[NT]	95	
Nickel	mg/kg	1	Metals-020 ICP- AES	<1	[NT]		[NT]	[NT]	107	
Zinc	mg/kg	1	Metals-020 ICP- AES	<1	[NT]		[NT]	[NT]	103	

<b>Result Definiti</b>	ons
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

<b>Quality Control</b>	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.



Envirolab Services Pty Ltd ABN 37 112 535 645 - 002 25 Research Drive Croydon South VIC 3136 ph 03 9763 2500 fax 03 9763 2633 melbourne@envirolab.com.au www.envirolab.com.au

# SAMPLE RECEIPT ADVICE

Client Details	
Client	JK Environments
Attention	Mitch Delaney

Sample Login Details	
Your reference	E35093UPD
Envirolab Reference	31971
Date Sample Received	15/06/2022
Date Instructions Received	15/06/2022
Date Results Expected to be Reported	22/06/2022

Sample Condition	
Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	1 Soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	7.3
Cooling Method	Icepack
Sampling Date Provided	YES

Comments Nil

Please direct any queries to:

Pamela Adams	Chris De Luca
Phone: 03 9763 2500	Phone: 03 9763 2500
Fax: 03 9763 2633	Fax: 03 9763 2633
Email: padams@envirolab.com.au	Email: cdeluca@envirolab.com.au

Analysis Underway, details on the following page:


Envirolab Services Pty Ltd ABN 37 112 535 645 - 002 25 Research Drive Croydon South VIC 3136 ph 03 9763 2500 fax 03 9763 2633 melbourne@envirolab.com.au www.envirolab.com.au



The ' $\checkmark$ ' 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.

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F: (02) 99106200 F: (02) 99106201				Required	:		أستحصي				MAC	QUARI	IE PAR	K, NS	W 211	.3		
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Sampler:	HW	ines	1								T	ests Ro	equire	ed .				
Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 2	Combo 3a	Combo 6	Asbestos (500ml)	8 Metals	PAHS	ткн/втех	BTEX	Asbestos			
9/06/2022	27	SDUP3		G	NA	Soil												
0/06/2022		SDUD4	- <u>.</u>	G	NA,	Soil			X		Pleas	e sen	4. riup	to'En	virola	- b ViC		
0/00/2022	28		0.01	A	NA	FCF			<u></u>	<u> </u>					x			
	20		0.01	• A	NA	FCF			- <u>-</u> `		1							
8/06/2022	0   7.		0.0.1	A	NA	FCF												
8/06/2022	31	CCCA DUA	0-0.1	A	NA	FCF				+	-							
a/Ub/2022	27	FCF5-014	0.01		NA	ÉCÉ				;	[		۰.		:			
8/06/2022	77	FCF6-8H4	0-0.1	A	NA	FCF					1							
8/06/2022	34	FCF7-BH4	0-0.1	A	NA	FCF					1		, i					• •
8/06/2022	17	- FCF8-BH4	0-0.1	A	NA -	FCF -				· ~	-			-	~	-		<i></i>
8/06/2022	26	FCF9-BH4	0-0.1	A A	NA	FCF			•	:								_
8/06/2022	7	FCF10-BH4	0-0.1	A	NA	FCF				1		En I	115		E 11 25	1 ea	Conri C	ė NS
8/06/2022	38	FCF11-BH4	0-0.1	A	NÁ	FCF	- 		•						Pii.	.626 (03) 9	н 33 2£	-3 20
8/06/2022	39	FCF12-BH4	0-0.1	A	NA	FCF						<u> </u>	<u> </u>	31	97			
8/06/2022	40	FCF13-BH4	0-0,1	A	NA	FCF		_		:		Coti   Tim	Pec	diyed;	12	16	2L	
8/06/2022	41	FCF14-BH4	0-0.1	A _	NA	FCF						Fα	hiya.:	3×51	5	2.4	ŀĴ	2
8/05/2022	41	FCF15-BH4	0-0.1	<u>A</u>	NA	FCF		<u> </u>	<u> </u>	:		Con		ei on	Dacio			
8/06/2022	43	FCF16-BH4	0-0.1	A	NA	FCF						Sec.	rity. (	itac.,	Fore	n/Noi	e	
8/06/2022	44	FCF17-BH4	0-0.1	A	NA	FCF		<u> </u>		_		ļ			ļ		<sup>!</sup>	
8/05/2022	45	FCF18-BH4	0-0.1	A	NA	FCF			<u> </u>		1.		<b> </b>	.			-	
8/06/2022	46	FCF19-BH4	0-0.1	A	ŇĄ	FCF			.	<u>_</u>			·[		, <b>, ,</b>	<u> </u>	· · ·	
8/06/2022	47	FCF20-BH4	0-0.1	A	NA <sup>:</sup>	FCF,			<u> </u>	<u> </u>					<b> </b>	-		
8/06/2022	48	FCF21-BH4	0.1-0.2	A	NA	FCF		<u> </u>				<u> </u>						
8/06/2022	49	FCF22-BH4	0.1-0.2	A	NA	FCF	_	Ľ.		-	<u> </u>		<b> </b>	ļ			<u> </u>	
9/06/2022	52	FCF23	Surface	A	NA	FCF				<u>,</u>	_		<u> </u>		X	<u> </u>	<u> </u>	<u> </u>
9/06/2022	51	FCF24	Surface	A	NA	FCF		<u> </u>				<u> </u>			<u> </u>			
Remarks (co	ommeni	ts/detection	limits require h Fibre Ceme	ed): :nt Fragme	ints		Sam G - 2 A - Z P - P	pie Co 50mg iploci lastic	ontain Glass Asbe Bag	iers: s Jar estos f	3ag		Η.	Z9-	78	<i>د</i> ک		
Relinquishe	d By: IV	10 ELSS dryst	D Hine. 22 1115	Date: 10	).6.22		Time [b	00 OQ			Rece	ived I ハリ!	зу: 5+{v	-r		Date { 인	: 1061	22
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# SAMPLE AND CHAIN OF CUSTODY FORM

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#### Envirolab Services Pty Ltd ABN 37 112 535 645 - 002 25 Research Drive Croydon South VIC 3136 ph 03 9763 2500 fax 03 9763 2633 melbourne@envirolab.com.au www.envirolab.com.au

# **CERTIFICATE OF ANALYSIS 31971-A**

Client Details	
Client	JK Environments
Attention	Mitch Delaney
Address	PO Box 976, North Ryde BC, NSW, 1670

Sample Details							
Your Reference	E35093UPD						
Number of Samples	1 Soil						
Date samples received	15/06/2022						
Date completed instructions received	23/06/2022						

## **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	30/06/2022				
Date of Issue	28/06/2022				
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 Chris De Luca, Operations Manager

#### Authorised By

Pamela Adams, Laboratory Manager



Metals from Leachate determ. pH 2.9 or 5							
Our Reference		31971-A-1					
Your Reference	UNITS	SDUP4					
Date Sampled		09/06/2022					
Type of sample		Soil					
Date extracted	-	27/06/2022					
Date analysed	-	28/06/2022					
pH of soil for ASLP	pH units	6.1					
pH of soil ASLP (after HCI)	pH units	2.0					
Extraction fluid used	-	1					
pH of final Leachate	pH units	5.0					
Chromium	mg/L	<0.01					
Nickel	mg/L	0.02					

Method ID	Methodology Summary
EXTRACT.7	Toxicity Characteristic Leaching Procedure (TCLP).
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.
Inorg-004	Toxicity Characteristic Leaching Procedure (TCLP) using AS 4439 and USEPA 1311.
	Please note that the sample mass used may be scaled down from the default based on the sample mass available.
	Samples are stored at 2-6°C before and after leachate preparation.
Metals-020	Determination of various metals by ICP-OES in accordance with USEPA 1311 and hence AS 4439.3. Buffer fluid determination performed only if required, otherwise leaching fluid selection should relate to the relevant landfill category from Table 3 of AS 4439.3 following information from the client. Extraction Fluid 1 refers to pH 5.0 Buffer, while Extraction Fluid 2 is the pH 2.9 Buffer.

QUALITY CONTROL: Metals from Leachate determ. pH 2.9 or 5						Du	Spike Recovery %			
Test Description	Units	PQL	Method	Blank	#	Base	Dup.	RPD	LCS-1	[NT]
Date extracted	-			27/06/2022	[NT]		[NT]	[NT]	27/06/2022	
Date analysed	-			28/06/2022	[NT]		[NT]	[NT]	28/06/2022	
Chromium	mg/L	0.01	Metals-020	<0.01	[NT]		[NT]	[NT]	103	
Nickel	mg/L	0.02	Metals-020	<0.02	[NT]		[NT]	[NT]	102	

<b>Result Definiti</b>	ons
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

<b>Quality Control</b>	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.



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# SAMPLE RECEIPT ADVICE

Client Details	
Client	JK Environments
Attention	Mitch Delaney

Sample Login Details	
Your reference	E35093UPD
Envirolab Reference	31971-A
Date Sample Received	15/06/2022
Date Instructions Received	23/06/2022
Date Results Expected to be Reported	30/06/2022

Sample Condition	
Samples received in appropriate condition for analysis	Yes
No. of Samples Provided	1 Soil
Turnaround Time Requested	Standard
Temperature on Receipt (°C)	7.3
Cooling Method	Icepack
Sampling Date Provided	YES

Comments Nil

Please direct any queries to:

Pamela Adams	Chris De Luca
Phone: 03 9763 2500	Phone: 03 9763 2500
Fax: 03 9763 2633	Fax: 03 9763 2633
Email: padams@envirolab.com.au	Email: cdeluca@envirolab.com.au

Analysis Underway, details on the following page:



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The '\s' 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.

# Ken Nguyen

From:	Mitchell Delaney <mdelaney@jkenvironments.com.au></mdelaney@jkenvironments.com.au>
Sent:	Thursday, 23 June 2022 2:32 PM
To:	Ken Nguyen
Subject:	RE: Results for Registration 31971 E35093UPD
Follow Up Flag:	Follow up
Flag Status:	Flagged

**CAUTION:** This email originated from outside of the organisation. Do not act on instructions, click links or open attachments unless you recognise the sender and know the content is authentic and safe.

Hi Ken,

Can we please schedule additional analysis on the sample SDUP4 for TCLP Chromium and nickel.

Standard TA please.

Many thanks.

Regards Mitchell Delaney Senior Associate | Environmental Scientist



T: +617 3709 9799 D: 0405 140 181 E: <u>MDelaney@jkenvironments.com.au</u> www.jkgeotechnics.com.au Brisbane Office Level 22, 69 Ann Street BRISBANE QLD 4000 Sunshine Coast Office 8 Innovation Parkway BIRTINYA QLD 4575 31971-4 Dr 30/6/22 Std TAT

# **JK**Environments

This email and any attachments are confidential and may be privileged in which case neither is intended to be waived. If you have received this message in error, please notify us and remove it from your system. It is your responsibility to check any attachments for viruses and defects before opening or sending them on. At the Company's discretion we may send a paper copy for confirmation. In the event of any discrepancy between paper and electronic versions the paper version is to take precedence.

From: Ken Nguyen <KNguyen@envirolab.com.au> Sent: Tuesday, 21 June 2022 2:14 PM To: Mitchell Delaney <MDelaney@jkenvironments.com.au> Subject: Results for Registration 31971 E35093UPD

Please refer to attached for: a copy of the Certificate of Analysis a copy of the COC/paperwork received from you ESDAT Extracts an Excel or .csv file containing the results

Please note that a hard copy will not be posted.

Enquiries should be made directly to: melbourne@envirolab.com.au

How did we do? Send Feedback



# **Appendix F: Report Explanatory Notes**





# QA/QC Definitions

The QA/QC terms used in this report are defined below. The definitions are in accordance with US EPA publication SW-846, entitled *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (1994)<sup>18</sup> methods and those described in *Environmental Sampling and Analysis, A Practical Guide,* (1991)<sup>19</sup>. The NEPM (2013) is consistent with these documents.

#### A. <u>Practical Quantitation Limit (PQL), Limit of Reporting (LOR) & Estimated Quantitation Limit (EQL)</u>

These terms all refer to the concentration above which results can be expressed with a minimum 95% confidence level. The laboratory reporting limits are generally set at ten times the standard deviation for the Method Detection Limit for each specific analyte. For the purposes of this report the LOR, PQL, and EQL are considered to be equivalent.

When assessing laboratory data it should be borne in mind that values at or near the PQL have two important limitations: *"The uncertainty of the measurement value can approach, and even equal, the reported value. Secondly, confirmation of the analytes reported is virtually impossible unless identification uses highly selective methods. These issues diminish when reliably measurable amounts of analytes are present. Accordingly, legal and regulatory actions should be limited to data at or above the reliable detection limit" (Keith, 1991).* 

#### B. <u>Precision</u>

The degree to which data generated from repeated measurements differ from one another due to random errors. Precision is measured using the standard deviation or Relative Percent Difference (RPD).

#### C. <u>Accuracy</u>

Accuracy is a measure of the agreement between an experimental result and the true value of the parameter being measured (i.e. the proximity of an averaged result to the true value, where all random errors have been statistically removed). The assessment of accuracy for an analysis can be achieved through the analysis of known reference materials or assessed by the analysis of surrogates, field blanks, trip spikes and matrix spikes. Accuracy is typically reported as percent recovery.

#### D. <u>Representativeness</u>

Representativeness expresses the degree to which sample data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is primarily dependent upon the design and implementation of the sampling program. Representativeness of the data is partially ensured by the avoidance of contamination, adherence to sample handing and analysis protocols and use of proper chain-of-custody and documentation procedures.

#### E. <u>Completeness</u>

Completeness is a measure of the number of valid measurements in a data set compared to the total number of measurements made and overall performance against DQIs. The following information is assessed for completeness:

- Chain-of-custody forms;
- Sample receipt form;
- All sample results reported;
- All blank data reported;



 <sup>&</sup>lt;sup>18</sup> US EPA, (1994). SW-846: Test Methods for Evaluating Solid Waste, Physical/Chemical Methods. (US EPA SW-846)
 <sup>19</sup> Keith., H, (1991). Environmental Sampling and Analysis, A Practical Guide



- All laboratory duplicate and RPDs calculated;
- All surrogate spike data reported;
- All matrix spike and lab control spike (LCS) data reported and RPDs calculated;
- Spike recovery acceptable limits reported; and
- NATA stamp on reports.

#### F. <u>Comparability</u>

Comparability is the evaluation of the similarity of conditions (e.g. sample depth, sample homogeneity) under which separate sets of data are produced. Data comparability checks include a bias assessment that may arise from the following sources:

- Collection and analysis of samples by different personnel; Use of different techniques;
- Collection and analysis by the same personnel using the same methods but at different times; and
- Spatial and temporal changes (due to environmental dynamics).

#### G. <u>Blanks</u>

The purpose of laboratory and field blanks is to check for artefacts and interferences that may arise during sampling, transport and analysis.

#### H. <u>Matrix Spikes</u>

Samples are spiked with laboratory grade standards to detect interactive effects between the sample matrix and the analytes being measured. Matrix Spikes are reported as a percent recovery and are prepared for 1 in every 20 samples. Sample batches that contain less than 20 samples may be reported with a Matrix Spike from another batch. The percent recovery is calculated using the formula below. Acceptable recovery limits are 70% to 130%.

### (Spike Sample Result – Sample Result) x 100 Concentration of Spike Added

#### I. Surrogate Spikes

Samples are spiked with a known concentration of compounds that are chemically related to the analyte being investigated but unlikely to be detected in the environment. The purpose of the Surrogate Spikes is to check the accuracy of the analytical technique. Surrogate Spikes are reported as percent recovery.

#### J. <u>Duplicates</u>

Laboratory duplicates measure precision, expressed as Relative Percent Difference. Duplicates are prepared from a single field sample and analysed as two separate extraction procedures in the laboratory. The RPD is calculated using the formula where D1 is the sample concentration and D2 is the duplicate sample concentration:

```
\frac{(D1 - D2) \times 100}{\{(D1 + D2)/2\}}
```





# Appendix G: Data (QA/QC) Evaluation





# Data (QA/QC) Evaluation

# A. INTRODUCTION

This Data (QA/QC) Evaluation forms part of the validation process for the DQOs documented in Section 6.1 of this report. Checks were made to assess the data in terms of precision, accuracy, representativeness, comparability and completeness. These 'PARCC' parameters are referred to collectively as DQIs and are defined in the Report Explanatory Notes attached in the report appendices.

### 1. Field and Laboratory Considerations

The quality of the analytical data produced for this project has been considered in relation to the following:

- Sample collection, storage, transport and analysis;
- Laboratory PQLs;
- Field QA/QC results; and
- Laboratory QA/QC results.

# 2. Field QA/QC Samples and Analysis

A summary of the field QA/QC samples collected and analysed for this investigation is provided in the following table:

Sample Type	Sample Identification	Frequency (of Sample Type)	Analysis Performed
Intra-laboratory duplicate (soil)	SDUP1 (primary sample BH2 0-0.1m)	Approximately 12.5% of primary samples	Heavy metals, TRH/BTEX, PAHs, OCPs, OPPs and PCBs
Inter-laboratory duplicate (soil)	SDUP4 (primary sample TP1 0-0.1m)	Approximately 12.5% of primary samples	Heavy metals, TRH/BTEX, PAHs, OCPs, OPPs and PCBs
Trip spike (soil)	TS-S1 (8/6/22)	One for the investigation to demonstrate adequacy of preservation, storage and transport methods	BTEX
Filed blank (soil)	TB-S1 (8/6/22)	One for the investigation to demonstrate adequacy of storage and transport methods	BTEX
Rinsate (soil SPT)	FR-S1-SPT (8/6/22)	One for the investigation to demonstrate adequacy of decontamination methods	BTEX

The results for the field QA/QC samples are detailed in the laboratory summary tables (Table S9) attached to the investigation report and are discussed in the subsequent sections of this Data (QA/QC) Evaluation report.



# 3. Data Assessment Criteria

JKE adopted the following criteria for assessing the field and laboratory QA/QC analytical results:

## Field Duplicates

Acceptable targets for precision of field duplicates in this report will be 30% or less, consistent with NEPM (2013). RPD failures will be considered qualitatively on a case-by-case basis taking into account factors such as the concentrations used to calculate the RPD (i.e. RPD exceedance where concentrations are close to the PQL are typically not as significant as those where concentrations are reported at least five or 10 times the PQL), sample type, collection methods and the specific analyte where the RPD exceedance was reported.

### Field/Trip Blanks and Rinsates

Acceptable targets for field blank and rinsate samples in this report will be less than the PQL for organic analytes.

# Trip Spikes

Acceptable targets for trip spike samples in this report will be 70% to 130%.

### Laboratory QA/QC

The suitability of the laboratory data is assessed against the laboratory QA/QC criteria which is outlined in the laboratory reports. These criteria were developed and implemented in accordance with the laboratory's NATA accreditation and align with the acceptable limits for QA/QC samples as outlined in NEPM (2013) and other relevant guidelines.

A summary of the acceptable limits adopted by the primary laboratory (Envirolab) is provided below:

#### RPDs

- Results that are <5 times the PQL, any RPD is acceptable; and
- Results >5 times the PQL, RPDs between 0-50% are acceptable.

#### Laboratory Control Samples (LCS) and Matrix Spikes

- 70-130% recovery acceptable for metals and inorganics;
- 60-140% recovery acceptable for organics; and
- 10-140% recovery acceptable for VOCs.

#### Surrogate Spikes

- 60-140% recovery acceptable for general organics; and
- 10-140% recovery acceptable for VOCs.

#### Method Blanks

• All results less than PQL.



# B. DATA EVALUATION

## 1. Sample Collection, Storage, Transport and Analysis

Samples were collected by trained field staff in accordance. Field sampling procedures were designed to be consistent with relevant guidelines, including NEPM (2013) and other guidelines made under the CLM Act 1997.

Appropriate sample preservation, handling and storage procedures were adopted. Laboratory analysis was undertaken within specified holding times in accordance with Schedule B(3) of NEPM (2013) and the laboratory NATA accredited methodologies.

JKE note that the temperature on receipt of soil samples was reported to be up to 11°C. JKE understand that the temperature is measured at the laboratory using an infrared temperature probe by scanning the outside of the sample container (i.e. one sample jar/container at the time of registering the samples). This procedure is not considered to be robust as there is a potential for the outside of the jar to warm to ambient temperature, or at least to increase from that of the internal contents, relatively quickly. On this basis, JKE is of the opinion that the temperatures reported on the Sample Receipts are unlikely to be reliable or representative of the overall batch. This is further supported by the trip spike recovery results (discussed further below) which reported adequate recovery in the range of 99% to 108%.

Whilst it could be argued that 1% loss of volatiles may have led to these contaminants being under-reported (i.e. the lower end of the trip spike recovery was 99%), it is noted that all BTEX results and volatile TRHs (F1 and F2) were below the PQLs and even a nominal 1% increase of TRH/BTEX concentrations in these samples would not result in exceedance of the SAC.

Envirolab noted that the asbestos results were reported to be consistent with the recommendations in NEPM (2013), however this level of reporting is outside the scope of their NATA accreditation. In the absence of other available analytical methods for asbestos, this was found to be acceptable for the purpose of this investigation.

Review of the project data also indicated that:

- COC documentation was adequately maintained;
- Sample receipt advice documentation was provided for all sample batches;
- All analytical results were reported; and
- Consistent units were used to report the analysis results.

# 2. Laboratory PQLs

Appropriate PQLs were adopted for the analysis and all PQLs were below the SAC.

#### 3. Field QA/QC Sample Results

#### Field Duplicates

The results indicated that field precision was acceptable. RPD non-conformances were reported for some analytes as discussed below:





- An elevated RPD was reported for PAH compounds fluoranthene and benzo(a)pyrene in SDUP2/BH2 (0-0.1m); and
- Elevated RPDs were reported several PAH compounds, chromium, copper, lead, mercury, nickel and zinc in SDUP2/TP2 (0-0.1m).

Values outside the acceptable limits have been attributed to results close to the PQL. The RPD exceedances are not considered to have had an adverse impact on the data set as a whole.

# Trip Blanks

During the investigation, one soil trip blank was placed in the esky during sampling and transported back to the laboratory. The results were all less than the PQLs, therefore cross contamination between samples that may have significance for data validity did not occur.

# Rinsates

All results were below the PQL. This indicated that cross-contamination artefacts associated with sampling equipment were not present and the potential for cross-contamination to have occurred was low.

# Trip Spikes

The results ranged from 99% to 108% and indicated that field preservation methods were appropriate.

# 4. Laboratory QA/QC

The analytical methods implemented by the laboratory were performed in accordance with their NATA accreditation and were consistent with Schedule B(3) of NEPM (2013). The frequency of data reported for the laboratory QA/QC (i.e. duplicates, spikes, blanks, LCS) was considered to be acceptable for the purpose of this investigation.

A review of the laboratory QA/QC data identified the following minor non-conformances:

- Lab report No 297802:
  - The zinc lab spike recovery for JKE sample TP2 (0-0.1m) was not possible due to the inhomogeneous nature of the elements in the sample. The laboratory reported that acceptable recovery was achieved from the LCS;
  - The arsenic lab spike recovery for JKE sample TP2 (0-0.1m) was low. Sample interference was suspected by the laboratory. The laboratory reported that acceptable recovery was achieved from the LCS;
- Lab report No 297802-A: pH the sample BH5 (0-0.1m) was outside of the recommended holding time for pH analysis.

JKE is of the opinion that the laboratory QA non-conformances were minor and were not considered to adversely impact the overall accuracy or precision of the dataset. All laboratory duplicate and triplicate results were assessed against the SAC.



# C. DATA QUALITY SUMMARY

JKE is of the opinion that the data are adequately precise, accurate, representative, comparable and complete to serve as a basis for interpretation to achieve the investigation objectives.

Non-conformances were reported for some field QA/QC samples and laboratory QA/QC analysis. These nonconformances were considered to be sporadic and minor, and were not considered to be indicative of systematic sampling or analytical errors. On this basis, these non-conformances are not considered to materially impact the report findings.



# **Appendix H: Guidelines and Reference Documents**





Acid Sulfate Soils Management Advisory Committee (ASSMAC), (1998). Acid Sulfate Soils Manual

Australian and New Zealand Environment Conservation Council (ANZECC), (2000). Australian and New Zealand Guidelines for Fresh and Marine Water Quality

Canadian Council of Ministers of the Environment, (1999). Canadian soil quality guidelines for the protection of environmental and human health: Benzo(a)Pyrene (1997)

CRC Care, (2011). Technical Report No. 10 – Health screening levels for hydrocarbons in soil and groundwater Part 1: Technical development document

Contaminated Land Management Act 1997 (NSW)

Department of Land and Water Conservation, (1997). 1:25,000 Acid Sulfate Soil Risk Map Series

Managing Land Contamination, Planning Guidelines SEPP55 – Remediation of Land (1998)

National Health and Medical Research Council (NHMRC), (2021). National Water Quality Management Strategy, Australian Drinking Water Guidelines 2011

NSW Department of Environment and Conservation, (2007). Guidelines for the Assessment and Management of Groundwater Contamination

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# Project inbox register

Date	Received from	Role	Enquiry details
			Good morning, I am wanting to enquire about the spaces within the current facility that are part of the redevelopment. I am based in Armidale, however our Tablelands Mental Health staff work out of the Community Health part of the Glen Innes Hospital. We have noted through discussions with our staff that the consult and interview spaces within this section are extremely outdated and in need of some attention. Rather than us undertaking some form of refurbishment, I am wondering if these form part of the redevelopment plan?
	31-May-21 Elle Thomas	Tablelands Mental Health Services, HNELHD	
	14-Jun-22 Tony Brown	Community member	Request to be added to distribution list
	15-Jun-22 Eve Chappell	Glen Innes Historical Society, researcher	@3pm
	15-Jun-22 Tony Brown 15-Jun-22 Melissa Hill 17-Jun-22 Hanna Little	Community member Community member Community member	Follow-up emailI clicked on the link that says ' Register to receive updates about the Glen Innes Hospital'. But thinking about it . Will the 50M be used to provide extra services, renal, cancer treatment, RMI or other specialist services infrastructure? Improved surgery facilities so more can be done locally? Request to be added to distribution list Request to be added to distribution list

		I've had an opportunity to look over the master plan this morning and note there is new staff housing. Kindly provide further information about what this housingis broken down to; i.e.: dormitory style accommodation, share housing, single family units? Is this staff accommodation to be used for current on-call staff, rotational contract staff or to assist in attracting new staff on a more permanent basis and provide them accommodation for a period as part of an attraction incentive? I am a new member of the community and since moving to Glen Innes have registered interest and been accepted on the regional health ministers advisory panel.
17-Jun-22 Hanna Little	Community member	
21-Jun-22 Phillip Perkins	Community member	Request to be added to distribution list
27-Jun-22 Kane Duke	Glen Innes Severn Council, Acting Director of Development, Planning and Regulatory Services	Hello, Council has received a submission regarding the proposed hospital development for your consideration. If you would like to discuss this matter further, please contact me on the below listed number or via return email.

I am an aged pensioner, and a resident of Glen Innes...and I applaud the NSW Government for this vital initiative. Health services in Glen Innes are in a dire situation. One example, is that I have been trying, since March 2021, to find a doctor, in this town, and am unable, because all the local doctors have closed their books, and aren't taking on new patients.

It would be important, in this re-development of the Glen Innes Hospital, to have a Community Health Clinic or " Super Clinic", as they were once called, where doctors could administer health care to the local community!

I have heard that, in this proposed re-development, the existing Nurses' Quarters building, adjacent to the main hospital, will be demolished. I believe that this is a waste of a perfectly good building - once the internal asbestos linings have been, safely removed, it could be converted into the Community Health Clinic, on the ground floor, and specialist consultation rooms, on the second floor....and maybe apartments, as temporary accommodation for doctors and/or other visiting health professionals.

Back in 2010, Glen Innes used to have a Skin Cancer specialist, but because this clinic was unable to find larger premises, the specialist left town. For anyone, in this locality, to see a Skin Cancer specialist, they have to travel to Coffs Harbour or Toowoomba, in Queensland. This situation needs to change, especially with the prevalence of skin cancers, in the New England region...and a designated Skin Cancer clinic should be part of the Glen Innes Hospital re-development. Than you for your consideration

30-Jun-22 Chris Jones

Community member

Good Afternoon, It has been brought to Council's attention that the preliminary master plan for the redevelopment of the Glen Innes Hospital includes the demolition of a local heritage listed building known as the "Isolation Ward". Please see a copy of the letter attached, that was sent to MP Adam Marshall from Graham Wilson on behalf of the Land of the Beardies Museum complex. Council would appreciate an opportunity be provided to have further discussions and consultation in relation to this matter.

	Glen Innes Severn Council, Acting Manager of	
6-Jul-22 Kathleen Taminiau	Planning and Regulatory Services	
		Good morning Kylie,
		There are 3 attachments to this email which summarise the
		concerns from the Glen Innes and District Historical Society in
		relation to the plans for the redevopment of the Glen Innes
		Hospital. These attachments include:-
		1)An overall summary letter, which broadly outlines our
		concerns.
		2)A report from our heritage Consultant, Graham Wilson OAM,
		on the importance of the old isolation ward.
		3)A letter from out Work, Health and safety Co-ordinator,
		Merilyn Hottes, about the concerns involved with the access to the
	Honorary Secretary, Glen Innes and District	parking areas.
18-Jul-22 Anthony Trollope	Historical Society	I have also posted a hard copy of this email to you.

Hi, I had a discussion with staff when they were in Mckenzie mall in Glen Innes and have had a couple of thoughts since then
1) I discussed and understood why a Helipad wasn't on the roof of the hospital. As an alternative, why couldn't a Heli pad be placed in the grounds as close to the hospital as possible?
2) Has it been discussed, thought of, to make the hospital foundations and walls of a suitable strength that would allow the addition of an upper floor. This could be a cheaper alternative to building a bigger hospital down the track if the size of the community grows and additional space is needed at a future date. Thank You Tony

27-Jul-22 Tony Brown Community member

Good morning Health Projects Planning Leam,

Very pleased that we will be getting a new hospital. I have some comments and questions about the master plan:

1/ Proposed bed capacity. Perhaps the bed capacity needs to be reassessed rather than basing the figure on the much diminished current hospital bed numbers. I gather patients are diverted to other hospitals now due to the current hospital reaching total capacity.

2/ Parking. From the master plan, the parking appears fairly limited and like so many hospital developments, parking is never enough (e.g. Tamworth). Visitors will park in Macquarie Street and walk around the corner. Pedestrian access is necessary. I realise that this would require visitors to walk across the ambulance entrance under the current plan.

3/ Site planning. The above points raise the question; should the new building be moved eastwards and the parking be moved to the Macquarie Street side with the main entrance being off Macquarie Street?

4/ Pedestrian access from town CBD. There will be quite a bit of pedestrian traffic to and from the new hospital. Much of this traffic will be along the southern side of Ferguson Street. As there is a crest on Ferguson Street near the planned entrance, there is a question of pedestrian safety.

5/ Helicopter Landing Site. This has been a hot topic in our community with considerable funds raised. Has there been any consideration of a Helicopter Landing Site?

6/ What plans are in place to make good use of the current hosnital building for related health services?

31-Jul-22 David Donnelly

Community member

Contact details	Response details	Response from	Date
Ellena.Thomas@health.nsw.gov.au			
	Brief reply and forwarded to Melissa Crain for	Melissa Crain, HNELHD Facility	
	follow-up as District matter	Planner	2-Jun-22
<u>chooksky@gmail.com</u>			
	Confirmed	Kylie Neville from project inbox	15-Jun-22
eve@auzzie.net	Thank you reply sent	Kylie Neville from project inbox	15-Jun-22
	Noted that the process is in the early design		
	phase and details not yet finalised.		
<u>chooksky@gmail.com</u>		Kylie Neville from project inbox	15-Jun-22
lissajhill@hotmail.com	Confirmed	-	-
basketball_mother@hotmail.com	Confirmed	-	-

	Good morning Hanna, thanks for your emails. I will add you to our distribution list for		
	updates. Also just a quick reply, the staff		
	accommodation project for Glen Innes is		
	being managed as a separate project by		
	Hunter New England Local Health District.		
basketball_mother@hotmail.com	There will be more details released on this		
	soon, however the intention is to provide		
	four high-end modular units onsite to be		
	used as staff accommodation. These units		
	will be modern, stylish and sustainable to		
	provide staff with comfortable and private		
	accommodation close to the hospital.		
		Kylie Neville from project inbox	20-Jun-22
phillipaperkins@bigpond.com	Confirmed		

-

kduke@gisc.nsw.gov.au

-

https://nsw

-

ChrisJones160@hotmail.com

Dear Kathleen, thank you for your email.		
This is a quick response to confirm we have		
received and noted your email. The project		
team briefed Glen Innes Severn Council		
(General Manager, Mayor and several		
Councillors) on the Glen Innes Hospital		
master plan on 23 June. At this session it was		
noted that as part of our due diligence		
process an independent heritage adviser is		
engaged to complete an assessment of the		
buildings. We will be in touch once this		
process has been completed		
In the meantime if you have any questions		
about the redevelopment please don't		
besitate to reach out via this email		
Kind regards		
Kinu regarus,		
купе		
(on behalf of the Glen Innes Hospital		
redevelopment team)	Kylie Neville from project inbox	7-Jul-22

#### ktaminiau@gisc.nsw.gov.au

tony.trollope@gleninneshistory.com.au

Hi Anthony, thanks for your email. Just a<br/>quick response to confirm we have received<br/>it and associated attachments. We will be in<br/>touch as the process progresses.Many thanks,<br/>KylieKylie Neville from project inbox

19-Jul-22

# browninthebush@gmail.com



ddonnelly265@gmail.com

/health.sharepoint.com/:b:/s/Communications-HI/EentBsMPbQBAniTugtax4U8B5XF74K5k-EpfchSW6S3Hdw?e=RyvfYH
Date	Stakeholder/s	Items discussed
15/11/2021	Maintenance team, clinical managers	Site visit - engineering investigations
15/11/2021	Eve Chappell - History House	Request to bring project team through the old hospital (now museum)
Dec-21	Julia Morgillo, Aboriginal Health Liaison Officer	Engagement with Aboriginal stakeholders
		Clinical Services Plan - medical workforce raised as main issue, local MP has
	Glen Innes Shire Council, Aboriginal Health	requested a GP clinic and consult rooms, preference to co-locate
9/02/2022	service partners, staff.	Ambulance station.
14/06/2022	Adam Marshall MP	Monthly project update - Master Plan briefing
20/06/2022	Staff	Master Plan - drop-in session
20/06/2022	Historical Society	Master Plan
20 and 21 June 2022	Community	Master Plan - pop-up sessions x2
20 8110 21 Julie 2022	Community	
21-Jun-22	Auxiliary and Local Health Committee	Master Plan
21-Jun-22	First Nations	Master Plan
23-Jun-22	Council	Master Plan
25-101-22	Adam Marshall MP	Monthly project update
26-Jul-22	Glen Innes Local Aboriginal Land Council	Aboriginal cultural heritage on the hospital site

Project team member/s	Attendees
Melissa Crain, Lauren Stocks, John Ward, Kylie	
Neville	
Kylie Neville, Lauren Stocks	
Melissa Crain	
Led by Michael DiRienzo and Susan Heyman from	
LHD (Jackie Hawkins and Lauren Cruz, HI and	Adam Marshall, LHD - Ramsey Awad,
Melissa Crain, LHD attended)	Lauren Cruz, Anna-Marie Styles-Tape
	Adam Marshall, Mayor Rob Banham,
	Councillor Troy Arandale, General Manager
Mark Brockbank, Susan Heyman, Jackie Hawkins,	Craig Bennett, Kirsti Dixon (MO Taylor),
Lauren Stocks	Alysia Smith (MO Taylor)
Jackie Hawkins, Lauren Stocks, Kylie Neville,	
Melissa Crain, Ryan Loveday	Staff
Jackie Hawkins, Lauren Stocks, Kylie Neville,	
Melissa Crain, Ryan Loveday, John Ward	Eve Chappell plus 4 others
Jackie Hawkins, Lauren Stocks, Kylie Neville,	
Melissa Crain, Ryan Loveday, John Ward	Community members approx 70
Jackie Hawkins, Lauren Stocks, Kylie Neville,	10 Auxiliary members and Elizabeth
Melissa Crain, Ryan Loveday, John Ward	McCarthy via Teams
Jackie Hawkins, Lauren Stocks, Kylie Neville,	
Melissa Crain, Ryan Loveday, John Ward	Phil, Kerrie, Jackie, Teniah, Jess
Jackie Hawkins, Lauren Stocks, Kylie Neville,	Councillors Rob Banham, Troy Arandale,
Melissa Crain, Ryan Loveday	Jack Parry, Laura Gresham, Carol Sparks
Amanda Bock, Mark Brockbank, Jackie Hawkins,	Adam Marshall, George John (MO
Kylie Neville, Susan Heyman	Hazzard), Kirsti Dixon (MO Taylor)
	Harrison Rochford (OzArk), Philip Winzer
Jackie Hawkins	(GILALC)

# DateComms28/10/2021Staff update issued from Susan Heyman

Details

Advising of project team appointment

Photos from site investigations, staff survey on comms preferences, project team photos, FAQs

Additional funding, site visits, master planning update, website

Master plan release, consultation, Ambulance station and staff accommodation Master plan release, consultation, Ambulance station and staff accommodation

30/11/2021 Staff newsletter issued from HNELHD-Communication 16/03/2022 Staff newsletter issued from HNELHD-Communication

5/07/2022 Staff newsletter issued from HNELHD-Communication

25/07/2022 Project update mailed out to all 2370 residents

#### Stats

137 opens, 20 clicks 129 opens, 19 clicks 138 opens, 28 clicks 3590 households HEALTH INFRASTRUCTURE

# Glen Innes Hospital Upgrade -Demolition

Ngoorabul/Ngarabal Country

Decision Statement for Review of Environmental Factors – Prepared by GeoLINK

25/11/2022

Version Number: 1



Project Details	
Project Name	Glen Innes Hospital Upgrade – Demolition
Project Location	85 Taylor Street, Glen Innes
REF Prepared by	GeoLINK, dated 8 November 2022
Activity Description	This Review of Environmental Factors (REF) relates to proposed demolition of the Old Nurses' Quarters at Glen Innes Hospital, in order to facilitate future construction (subject to a separate planning assessment process). The activity involves:
	<ul> <li>Establishment, securing and maintenance of the site area.</li> <li>Demolition and stripping out of the Old Nurses Quarters including the façade, internals and the structure (on-ground, inground and foundations).</li> <li>The disconnection and removal of selected existing services where required.</li> <li>Ancillary removal of identified trees adjacent to the building (ten trees are proposed for removal due to their proximity to the worksite and/or poor health and low amenity value).</li> <li>Protection of retained work and adjacent trees/structures.</li> <li>Temporary supports.</li> <li>A site boundary fence will be retained on site at completion of works.</li> <li>The areas where demolition occurs are to be cleaned up and restored to a suitable standard</li> </ul>

# **Decision Statement**

Based on the REF document, the Recommendation report and any other information and any advice from other relevant determining authorities:

- the proposed activity is not likely to have a significant impact on the environment and therefore an EIS is not required.
- the proposed activity will not be carried out in a declared area of outstanding biodiversity value and is not likely to significantly affect threatened species, populations or ecological communities, or their habitats or impact biodiversity values, meaning a SIS and/or BDAR is not required
- the proposed activity may proceed subject to the mitigation measures in Schedule 1 below that are required to eliminate, minimise or manage environmental impacts.

# Determination

Acting as a delegate of the Health Administration Corporation, and, in accordance with Section 5.5 of the *Environmental Planning and Assessment Act 1979*, having taken into account to the fullest extent possible all matters likely to affect the environment as a result of the proposed activity, and having regard to the Assessment Report, the Statement of Compliance and the Review of Environmental Factors, I hereby determine the Review of Environmental Factors by granting approval subject to the Mitigation Measures in Schedule 1 below.

1 December 2022

Rebecca Wark

Date

Chief Executive Health Infrastructure

# Schedule 1

# **Mitigation measures**

The following Mitigation Measures have been imposed to ensure that any development activity is carried out in accordance with the plans/documentation and any amendment approved under Part 5 of the *Environmental Planning and Assessment Act 1979*.

## **General measures**

#### 1. Development in Accordance with Plans and Documentation

The proposal must be carried out generally in accordance with the Review of Environmental Factors dated 8//11/2022 and prepared by GeoLINK on behalf of NSW Health Infrastructure (including accompanying appendices A - N) and generally in accordance with the following plans/documentation as modified below and by any of the under-mentioned measures:

Drawing Title	Drawing Ref	Revision	Date	Prepared by
Demolition Plan – Old Nurse's Quarters	7104GIO2-FS1002	03	02/08/2022	Fulton Trotter Architects

#### 2. Crown Certificate

A Certificate under Section 6.28 of the *Environmental Planning and Assessment Act* 1979 is to be obtained prior to any work commencing.

#### 3. Building Code of Australia

All building work is to be undertaken in accordance with the Building Code of Australia and referenced Australian Standards, including the requirements of AS 1428.1 General Requirements for Access.

#### 4. Approvals

These conditions do not remove any obligation to obtain all other licences, permits, approvals and land owner consents from all relevant authorities and land owners as required under any other legislation for the Project. The terms and conditions of such licences, permits, approvals and permissions must be complied with at all times. A copy of all approvals is to be kept on site.

#### 5. Long Service Levy

The Crown Certificate must not to be issued unless the Crown Certifier is satisfied the required levy payable under Section 34 of the *Building and Construction Industry Long Service Payments Act 1986* has been paid. The levy must be payed by the person liable, as specified in Section 38 of the *Building and Construction Industry Long Service Payments Act 1986*. For further information contact the Long Service Payments Corporation on their Helpline 131441.

#### 6. Tree Management and Landscape

- 6.1 Trees not proposed to be removed are to be protected in accordance with AS 4970 2009 Protection of Trees on Development Sites.
- 6.2 No building materials, builder sheds and the like are permitted to be stored under the canopy of existing trees.

#### 7. Prior Notice of Category 2 Remediation Work

7.1 Where relevant, all required regulatory notifications and permits are to be obtained including Notification of Category 2 remediation Works to Council for the remedial work at least 30 days before the commencement of the work. Notice must be given in accordance with cl 4.13 of the *State Environmental Planning Policy* (*Resilience and Hazards*) 2021.

# **Prior to commencement of works**

*Note:* The following Measures are to be complied with prior to the commencement of works on the subject site, and at other stages where stated.

#### 8. Community Notification

- 8.1 Prior to commencement of work, the proponent must notify in writing Council and the occupier of any land within 40 metres of the boundary of the site works. The notification should outline the project, the expected timing for commencement and completion of construction works.
- 8.2 Where practicable, work programs for noisy work should be coordinated with the hospital, at least two (2) weeks prior to commencement to minimise impacts on their operations.
- 8.3 Complaints received prior to and during the undertaking of works shall be recorded and attended to promptly. On receiving a complaint, works shall be reviewed to determine whether issues relating to the complaint can be avoided or minimised. Feedback shall be provided to the complainant explaining what remedial actions were taken.
- 8.4 The proponent shall develop a complaints management system and record details of all complaints received and the means of resolution of those complaints. The Complaints Register shall be made available on request.
- 8.5 A site notice board must be located at the entrance or other appropriate location on the site in a prominent position and must including the following:
  - a. 24-hour contact person for the site;
  - b. Telephone, facsimile numbers and email addresses;
  - c. Site activities and time frames.
- 8.6 The site notice must be erected no less than 2 days prior to the commencement of works.

#### 9. Hazardous Materials

- 9.1 All asbestos handling shall be carried out consistent with the recommendations of the Hazardous Materials Survey prepared by Southern Asbestos Consultancy Pty Ltd and dated 23/7/2022.
- 9.2 An Asbestos Management Plan is to be prepared to provide a procedure to control the risk of exposure from asbestos and lead impacted topsoil during the work.
- 9.3 An unexpected finds procedure is to be included in an overarching Construction Management Plan (CMP) for the work, in the event that other contamination is encountered which have not been identified during this assessment.
- 9.4 Waste must be transported by an appropriately licensed transporter, and disposed to a facility that is licensed to receive that class of waste. It is recommended that this report is sent to the proposed receiving facility to confirm their acceptance of the material prior to off-site disposal. If the description of the soil differ from that described within, then further assessment for waste classification purposes may be required prior to off-site disposal.
- 9.5 SafeWork NSW is to be notified in accordance with the relevant policy prior to work involving asbestos material being undertaken.
- 9.6 Air monitoring devices shall be put in place, around the site, during the demolition. A qualified environmental hygienist shall be on site to supervise the work to ensure the safety of workers and the public are not compromised in anyway. Daily monitoring and results will be taken and analysed to ensure safe air quality levels ensue.

9.7 A Lead Removal Control Plan will be developed and implemented by the contractor. Lead based paint is defined as paint containing more than 1% lead by weight, and is classified as hazardous waste according to EPA NSW 'Waste Classification Guidelines. Part 1: Classifying Waste'.

#### **10.** Dilapidation Report

Prior to commencement of works, a dilapidation report is to be prepared for hospital, Council, or other assets within the zone of influence of the work.

#### **11. Construction Management**

A detailed Construction Environmental Management Plan (CEMP) is to be prepared prior to the commencement of works and implemented during the undertaking of works. The CEMP must be prepared having regard to the *Environmental Management Plan Guideline: Guideline for Infrastructure Projects (2020)* prepared by the Department of Planning and Environment, and is to include (where relevant), but not be limited to, the following:

- (a) Details of:
  - i. hours of work;
  - ii. 24-hour contact details of site manager;
  - iii. management of dust and odour;
  - iv. stormwater control and discharge;
  - v. measures to ensure that sediment and other materials are not tracked onto the roadway by vehicles leaving the site;
  - vi. any other specific environmental construction mitigation measures detailed in this REF;
  - vii. any requirements outlined in any relevant approvals, permits or licences.
  - viii. community consultation and complaints handling.
- (b) Construction traffic and pedestrian management plan;
- (c) Construction noise and vibration management;
- (d) Construction waste management, including contaminated waste;
- (e) Construction soil and water management;
- (f) Flood management;
- (g) Tree protection;
- (h) Air quality and dust management measures;
- (i) Demolition work plans;
- (j) Unexpected finds protocol for Aboriginal and non-Aboriginal heritage and associated communications procedure;
- (k) Unexpected finds protocol for historical heritage;
- (I) Unexpected finds protocol for contamination; and
- (m) Emergency Management Plan.
- (n) Training of responsibilities under *National Parks and Wildlife Act* 1975, *Heritage Act* 1977 and any other relevant legislation.

#### 12. Demolition/Construction Waste Management Plan

- 12.1 A Demolition/Construction Waste Management Plan shall be prepared by an appropriately qualified contractor prior to the commencement of works. The Waste Management Plan should be prepared in accordance with DECCW's "Waste Classification Guidelines (2008)" and the Protection of the Environment Operations Act 1997.
- 12.2 The Demolition/Construction Waste Management Plan is to include the following requirements and details:
  - a. The type and volume of all waste materials (e.g. excavation material, green waste, bricks, concrete, timbers, plasterboard and metals) is to be estimated prior to the commencement of works, with the destination for each waste identified. Waste should be re-used or recycled as much as practicable. Where not practicable, the location of a suitable waste disposal facility is to be identified.
  - b. Cleaning out of batched concrete mixing plant is not permitted within any construction compound.
  - c. Non-recyclable waste and containers are to be regularly collected and disposed of at a licensed disposal site. Frequency of collection should be identified.
  - d. No burning or burying of waste is permitted on the site.

- e. Any bulk garbage bins delivered by authorised waste contractors are to be placed and kept within the property boundary.
- 12.3 The following mitigation measures will be implemented in order to prevent adverse impacts in relation to waste generated by the proposed works:
  - a. No materials will be used in a manner that will pose a risk to public safety and waste generated from the proposed works will be recycled where possible.
  - b. Unnecessary resource consumption will be avoided.
  - c. Non-recyclable wastes will be collected and disposed of or recycled in accordance with Office of Environment and Heritage (OEH) guidelines.

#### 13. Noise Management Measures

- 13.1 During preparation of the program, consult with the hospital to determine what areas (if any) of the hospital is particularly noise sensitive, and at what time (ward rooms, operating theatres, etc.).
- 13.2 Identify feasible acoustic controls or management techniques (use of screens, scheduling of noisy works, notification of adjoining land users, respite periods) when excessive levels may occur.
- 13.3 For activities where acoustic controls and management techniques still cannot guarantee compliant noise levels, implement a notification process whereby nearby development is made aware of the time and duration of noise intensive construction processes.

#### 14. Erosion and Sediment Control

- 14.1 Erosion and sediment controls will be implemented in accordance with the Landcom/ Department of Housing Managing Urban Stormwater, Soils and Construction Guidelines (the Blue Book) and ensure any water diversion or control outlets associated with the works do not result in scouring.
- 14.2 Works will only commence once all erosion and sediment controls have been established. The controls will be maintained in place until the works are complete and all exposed erodible materials are stable.
- 14.3 Erosion and sedimentation controls will be checked and maintained (including clearing of sediment from behind barriers) on a regular basis (including after any precipitation events) and records kept and provided on request.

#### 15. Services and Utilities

Prior to the commencement of works, any services and utilities that may be impacted by the works are to be appropriately relocated.

#### 16. Construction Traffic Management

A Construction Traffic Management shall be prepared in consultation with Council prior to commencement of works.

## **During construction/undertaking of work**

*Note:* The following Conditions are to be complied with during the approved construction/the undertaking of works.

#### 17. Construction Site Management

- 17.1 Construction site fencing is to be installed around the construction site. Vehicle and workforce access points and roads to the construction compounds are to be clearly designated and controlled for authorised access only. Vegetation clearance is to be minimised.
- 17.2 The worksite should be left tidy and rubbish free each day prior to leaving the site and at the completion of works.

- 17.3 The use and storage of hazardous materials and dangerous goods, including petroleum, distillate and other chemicals, shall be in accordance with the relevant legislation including, but not limited to:
  - Protection of the Environment Operations Act 1997
  - Work Health and Safety Regulation 2017
  - AS 1940 The storage and handling of flammable and combustible liquids
  - Safe Work NSW Code of Practice Managing Risks of Hazardous Chemicals in the Workplace.
- 17.4 All materials on-site or being delivered to the site must be wholly contained within the site. The requirements of the Protection of the Environment Operations Act 1997 are to be complied with when placing/stockpiling loose material or when disposing of waste products or during any other activities likely to pollute drains or watercourses.
- 17.5 The public way must not be obstructed by any materials, vehicles, refuse, skips or the like, under any circumstances.
- 17.6 All equipment and machinery should be secured against vandalism outside of working hours.
- 17.7 No batching plant is permitted on the site.
- 17.8 A copy of the approved and certified plans, specifications and documentation shall be kept on site at all times and shall be available for perusal by any officer of Council.
- 17.9 Any contractor(s) must meet all workplace safety legislation and requirements.
- 17.10 No vehicle maintenance is permitted in the demolition and construction areas except in emergencies.
- 17.11 Any loose material stockpiles are to be stored within the temporary construction compound(s) and are to be protected from possible erosion.

#### 18. Erosion and Sediment Control

- 18.1 Disturbance of sediment during the construction phase of the development and the design management and implementation of pollution controls must be consistent with "Managing Urban Stormwater: Soils and Construction" (NSW Landcom, 2004), (Blue Book), and "approved Methods for the Modelling and Assessment of air pollutants in NSW (EPA)".to ensure containment of sediment to the immediate work site.
- 18.2 All sediment control measures must be regularly inspected and cleaned out and/or repaired as necessary, and all collected silt disposed of appropriately. Stockpiles should also have adequate sediment control measures in place.
- 18.3 Erosion and control measures are not to be removed until disturbed areas have stabilised.

#### **19.** Air Quality and Dust Management

- 19.1 Spraying of paint and other materials with the potential to become air borne particulates is only to be undertaken on days with still or light wind conditions.
- 19.2 No burning of materials is permitted.
- 19.3 Dust generated during construction activities is to be controlled to avoid impact on surrounding properties
- 19.4 All necessary maintenance for construction vehicles and equipment is to be undertaken during the construction period.
- 19.5 Excessive use of vehicles and powered construction equipment is to be avoided.

- 19.6 Exposed areas are to be progressively revegetated as soon as practical.
- 19.7 Vehicle wash down areas are to be established to ensure all mud and soil from construction vehicles is not carried onto public roads.
- 19.8 All vehicles involved in any excavation and/or demolition and departing the site with demolition materials, spoil or loose matter must have their loads fully covered before entering the public roadway.
- 19.9 Vehicles, machinery and equipment will be maintained in accordance with manufacturer's specifications in order to meet the requirements of the Protection of the Environment Operations Act 1997 and associated regulations.

#### 20. Services

- 20.1 All services and utilities in the area of construction must be appropriately disconnected and reconnected as required. The contractor is required (if necessary) to consult with the various service authorities regarding their requirements for the disconnection of services.
- 20.2 Where services are found not to be adequate to support the development they shall be appropriately augmented.

#### 21. Traffic Management

Existing traffic access and arrangements should be maintained during construction as much as practicable.

#### 22. Contamination (Unexpected Finds)

- 22.1 Should any new soil contamination information or contaminants be identified during the undertaking of works which have the potential to alter previous conclusions about site contamination, then the Managing Contractor and HI must be immediately notified and works must cease in the location of the contamination.
- 22.2 Works must not recommence until a suitably qualified contaminated land specialist (i.e. a Certified Environmental Practitioner) has investigated and assessed the category of the contamination in accordance with SEPP (Resilience and Hazards) 2021 and if required prepared a Remediation Action Plan (RAP) which details the necessary remedial work or management required to render the site suitable for the proposed development.
- 22.3 Following completion of the remediation, a Site Remediation & Validation Report (SRVR) which documents the completeness of the remedial work is to be submitted to HI and the EPA, if required.
- 22.4 A notice of completion of remediation work must be given in accordance Section 4.14 & Section 4.15 of the State Environmental Planning Policy (Resilience and Hazards) 2021.
- 22.5 Any contaminated materials or hazardous substances that need to be removed from site are to be classified first and then stored, transported and disposed of in accordance with EPA requirements at an EPA licensed waste facility.
- 22.6 Asbestos removal and management in NSW is regulated under the Work Health and Safety Act 2011 and Work Health and Safety Regulation 2017. The handling of asbestos work must be carried out in accordance with Safework Australia Code of Practice "How to Manage and Control Asbestos in the Workplace" February 2016, including being undertaken by contractors who hold a current Safework Asbestos or Demolition Licence and any other current Safework Licence required
- 22.7 If soils are to be disposed offsite during construction, they are required to be disposed in accordance with the waste classification, subject to additional sampling and analysis.
- 22.8 Construction works should not result in the contamination of the site.

- 22.9 A spill containment kit will be available at all times. All personnel will be made aware of the location of the kit and trained in its effective deployment.
- 22.10 The contractor shall develop a procedure for the management of acid sulfate material (ASM) including identification, testing and treatment of ASM encountered during the works and opportunities for reuse of treated ASM within the site.
- 22.11 Materials will be sourced from licensed quarries and operators. All materials will be certified uncontaminated and environmentally safe.

#### 23. Noise and Vibration Management

- 23.1 All works will be in accordance with AS2436-1981: Guide to Noise Control on Construction, Maintenance and Demolition Sites. The recommendations of the construction noise and vibration assessment (MAC 2022) undertaken for the proposal must be implemented, including minimum working distances and vibration monitoring.
- 23.2 Building contractors are to implement the requirements of the Office of Environment "Interim Construction Noise Guideline (July 2009)" as far as practicable.
- 23.3 Construction is to be carried out in accordance with the Building Code of Australia deemed-to-satisfy provisions with respect to noise transmission.
- All reasonable, practicable steps are to be undertaken to reduce noise and vibration from the site.
- 23.5 Plant and equipment is to be maintained, checked and calibrated in accordance with the appropriate design requirements and to ensure that maximum sound power levels are not exceeded.
- 23.6 Plant and equipment (where possible) is to be strategically positioned on site to reduce the emission of noise from the site to the surrounding area, users of the site and on-site personnel.
- 23.7 Unnecessary noise is to be avoided when carrying out manual operations and operating plant.
- 23.8 Any equipment not used for extended periods is to be switched off.

#### 24. Non Aboriginal Heritage

- 24.1 All personnel working on site will receive training in their responsibilities under the Heritage Act 1977.
- 24.2 If any item of European heritage is discovered during works, work shall cease immediately and the project heritage consultant, the relevant Council and/or Office of Environment and Heritage notified.
- 24.3 Work shall not recommence until the significance of the find is established.

#### 25. Aboriginal Heritage

- 25.1 If suspected Aboriginal material has been uncovered as a result of development activities within the Project Area:
  - · work in the surrounding area is to stop immediately
  - a temporary fence is to be erected around the site, with a buffer zone of at least 10 metres around the known edge of the site
  - an appropriately qualified archaeological consultant is to be engaged to identify the material, and
  - if the material is found to be of Aboriginal origin, the Aboriginal community is to be consulted in a manner as outlined in the OEH guidelines: Aboriginal Cultural Heritage Consultation Requirements for Proponents (2010).

- 25.2 Should Human Remains be located at any stage during earthworks within the Project Area, all works must halt in the immediate area to prevent any further impacts to the remains. The Site should be cordoned off and the remains themselves should be left untouched. The nearest police station, the relevant Local Aboriginal Land Council and the OEH Regional Office are all to be notified as soon as possible.
- 25.3 If Aboriginal cultural materials are uncovered as a result of development activities within the Project Area, they are to be registered as Sites in the Aboriginal Heritage Information Management System (AHIMS) managed by the OEH. Any management outcomes for the site will be included in the information provided to the AHIMS.
- 25.4 All effort must be taken to avoid any impacts on Aboriginal Cultural Heritage values at all stages during the development works. If impacts are unavoidable, mitigation measures should be negotiated between the Proponent, OEH and the Aboriginal community.

#### 26. Restriction on Hours during Construction

- 26.1 The undertaking of any construction activity on the subject site is to be limited to the following hours:
  - Monday to Friday inclusive: 7.00am to 6.00pm
  - Saturdays: 8.00am to 1.00pm
  - Sundays and Public Holidays: No work permitted.
- 26.2 Entry and departure of vehicles from the site will be restricted to the imposed work hours.
- 26.3 Activities may be undertaken outside of hours in condition 26.1 and 26.2 if required
  - By the police or a public authority for the delivery of vehicles, plant or materials; or
  - in an emergency to avoid the loss of life, damage to property or to prevent environmental harm.
  - Where the works are inaudible at the nearest external sensitive receiver, a disruption notice has been issued by the relevant LHD or Hospital and a letter of support has been provided from the relevant LHD or Hospital for the Out of Hours Works.
- 26.4 Consideration will be given to extending these hours to allow for specific work tasks on a case-by-case basis, subject to approval from Health Infrastructure being sought prior to this occurring and the assessment of any impact of this extension.

#### 27. Access and pedestrian movements

- 27.1 Safe pedestrian access and movement to the hospital and surrounding buildings shall remain unimpeded at all times.
- 27.2 Appropriate signage and directional information shall be provided.

#### 28. Site Restoration

Following completion of demolition works, the contractor must make good the site. If no construction works have begun within 4 months of demolition, landscaping shall be undertaken to ensure site stabilisation and suitable streetscape and visual amenity is achieved.

# **Advisory Notes**

#### AN1 Project Compliance – DGN 40

Health Infrastructure (HI) is responsible for ensuring that the conditions of consent are complied with during the course of the delivery of the project. To ensure that HI is complying with its legal obligations, compliance with the requirements of DGN 40 – Compliance with Planning Approval Conditions is required.

#### AN2 Tree Removal

As part of the Main Works Stage, trees removed as part of this Demolition Stage must be replaced on site with suitable species that will maximise the increase of tree canopy, at a ratio of not less than 1:1 and a minimum pot size of 45L. In the absence of imminent future works, the replacement must occur within a timeframe of 12 months from commencement of the activity.

#### AN3 Contamination – RAP: Main Works (New Facility) Stage

As part of the Main Works Stage the following must be completed:

 Undertake a Detailed (Stage 2) Site Investigation (DSI) to address the data gaps identified in Section 10.4 of the Preliminary (Stage 1) Investigation as part of the Main Works environmental assessment.

Note: As not all areas of the hospital are being redeveloped, the extent of 'the site' for the DSI needs to be confirmed to limit the DSI to broadly capture the proposed development footprint

- Following completion of the DSI, prepare and implement a Remediation Action Plan (RAP) to document the remediation and validation requirements for the site.
- Upon the completion of remediation works, validate the remediation works and prepare a Validation Assessment report.
- In the absence of imminent future works, the above must occur within a timeframe of 24 months from commencement of works.



# Glen Innes Hospital Upgrade – Demolition

Project Details	
Project Name	Glen Innes Hospital Upgrade – Demolition
Project Location	85 Taylor Street, Glen Innes
REF Prepared by	GeoLINK, dated 8 November 2022
Activity Description	This Review of Environmental Factors (REF) relates to proposed demolition of the Old Nurses' Quarters at Glen Innes Hospital, in order to facilitate future construction (subject to a separate planning assessment process).
	<ul> <li>Establishment, securing and maintenance of the site area.</li> <li>Demolition and stripping out of the Old Nurses Quarters including the façade, internals and the structure (on-ground, inground and foundations).</li> <li>The disconnection and removal of selected existing services where required.</li> <li>Ancillary removal of identified trees adjacent to the building (ten trees are proposed for removal due to their proximity to the worksite and/or poor health and low amenity value).</li> <li>Protection of retained work and adjacent trees/structures.</li> <li>Temporary supports.</li> <li>A site boundary fence will be retained on site at completion of works.</li> <li>The areas where demolition occurs are to be cleaned up and restored to a suitable standard following the removal of the structure.</li> </ul>

NSW Health Infrastructure is proposing demolition works at Glen Innes Hospital under the provisions of *State Environmental Planning Policy (Transport & Infrastructure) 2021* (T&I SEPP) which requires determination under Part 5 of the *Environmental Planning & Assessment Act 1979* (EP&A Act). This Statement of Compliance demonstrates that the Review of Environmental Factors (REF) for the proposed activity has met the requirements of Part 5 of the EP&A Act and the *Environmental Planning and Assessment Regulation 2021* (EP&A Regulations).

The REF has identified and considered the following matters:

#### 1. The activity is "development without consent" under the T&I SEPP

#### The activity:

- Is being undertaken by, or on behalf of a public authority within the boundaries of an existing health services facility
- is for the demolition of buildings carried out for the purposes of a health services facility,
- is located in a prescribed zone
- does not result in a building exceeding 15 metres in height or is located closer than 5 metres to any property boundary (or an addition to a building resulting in the building exceeding that height or being closer than that distance to any property boundary.

# 2. The notification requirements of the T&I SEPP have been met in accordance with Chapter 2, Division 1, Division 5, and Division 10

• There are no consultation requirements associated with the proposal. The general consultation requirements under Chapter 2, Division 1 of the TISEPP do not apply in this instance. The notification requirements under

Chapter 2, Division 10 of the TISEPP do not apply to development under Section 2.61(c), which relates to 'demolition of buildings carried out for the purposes of a health care facility'.

#### 3. Consideration of other NSW Legislation

- Consideration of the applicable NSW Legislation is provided at Section 4.5 in the REF.
- 4. The requirements of Section 5.5 of the EP&A Act and Section 171 of the EP&A Regulations have been met:
  - Pursuant to Section 5.5(1) of the EP&A Act, the REF has examined and taken into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the proposed activity.
  - The factors to be taken into account under Section 171 of the EP&A Regulation 2021 have been fully considered in the REF in determining the likely impact of the proposed activity on the environment and measures to mitigate potential singular and cumulative impacts associated with the proposed activity have been identified.
  - As demonstrated in the completed Section 5.5 checklist (Section 4.3 of the REF) and Section 171 checklist (Section 6.1 of the REF), the proposed activity will not have significant effects on the environment or threatened species and as a result, an Environmental Impact Statement is not required before a decision is made whether or not the proposed activity can proceed.

#### 5. Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

 The activity will not have any impacts on matters of national significance including impacts on Commonwealth land, listed threatened species, migratory species protected under international agreements, national heritage places, world heritage properties/areas, or Ramsar wetlands of international importance. An approval under the EPBC Act is therefore not required.

#### 6. Approvals, authorisations and notifications under other Acts

• As detailed in the REF, any approvals, authorisations or notifications that are required under other Acts before the activity can proceed have been obtained, or where applicable, have been included in the identified requirements.

## Certification

I certify that I have reviewed and endorsed the contents of this REF document, and, to the best of my knowledge, it is in accordance with the *Environmental Planning & Assessment Act 1979* (EP&A Act), the *Environmental Planning & Assessment Regulation 2021* (EP&A Regulation) and the Guidelines approved under Section 170 of the EP&A Regulation, and the information it contains is neither false nor misleading.

### **Author and endorsements**

Author	Position	Date
Nicholas Dowman	Senior Planning Advisor	25/11/2022
Endorsed by	Position	Date