Wyong Hospital - World Class End Of Life Care Project

Health Infrastructure

Block C Refurbishment Works - Air Quality Impact Assessment

JBS&G 66192 | 158,183 Revision 1

14 March 2024

We acknowledge the Traditional Custodians of Country throughout Australia and their connections to land, sea and community.

We pay respect to Elders past and present and in the spirit of reconciliation, we commit to working together for our shared future.

Caring for Country The Journey of JBS&G
Artist: Patrick Caruso, Eastern Arrernte

Table of Contents

List of Tables

List of Figures

Appendices

Abbreviations

Term	Definition
ACM	Asbestos Containing Material
AMP	Asbestos Management Plan
AQIA	Air Quality Impact Assessment
ASS	acid sulfate soils
bgs	below ground surface
BoM	Bureau of Meteorology
CEMP	Construction Environmental Management Plan
CLM	Contaminated Land Management
DLWC	Department of Land and Water Conservation
DP	Deposited Plan
DP&E	Department of Planning and Environment
DSI	Detailed Site Investigation
ED	Emergency Department
EIS	Environmental Impact Statement
EPA&A	Environmental Planning & Assessment
ESD	Ecological Sustainable Development
ha	hectares
JBS&G	JBS&G Australia Pty Ltd
km/h	Kilometres per Hour
LAA	Licensed Asbestos Assessor
LEP	Local Environmental Plan
LGA	Local Government Authority
LHD	Local Health District
m	Meters
MGA	Metric Rectangular Grid
mL	Millilitre
NATA	National Association of Testing Authorities
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measure
NOHSC	Australia National Occupational Health and Safety Commission
NSW	New South Wales
PAH	Polycyclic Aromatic Hydrocarbons
PM	Particulate Matter
POEO	Protection of the Environment Operations
REF	Review of Environmental Factors
RL	Relative level
SEPP	State and Environmental Planning Policy

TPH	Total Petroleum Hydrocarbons
TRH	Total Recoverable Hydrocarbons
TSP	Total Suspended Particulates
VOC	Volatile Organic Compounds
WH&S	Work Health and Safety

Executive Summary

JBS&G Australia Pty Ltd (JBS&G) was engaged by Health Infrastructure (HI, the client) for the provision of environmental services associated with the proposed refurbishment of part of Block C within Wyong Hospital. WH is located at 664 Pacific Highway, Hamlyn Terrace, New South Wales (NSW).

The proposed refurbishment involves repurposing one of the existing Block C hospital buildings (the site) into a new World Class End of Life Program (WCEoL) facility. The site location and layout are shown on **Figures 1 and 2** respectively and it is formally identified as part of Lot 4 in DP 1248441 with an area of approximately 1,200 m^2. The refurbishment of this existing Block C building will include landscaping works in the surrounding area. Proposed development plans have been provided as **Appendix A**.

This air quality impact assessment (AQIA) has been prepared to support the HI Review of Environmental Factors (REFs). This AQIA includes detailed review of the site setting, environmental conditions, surrounding land uses, known contamination status of the site and the proposed development scenario and was undertaken in accordance with the regulatory requirements stated in **Section 5.4**, and to meet the HI REF requirements for the redevelopment.

Potential sources of air and odour emissions were identified, as detailed in **Section 5.1**, principally associated with movement of plant/vehicles and construction materials (gravel/sands/concrete) and the use of fuels (for equipment/plant etc.). A qualitative assessment of potential health and nuisance impacts associated with emissions to air, specifically dust, and odours was performed in accordance with relevant NSW Environment Protection Authority (EPA) guidelines and also industry best practice guidance.

JBS&G consider potential sources of air emissions can be adequately managed via implementation of appropriate controls and monitoring of air quality impacts (if any) as detailed in **Section 6** for the duration of the refurbishment works program.

1. Introduction

1.1 Introduction and Background

JBS&G Australia Pty Ltd (JBS&G) was engaged by Health Infrastructure (HI, the client) for the provision of environmental services associated with the proposed refurbishment of part of Block C within Wyong Hospital (WH Block C, the site). The proposed refurbishment involves repurposing the existing Block C hospital building into a new World Class End of Life Program (WCEoL) facility. The site is formally identified as part of Lot 4 in DP 1248441 and comprises an area of approximately 1,200 m^2. The refurbishment of the existing Block C building will include landscaping works in the surrounding area. The site location and layout are shown on **Figures 1** and **2** respectively, and proposed development plans have been provided as **Appendix A**.

The air quality impact assessment, documented herein, has been limited to only the impact of construction works in aforementioned areas of the Local Health District (LHD) that are subject to refurbishment.

The HI Review of Environment Factors (REF) for the proposed redevelopment requires that an AQIA is completed in order to address the following items during both the Early and Main Works components of development:

- Could the works result in dust generation?
- Could the works generate odours (during construction or operation)?
- Will the works involve the use of fuel-driven heavy machinery or equipment?
- 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?
- Will the works have any adverse impact on air quality?
- Consider the cumulative air quality impacts, the surrounding sensitive receivers and the potential adverse effects that the activity may have on air quality.

As such, this AQIA details the potential construction and operational air quality impacts to both onsite and on nearby sensitive receivers and outlines the proposed management and mitigation measures that would be implemented to reduce any air quality impacts.

The AQIA presented herein has been developed with consideration to the *National Environment Protection (Ambient Air Quality) Measure* (Air Quality NEPM 2016, updated 2021) and Chapter 3 Hazardous and Offensive Development of *State and Environmental Planning Policy (Resilience and Hazards) 2021* (Resilience and Hazards SEPP[1]) and outlines the detailed assessment of potential air quality impacts and appropriate management and mitigation measures that may be required during the development activities.

1.2 Proposed Development/Remediation Scenario

As discussed above, the site is occupied by an existing hospital building which is proposed to be refurbished for ongoing hospital use, specifically into a WCEoL facility and associated outdoor

[1] *State Environment Planning Policy No. 33 – Hazardous and Offensive Development (*SEPP 33) has been repealed and the requirements incorporated into the Resilience and Hazards SEPP 2021 as of 1 March 2022.

landscaped areas. The anticipated footprint of the refurbishment works is shown on **Figure 2** and excerpts of the detailed design plans are provided in **Appendix A**.

1.3 Objectives and Scope of Work

The objective of the assessment is to conduct an AQIA to satisfy the HI REF provided for the proposed development. The scope of works comprised:

- Detailed review of the site setting, environmental condition, surrounding land uses and development scenario;
- Identification of potential sources of air and odour emissions associated with the proposed development and potential receptors;
- An assessment of the class, quantity and location of any dangerous and hazardous materials which may be encountered during redevelopment activities to determine if the proposed works constitutes potentially hazardous or offensive development;
- An assessment of any air quality impact in accordance with any relevant Environment Protection Authority (EPA) guidelines; and
- Appraisal of appropriate air quality impact mitigation, monitoring, and control measures.

2. Summary of Site Condition

2.1 Site Details

The site location and proposed layout are shown on **Figures 1** and **2**. The site details are summarised in **Table 2.1** and described in more detail in the following sections.

Table 2-1 Site Identification Details

Site Legal Identifier (as shown on Figure 2)	Lot 4 in DP1248441
Site Address	664 Pacific Highway, Hamlyn Terrace, NSW 2259
Site Area	1,200 m^2
Local Government Authority	Central Coast Council
Approximate Coordinates (GDA 94 Map Grid of Australia (MGA) 54)	Easting: 358326 Northing: 6318808
Registered Site Owner	Health Administration Corporation
Current Zoning	Zone SP2 – Health Services Facility (*Central Coast Local Environmental Plan 2022*)
Previous Land Uses	Unknown
Current Land Uses	Health Service
Proposed Land Uses	Health Service

2.2 Site Condition

The site is located within the eastern (and central) portion of the Wyong Hospital Campus and is wholly surrounded by other hospital facilities. The site, as shown on **Figure 2**, is occupied by the existing hospital Block C building. JBS&G was not provided with access to the building interior, however inspection of the building exterior confirmed it was a single storey U-shaped brick structure which was centred around a grassed courtyard area. Concrete walkways lined much of the Block C exterior and covered walkways connected Block C to other hospital buildings.

The area of the proposed refurbishment is sealed apart from the internal courtyard and land external to the Block C building which were grassed with some trees.

There was no evidence of significant contamination at the site in the form of asbestos containing materials (ACM) fragments, odours or staining on the surfaces, nor aboveground or underground fuel storage tanks (AST/UST) observed within inspected area.

2.3 Surrounding Environment

The current land uses surrounding the site are summarised below:

- North – the site is bound to the north by Block E of Wyong Hospital and associated parking areas. Further north of the hospital campus is Skyhawk Reserve and an area of low density residential land use;
- West – the site is bound to the east by majority of the Wyong Hospital campus (i.e. the Wyong Hospital Helicopter Landing Site, Blocks B, A, F, H, the and associated parking areas). Further west of the hospital campus is Louisiana Road and areas of low density residential land use and crown reserve;

- East – the site is bound to the east by another Wyong Hospital Block C building, the Block D area and associated parking. Further east of the hospital campus is the Pacific Highway and areas of commercial land use; and
- South – the site is bound to the south by the remainder of Wyong Hospital Block C and associated parking areas. Further south of the hospital campus is the Pacific Highway and an area of low density residential land use.

2.4 Environmental Setting

Environmental characteristics as relevant to the AQIA have been summarised within **Section 2.4**.

2.4.1 Topography

The immediate area of the site is generally flat and sits at an elevation of between 26 and 28 m above Australian Height Datum (m AHD). However the more broader Wyong Hospital Campus gently slopes from the north to the south, with ground levels falling by approximately 20m between these boundaries.

2.4.2 Geology and Soils

The Wyong Hospital Campus, including the area of the site, is located on Narrabeen Clifton Sub-Group geological formation consisting of claystone, sandstone and shale.

2.4.3 Acid Sulfate Soil

The Wyong Hospital Campus, including the area of the site, is not located in are area with known occurrence of acid sulfate soils.

2.4.4 NSW EPA Records

A search of the NSW EPA database for the site and immediate surrounding properties (within a 1 Km radius) yielded the following results.

The search was undertaken through the following public registers:

- Search of the NSW EPA contaminated land public register of record of notices (under Section 58 of the CLM Act) identified no notices issued under the CLM Act for the site or immediate surrounds.
- Search of the NSW contaminated sites notified to the EPA (under Section 60 of the CLM Act) did not identify the site or land immediately surrounding the site to be on the EPA contaminated land register or list of sites notified to EPA.
- Search of the NSW EPA Government per- and poly-fluoroalkyl substances (PFAS) Investigation Program did not identify the site or land immediately surrounding the site listed on the NSW Government PFAS Investigation program.
- Search of the NSW *Protection of the Environment Operations Act 1997* (POEO Act) public register of licences, applications and notices (maintained under Section 308 of the POEO Act) did not identify any environment protection licences (EPL), prevention, clean-up or prohibitions notices registered to the site or land immediately surrounding the site.

A search of the public register external to the immediate surrounding properties (> 1 km in radius) was conducted. No active POEO licences were identified.

3. Receiving Environment

3.1 Air Quality in Wyong

Air quality in the Central Coast region is impacted by a range of air pollution emissions sources including major industry, motor vehicles, commercial operations and leaking pipes and tanks as well as from domestic activities such as solid fuel heaters. Major pollutants that may potentially be emitted by the proposed Main Works program have been identified as follows:

Fine Particles

Particles (or particulate matter) in the atmosphere come from a wide variety of sources, including soil (dust), vegetation (pollens and fungi), fossil fuel combustion, biomass burning and industrial activities. Particles in the atmosphere typically exhibit a bi-modal size distribution with a peak in the range of 0.1 to 2.5 µm and a second peak in the range 2.5 to 50 µm. As a result, particles with a diameter of up to 2.5 µm ($PM_{2.5}$) are commonly referred to as fine particles. There is also a distinction in the health effects of different sized particles. Particles up to about 10 µm (PM_{10}) diameter are inhaled, whereas larger particles are not. On this basis, the term 'fine particles' is often used to refer to PM_{10}.

Coarse Particles

Coarse particles remain in the air for relatively short periods of time and are therefore generally not carried long distances. As a result, coarse particles tend to be a local problem rather than a regional one, generally occurring closer to industrial sources such as metal processing plants and mining operations.

The level of particles in the atmosphere is determined by measurement of their mass. In the greater metropolitan area, two methods of measurement are commonly used; total suspended particulates (TSP) and dust deposition rates (DDR). While the mass determined by these measures will include fine particles, these will generally only make a small contribution. Measurements of TSP and DDR are therefore used to provide an indication of the level of coarse particulates in the atmosphere.

Concerns about coarse particles are generally more in terms of nuisance such as damage to- or soiling of materials, or adverse effects on sensitive vegetation through surface coating.

Air Toxins

Another group of air pollutants that are potentially hazardous to human health even at low levels, are toxic compounds known as air toxins. This group includes chemicals such as benzene, formaldehyde, chlorinated hydrocarbons, PAHs, polychlorinated biphenyls (PCBs) and dioxins. Trace amounts of many of these chemicals have been detected in air in urban environments in a number of areas around the world.

In recent years there has been increasing community concern about air toxins in ambient air and the associated health effects. These compounds may cause cancer, gene mutation, reproductive malfunction, affect foetal development, or have neurotoxic effects. While the levels that endanger public health have not been established, it is believed that even very low levels, particularly under long term exposure, could have adverse effects. Many air toxins are highly volatile and evaporate readily into the air following inhalation.

Odour

Odour is measured using panels of people who are presented with samples of odorous gas diluted with decreasing quantities of clean odour-free air. The panellists report when the smell becomes detectable. Odour in air is quantified in terms of "odour units" which is the number of dilutions required to bring the odour to a level at which 50 % of the panellists can just detect the odour. This process is known as olfactometry.

Background levels of odour in the environment can vary enormously based on a range of factors.

3.2 Air Quality in Proximity of the Site

In NSW the EPA is responsible for monitoring air quality. Since 2013 air quality data has been collected from the Wyong Monitoring Station operated by EPA in proximity of the site.

Table 3.1 summarises the measurements of particulate matter (PM) and carbon monoxide (CO) values recorded in air at the Wyong station. Results are shown as the value of particulate matter with a diameter of 10 micrometres or less (PM_{10} and $PM_{2.5}$).

Table 3.1 Wyong Monitoring Station Annual Average PM10 Concentration (µg/m3) Derived from 24 Hour Average

Year	WYONG PM10 annual average, derived from 24h average [µg/m³]	WYONG PM2.5 annual average, derived from, 24h average [µg/m³]	WYONG CO annual average derived from 8hr rolling average [ppm]
2013	16.6	6.7	0.1
2014	15.1	5.5	0.1
2015	14.9	5.2	0.1
2016	15.2	5.7	0.1
2017	16.1	5.8	0.1
2018	18	6.8	0.1
2019	21.1	10.5	0.1
2020	15.9	5.6	0.2
2021	13.5	4.7	0
2022	11.7	4	-
2023	13.9	4.9	-

As noted in **Section 2.3** the Wyong Hospital HLS is located approximately 45m north-west of the site. Review of the letter[2] assessing the potential impacts from retrieval helicopter operations at Wyong Hospital on patients, staff and visitors attending the proposed Wyong Palliative Care Unit, indicated that helicopters rotor downwash associated with the HLS is likely to extend out to a maximum distance of 45m below the generating aircraft. The AW 139 helicopter used by NSW Ambulance has a main rotor diameter of slightly less than 14m so two to three rotor diameters equates to approximately 30-45m. Based on the distance between the site and the HLS it was also concluded that "*… under most conditions, main rotor downwash effects such as strong winds, wind gusts and turbulence will be at levels which ought not be a cause for concern*." On this basis the use of the Wyong Hospital HLS is considered unlikely to affect the air quality impacts, if any, associated with the proposed refurbishment works on Block C.

It is noted however that the Air Quality Management Strategy presented in **Section 6** includes a requirement for dust monitoring when ground disturbance works outside of the Block C structure are proposed, and a number of mitigation measures that should be implemented in the event that the trigger level is exceeded. This approach is considered to be adequate to identify whether use of HLS is affecting emissions from the refurbishment works and allows for reprogramming of tasks during these helicopter take-off and landing events to prevent unacceptable emissions.

3.3 Meteorology

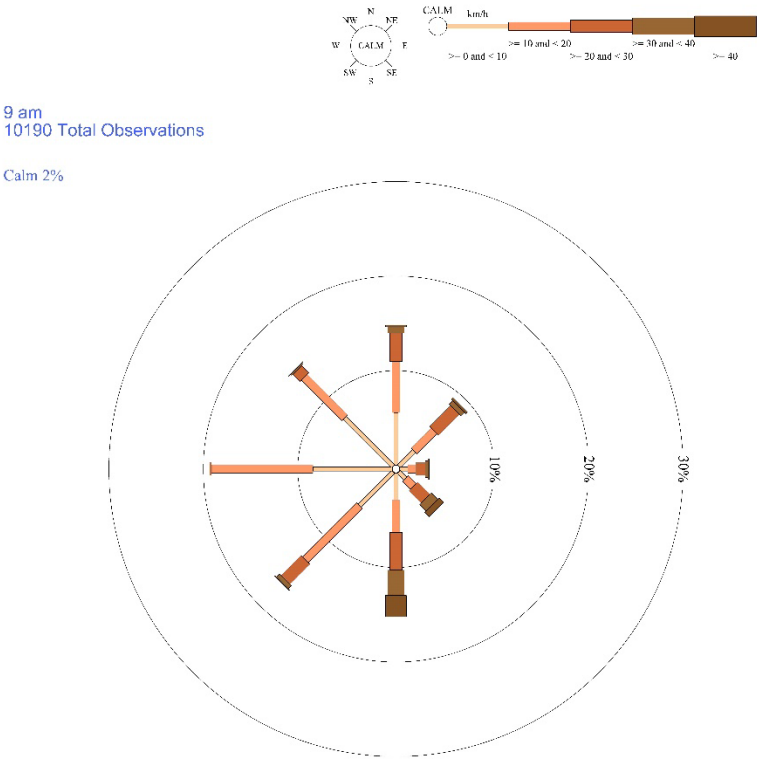
A review of average climatic data for the nearest Bureau of Meteorology monitoring location (Norah Head[3]) indicates the site is located within the following meteorological setting:

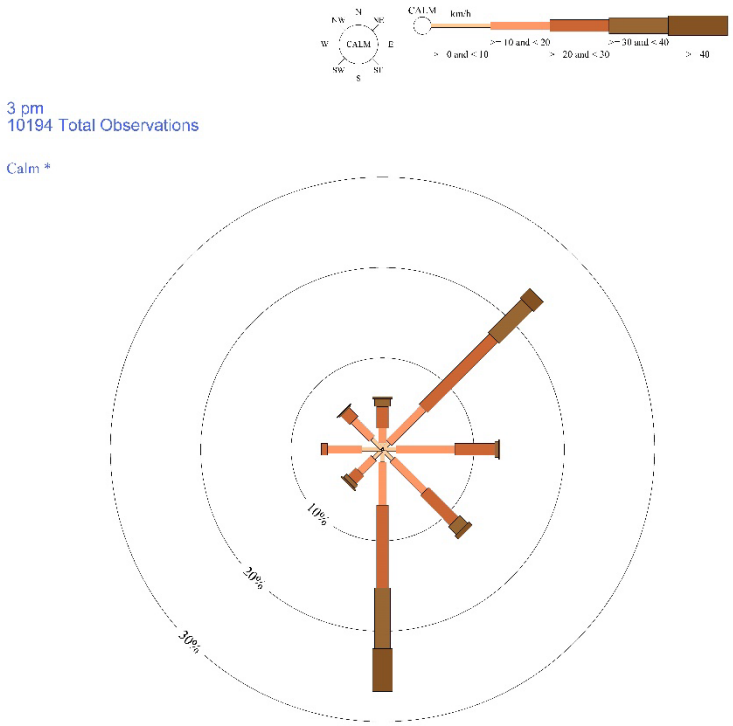
[2] as prepared by AviPro Aviation Management and Safety Advisers dated 14 November 2023.

[3] Climate data for Norah Head AWS 061366, located approximately 18km from Wyong Hospital, http://www.bom.gov.au/climate/averages/tables/cw_061366.shtml, accessed by JBS&G on 8 March 2024.

- Average minimum temperatures vary from 9.9 ^{o}C in July to 20 ^{o}C in February;
- Average maximum temperatures vary from 17.6 ^{o}C in July to 26.4 ^{o}C in January;
- The average annual rainfall is approximately 1179 mm with rainfall greater than 1 mm occurring on an average of 98.2 days per year;
- Monthly rainfall varies from 61.7 mm in September to 145.7 mm in June with the wettest periods occurring on average in March to June; and
- Average windspeeds are generally consistent throughout the year in the range of 15 to 20 km/hr at 9am and between 25 to 30 km/hr at 3pm **Plate 3.1** shows the 9am and 3pm wind rose data available for the Norah Head AWS monitoring station from 1995 to 2023.

Plate 3.1: Wind Speed Versus Direction Plot Recorded at Norah Head Weather Monitoring Station (061366) from 1995 to 2023





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3.4 Sensitive Receptors

NSW EPA[4] defines 'sensitive receptors' with respect to emissions to air, as the locations where people are likely to either live or work, or engage in recreational activities. In this context the sensitive receptors for the proposed refurbishment works program include:

- On site: construction site workers (includes above and below ground workers); and
- Off-site: Wyong Hospital users or residents in surrounding areas.

These two groups are discussed below.

3.4.1 Sensitive Site Receptors

Any emissions to air that occur as a result of the proposed refurbishment works activities have the potential to impact the workforce engaged within the site, not just potential sensitive receptors located outside the property boundaries. In this context all construction workers engaged at the site are the most sensitive receptors for the proposed works, as shown on **Figure 3**. The intention of the AQIA is identify whether emissions to air or odour impacts to site construction worker would exceed acceptable exposure levels for workers in NSW.

3.4.2 Sensitive Off-Site Receptors

The site is located within the operational Wyong Hospital, which borders land used for low-density residential/commercial purposes, as summarised in the review of the surrounding land uses (**Section 2.3**).

Numerous potentially sensitive receptors exist in proximity of the site which have been assessed in this AQIA. The assessment was limited to those receptors considered to be closest to the proposed refurbishment activities and primarily comprise staff and patients within Wyong Hospital, staff and patrons of adjacent commercial properties; and residents of nearby low density houses.

In considering the impacts to these receptors it is however noted that background air quality within Wyong is considered to be reduced by virtue of the general regional activities (i.e. vehicles, mining, combustion generators etc.). Given the rural setting of the site with high average maximum temperatures (**Section 3.3**), it is anticipated that surrounding buildings are fitted with recirculating air conditioning and filtration systems, effectively eliminating exposure of residents or workers within these buildings to potential air quality impacts, as may be generated during the refurbishment activities.

[4] In NSW EPA '*Approved Methods for the Modelling and Assessment of Air Pollutants in NSW*' (EPA 2022)

4. Scope of Air Quality Impact Assessment (AQIA)

As discussed in **Section 1.1**, an AQIA is required to meet the HI REF requirements. JBS&G consider the requirements for this assessment of air quality are as follows:

- Could the works result in dust generation?
- Could the works generate odours (during construction or operation)?
- Will the works involve the use of fuel-driven heavy machinery or equipment?
- 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?
- Will the works have any adverse impact on air quality?
- Consider the cumulative air quality impacts, the surrounding sensitive receivers and the potential adverse effects that the activity may have on air quality.

With respect to the second requirement listed above, JBS&G has considered NSW EPA guideline documents as available for assessment of air quality. These are:

- '*Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (EPA 2022[5])'; and
- '*Assessment and Management of Odour from Stationary Sources in NSW*' NSW Department of Environment and Conservation, November 2006 (DEC 2006).

Both guideline documents are specific to emissions of air pollutants from long-term and stationary sources in NSW.

However, JBS&G considers that the scope of work under consideration at the site i.e. the refurbishment of Block C, is not consistent with the definition of a 'stationary source'. Any potential sources of air and odour emissions that exist during the refurbishment of the site will not exist in the form of fixed or stationary locations, but will instead change over time as construction works progress. Furthermore, the ultimate goal of the refurbishment works will be to remove, or mitigate, any potential sources of air emissions or odour from the site. As such JBS&G consider that neither EPA (2016) nor (DEC 2006) are relevant for the current AQIA. It is also considered that the EPA does not currently have specific guidelines to assess air impacts from construction sites i.e. to assess impacts from an area of transient sources where emissions to air are short term and can be readily controlled or managed.

In the absence of any relevant NSW EPA guidelines for assessment of air emissions from earthworks/construction, JBS&G has adopted the risk-based approach developed in the United Kingdom by the Institute of Air Quality Management (IAQM) in "*IAQM Guidance on the Assessment of Dust from Demolition and Construction - 2014*" (IAQM 2014) to address requirements for assessment of air quality. The IAQM (2014) approach is widely used in NSW for performing qualitative assessments of emissions when only short term emissions require consideration, as is the case with proposed construction program at the site. The risk based approach is included in **Section 6.2**.

5 *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW.* State of NSW and Environment Protection Authority, August 2022, (EPA 2022)

5. Assessment of Air Quality

5.1 Potential Sources of Air and Odour Emissions

As discussed in **Section 3** and **Section 4**, the screening assessment of the known environmental condition of the site and proposed refurbishment activities has identified the following potential sources which may result in emissions and impacts on air quality have been identified:

- movement of vehicles (for delivery) and/or plant;
- concrete sawing/cutting during development (as may be required for services installation etc);
- the use of fuels associated with earthmoving equipment/heavy machinery/equipment; and
- the excavation, storage and handling of imported construction materials (sand/gravel) and/or landscaping materials including mulch or natural soil.

A contamination assessment for the site was documented in JK (2023[6]) and concluded that the site is suitable for the proposed refurbished use without the need for remediation, subject to the implementation of a suitable unexpected finds procedure to manage potential asbestos-related finds during construction. As such, management to reduce potential air quality impacts as may be associated with asbestos has been included herein for completeness (see **Sections 5.3.1** and **6.3**).

Further discussion of potential source emissions and air quality impacts specific to the proposed redevelopment is presented in the following sections.

5.1.1 Exhaust Emissions – Plant/Machinery/Equipment

It is anticipated that a range of fuel powered plant, machinery and equipment will be required to facilitate refurbishment activities including vehicle movement for various deliveries throughout the construction period. However no bulk fuel storage is anticipated during these construction activities. As such, potential emissions/air quality impacts have been identified as principally associated with exhaust fumes generated by vehicles, plant, machinery or equipment use.

Diesel and petroleum combustion is a well-known process and regulated in accordance with relevant emission standards as prescribed by the NSW EPA. Exhaust emissions will be anticipated from construction machinery on site. However, noting the site is located in Wyong, where substantial motor vehicle activity occurs, fuel combustion emissions due to the redevelopment works are anticipated to be insignificant in comparison to existing levels of exhaust-based constituents in the surrounding area.

5.1.2 Excavation, Storage/Handling of Site Materials

As discussed in **Section 1.2**, the proposed development scenario may include some minor excavation to facilitate services installation and new landscaping. In addition, materials will likely be imported for landscaping finishes.

Potential emissions and impacts on air quality associated with the movement/excavation of site materials have been identified as the potential generation of airborne dust particulate (respirable dust and/or asbestos fibres as discussed in **Section 5.3.1**).

[6] '*Report To Health Infrastructure On Preliminary Site Investigation For Proposed Alterations And Additions To Block C Education Centre Wing At Wyong Hospital, Pacific Highway, Wyong, NSW*' Prepared by JK Environments Pty Ltd, reference E36355PLrpt dated 8 December 2023 (JK 2023).

While the potential for these impacts is considered to be low, given that only limited excavation works are proposed, relevant control measures to address emissions from excavation, storage and handling and/or offsite disposal of materials are presented in **Section 6**.

5.1.3 Fugitive Dust

Exposed surfaces will be anticipated to generate dust by wind movement and erosion of surface particles. Any designated unsealed haulage roads and proposed areas of material stockpiling have been considered as having an unlimited wind erosion potential subsequent to the completion of construction (and subject to any application of stabilising materials such as road base gravel where hardstands are not encountered).

The greatest potential for the release of air pollutants from stockpiled material will be during handling of soils and/or emission of fugitive dusts when stockpiled materials are uncovered.

5.2 Assessment of Impacts from Dust

IAQM (2014) presents a robust method for assessment of the dust impact risk associated with construction/earthworks in order to determine the level of site-specific mitigation that should be applied. The method is a five step approach which is presented in **Sections 5.2.1** to **5.2.4** and summarised as follows:

- Step 1: Screen the Need for a Detailed Assessment. IAQM (2014) considers that no further assessment is required if there are no receptors within a certain distance of the works.
- Step 2: Assess the Risk of Dust Impacts Arising. IAQM (2014) requires this be completed for the demolition, earthworks, construction and trackout, with consideration given to the scale of each activity in conjunction with the sensitivity of the area;
- Step 3: Site-specific mitigation taking into consideration any requirements issued by the relevant local government authority;
- Step 4: Determine Significant Effects i.e. determine the impacts expected when mitigation measures are in place and whether these are considered significant; and
- Step 5: Prepare a Dust Assessment Report that documents the findings of Steps to 4.

5.2.1 Step 1 Screen the Need for a Detailed Assessment

IAQM (2014) considers that a detailed assessment is normally required where there is:

- a ‘human receptor’ within:
    - 350 m of the boundary of the site; or
    - 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s).
- an ‘ecological receptor’ within:
    - 50 m of the boundary of the site; or
    - 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s).

As discussed in **Section 3.4** and shown on **Figure 3** there are human receptors within 350m of the site, which triggers the need for the detailed assessment of dust impacts. The assessment has been undertaken for human receptors only, as no ecological receptors of emissions to air were identified.

5.2.2 Step 2 Assess the Risk of Dust Impacts Arising

In accordance with the IAQM guidance (Section 7, Step 2: Assess the Risk of Dust Impacts) three decisions must be made in Step 2, defined as Step 2A, Step 2B and Step 2C.

Step 2A: Define the Potential Dust Emission Magnitude

For Step 2A each potential activity i.e. minor earthworks, construction and trackout must be assigned a dust emission magnitude as either large, medium or small.

- The required refurbishment program is assessed as 'small' in relation to emissions magnitude, given the project details presented in **Section 1.2** align with the IAQM (2014) construction description of small being a "…*Total building volume <25,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber).*"

The required trackout works are assessed as 'small' in relation to emissions magnitude, which is generally consistent with the IAQM (2014) definition of small as less than 10 heavy duty vehicle movements in any one day, surface materials with low potential fust release and unpaved road lengths < 50m.

Step 2B: Define the Sensitivity of the Area

IAQM (2014) requires that sensitivity of the area to dust emissions be determined as 'high', 'medium', or 'low' by considering a number of factors:

- the specific sensitivities of receptors in the area;
- the proximity and number of those receptors;
- in the case of PM10, the local background concentration; and
- site-specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of wind-blown dust.

In accordance with IAQM (2014) Tables 2 to 4, the following receptor sensitivity has been determined:

The construction workforce (on-site receptor on **Figure 3**)

- Low sensitivity to dust soiling.
- Low sensitivity to human health.

Surrounding Community (off-site receptors on **Figure 3**)

- Residents on their private properties are considered to have a high sensitivity to dust soiling and human health;
- Staff working, and patients located, in other areas of the LHD outside of the refurbishment areas are considered to have a medium sensitivity to dust soiling but a high sensitivity to human health.

Considering the above receptor sensitivities, **Table 5.1** and **Table 5.2** have been reproduced from IAQM (2014) (for only the receptor settings applicable to this project) so that the sensitivity of the area as a whole can be determined.

For assessing the sensitivity to human health impacts, the mean background PM10 concentration of 15.6 µg/m^3 has been used given the local ambient air quality measured at the nearest monitoring station (see **Table 3.1**).

Table 5.1 Sensitivity of the Area to Dust Soiling of People and Property (as extracted from IAQM 2014 Table 2)

Receptor Sensitivity	Number of Receptors	Distance from Source (m)			
		<20	<50	<100	<350
High	**10-100**	High	High	Medium	Low
Medium	**>10**	Medium	Low	Low	Low
Low	**>1**	Low	Low	Low	Low

Table 5.2 Sensitivity of the Area to Human Health Impacts (as extracted from IAQM 2014 Table 3)

Receptor Sensitivity	Annual Mean PM10 Concentration	Number of Receptors	Distance from Source (m)				
			<20	<50	<100	<200	<350
High	**>32 µg/m3**	**>100**	High	High	High	Medium	Low
	28-32 µg/m3	**>100**	High	High	Medium	Low	Low
	24-28 µg/m3	**>100**	High	Medium	Low	Low	Low
	<24 µg/m3	**>100**	Medium	Low	Low	Low	Low
Low	**<24 µg/m3**	**>1**	Low	Low	Low	Low	Low

On the basis of **Table 5.2** where the average PM_{10} concentration of 15.6 µg/m^3 is applied, the sensitivity of the area to the refurbishment on the site is considered to be medium. However owing to the **Table 5.1** classification of 'high' sensitivity, this category has also been applied to both earthworks and trackout activities.

Step 2C: Define the Risks of Impacts

In accordance with IAQM (2014) Section 7.4, **Table 5.3** has been prepared showing the risk of dust impacts in the area assuming no mitigation works occur. The categorisation of risk in **Table 5.3** is based on the dust emission magnitude, i.e. small for this site, in combination with the sensitivity of the area.

Table 5.3 Risk of Dust Impacts (as extracted from IAQM 2014 Tables 7 and 9)

Potential Impact	Number of Receptors	Demolition	Earthworks	Construction	Trackout
Dust Soiling	**>100**	N/A	N/A	Low risk	Low risk
Human Health	**>100**	N/A	N/A	Low risk	Low risk

Based on **Table 5.3**, the proposed construction and trackout activities are conservatively assessed as presenting a low risk for both dust soiling and human health impacts in the event that dust mitigation measures are not implemented.

5.2.3 Step 3 Site Specific Mitigation

IAQM (2014) identifies a range of appropriate dust mitigation measures that should be implemented where the risk of dust impacts is considered to be low. These measures are presented in **Section 6**.

5.2.4 Step 4 Determine Significant Impacts

In accordance with IAQM (2014), the final step in the assessment is to determine the significance of any residual impacts, following the implementation of mitigation measures, and Section 9 of IAQM (2014) states that for almost all construction activity the aim should be to prevent significant effects on receptors through the use of effective mitigation, and that experience shows that this is normally possible.

An air quality management strategy has been developed to outline minimum controls required to manage potential emissions and air quality related issues, as outlined in **Section 6**. Implementation of the mitigation measures as recommended in **Section 6** are considered to be sufficient for effective management of off-site dust impacts.

5.3 Assessment of Other Emissions to Air

5.3.1 Asbestos Removal and Management

While the refurbishment works will require demolition of portions of existing building structures, which may contain asbestos, legally any Hazardous Building Removal works will need to take place in accordance with current regulations. As such the Air Quality Management measures listed in **Section 6** have not considered the potential for asbestos to be present on site in any form.

5.3.2 Odour Emissions

As outlined in **Section 2**, the proposed refurbishment does not involve use of materials which are considered to be a potentially significant source of odour generation potential. Similarly the proposed construction works are unlikely to cause the emission of substantial odours across the site as a whole, despite the likelihood that individual activities may cause localised odours. These localised odours are likely to be intermittent and are best controlled as part of individual job risk analyses. As such the Air Quality Management measures listed in **Section 6** have not considered the potential for substantial odour causing activities.

5.4 Regulatory Requirements

Development activities on site will be required to be completed in accordance with several sections of environmental and occupational health and safety legislation and associated regulations. The primary Acts, Regulations and Guidelines are listed below with a brief summary of their applicability. Please note that this list is not intended to be a comprehensive listing of acts and regulations. The site owner and contractors are required to satisfy themselves that all applicable permits, licences and legislation have been obtained and their conditions satisfied.

Environmental Planning & Assessment Act 1979

The overarching Act to institute a system of environmental planning and assessment for NSW.

Work Health and Safety Act, 2011

The overarching Act for NSW setting law relating to employee health and safety and employer responsibilities.

Work Health and Safety Regulation, 2017

Sets Regulations and details the duties for employers to achieve required employee health and safety performance.

***Contaminated Land Management Act 1997* (*CLM Act*)**

The *Contaminated Lands Management Act 1997* (CLM Act) controls the assessment of contamination and requirement of remediation of soils and groundwater.

Protection of the Environment Operations (Clean Air) Regulation 2010, under the POEO Act 1997

The *Protection of the Environment Operations Act 1997* (POEO Act) is the key piece of environment protection legislation administered by the EPA.

National Environment Protection (Ambient Air Quality) Measure (NEPC 2021)

National guidelines for the assessment of ambient air quality. These guidelines provide national air quality standards and criteria for a range of pollutants.

Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (EPA 2016)

NSW regulatory guidelines outlining the methods for detailed quantitative air quality assessments from stationary sources.

***Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres, 2nd Edition, 2005, Australia National Occupational Health and Safety Commission* (NOHSC 2005)**

Guidelines for the assessment of airborne asbestos fibres including relevant workplace exposure standards.

6. Air Quality Management Strategy

The following section provides the management and/or control measures which can be implemented to address potential sources of air quality and emissions impacts identified in **Section 5.1.** These have been prepared in general accordance with relevant regulatory guidelines (**Section 5.4**) and the recommendations in IAQM (2014) to keep dust emissions to a minimum and mitigate what would otherwise be considered a medium risk.

Table 6.1: Key Features of Air Quality Management Required During the Proposed Refurbishment Works

ID	Mitigation Measure
General Controls Required for the Work Area	
01	Display the name and contact details of person(s) accountable for air quality issues on the site boundary[1].
02	Develop plans for dust management as part of the Construction Environmental Management Plan (CEMP). As a minimum daily visual inspection of dust emissions on the site boundary is required. Given the sensitivity of the Wyong Hospital personnel who will continue to use land close to the refurbishment works it is recommended that realtime PM10 continuous monitoring take place should ground disturbance works occur[1,2].
03	Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken[1].
04	Make the complaints log available to the local authority when asked.
05	Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book[1].
06	Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked[1,4].
07	Carry out regular site inspections to monitor compliance with the CEMP, record inspection results, and make an inspection log available to the local authority when asked[4].
08	Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions[4].
09	Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible[3].
11	Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site[1].
12	Avoid site runoff of water or mud[1].
13	Keep site fencing, barriers and scaffolding clean using wet methods.
14	Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.
15	Ensure all vehicles switch off engines when stationary - no idling vehicles.
16	Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.
17	Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
18	Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate[1].
19	Use enclosed chutes and conveyors and covered skips.
20	Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
21	Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods[1].
22	Avoid bonfires and burning of waste materials.

Additional Controls Required During Ground Preparation and Landscaping	
23	Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable[1].
24	Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable[4].
25	Where practicable, only remove the cover in small areas during work and not all at once
Additional Controls Required During Trackout	
28	Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.
29	Avoid dry sweeping of large areas.
30	Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport[4].
31	Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
32	Record all inspections of haul routes and any subsequent action in a site log book[1].
36	Access gates to be located at least 10 m from receptors where possible.

Notes:

1. The task can be completed as per the requirements of the Contractors Environmental Management Plan (CEMP).
2. For further details see **Section 6.2**.
3. For further details see **Section 6.5.**
4. For further details see **Section 6.4.**

6.1 Diesel Particulate Matter Exposure Monitoring

Under the proposed refurbishment plans, it is anticipated plant/equipment utilised at the site will meet the minimum emissions standards outlined by the NSW EPA (required for registration), and standard construction requirements (i.e., documentation of plant maintenance and service history checklists etc.). As such, it is not anticipated that active monitoring for diesel particulate is required as part of site development activities.

6.2 Real-Time Respirable Particulate (Dust) Monitoring

Only required when tasks involving active ground disturbance are proposed: The preferred method of health monitoring is to undertake real-time assessment of levels of airborne particulates and potential co-occurring respirable fibres. Real-time monitoring shall be undertaken during mechanical disturbance works by a stationary light-scattering laser photometer (as proposed to be a TSI Dusttrak) as set to measure particulates in the PM_{10} size fraction. Representative continuous monitoring shall be undertaken through the course of a workday at representative locations in proximity of the active soil disturbance works at the boundary of the worksite. The level of PM_{10} shall be interpreted as a daily averaged sample, with consideration to peaks or significant exceedances above the criteria during the monitoring period which may be interpreted as being directly associated with site activities.

A criterion of 50 $\mu g/m^3$ of PM_{10} shall be adopted as the action level for the site works, consistent with the standard for the average PM_{10} concentration during the period of one day provided in the national air quality standards (NEPC 2021). As a conservative measure, where this criterion is observed to be exceeded, immediate instruction shall be provided to revise air emission controls and review the specific work activities that are suspected to have resulted in the elevated PM_{10} levels.

The Dusttrak shall be operated by an appropriately trained environmental consultant or occupational hygienist. Daily dust monitoring reports are to be prepared following the monitoring period.

6.3 Visual Monitoring

Visual monitoring shall be undertaken by the person(s) in control of the work-site at regular periods throughout the works. It shall be ensured that visible dust emissions from the works are not visible at the boundary of the worksite. Where visual dust emissions are observed, then control measures shall be revised.

6.4 Dust Management

As per **Table 6.1** during any active ground disturbance works at the site dust levels shall be managed primarily by ensuring:

- Water sprays are used on the excavation areas, stockpiles and haulage pathways;
- Stockpiles will be either periodically wetted down or covered to control dusts;
- Haulage vehicles shall be covered and are to leave via the designated (stabilised) site access;
- Haulage vehicles and plant and equipment shall be washed down whenever they leave the asbestos work area; and
- Access roads are to be sufficiently maintained to ensure no visible dust at the site boundary.

Care should be taken to not over-wet excavations and/or stockpiles such that excess runoff is generated. If dust is visible at the boundary of the work area, then additional dust control measures shall be employed, which may include:

- Temporarily suspending activities until wind speeds reduce; and/or
- Additional use of water sprays or dust suppression mixtures.

Further dust management measures may be further instructed by monitoring results as generated by dust monitoring works undertaken in accordance with **Section 6.2**.

6.5 Odour Management

As discussed in **Section 3**, the proposed works are considered not to represent a significant potential source of odour emissions. As such the mitigation measures listed in **Table 6.1** should be adequately protective of the emission of potentially offensive odours due to the proposed refurbishment works.

7. Conclusions and Recommendations

The AQIA detailed herein for the proposed WCEoL upgrade at Wyong Hospital has involved the following scope work:

- Detailed review of the site setting, environmental condition, surrounding land uses, known contamination status of the site, proposed development scenario was undertaken in accordance with the guidance documents listed in **Section 4**.
- Assessment of air quality impact was completed in accordance with relevant Environment Protection Authority guidelines and best practice industry guidance; and
- Potential sources of air and odour emissions were identified, as detailed in **Section 5.1**, principally associated with generation of dusts and the use of fuels (for equipment/plant etc.).

Based on the AQIA detailed herein, and subject to the Limitations in **Section 8**, the following conclusions and recommendations are presented:

- *Could the works result in dust generation?*

The proposed refurbishment of Block C at Wyong Hospital for the WCEoL program is considered to be small with respect to the scale of construction and earthworks required. Nonetheless in the event that dust mitigation measures are not implemented the proposed construction and trackout activities are conservatively assessed as presenting a low risk for both dust soiling and human health impacts.

It is noted that the Air Quality Management Strategy presented in **Section 6** includes a requirement for dust monitoring when ground disturbance works outside of the Block C structure are proposed, and a number of mitigation measures that should be implemented in the event that the trigger level is exceeded. This approach is considered to be adequate to identify whether use of HLS is affecting emissions from the refurbishment works and allows for reprogramming of tasks during these helicopter take-off and landing events to prevent unacceptable emissions.

- *Could the works generate odours (during construction or operation)?*

The proposed refurbishment works are considered not to represent a significant potential source of odour emissions. While JBS&G is unable to comment on the odour generating potential of materials to be used for the new building construction, it is considered that odours from new building materials, if any, would be managed effectively under the CEMP for the project.

- *Will the works involve the use of fuel-driven heavy machinery or equipment?*

Under the proposed redevelopment plans, it is anticipated that plant/equipment utilised at the site will meet the minimum emissions standards outlined by the NSW EPA (required for registration), and standard construction requirements (i.e., documentation of plant maintenance and service history checklists etc.).

- *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?*

The site is located within the operational Wyong Hospital, which borders with low-density residential/commercial properties. Numerous potentially sensitive receptors exist in proximity of the site and primarily comprise staff and patients within other areas of Wyong Hospital, staff and patrons of adjacent commercial properties; and residents of nearby low density houses.

- *Will the works have any adverse impact on air quality? Consider the cumulative air quality impacts, the surrounding sensitive receivers and the potential adverse effects that the activity may have on air quality.*

As discussed above, given that the proposed refurbishment works are temporary and small in scale, JBS&G consider potential sources of air emissions that are likely to occur will be limited to dust emissions. Based on JBS&G's previous experience these potential dust emissions that may occur during the redevelopment program can be adequately managed via implementation of appropriate controls and monitoring of air quality impacts detailed in **Section 6.**

8. Limitations

This report has been prepared for use by the client who has commissioned the works in accordance with the project brief only, and has been based in part on information obtained from the client and other parties. The report has been prepared specifically for the client for the purposes of the commission, and no warranties, express or implied, are offered to any third parties and no liability will be accepted for use or interpretation of this report by any third party.

The advice herein relates only to this project and all results conclusions and recommendations made should be reviewed by a competent person with experience in environmental investigations, before being used for any other purpose. This report should not be amended in any way without prior approval by JBS&G, or reproduced other than in full including all attachments as originally provided to the client by JBS&G.

Sampling and chemical analysis of environmental media is based on appropriate guidance documents made and approved by the relevant regulatory authorities. Conclusions arising from the review and assessment of environmental data are based on the sampling and analysis considered appropriate based on the regulatory requirements or agreed scope of work.

Limited sampling and laboratory analyses were undertaken as part of the investigations undertaken, as described herein. Conditions between sampling locations and media may vary, and this should be considered when extrapolating between sampling points. Chemical analytes are based on the information detailed in the site history. Further chemicals or categories of chemicals may exist at the site, which were not identified in the site history and which may not be expected at the site.

Changes to the conditions may occur subsequent to the investigations described herein, through natural processes or through the intentional or accidental addition of contaminants. The conclusions and recommendations reached in this report are based on the information obtained at the time of the investigations.

This report does not provide a complete assessment of the environmental status of the site, and it is limited to the scope defined herein. Should information become available regarding conditions at the site including previously unknown sources of contamination, JBS&G reserves the right to review the report in the context of the additional information.

Within the limitations imposed by the scope of services, the preparation of this report has been undertaken and performed in a professional manner, in accordance with generally accepted environmental consulting practices. No other warranty, whether express or implied, is made, including to any third parties, and no liability will be accepted for use or interpretation of this report by any third party.

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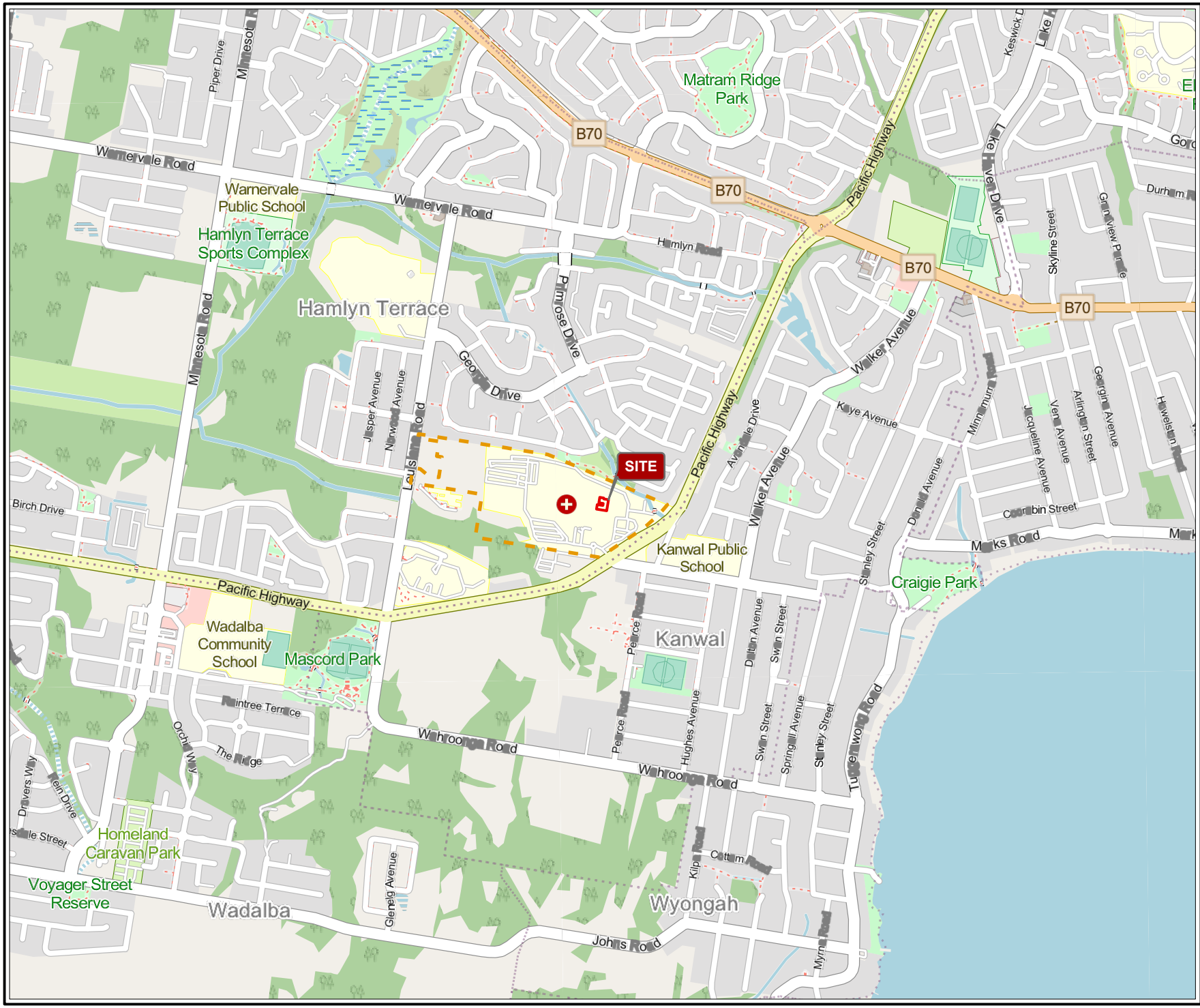
Figures



Legend

- Approximate Site Boundary - Building C
- Hospital Boundary

JBS&G

Job No: 66192	
Client: Health Infrastructure	
Version: R01 Rev A	Date 8/03/2024
Drawn By: HW	Checked By: SK

Scale 1:18,000

0 170 340

metres

Coord. Sys. GDA2020 MGA Zone 56

Hamlyn Terrace, Pacific Highway, Wyong, NSW

SITE LOCATION

FIGURE 1

File Name: 66192_WyongAndWestmead_AQIA_RevA
Reference: Nearmap - www.nearmap.com (Capture Date: 29/10/2023)

Legend

- Approximate Site Boundary - Building C
- Hospital Boundary
- NSW Cadastre
- Hydro Line

JBS&G

Job No: 66192

Client: Health Infrastructure

Version: AQIA Rev A	Date 8/03/2024
Drawn By: HW	Checked By: SK

Scale 1:800

0 7.5 15

metres

Coord. Sys. GDA2020 MGA Zone 56

Hamlyn Terrace, Pacific Highway, Wyong, NSW

SITE LAYOUT

FIGURE 2

File Name: 66192_WyongAndWestmead_AQIA_RevA
Reference: Nearmap - www.nearmap.com (Capture Date: 29/10/2023)

Legend

- Approximate Site Boundary - Building C
- NSW Cadastre
- Hospital Boundary

Potential Sensitive Receptors

- Potential On-Site Receptors (Construction - Workforce Only)
- Potential Wyong Hostpital Receptors (Staff & Patients)
- Potential Off-Site Receptors

JBS&G

Job No: 66192

Client: Health Infrastructure

Version: R01 Rev A	Date 11/03/2024
Drawn By: HW	Checked By: SK

Scale 1:5,000

0 40 80

metres

Coord. Sys. GDA2020 MGA Zone 56

Hamlyn Terrace, Pacific Highway, Wyong, NSW

POTENTIAL SENSITIVE RECEPTORS

FIGURE 3

File Name: 66192_WyongAndWestmead_AQIA_RevA
Reference: Nearmap - www.nearmap.com (Capture Date: 29/10/2023)

Appendix A Excerpts from the Wyong Hospital WCEoL Program Master Plan

WORLD CLASS END OF LIFE PROGRAM

Wyong Concept Design Report

BVN

We acknowledge the Darkinjung traditional boundary which the Wyong Hospital Campus is on spanning both the Wyong Shire and Gosford City local government areas on the Central Coast.

We pay our respects to your Country, ancestors and the community that maintains culture from the past, in the present and into the future.

We recognise that the success of this project requires us listening to the Traditional Owners of the land and other Aboriginal and Torres Strait Islander People, working with you, and walking beside you on this journey.

5. Master Plan Context

5.1 SITE MASTER PLAN

In support of the WCEoL Program, previous master plan studies undertaken for the campus were reviewed. The high-level master plan study, conducted by HDR for the construction of the new ASB, was to guide development and provide a structure to accommodate upcoming projects and future development on the site as a holistic approach.

The study looked at:

- Age of the buildings with the eastern side of the campus being the oldest built around 1980, and the western side consisting of developments finished in early 2000s. The proposed ASB was constructed in 2021
- The stages and opportunities for future development
- Potential sites for new developments within the campus
- Implementing green landscaped entry zone

The WCEoL Program master plan developed a set of principles which were established as part of a collaborative engagement process with the stakeholder group and responds directly to the shared aspiration to create a people-centred, healing environment for a palliative care unit. The master plan considered future visions for location and option 2 was selected as the preferred master plan option for development into concept design.

WYONG BUILDING AGE

— — INDICATIVE SITE BOUNDARY

1	2002
1A	2004
2	2001
3	1990
3A	2016
3B	2014
4	1980
4A	2001
5	2021

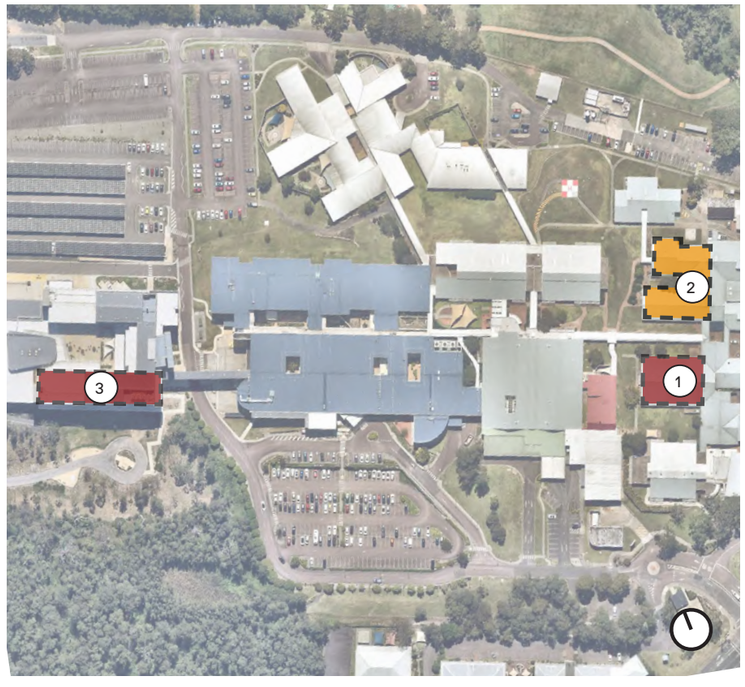
WYONG INDICATIVE PREVIOUS LONG TERM MASTER PLAN STAGES

— — INDICATIVE SITE BOUNDARY

STAGE 2 - FIT OUT IPU SHELL & BUILD HELIPAD

STAGE 3 - DEMOLISH & NEW BUILDING EAST

STAGE 4 - DEMOLISH & NEW DEVELOPMENT OPPORTUNITY



WYONG OPTION LOCATIONS WITHIN WYONG HOSPITAL CAMPUS

1. OPTION 1 UNIVERSITY OF NEWCASTLE PODIATRY CLINIC SITE
2. OPTION 2 BUILDING C SITE
3. OPTION 3 ACUTE SERVICES BUILDING (ASB) BLOCK H, LEVEL 05 (COLD SHELL)

6. Strategic Context

6.1 ACCESS TO SITE

SITE ACCESS AND VEHICULAR CIRCULATION:

Main public access to Wyong hospital is from the south east off Pacific Highway, with drop off at Main Entry block A and emergency drop off at building H. Wyong hospital has good access to public bus transport, one stop inside the campus and the other on Pacific Highway. The main vehicular access to the site is via the Pacific Highway which leads onto Henry Moore Drive the internal ring road which services the on-site car parks and hospital. Ambulance vehicles access via the west from Louisiana Road to the new Emergency department, and from Pacific Highway east of the campus.

Logistics mainly access via Henry Moore Drive to loading dock on Block A and the old loading dock behind building C.

- INDICATIVE SITE BOUNDARY
- SITE FALL (HIGH TO LOW)
- PUBLIC SITE ENTRY
- STAFF SITE ENTRY
- MAIN ENTRY
- EMERGENCY ENTRY
- LOGISTICS
- AMBULANCE
- PUBLIC PARKING
- STAFF PARKING
- BUS STOP
- EXISTING BUILDINGS
- HELIPAD
- SELECTED CONCEPT DESIGN LOCATION

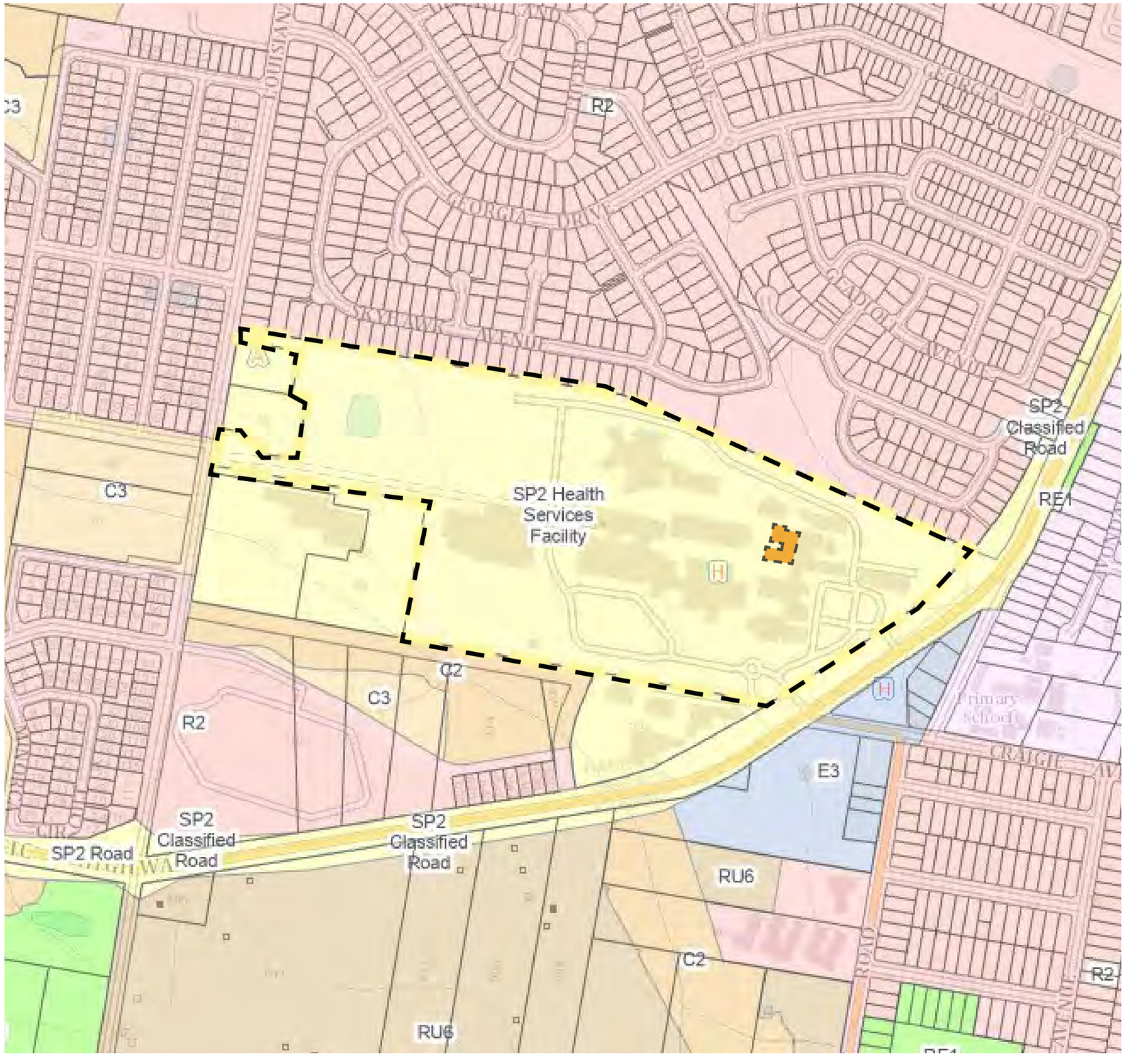
WYONG HOSPITAL SITE ACCESS

6.2 ZONING

LOCATION

Wyong Hospital is located 2.5km north east of North Wyong, 6km north east of Wyong town centre and 23kms north east of Gosford. The site is bounded by the Pacific Highway to the west, Louisiana Road to the east, residential dwellings to the north, and an aged care facility and Kanwal medical village to the south. A ring road (Henry Moore Drive) provides access to hospital buildings and multiple car parks within the site.

The map insert from NSW Planning Portal Spatial Viewer site, confirms the zoning of the site.



- C2 - ENVIRONMENTAL CONSERVATION; C2, ENVIRONMENTAL MANAGEMENT
- C3 - ENVIRONMENTAL MANAGEMENT
- E3 - PRODUCTIVITY SUPPORT
- R1 - GENERAL RESIDENTIAL
- R2 - LOW DENSITY RESIDENTIAL
- RE1 - PUBLIC RECREATION
- RU6 - TRANSITION
- SP2 - INFRASTRUCTURE
- SELECTED CONCEPT DESIGN LOCATION

WYONG HOSPITAL ZONAL MAP

6.3 LOCAL HEALTH SERVICES

The Wyong hospital campus is primarily occupied and operated by the Central Coast Local Health District.

Other health services with operations on campus include Women's and Children's, NSW Ambulance and HealthShare.

The proposed WCEoL development does not impact the operations of the other health services beyond what is articulated in the Functional Design Brief.

6.4 GREEN SPACES

During concept design we developed a specific response to the inclusion and design of green spaces for the project.

The image below shows the open space comparison for the WCEoLP Palliative Care unit.
In response to the Project Design Principles, open space is maximised to ensure the well being of patients, carers, visitors and staff.

CONTEXT

1. Timber decking with curved edge
2. Accessible sensory garden
3. Tree & understorey planting buffer
4. Blades / Screening to each bedroom courtyard
5. Fire pit and seating opportunity
6. Pool of reflection
7. Mounded planting
8. BBQ / amenity
9. Staff relaxation space with seating opportunities
10. Gully landscape / Water Sensitive Urban Design opportunities

CONCEPT OPTION BUILT VS LANDSCAPE AREA

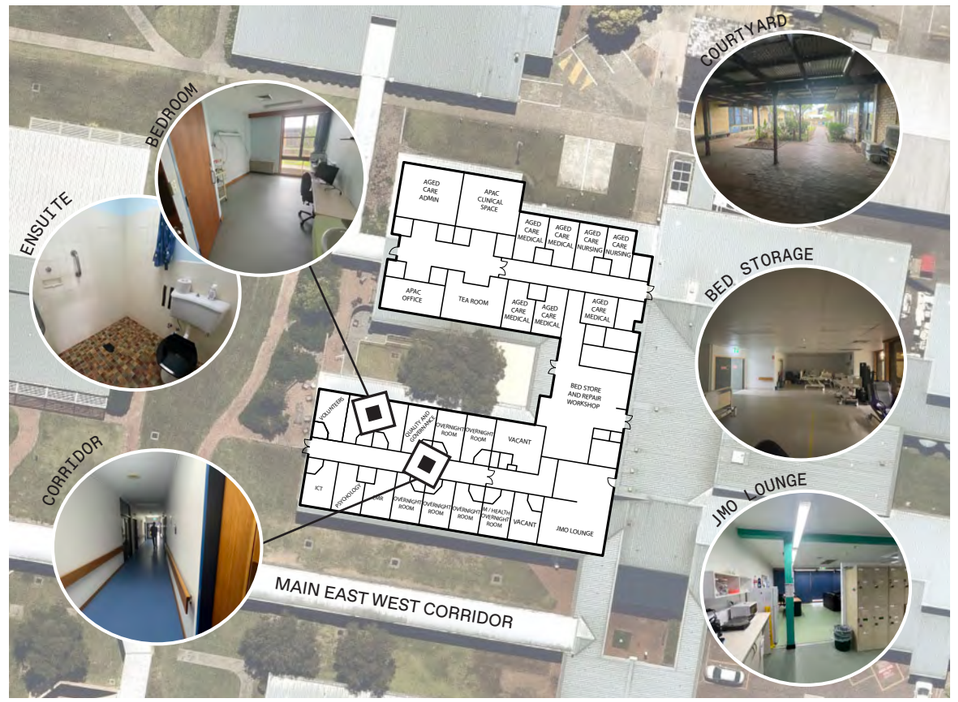
BUILT AREA (965 SQM)

LANDSCAPED AND GREEN AREA (875 SQM)

6.6 BUILT FORM

Selected concept site, sits within the existing load bearing building fabric of building C. The building has brick exterior with openings around the perimeter. There are opportunities for outlook and natural light as well as access to the central courtyard. The site being located further away from the main hospital and the brick work, have given the building its quiet and residential feel.

WYONG CONCEPT OPTION EXISTING BUILDING FABRIC



WYONG CONCEPT OPTION EXISTING BUILDING

6.7 TOPOGRAPHY

TOPOGRAPHY AND LEVELS:

The site generally slopes from the north to the south resulting in an approximate fall of 20m ending in the existing creek on the southern boundary.

WYONG HOSPITAL SITE TOPOGRAPHY

— — INDICATIVE SITE BOUNDARY

SITE FALL (HIGH TO LOW)

SELECTED CONCEPT DESIGN LOCATION

6.10 DEVELOPABLE AREA

To respond to the project Design Principles the project looks to maximise outlook and access to green space within the project budget.

For the development of Wyong WCEoLP unit, it has been determined the project should include the refurbishment of building C and also include the landscaping to the area surrounding the building.

OUTLINE OF DEVELOPABLE AREA

BUILDING C SITE, OUTLINE OF DEVELOPABLE AREA

7. Development Proposal

7.5 PREFERRED OPTION - CONCEPT DESIGN

OPTION 3 - 10/2 BED CONFIGURATION

Discussion with the LHD user group in the first workshop revealed the follwoing:

- observation of bedrooms from staff station was paramount - move communal spaces away from staff station
- increase bedrooms to north wing - review 10+2 split with higher acuity and additional staff sub north and 2 beds south - low acuity patients
- DU located further away from bedrooms
- functional relationships / central proximity

    1. staff station
    2. CU / med
    3. DU
    4. St general
    5. Interview

- all external spaces require equitable access
- movement to methadone therapy north west jeopardise privacy & security to the north bedrooms.

Option 3 addresses the items raised by the users during workshop 1:

Opportunities

- Bedrooms maximised north (10 high acuity patients)
- Private courtyards to all bedrooms
- Central main staff station with staff-sub to high acuity area
- Clinical support centrally located
- Access to outdoors from communal spaces
- Separate staff courtyard accessed from staff room

Constraints

- Distance to low acuity bedrooms from staff station

- SINGLE BEDROOMS
- SUPPORT SPACES
- STAFF AREAS
- CORRIDORS
- LOUNGE/ RECREATION / DINING
- COURTYARD/GREEN SPACES
- DECKING

CONCEPT OPTION 3 PLAN

7.5 PREFERRED OPTION - CONCEPT DESIGN

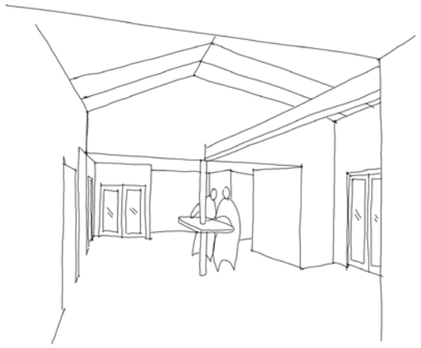
OPTION 3 - 10/2 BED CONFIGURATION

Option 3 looked at improving the staff oversight into the bedrooms by providing a Staff Station Sub at the north wing. This appraoch was studdied in 2 different ways.

Clinical Support - Option A

- Staff station-sub central to north wing for oversight of high acuity patients

CONCEPT OPTION 3 STAFF STATION-SUB OPTION A



STAFF STATION SUB CENTRAL TO UNIT

STAFF STATION WEST OF UNIT - LOUNGE AREA OUTSIDE BEDROOMS

SUBJECT TO STRUCTURAL REVIEW

THE PRINCE & PRINCESS OF WALES HOSPICE, GLASGOW, RYDER

Clinical Support - Option B

- Staff station-sub to west of north wing for oversight of high acuity patients
- Communal seating area provided

CONCEPT OPTION 3 STAFF STATION-SUB OPTION B

7.5 PREFERRED OPTION - CONCEPT DESIGN

OPTION 3 - 10/2 BED CONFIGURATION

LHD feedback from workshop 2 required some minor modifications

- Swap clinical workroom with clean room/medications - so medications closer to patients
- Provide glazing to observe bedrooms 10 and 12 directly from the staff station.

Option 3 was updated in line with user comments and issued for user endorsement of Concept Design.

AMENDED CONCEPT OPTION 3 (PREFERRED OPTION)

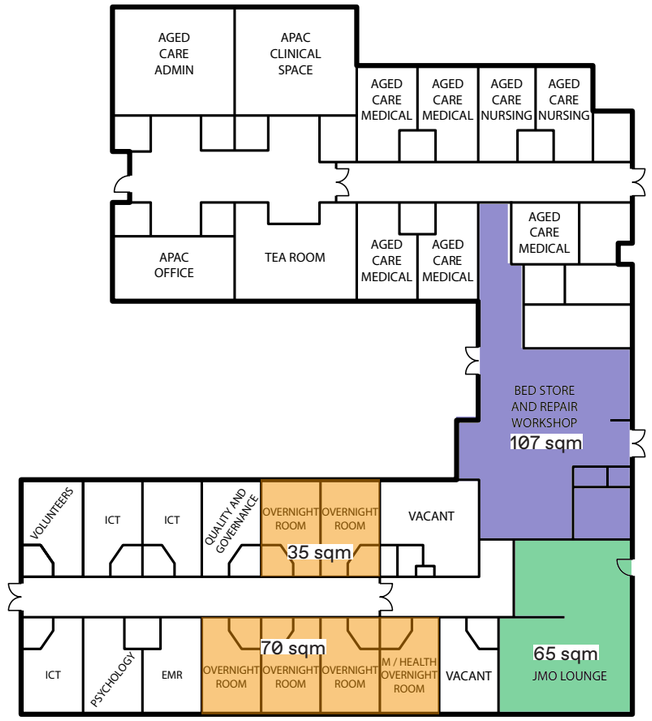
7.6 STAGING / DECANTING WORKS

DECANTING

The existing building C was selected in the masterplanning phase for providing these 12 palliative care beds. That raised the requirement for decanting of existing users. The plan on the right shows the indicative spaces that require to be relocated.

For detail decanting strategy refer to separate decanting report prepared by BVN.

BED STORAGE	107 sqm
OVERNIGHT BEDROOMS	105 sqm
JMO LOUNGE	65 sqm



EXISTING BUILDING C USERS

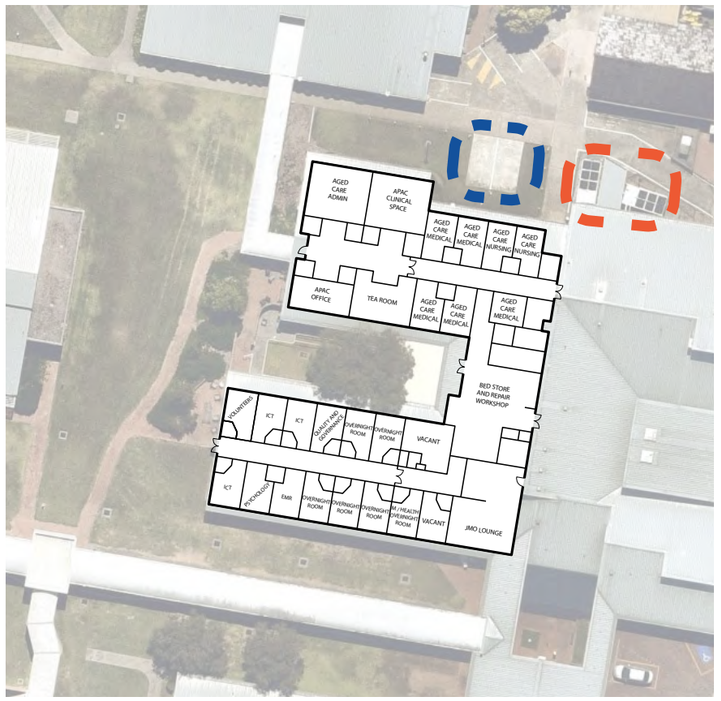
ENGINEERING AND TRAFFIC

The preferred option requires the review of the following:

- Relocation of 2 car parks north to allow for bedroom 4-6 outdoor area (shown blue)
- Given the location of proposed bedrooms existing chillers and pumps to be relocated (shown orange)

Refer to services consultant executive summary for services requirements

INDICATIVE LOCATION OF IMPACTED CAR PARKS AND CHILLER/PUMPS



10.12 SITE INVESTIGATIONS REPORT

10.12.1 SURVEY

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12.
13.
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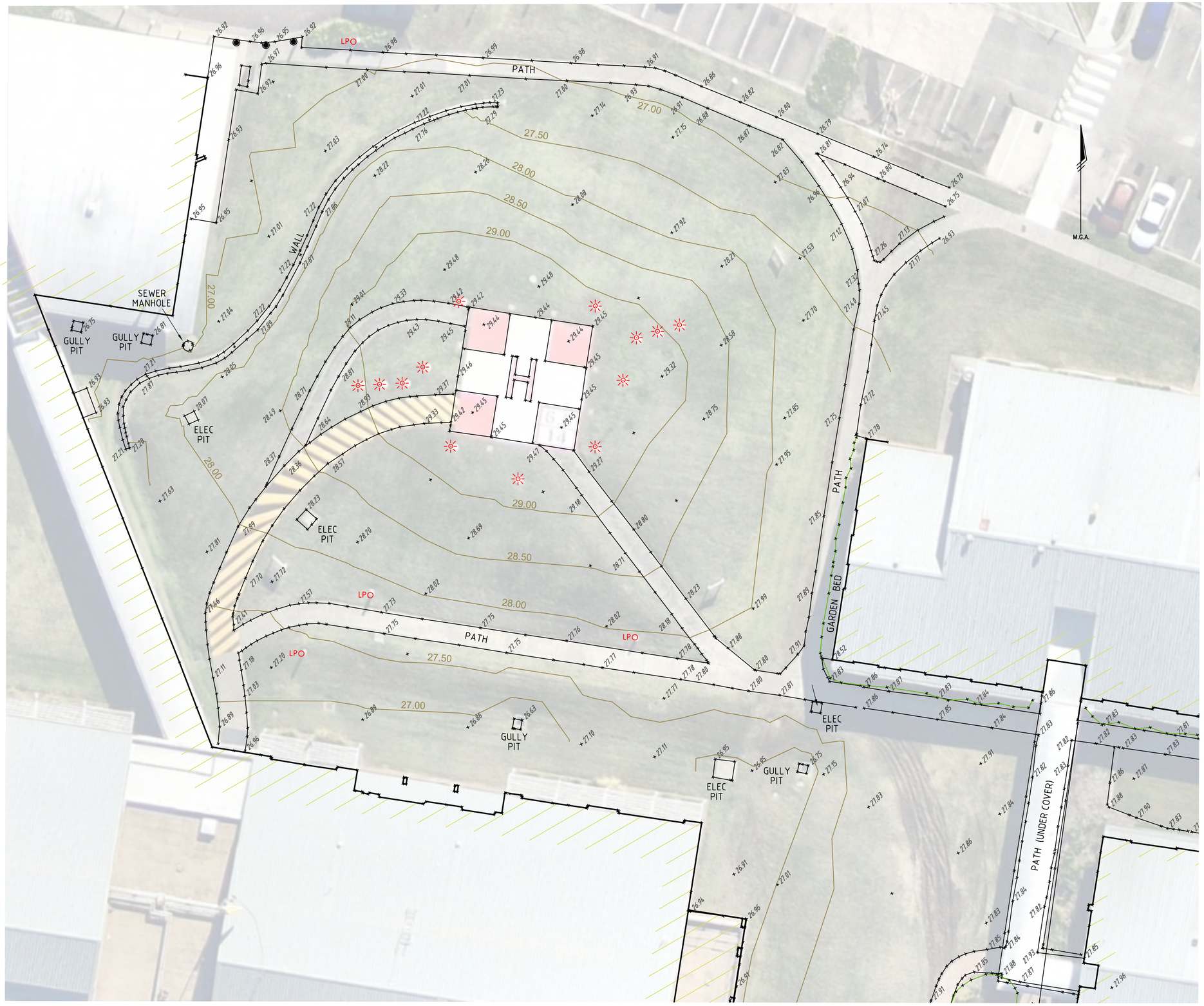
LEGEND

- LIGHT
- LP LIGHT POLE
- FH FIRE HYDRANT
- BOLLARD
- SECURITY POLE



ADJOINS SHEET 2

No.	DATE	REVISION DETAILS	DRAWN	CHK	APP
B	6.11.2023	SURVEY SHIFTED TO MGA 2020 AND AHD	LB	TP	GE
A	17.07.2023	INITIAL PLAN	TP	AP	GE

HORIZ. SCALE: 1:200 @ A2
VERT. SCALE: N/A @ A2
COORDINATES: MGA 2020
ORIGIN: SSM 141883
DATUM: AHD
ORIGIN: SSM 141883 RL25.340
4 2 0 4 8 12 Metres

NOTES

CLIENT: HEALTH INFRASTRUCTURE

SURVEY:	TP	DATE OF SURVEY:	OCT 2023
DRAWN:	RN	DATE OF PLAN:	17.07.2023
CHECKED:	AP	DATE LAST SAVED:	06.11.2023
APPROVED:	GE	DATE APPROVED:	17.07.2023

TITLE: WYONG HOSPITAL DETAIL SURVEY PLAN

DRAWING No: AU213010897.001-DET-B.dwg

JOB No: 213010897

ISSUE: B

SHEET 1 OF 2 SHEETS

SIZE: A2

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ADJOINS SHEET 1

LEGEND

- LIGHT
- LP LIGHT POLE
- FH FIRE HYDRANT
- BOLLARD
- SECURITY POLE

REVISIONS	No.	DATE	REVISION DETAILS	DRAWN	CHK	APP
	B	6.11.2023	SURVEY SHIFTED TO MGA 2020 AND AHD	LB	TP	GE
	A	17.07.2023	INITIAL PLAN	TP	AP	GE

HORIZ. SCALE: 1:200 @ A2
VERT. SCALE: N/A @ A2
COORDINATES: MGA 2020
DATUM: AHD
ORIGIN: SSM 141883
ORIGIN: SSM 141883 RL25.340
4 2 0 4 8 12 Metres

NOTES

CLIENT: HEALTH INFRASTRUCTURE

SURVEY: TP
DRAWN: RN
CHECKED: AP
APPROVED: GE

DATE OF SURVEY: OCT 2023
DATE OF PLAN: 17.07.2023
DATE LAST SAVED: 06.11.2023
DATE APPROVED: 17.07.2023

TITLE: WYONG HOSPITAL DETAIL SURVEY PLAN

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JOB No 213010897
ISSUE B
SHEET 2 OF 2 SHEETS
SIZE A2

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GT - Gutter
RR - Roof Ridge
BV - Eaves

TB - Top of beam (in ceiling space)
BB - Bottom of beam (in ceiling space)
SC - Steel Column (in ceiling space)

REVISIONS						
No.	DATE	REVISION DETAILS	DRAWN	CHK	APP	
A	6.11.2023	INITIAL VERSION	LB	TP	GE	

■ SCALE: 1:250
■ COORD: MGA 2020
■ ORIGIN: SSM141883
■ DATUM: SSM141883
■ ORIGIN: 25.340 AHD
■ CROSS SECTION: V : N/A H : N/A
■ SCALE BAR: 5 2.5 0 5 10 15

■ CLIENT: HEALTH INFRASTRUCTURE

■ SURVEY: TP
■ DRAWN: LB
■ DESIGNED: AP
■ APPROVED: GE
DATE OF SURVEY: OCT 2023
DATE OF PLAN: 6.11.2023
DATE LAST SAVED: 06.11.2023
DATE APPROVED: 6.11.2023

■ TITLE: WYONG HOSPITAL - ROOF PLAN
■ DWG No: AU213010897.001-ROOF-A.dwg

■ JOB No: 213010897
■ ISSUE: A
SHEET 1 OF 1 SHEETS
■ SIZE: A3

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Denotes area inaccessible at the time of survey

FL - Denotes Floor Level
CL - Denotes Ceiling Level

REVISIONS						
No.	DATE	REVISION DETAILS	DRAWN	CHK	APP	
B	6.11.2023	SURVEY SHIFTED TO MGA2020 AND AHD. ADDITION OF PLANT ROOM LOCATION AND CORRIDOR	LB	TP	GE	
A	17.07.2023	INITIAL VERSION	RN	AP	GE	

SCALE: 1:200
COORD: MGA 2020
ORIGIN: SSM141883
DATUM: SSM141883
ORIGIN: 25.340 AHD
CROSS SECTION: V : N/A H : N/A
SCALE BAR: 4 2 0 4 8 12 Metres

CLIENT: HEALTH INFRASTRUCTURE

SURVEY: TP
DRAWN: RN
DESIGNED: AP
APPROVED: GE

DATE OF SURVEY: OCT 2023
DATE OF PLAN: 17.07.2023
DATE LAST SAVED: 06.11.2023
DATE APPROVED: 17.07.2023

TITLE: WYONG HOSPITAL - INTERNAL FLOOR PLAN
DWG No: AU213010897.001-FLOOR-B.dwg

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ISSUE: B
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SIZE: A3

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