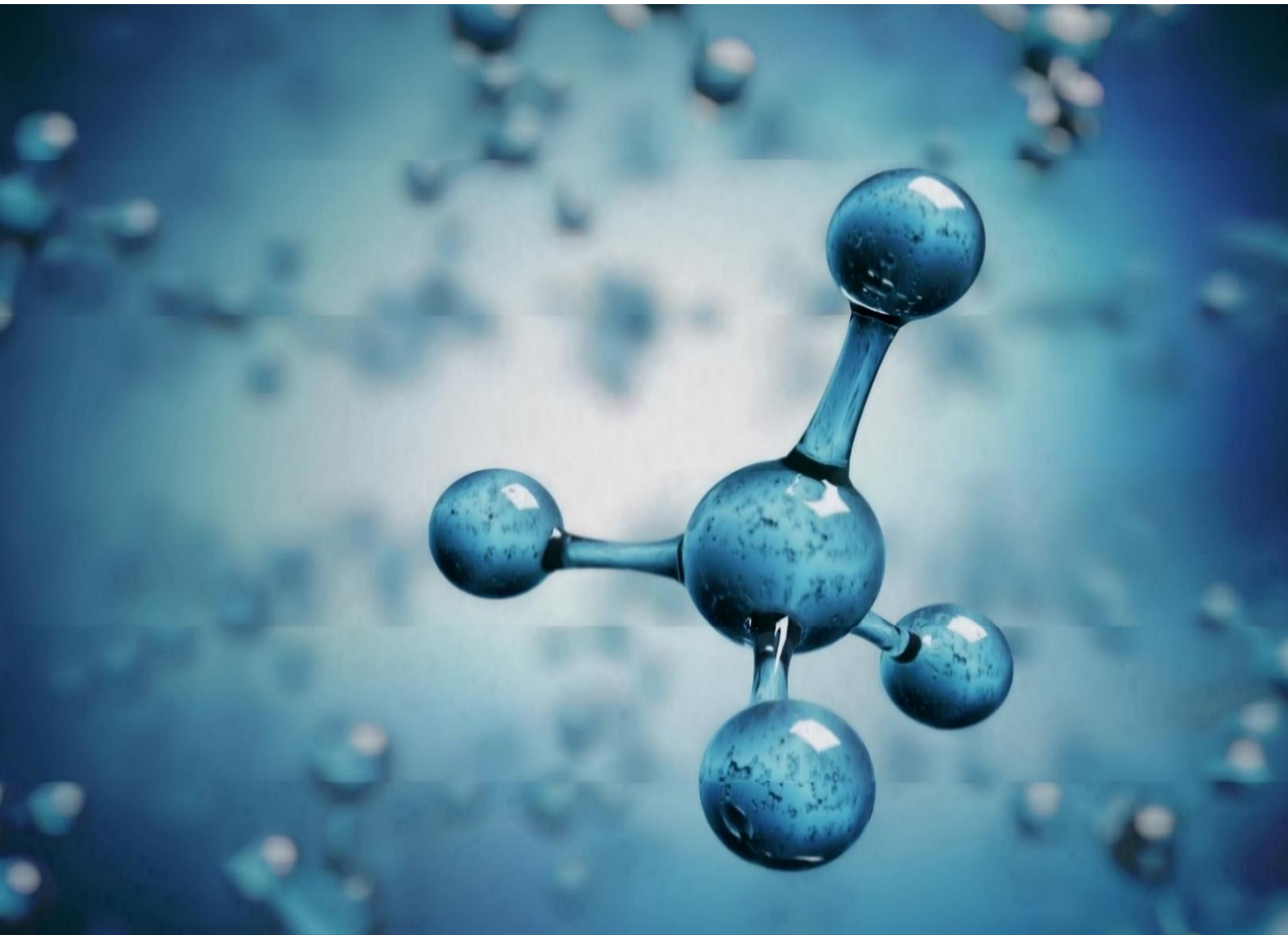
Lucas Heights Bioenergy Facility

Environmental Impact Statement

LMS Energy Pty Ltd

October 2025

→ The Power of Commitment



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S4	0	T Holmes	K Rosen	On file	D Gamble		22/10/25

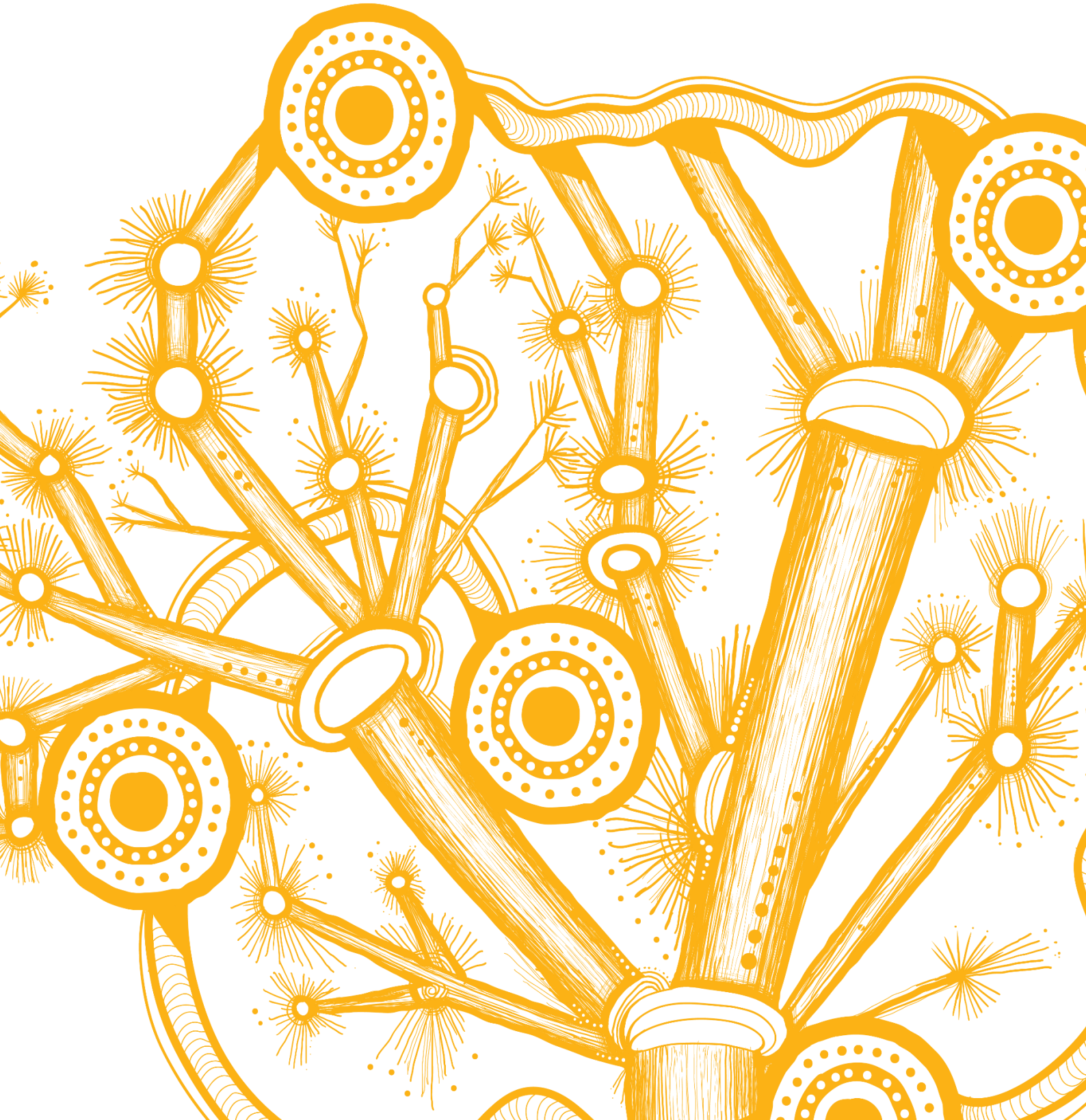
GHD Pty Ltd | ABN 39 008 488 373
Contact: Thomas Holmes, Environmental Scientist | GHD
133 Castlereagh Street, Level 15
Sydney, New South Wales 2000, Australia
T +61 2 9239 7100 | **F** +61 2 9239 7199 | **E** sydmail@ghd.com | **ghd.com**

Registered Environmental Assessment Practitioner EIS Declaration

EIS Declaration (SSD)		
Project name		
Application number:		
Address of the land in respect of which the development application is made:		
Proponent details		
Applicant name: LMS Energy Pty Ltd		
Applicant address:		
Details of person by this EIS was prepared		
Name:	Thomas Holmes	Karl Rosen
Address:	Level 15, 133 Castlereagh Street, Sydney, 2000	Level 15, 133 Castlereagh Street, Sydney, 2000
Professional qualification	BSc Earth Science / Geography	BSc (Applied Physical Geography) (Hons 1)
Declaration by registered environmental assessment practitioner		
Name: David Gamble		
Registration number: R80043		
Organisation registered with: GHD Pty Ltd		
Declaration	The undersigned declares that this EIS: – has been prepared in accordance with Schedule 2 and Part 10 of the Environmental Planning and Assessment Regulation 2021; – contains all available information relevant to the environmental assessment of the development, activity or infrastructure to which the EIS relates; – does not contain information that is false or misleading; – addresses the Planning Secretary's environmental assessment requirements (SEARs) for the project; – identifies and addresses the relevant statutory requirements for the project, including any relevant matters for consideration in environmental planning instruments; – has been prepared having regard to the Department's State Significant Development Guidelines – Preparing an Environmental Impact Statement; – contains a simple and easy to understand summary of the project as a whole, having regard to the economic, environmental and social impacts of the project and the principles of ecologically sustainable development; – contains a consolidated description of the project in a single chapter of the EIS; – contains an accurate summary of the findings of any community engagement; and – contains an accurate summary of the detailed technical assessment of the impacts of the project as a whole.	
Signature 		
Date: 08/10/25		

Acknowledgement of Country

GHD acknowledges Aboriginal and Torres Strait Islander peoples as the Traditional Custodians of the land, water and sky throughout Australia on which we do business. We recognise their strength, diversity, resilience and deep connections to Country. We pay our respects to Elders of the past, present and future, as they hold the memories, knowledges and spirit of Australia. GHD is committed to learning from Aboriginal and Torres Strait Islander peoples in the work we do.



Key terms, acronyms and abbreviations

Terms and abbreviations	Definition
APZ	Asset protection zone
BAL	Bushfire attack level
CEMP	Construction Environmental Management Plan
CO_2	Carbon dioxide
CO	Carbon monoxide
CH_4	Methane
dB	Decibel
EIS	Environmental impact statement
EPA	Environment Protection Authority (NSW)
EPL	Environment Protection Licence
FDI	Fire danger index
FTE	Full time equivalent
GW	Gigawatt
GWh	Gigawatt hours
GO	Garden organics facility
ha	Hectare
H_2S	Hydrogen sulphide
H_2SO4	Sulfuric acid
HV	High voltage
kW/m²	Kilowatts per square metre
km	Kilometres
kV	Kilovolt
LFG	Landfill gas
LHRRP	Lucas Heights Resource Recovery Park
LoS	Level of service
NCA	Noise catchment area
NPI	National Pollutant Inventory
NOx	Oxides of nitrogen
NO_2	Nitrogen dioxide
OEMP	Operations Environmental Management Plan
MGB	Mobile garbage bin
MW	Megawatt
MWh	Megawatt hour
m	Metres
PBP	Planning for bushfire protection
PHA	Preliminary hazard assessment
Planning Systems SEPP	State Environmental Planning Policy (Planning Systems) 2021
$PM_{2.5}$	Particulate matter less than 2.5 microns in diameter

Terms and abbreviations	Definition
PM_{10}	Particulate matter less than 10 microns in diameter
POEO Act	*Protection of the Environment Operations Act 1997* (NSW)
POEO Clean Air Regulation	NSW Protection of the Environment Operations (Clean Air) Regulation 2022
PSI	Preliminary Site Investigation
SEARs	Secretary's Environmental Assessment Requirements
SEPP	State Environment Planning Policy
SSD	State Significant Development
The project	The installation of a new, upgraded bioenergy facility at the Lucas Heights Resource Recovery Park (LHRRP) to replace the existing power station.
The project site	The operational footprint of the bioenergy facility
The project application area	The area constituting the project site and all areas of construction works, including ancillary servicing corridors.
The proponent	LMS Energy Pty Ltd
The Regulation	Environmental Planning and Assessment Regulation 2000 (NSW)
TVOC	Total Volatile Organic Compounds
µm	Micron
$\mu g/m^3$	Micrograms per cubic metre

Executive summary

Background to the project

LMS Energy Pty Ltd (LMS) is seeking approval to upgrade the landfill biogas management infrastructure at the Lucas Heights Resource Recovery Park (LHRRP) through the installation of a replacement bioenergy facility ('the project'). The project is a State Significant Development and is subject to approval by the NSW Minister for Planning and Public Spaces under the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act).

LHRRP is operated by Cleanaway Pty Ltd under State Significant Development (SSD) Consent SSD 6835, which authorises the operation of a range of waste and resource recovery operations. The consent also enables ongoing operation of landfill gas infrastructure, which captures and transfers biogas to a power station and flare for energy recovery and emissions management. The existing power station and flare are authorised under a separate 1996 Sutherland Shire Council consent (#970251).

Utilisation of landfill biogas for renewable electricity generation delivers significant environmental and community benefits, including carbon abatement and improved air quality. The bioenergy facility is proposed to replace the existing power station which has been operating for nearly 30 years and is approaching the end of its design life. The new bioenergy facility would provide capacity to generate up to 190,000 MWh annually though remaining landfilling and post closure periods of LHRRP, equivalent to powering around 30,000 homes and reducing over 1 million tonnes of carbon dioxide emissions each year.

Project need

Landfill biogas is a major source of methane emissions, which account for approximately 97% of greenhouse gas emissions from solid waste management in NSW (DCCEEW, 2024). The capture and combustion of landfill biogas is therefore critical to reducing environmental risk and supporting renewable energy generation. The existing power generation infrastructure at the LHRRP has performed this role since 1998 but is now nearing the end of its design life and may not provide sufficient capacity to manage predicted future biogas flows. The proposed bioenergy facility is required to ensure ongoing compliance with regulatory requirements, maintain effective environmental risk management, and provide a reliable, long-term solution for the utilisation of landfill biogas to deliver renewable energy and provide significant carbon abatement.

Project objectives

Recoverable landfill biogas from the LHRRP is forecasted to reach peak levels of approximately 12,000 to 13,000 m^3/hour over the next five years. Landfill biogas generation will continue for decades following the closure of LHRRP, necessitating long-term management solutions.

This project is designed to address two key requirements:

– Providing a modern version of the existing power station to meet contemporary operational standards and regulatory compliance requirements.
– Ensuring the facility can accommodate the forecast future landfill biogas volumes, supporting efficient and sustainable energy recovery.

The design of the project would meet the objectives listed above while avoiding and minimising impacts on the local and regional environment, and impacts on the local community and businesses, as far as possible.

The project's location is shown on Figure ES1.

Figure ES1 *Project location*

Description of the project

The project involves upgrading the existing renewable energy infrastructure to deliver a modernised bioenergy facility at the existing power station site as shown on Figure ES2. The upgraded facility would have a generation capacity of approximately 22 megawatts (MW) and would capture and recover landfill biogas to generate electricity.

Key project elements include:

– New bioenergy facility – Replacement of the existing landfill biogas power station at the LHRRP to generate up to 190,000 MWh per year of renewable electricity annually.
– Carbon abatement – Utilisation of landfill biogas for energy recovery would abate over 1 million tonnes of carbon dioxide equivalent emissions each year, supporting NSW's climate change and renewable energy objectives.
– Supporting infrastructure – Installation of new biogas delivery, metering and condensate removal systems; biogas monitoring equipment; electrical transformers; high voltage (HV) switchroom and control room; bunded oil and chemical storage and internal access roads.
– Retention or upgrade to existing ancillary site infrastructure such as staff amenities and workshops.
– Utility connections – An underground HV line to connect with the existing on site termination pole to the AusGrid 33 kilovolt (kV) network, with onward transmission to the Lucas Heights Zone Substation. Existing fibre communications and potable water supply would service the site.
– Fire safety – Generator modules and HV switchroom fitted with compliant fire detection and suppression systems, with access to the broader LHRRP water supply for emergency response.
– Access and traffic – Access via existing entry points on Little Forest Road and the eastern boundary, with internal all-weather roads retained and upgraded. Nine existing car parks would continue to service the facility.
– Environmental compliance – The facility aligns with NSW Environmental Protection Authority (EPA) guidance for active landfill biogas extraction on high gas-producing sites, ensuring effective management of environmental risk alongside renewable energy generation.

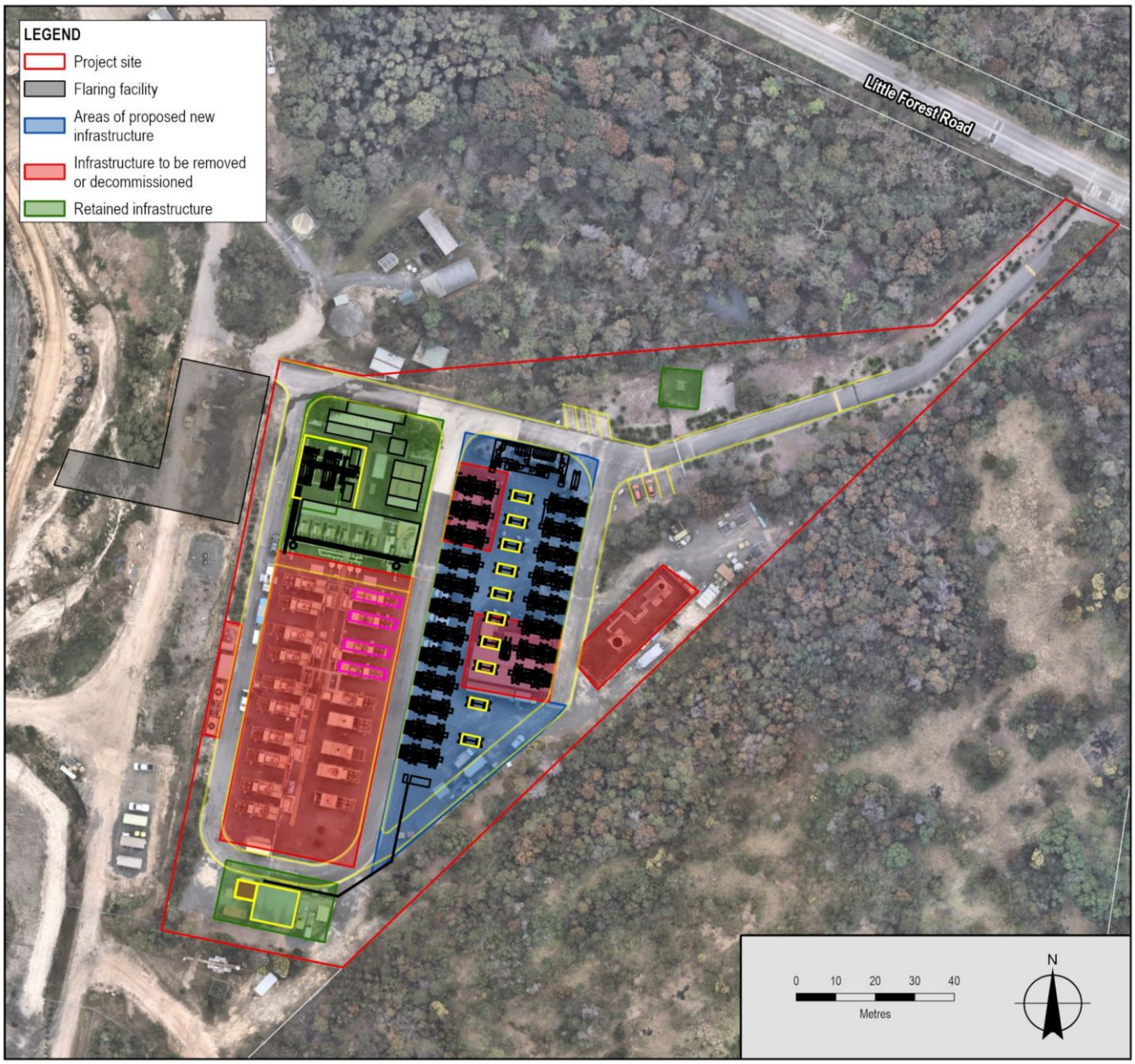


Figure ES2 *Bioenergy facility layout*

Alternative options to the project

A “do nothing” scenario was considered, which would lead to significant environmental, operational, and regulatory challenges. Without a new bioenergy facility, the LHRRP would lack sufficient capacity to manage predicted future landfill gas volumes as the existing power station nears the end of its design life. This would increase the risk of uncontrolled emissions, reduce renewable energy generation, and potentially result in non-compliance with regulatory requirements.

Other options included extending the life of the existing power station or relying solely on flaring. These approaches were deemed unviable as the existing plant has limited capacity and ageing assets. Flaring, although effective in controlling emissions, does not capture the renewable energy value of landfill biogas and would undermine alignment with NSW’s sustainability objectives.

Several alternative locations within the LHRRP were also assessed. The bioenergy facility was initially proposed to be situated along the western boundary of the existing power station adjacent to the existing landfill and planned parklands however an opportunity has since been identified to relocate the project to the existing power station site.

The existing power station site was selected as optimal, given its proximity to biogas extraction and electrical infrastructure, established access, and suitability for construction. The site is already disturbed, located outside sensitive environmental areas and potential post-closure parkland, and offers operational efficiencies with minimal additional land disturbance.

Technology selection focused on proven, reliable equipment for landfill biogas utilisation. Caterpillar G3516 lean burn generator sets were chosen for their high efficiency, effective methane destruction, and demonstrated performance at landfill sites nationally and internationally. Supporting equipment, including gas conditioning, flares, and transformers, reflects best practice for biogas power generation.

Construction

Construction of the project would commence in the first quarter of 2026 (Q1), with an estimated duration of 6 to 8 months (weather permitting and subject to planning approval).

The key phases of construction would include:

– Early works to establish the site compound, installing environmental controls, and separating the construction area from existing power station operations. Demolition of the existing site sheds and flare compound, minor civil works for site levelling and compaction, and preparation of laydown areas for materials and equipment.
– Assembly and crane placement of generators on concrete pads, installation of gas delivery skids and the HV switchroom, and development of ancillary components such as access platforms, stairs, and service buildings.
– Utility connections, including electricity, gas, water, oil and compressed air, would be delivered through trenching works.
– Testing and commissioning of the generators and ancillary systems to ensure operational readiness, followed by demobilisation of the construction compound.

Operation

The bioenergy facility would comprise 20 modular lean-burn generators (1.1 MW each), designed to operate 24/7 with remote monitoring and programmable controls to optimise gas capture and combustion. The modular system provides flexibility to balance electricity generation and flaring, ensuring all available landfill biogas is managed efficiently. Six full-time equivalent staff would support operations during standard working hours, with continuous monitoring outside these times. Operations will be guided by a comprehensive Operational Environmental Management Plan (OEMP), ensuring compliance with environmental and safety requirements.

Decommissioning of existing power station

To enable the transition, the existing power station would remain in operation under the existing 1996 Sutherland Shire Council consent (#970251) until the new facility is commissioned and operating (forecast June 2026). Following energisation, decommissioning would involve the staged disconnection and safe removal of redundant equipment, recycling of more than 95% of materials, and remediation of any remaining contamination hotspots by licensed contractors as required. Fit-for-purpose infrastructure such as offices, roadways, oil storage, and gas delivery systems would be retained and repurposed. Decommissioning and remediation activities would be completed within 36 months of commissioning the new bioenergy facility.

The existing 1996 Sutherland Shire Council consent (#970251) will be surrendered following the commissioning of the new bioenergy facility.

LHRRP post closure decommissioning

The bioenergy facility is designed to operate for 25 to 30 years and will continue beyond landfill closure (expected around 2037 to 2040), capturing residual landfill biogas for as long as it remains available. At the end of its operational life, LMS will assess whether to reinvest in extending the facility or to proceed with decommissioning. Due to its modular design, decommissioning can be staged progressively as landfill gas production declines, allowing ongoing optimisation of operations while managing environmental risks.

Community and stakeholder engagement

Community and stakeholder engagement undertaken to date has included briefings, meetings, a public drop-in session, and correspondence with key groups. Principal stakeholders consulted include:

– NSW and Commonwealth government agencies
– Sutherland Shire Council
– local community groups.

Environmental impact assessment

Key environmental and social issued identified through assessment of the project are discussed below:

Air quality – Construction impacts would be minor and short term, limited to dust from vehicle movements and earthworks. During operation, modelling confirms compliance with air quality and odour standards, with all pollutants predicted to remain within applicable criteria.

Noise – Construction and commissioning activities would comply with relevant Noise Management Levels. Operational noise is predicted to meet project noise trigger levels at all sensitive receivers, with only minor impacts at part of the potential future recreational area nearest the boundary.

Industrial hazards – Hot works during construction (e.g. welding, cutting, grinding) pose potential fire or injury risks, managed through standard safety procedures. During operation, risk modelling shows that even worst-case incidents (e.g. full bore rupture) would not result in hazards such as fire to extend beyond the site boundary and individual and societal risk remaining well below acceptable thresholds.

Bushfire hazards – Construction risks include ignition from hot works or fuel storage. During operation, the facility has low bushfire vulnerability due to its non-combustible design, monitoring systems, and asset protection zones, which limit potential fire spread or exposure to external bushfires.

Contamination – Construction may disturb waste or fill of unknown quality, but impacts would be confined to the footprint. During operation, risks such as landfill biogas accumulation or contaminant migration are considered low, with design measures and ongoing monitoring in place to minimise exposure.

Water resources – Construction of the project may temporarily alter drainage and generate minor sedimentation. The new generators will be installed within the existing power station site and there will be negligible changes to impervious surfaces, with stormwater managed via bunded storage and drainage systems designed to meet water quality targets. Wastewater generation is limited to staff and office facilities to be managed under the existing systems for the site.

Traffic and access – The project would generate up to 20 heavy vehicle trips per day during construction with modelling confirming that intersections would continue to operate within capacity. Construction traffic would not conflict with peak early morning traffic accessing the LHRRP. During operation, traffic impacts would be negligible, with on-site parking provided and reduced demand following decommissioning of the existing power station.

Visual landscape and future land use – Construction would be confined to the site and would generally out of view of the public realm. During operation, limited views of the facility from the future parkland are possible however the facility would largely be screened by topography and vegetation. The facility would not encroach into areas designated as future parkland, recreation or ecological restoration.

Terrestrial biodiversity – Areas of new infrastructure have been designed to avoid native vegetation, utilising existing hardstand and cleared areas resulting in minimal clearing or habitat disturbance. Given the limited ecological value, lack of significant fauna habitat, and temporary nature of the works, impacts on local flora and fauna are expected to be low, with no disruption to significant wildlife populations or ecological processes.

Cultural heritage – A due diligence assessment found no Aboriginal or heritage-listed items on or near the project site, and no landscape features indicative of heritage values. Consequently, impacts to Aboriginal heritage or other heritage items are not anticipated during construction and operation.

Social and economic – Construction may cause minor temporary impacts to local amenity through noise, dust, and increased traffic, though separation from residential areas and the industrial setting of the LHRRP limits these effects. Nearby recreational users may experience any disruption, but impacts are expected to be short-term and manageable. The project will generate up to 15 full-time construction jobs, providing modest economic benefits and potential opportunities for local suppliers. The bioenergy facility would replace the existing power station with

improved technology, which would not lead to any additional impacts on local amenity. It would maintain six full-time positions, supporting ongoing employment and regional waste infrastructure.

Waste – Construction activities are expected to generate a range of waste streams, including food waste, general solid waste and minor quantities of hazardous materials such as lubricants and oils. Waste quantities are expected to be low, and impacts from waste are considered minor and localised. Operational waste management would remain consistent with existing site processes.

Management and mitigation measures

Measures to minimise the identified potential impacts would be implemented through the design development and construction planning phases, taking into account the input of stakeholders and the local community. The majority of potential impacts would be well managed through the proposed design and implementation of standard mitigation and management measures.

Next steps

LMS is seeking approval from the NSW Minister for Planning and Public Spaces for the construction and operation of the project. Key stages of the approval process are outlined in Figure ES3.

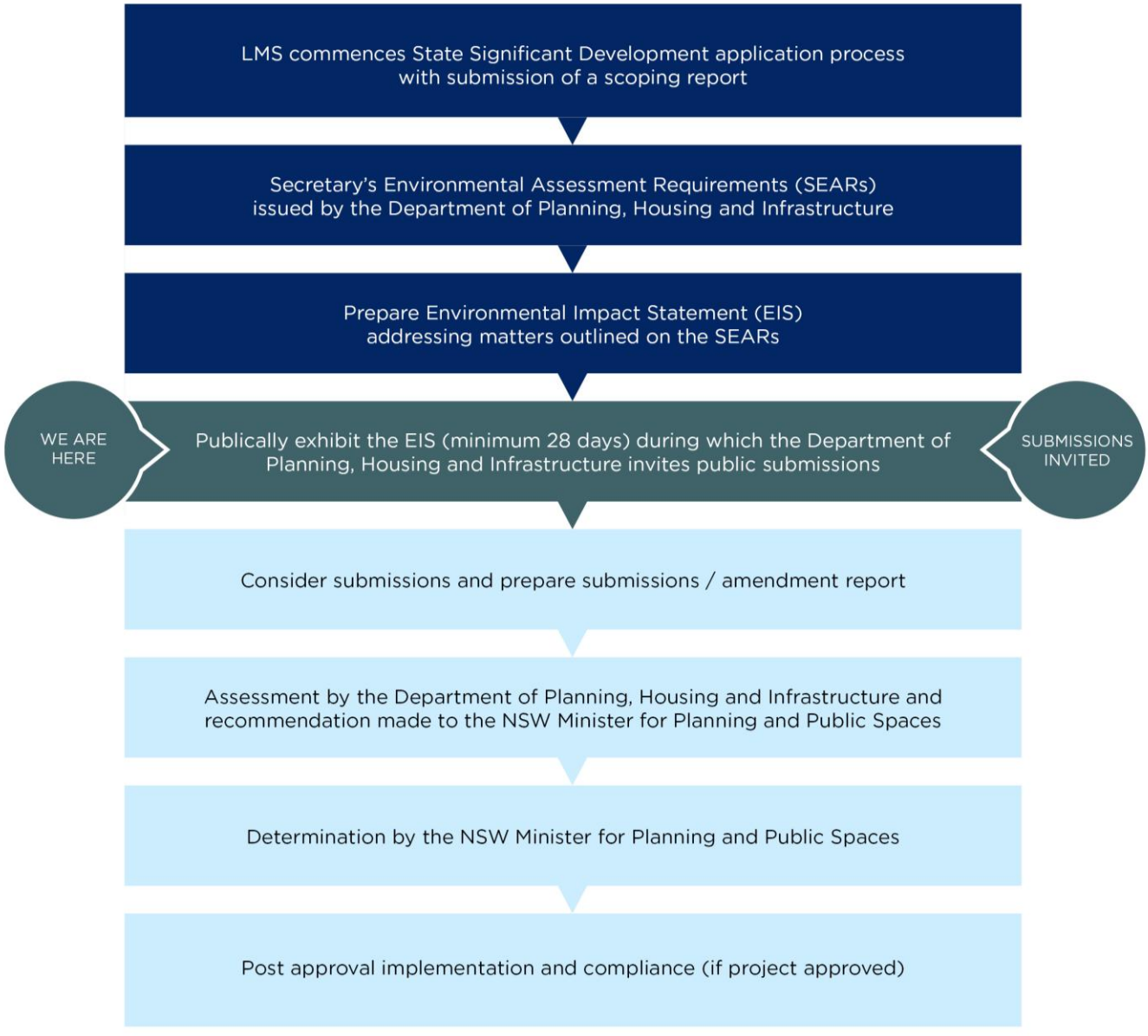


Figure ES3 ***Approval and consultation process***

During the exhibition period, the environmental impact statement will be available for viewing on the Major projects planning portal at: **Lucas Heights Bioenergy facility | Planning Portal - Department of Planning and Environment**

Following exhibition of the EIS, any submissions made by the community or key stakeholders will be responded to in a Submissions Report by the proponent. Written submissions can be made to the NSW Department of Planning, Housing and Infrastructure. All submissions received will be placed on the project website. Submissions can be made by creating an account at planningportal.nsw.gov.au/major-projects/projects/on-exhibition. This allows you to save a submission in progress and stay up to date with the progress of an application.

Consultation with key stakeholders would continue throughout the construction phases as required.

The Minister for Planning and Public Spaces would then make a decision on the project and, if approved, set conditions of approval.

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1. Introduction

1.1 Project overview

LMS Energy Pty Ltd (LMS) proposes to upgrade the landfill biogas management infrastructure at the Lucas Heights Resource Recovery Park (LHRRP), by upgrading the existing power station (the project) to produce renewable energy from landfill gas generated at the LHRRP.

The new bioenergy facility would be a like for like replacement of the existing power station biogas generators within the existing power station site, with improvements that comply with modern standards and regulations and forecasted biogas generation capacity requirements. The project ensures appropriate capacity to manage forecast peak recoverable biogas and renewable energy generation would effectively continue through the remaining landfilling and post closure periods at the LHRRP.

The location of the project is shown on Figure 1.1.

1.2 Background

The LHRRP is operated by Cleanaway Pty Ltd (Cleanaway) in accordance with State significant development (SSD) consent (No. SSD 6835). SSD 6835 allowed for an increase in landfill capacity, relocation and expansion of the garden organics (GO) facility and construction and operation of a new advanced resource recovery technology (ARRT) facility. The approval also allowed for continued operation and maintenance of the landfill biogas infrastructure within the LHRRP boundary including the progressive installation of landfill biogas extraction wells and header pipes to transfer landfill biogas to a power station and flare.

Through the production of distributed baseload renewable electricity, the utilisation of landfill biogas for energy generation provides numerous environmental and community benefits, including carbon abatement and air quality improvement through destruction of methane and other volatile organic compounds. The proposed bioenergy facility would be capable of generating up to 190,000 MWh annually, which is equivalent to powering approximately 30,000 homes in the region and abating over one million tonnes of carbon dioxide emissions.

The existing power station was commissioned in 1998 and is nearing the end of its design life.

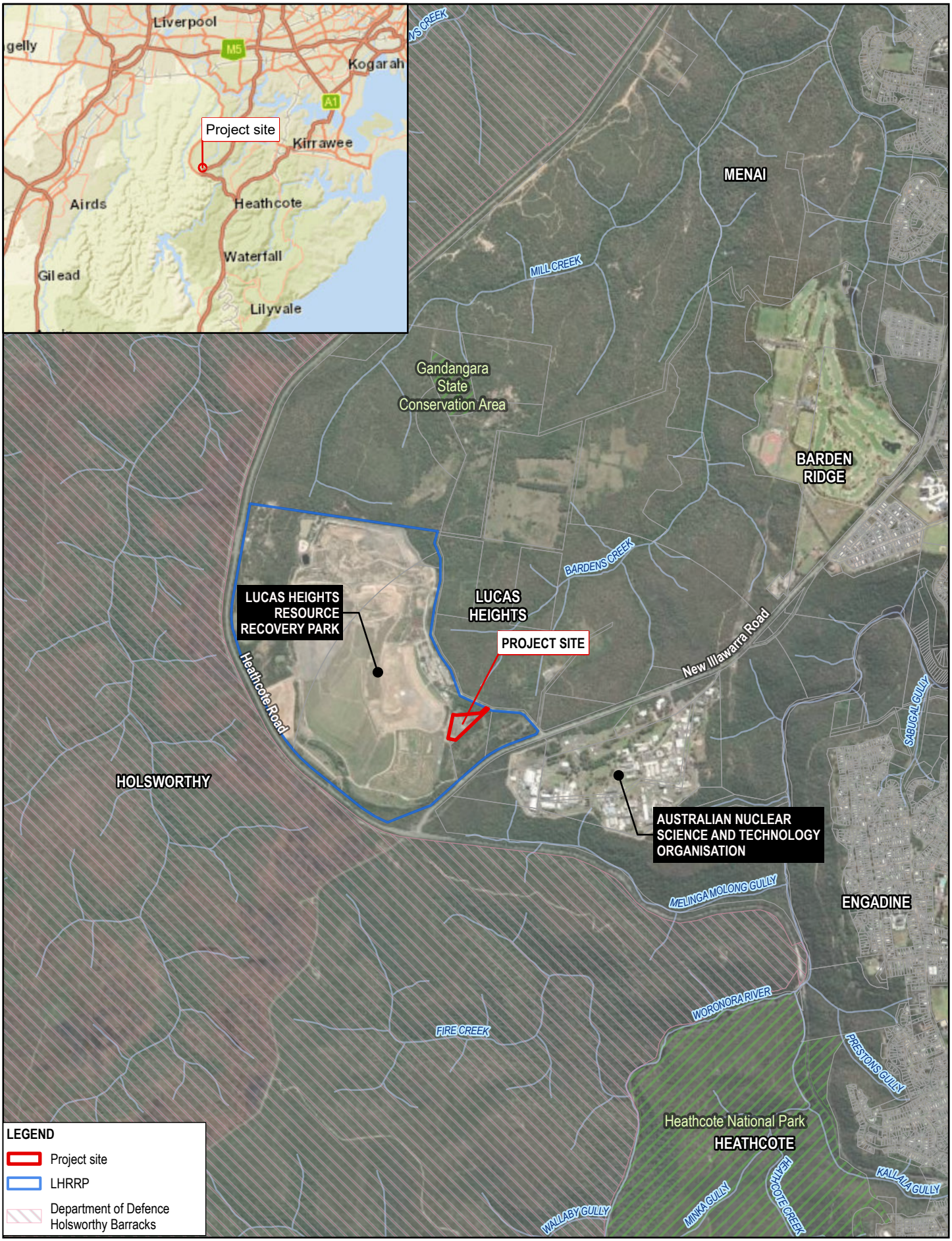
1.3 Outline of project need

Recoverable landfill biogas from the LHRRP is forecasted to reach peak levels of approximately 12,000 to 13,000 m^3/hour over the next five years. Landfill biogas generation will continue for decades following the closure of LHRRP, necessitating long-term management solutions.

This project is designed to address two key requirements:

– Providing a modern version of the existing power station to meet contemporary operational standards and regulatory compliance requirements
– Ensuring the facility can accommodate the forecast future landfill biogas volumes, from existing approved landfill operations supporting efficient and sustainable energy recovery.

A more detailed description of the project requirements is provided in section 2.2.



Paper Size ISO A4

0 250 500 750 1,000

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

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GHD

LMS Energy
Lucas Heights Bioenergy facility

Regional context

Project No.	**12649882**
Revision No.	**0**
Date	**17/09/2025**

FIGURE 1.1

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Print date: 17 Sep 2025 - 00:49

Data source: LPMA: DTDB/DCDB, 2019. World Imagery: Maxar
World Street Map: Esri, HERE, Garmin, NGA, USGS
Created by: dbbanatin

1.4 The proponent

The proponent for the project is LMS Energy Pty Ltd (LMS). LMS is an Australian landfill biogas company whose infrastructure projects focus on diverting and recycling landfill biogas as a source of renewable energy which in turn reduces the emissions of landfill biogases such as methane and carbon dioxide to atmosphere (LMS Energy n.d.).

Details for the proponent are provided in Table 1.1.

Table 1.1 Proponent details

Proponent	LMS Energy Pty Ltd
Project Proponent Address	118 Greenhill Road, Unley SA 5061
Business ABN	39 059 428 474
Contact Name	Jon Varcoe
Email	compliance@lms.com.au

1.5 Approval history

The existing power station is located on Lot 102 DP 1009354, currently utilising the landfill gas generated from LHRRP and approved under a 1996 Sutherland Shire Council consent (#970251). The development consent was amended in 2004 under Sutherland Shire Council consent DA03-2231 to allow the expansion of the facility with an additional three generator modules, taking the site total to 15 x 1 Megawatt (MW) engines.

State Significant Development (SSD) application (No. SSD 6835) was approved by the Planning Assessment Commission on 23 January 2017 to replace DA 11.01.99. SSD 6835 allowed for an increase in landfill capacity, relocation and expansion of the GO facility and construction and operation of a new ARRT facility. A condition of SSD 6835 also required the modification of DA 11.01.99 so that all conditions that relate to the LHRRP are referenced in the SSD, which was subsequently undertaken.

To date, SSD 6835 has been modified three times; for an increase in operating hours (Modification 1), expansion of the GO facility to 100,000 tonnes per year (Modification 2) and to construct and operate five landfill biogas combustion flares to manage forecast peaks in landfill biogas emissions (Modification 3). It is noted that Modification 4 has recently been proposed which involves the establishment of a Food and Garden Organics (FOGO) facility, reconfiguration of the existing Resource Recovery Centre (RRC) and waste collection point, including excavation of an existing borrow pit.

A Scoping Report for the proposed Western Extension of the landfill has also recently been submitted to the Department of Planning, Housing and Infrastructure (DPHI) and an Environmental Impact Statement (EIS) is currently in preparation.

1.6 The project

1.6.1 Key features

The key features of the project are summarised in Table 1.2.

Table 1.2 Key features of the project

Project element	Summary
Output capacity	20 x 1.1 MW modular lean burn generator sets to provide a total output of approximately 22 MW.
Proposed built infrastructure	– Modular lean burn generator sets – Ancillary infrastructure including: • gas delivery and metering, system • transformers to step up the electrical output voltage from LV to HV to match the local grid voltage

Project element	Summary
	• electricity metering, protection and communication equipment • covered storage bund for chemical and coolant storage • HV Switchroom / Control room • lightning poles • external lighting • safety showers.
Utilities connections	New underground HV electricity line to the Ausgrid 33 kilovolt (kV) distribution network as an extension of the connection from the existing on site electrical infrastructure to the Lucas Heights Zone Substation.

A detailed description of the project is provided in chapter 3.

1.6.2 Related development

As mentioned in section 1.5, LMS has modified SSD 6835 under section 4.55(1a) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) for installation of an enclosed flare system to meet the full biogas recovery capacity at the LHRRP (Modification 3).

The flare facility will provide a contingency as required during commissioning, maintenance and shutdown of the proposed bioenergy facility to maintain consistent biogas combustion rates to support the operation of the existing landfill at LHRRP and compliance with the Environmental Protection Licence (EPL) 5065. It will also ensure continued landfill biogas combustion (where required) during the transition between commissioning of the new generators and decommissioning of the old generators.

1.7 Planning approval process

The *Environmental Planning and Assessment Act 1979* (EP&A Act) (NSW) is the principal legislation regulating development in NSW. It establishes a regime for the making of development applications, assessment of their environmental impacts, and the determination of those applications. It also allows for the making of environmental planning instruments such as State Environmental Planning Policies (SEPPs) and Local Environmental Plans (LEPs).

Part 4, Division 4.7 of the EP&A Act provides for declaration, assessment and approval of SSD. The process for environmental assessment and determination of SSD applications is set out as follows:

– submission of a Scoping Report to support a request for Secretary's Environmental Assessment Requirements (SEARs)
– development of Planning Secretary's Environmental Assessment Requirements (SEARs)
– preparation of an Environmental Impact Statement (EIS) to address the SEARs
– lodgement of the EIS and development application
– public exhibition of the EIS
– response to submission(s) received during public exhibition of the EIS
– preparation of Planning Secretary's Assessment Report
– determination of the development application by the consent authority.

Further details of the statutory context for the project are provided in chapter 4.

The project is declared State Significant Development in accordance with Section 4.36 of the EP&A Act and Schedule 1 of *State Environmental Planning Policy (Planning Systems) 2021 (Planning Systems SEPP)*. The Minister for Planning is the consent authority, and the project is to be assessed in accordance with the provisions of Division 4.6 of the EP&A Act.

1.8 Document purpose and structure

1.8.1 Purpose

This EIS supports the application for approval of the project as SSD under Part 4 of the EP&A Act. It addresses the environmental assessment requirements of the SEARs received on 6 March 2025 and the EIS form and content requirements of section 190 and 192 of the Environmental Planning and Assessment Regulation 2021 (the EP&A Regulation).

Appendices to the EIS provide supporting technical reports, which provide detailed assessments of the potential impacts of the project as they relate to the key environmental issues defined by the SEARs.

An outline of the structure of the EIS and supporting information is provided in section 1.8.2.

1.8.2 Structure

The EIS is presented in two volumes:

– Volume 1. Includes a detailed description of the project, provides its strategic and statutory context, describes the community engagement undertaken to date, and assesses the potential impacts upon environmental, social, and economic aspects.
– Volume 2. Contains supporting information. This includes a series of specialist studies that have informed the overall environmental impact assessment presented in Volume 1.

The structure and content of Volume 1 is listed in Table 1.3. Supporting information, including specialist studies, included in Volume 2 are listed in Table 1.4.

Table 1.3 Structure of EIS volume 1

Chapter No.	Chapter title	Content
-	Executive summary	Provides an overview of all aspects of the environmental impact assessment of the project.
1	Introduction	Provides background to the project (including the strategic context and objective of the project, the alternatives considered, and the benefits of the project), an overview of the proponent and the project, and the approval pathway. It also outlines the document purpose and structure.
2	Strategic context	Explains the strategic need for the project, benefits, consistency with government plans, policies and guidelines. This chapter also provides an outline of the alternatives considered during the development of the project
3	Project description	Provides a detailed description of the project. Includes a description of the project area, the physical layout and design, uses and activities, and timing (stages, phases, and sequencing) of the project.
4	Statutory context	Provides the statutory context of the project, including an outline of the relevant legislation and environmental planning instruments applicable to the project.
5	Engagement	Discusses engagement undertaken with the community, including government agencies. Outlines how the community engagement aims have been addressed, the key issues raised by the community, and the proposed future approach to community engagement.
6	Assessment of impacts – key issues	Provides a detailed assessment of impacts during construction, operation, and decommissioning and rehabilitation of the project for the following key issues: – Air quality – Noise and vibration – Hazards and risks – industrial – Hazards and risks – bushfire – Soils and contamination – Water resources – Traffic and transport Provides management measures to avoid or reduce impacts associated with the project.

Chapter No.	Chapter title	Content
7	Assessment of impacts – other issues	Provides a standard assessment of impacts during construction, operation, and decommissioning of the project for the following issues: – Visual landscape and future land use – Biodiversity – Cultural heritage – Greenhouse gas emissions – Social and economic – Waste – Cumulative. Provides management measures to avoid or reduce impacts associated with the project.
8	Justification	Provides an overview of the conclusions from the environmental impact assessment and discusses the project's justification on balance of environmental, social and economic considerations.
9	References	Provides a list of references used throughout the EIS.

Table 1.4 Structure of EIS volume 2

Appendix No.	Appendix title
A	Secretary's Environmental Assessment Requirements
B	Statutory compliance table
C	Detailed plans and drawings
D	Engagement outcomes report
E	Compilation of mitigation measures
F	BDAR Waiver
Technical reports	
1	Air quality assessment
2	Noise impact assessment
3	Preliminary hazard assessment
4	Bushfire hazard assessment
5	Preliminary site investigation
6	Water impact assessment
7	Traffic and access assessment
8	Cultural heritage due diligence assessment
9	Social impact assessment

2. Strategic context

This chapter describes the strategic planning context for the project, including the key issues and demands that have influenced the development of the project. Also relevant are the key features of the site and surrounds and alternatives that were considered during development of the project.

2.1 Strategic background

LMS has identified the need to replace the existing landfill biogas power station at Lucas Heights with a modern bioenergy facility that integrates advanced technologies. This upgrade would enhance resource recovery, reduce emissions, and contribute to sustainable waste management. By capturing and converting landfill biogas from the LHRRP, the new facility would provide a more efficient and environmentally responsible energy solution while supporting broader objectives of improving human health, environmental outcomes, and economic sustainability.

The project aligns with Federal and State government policies promoting resource recovery and circular economy principles. The project has been developed in accordance with this framework ensuring the project contributes to the modernisation of landfill operations and the long-term sustainability of waste management in NSW.

The strategic planning context for the project is provided by a range of plans and strategies, particularly those that set the direction for the future management of waste and waste infrastructure in NSW.

The project is consistent with the relevant policies, strategies, guidelines and plans listed below.

– **National plans and strategies:**
  - National Waste Policy Less Waste, More Resources (Commonwealth of Australia 2018)
  - Clean Energy Australia report (CEC, 2024)
  - Australia's Bioenergy Roadmap (ARENA, 2021)
– **NSW plans and strategies:**
  - NSW Circular Economy Policy (Environment Protection Authority (EPA) 2019)
  - NSW Energy from Waste Policy Statement (EPA 2021)
  - Eligible Waste Fuels Guidelines (EPA 2022)
  - NSW Waste and Sustainable Materials Strategy 2041 (DPIE 2021)
  - EPA Environmental Guidelines – Solid waste landfills (EPA 2016)
  - Net Zero Plan Stage 1: 2020-2030 (DPIE 2020)
  - Draft Waste and Circular Infrastructure Plan (EPA 2025)
– **Regional and local plans and strategies:**
  - Greater Sydney Region Plan – A Metropolis of Three Cities – connecting people (Greater Sydney Commission, 2018)
  - Sutherland Shire Local Strategic Planning Statement (Sutherland Shire Council 2020)
  - Sutherland Shire Our Shire Towards 2032 – Community Strategic Plan (Sutherland Shire Council 2022).

2.2 Need for the project

NSW generates approximately 19 million tonnes of waste annually, with around 7 million tonnes sent to landfill (Blue Environment, 2020). Landfills are a major source of methane emissions, which contribute significantly to climate change. The NSW Greenhouse Gas Inventory reports that methane, a major component of landfill biogas, accounts for approximately 97% of emissions from landfilling, making its capture and utilisation a critical environmental and energy priority. Rates of methane recovery at solid waste landfills are reported to be a key factor in emission trends (DCCEEW, 2024).

NSW generates approximately 19 million tonnes of waste annually, with around 7 million tonnes sent to landfill (Blue Environment, 2020). Landfills are a major source of methane emissions, which contribute significantly to climate change. The NSW Greenhouse Gas Inventory reports that methane, a major component of landfill biogas, accounts for approximately 97% of emissions from landfilling, making its capture and utilisation a critical environmental and energy priority. Rates of methane recovery at solid waste landfills are reported to be a key factor in emission trends (DCCEEW, 2024).

The LHRRP Operational Environmental Management Plan (OEMP) (SITA 2015) identifies that landfill biogas management is required to control off site migration of landfill gas emissions, minimise odour and recover energy from biogas. The LHRRP's Environment Protection Licence (EPL) requires the progressive expansion of gas infrastructure to manage landfill biogas generation and for the collection of landfill biogas for treatment by combustion.

Recoverable landfill biogas from the LHRRP is forecasted to reach peak levels of approximately 12,000 to 13,000 m^3/hour over the next five years as shown on Figure 2.1. This forecast underpins the growing need to expand and modernise landfill biogas recovery infrastructure to maximise resource recovery and minimise emissions over the long term.

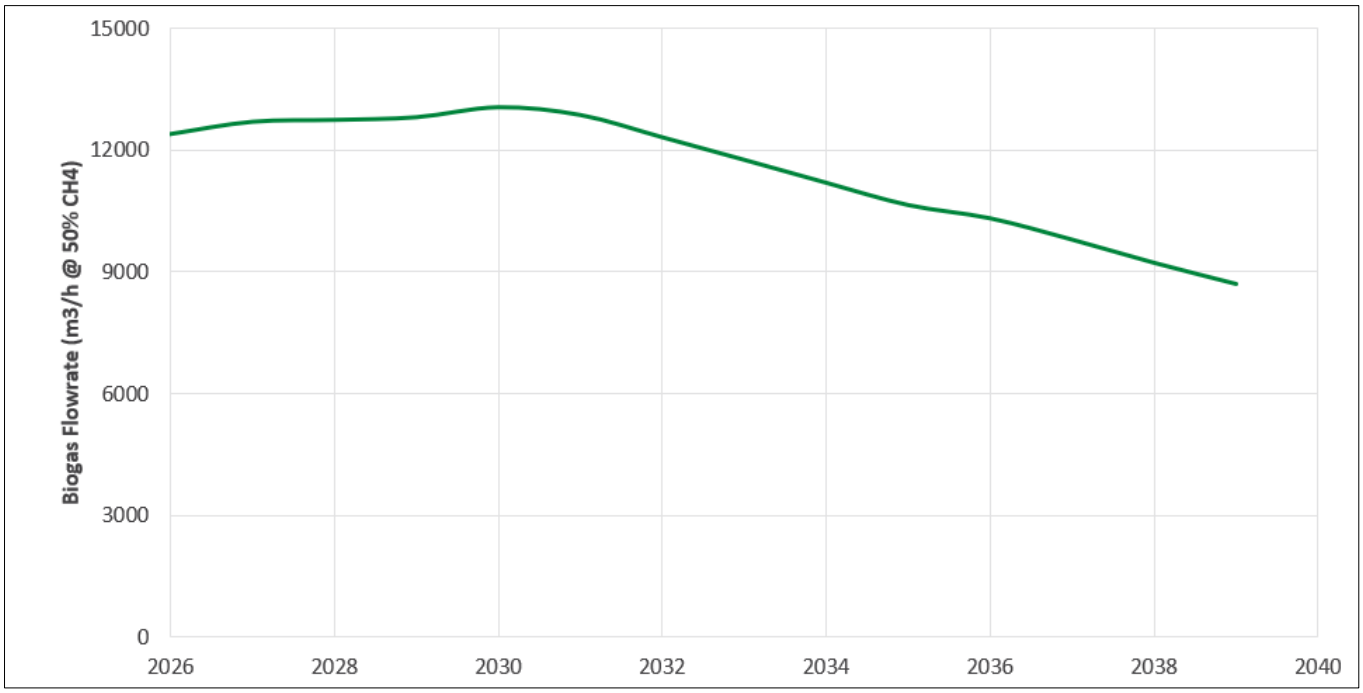


Figure 2.1 LHRRP estimated forecast peak recoverable biogas (LMS Energy, 2025)

The proposed bioenergy facility is essential to replace the existing power station with modern infrastructure that meets the latest industry standards. By integrating advanced gas combustion technology, the bioenergy facility would enable increased landfill biogas recovery capacity at the LHRRP, which would accommodate the current approved filling activities and post closure biogas generation at the LHRRP. This would not only improve environmental outcomes but also enhance energy production efficiency and contribute to NSWs transition towards a circular economy and sustainable waste management practices.

2.2.1 The National Energy Market

Electricity supply in eastern Australia is served by the National Energy Market (NEM). It interconnects five regional market jurisdictions – Queensland, NSW (including the Australian Capital Territory), Victoria, South Australia and Tasmania. Western Australia and the Northern Territory are not connected to the NEM.

The National Electricity Law and the National Electricity Rules are the main laws that regulate the NEM. They are in force in NSW through the *National Electricity (New South Wales) Act 1997.*

Three national market bodies, each with unique functions, oversee the NEM. These are:

– Australian Energy Market Operator (AEMO) – who operates the market
– Australian Energy Market Commission (AEMC) – who makes the market rules
– Australian Energy Regulator (AER) – who enforces the rules.

In addition to the national market bodies, there is the Energy Security Board. The Energy Security Board provides system oversight for energy security and reliability to drive better outcomes for consumers and is comprised of an Independent Chair, Independent Deputy Chair, and the heads of AEMO, the AEMC and the AER.

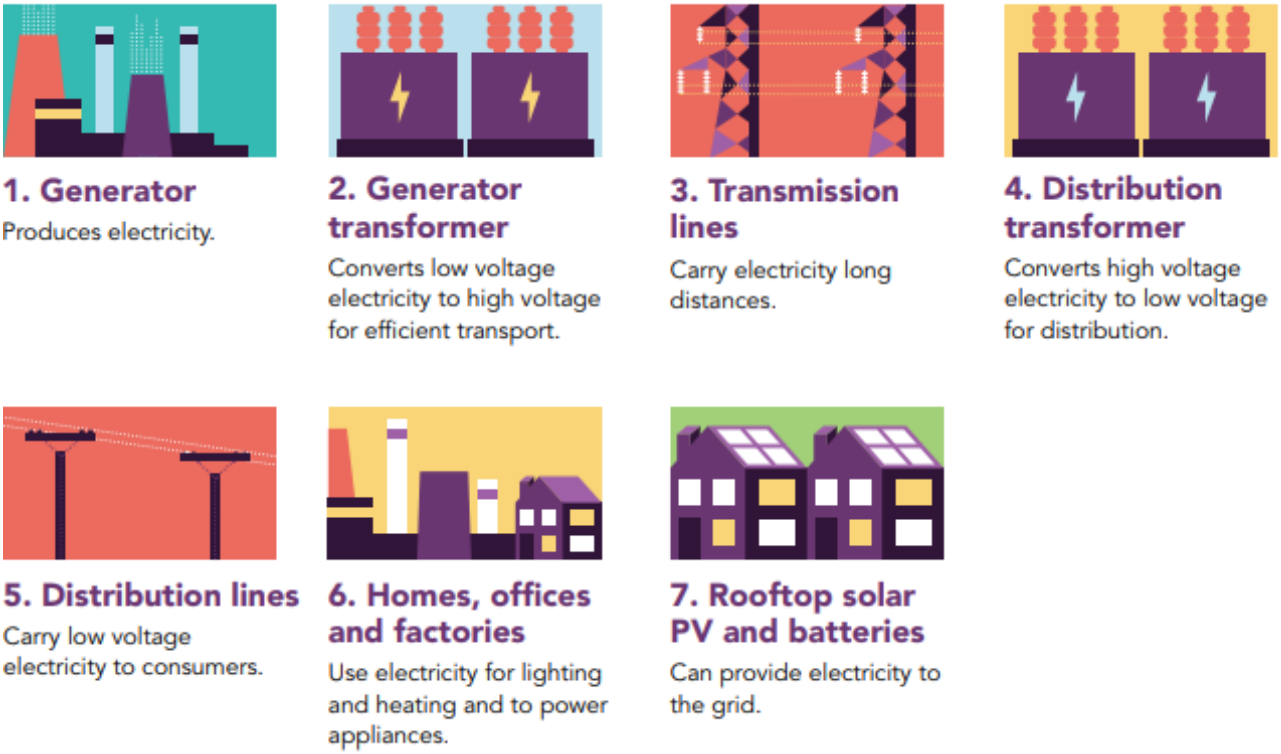
The NSW Government also has a range of powers to deal with an electricity supply emergency under the *Electricity Supply Act 1995* (NSW).

How electricity is generated and transmitted to electricity consumers

There are four parts to the electricity supply chain in the NEM:

1. Generation – changing raw energy (such as from the sun, wind, gas or coal) into electricity.
2. Transmission – moving electricity from where it is generated at power stations to substations near where it is eventually used. This is done using high voltage poles and wires, including interconnectors that move energy between states.
3. Distribution – moving electricity from substations to where it is used by households and businesses. This is done using low voltage poles and wires. Electricity generated by rooftop solar panels can also flow back into this network.
4. Retail – selling electricity to households and businesses, including metering and billing. This is the direct interface between the electricity industry and consumers.

The NEM supply chain is shown on Figure 2.2.



Source: The National Electricity Market (AEMO, 2020a)

Figure 2.2 The electricity supply chain (the transport of electricity from generators to consumers)

Firming technologies and the role of bioenergy in the renewable energy transition

The electricity market in Australia is undergoing a significant transition from centralised fossil fuel generation to a decentralised system dominated by renewable energy sources such as wind and solar (AEMO, 2020a). This shift is driven by an ageing coal-fired power fleet, cost reductions in renewable technology, and growing community and policy support for reducing carbon emissions.

However, a key challenge in this transition is ensuring the reliability, security, and affordability of the power system. While wind and solar are the cheapest and cleanest sources of new electricity generation, they are variable, as their output depends on weather conditions and the time of day. As a result, the electricity system requires firming capacity to ensure a stable supply during periods of low wind or solar generation.

Traditionally, gas-fired power stations, battery storage, and pumped hydro have provided firming capacity. However, bioenergy from landfill biogas is an emerging firming solution that provides dispatchable, low-emission, continuous base-load power while also addressing waste management challenges.

The proposed bioenergy facility would capture landfill biogas containing methane from landfill decomposition, preventing its release into the atmosphere and instead converting it into useable electricity. This process not only contributes to reducing greenhouse gas emissions but also provides a stable and predictable source of renewable energy, helping to balance fluctuations in wind and solar power. Unlike intermittent renewables, landfill biogas energy production operates continuously, making it a reliable complement to variable generation sources in the NEM.

With planned coal-fired power station closures, such as: Liddell, Eraring, Vales Point, Bayswater, and Mount Piper, firming technologies are critical to maintaining energy security in NSW (DISR, 2020). Bioenergy, including landfill gas conversion, provides a scalable, renewable alternative that aligns with NSW's Net Zero Plan Stage 1: 2020-2030 and contributes to the circular economy by repurposing waste gas into clean energy.

The role of landfill gas in the renewable energy transition

The NSW Government has committed to achieving net zero emissions by 2050, with key strategies such as the Net Zero Plan Stage 1 (DPIE, 2020b) and the NSW Electricity Infrastructure Roadmap promoting the transition to clean energy. The capture and utilisation of landfill biogas for electricity generation supports these objectives by:

- **Reducing greenhouse gas emissions** – methane has a global warming potential 28 times greater than carbon dioxide. Capturing and using landfill biogas is proven technology that significantly reduces emissions from waste disposal sites.
- **Enhancing grid reliability** – unlike solar and wind, landfill gas generation is continuous allowing stable conversion to baseload, dispatchable electricity, providing a stable supply of renewable energy to complement variable renewables.
- **Supporting the circular economy** – the project aligns with circular economy principles, by converting waste gas into valuable electricity for the NEM.
- **Improving waste management outcomes** – as landfill biogas collection technology advances, more waste sites can become productive energy sources, reducing the environmental footprint of landfills.

The transition to renewable energy in NSW will require a diverse mix of generation sources, including wind, solar, and firming technologies such as bioenergy, battery storage, and pumped hydro. The project would contribute to this transition by providing base load, low-emission electricity while addressing waste management and emissions reduction targets.

Bioenergy as a renewable energy source

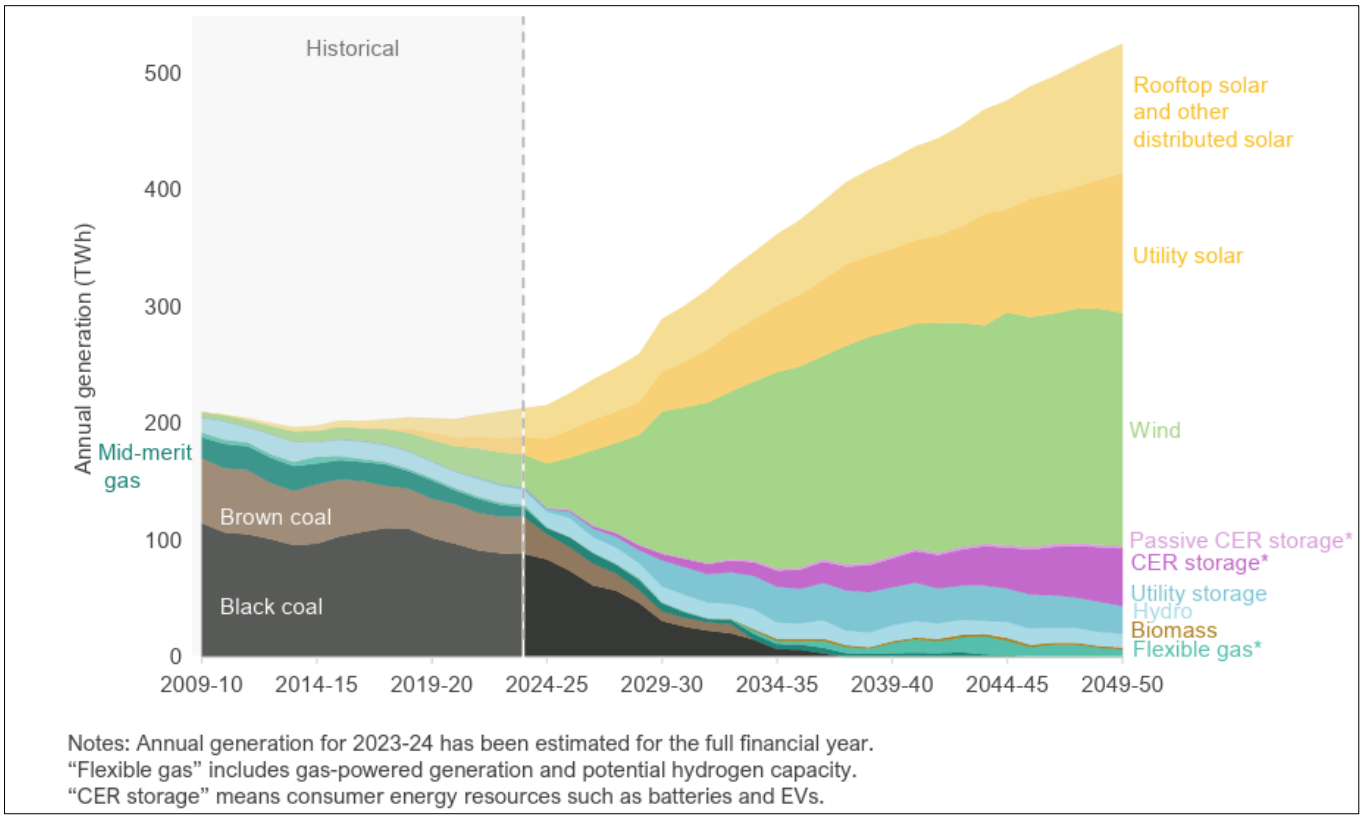
Bioenergy is an essential part of the renewable energy mix. It offers on-demand base load electricity generation using proven commercially viable and scalable technology to support energy security in NSW.

2.3 National plans and strategies

The 2024 Integrated System Plan

The 2024 Integrated System Plan (ISP) (AEMO, 2024) provides a comprehensive roadmap for the future of NEM. It outlines where new transmission, generation, and storage infrastructure are needed across the NEM to ensure that Australia meets its electricity needs while achieving its emissions reduction goals. The ISP focuses on the lowest cost investments required to deliver reliable, secure, and affordable electricity to Australians, while also addressing the nation's transition to a low carbon economy.

One of the key findings in the 2024 ISP is the accelerated timeline for the closure of Australia's coal fired power stations, which are now expected to shut down by 2038, five years earlier than previously anticipated. This shift places additional urgency on expanding renewable energy capacity, which will need to triple by 2030 and increase sevenfold by 2050, as shown on Figure 2.3. A dramatic increase in renewable energy generation capacity will be necessary to replace the lost baseload generation from coal plants and ensure grid stability as more intermittent sources like wind and solar come online.



Source: Integrated System Plan (AEMO, 2024)

Figure 2.3 Forecast energy generation mix in Australia up to 2050

Consistency with the project

The project would contribute to the ISP's goal of ensuring grid reliability by providing a continuous and stable source of base load renewable energy. Landfill biogas combustion to generate electricity offers a valuable source of synchronous generation as well as being flexible and dispatchable, while improving local grid stability with inertia. This capability directly supports the ISPs focus on energy reliability and security as more intermittent renewable energy sources come online.

2.3.1 National Waste Policy 2018

The Australian Government released the 'National Waste Policy: Less Waste More Resources' (Commonwealth of Australia, 2018) (The National Waste Policy). The National Waste Policy builds on the 2009 policy to provide a framework for businesses, governments, communities and individuals for waste management up to 2030. The policy sets the direction for waste management in Australia, aiming to produce less waste for disposal and manage waste as a resource to deliver economic, environmental and social benefits with a clear shift towards a circular economy.

The policy establishes a comprehensive program for national coordinated action on waste underpinned by five key principles:

1. Avoid waste by prioritising waste avoidance and encouraging efficient use of resources and designing products so waste is minimised.
2. Improve resource recovery including the collection systems and processes and improving the quality of recycled material produced.
3. Increase the use of recycled material and build demand and markets for recycled products.
4. Better management of material flows to benefit human health, the environment and economy.
5. Improve information to support innovation, guide investment and enable informed consumer decisions.

The overall objectives of the National Waste Policy are that all wastes, including hazardous wastes, are managed in a way that is consistent with Australia's international obligations, to protect human health and the environment. The policy also seeks to ensure that risks associated with waste are understood and managed to minimise intergenerational legacy issues.

Consistency with the project

The project aligns with the National Waste Policy by enhancing resource recovery and improving waste management to benefit human health, the environment, and the economy. By integrating best-practice resource recovery technologies, the facility would increase the recovery of valuable materials, reduce emissions, and support the transition to a circular economy. This approach directly supports the policy's objectives, including:

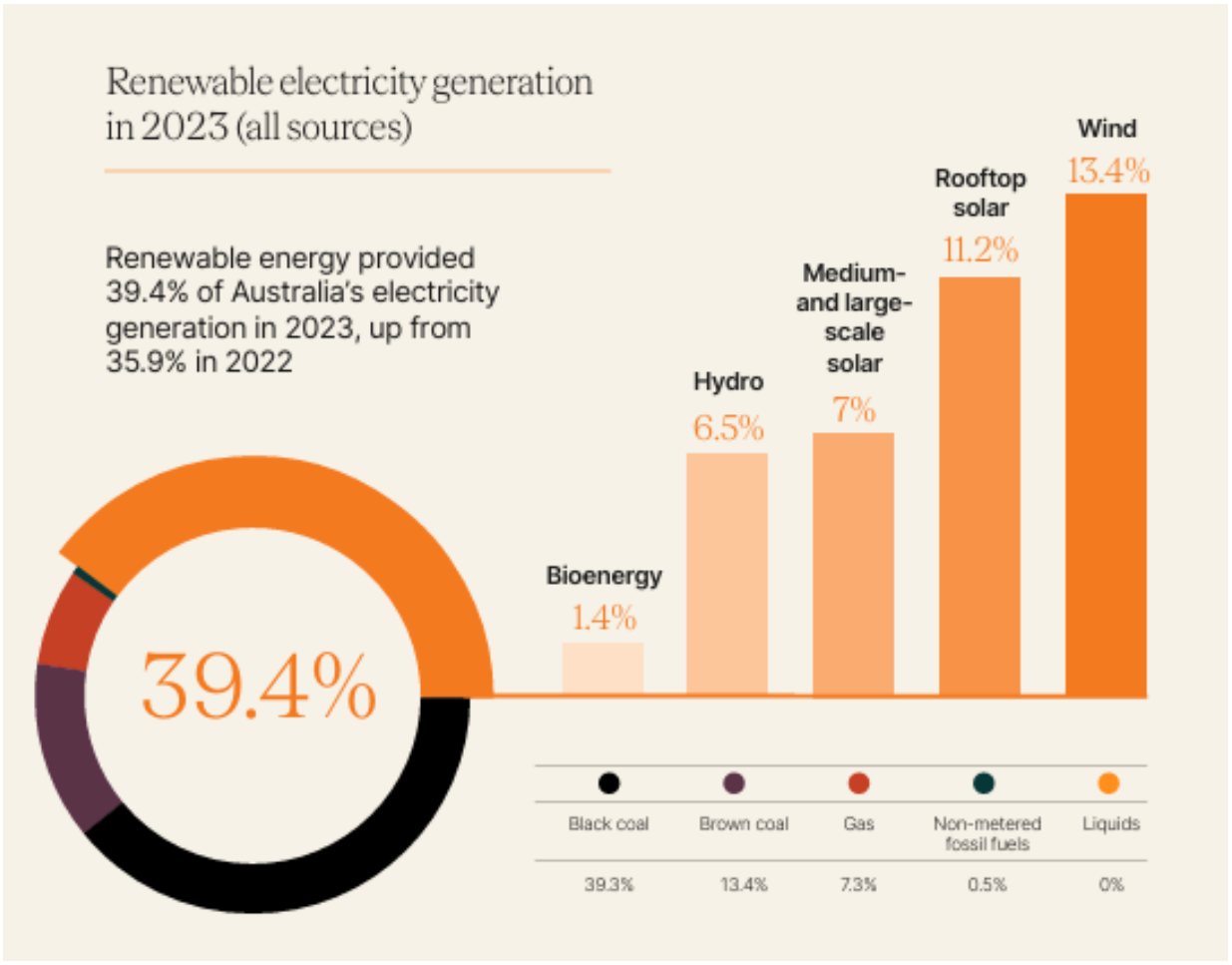
– Capturing landfill biogas and converting it into renewable energy ensures valuable resources are not wasted and supports the circular economy.
– By increasing landfill biogas capture efficiency, the project would lower methane emissions, contributing to climate change mitigation.
– Using waste byproducts for electricity generation reduces reliance on fossil fuels and maximises the utility of landfill biogas.
– The project encourages investment in resource recovery solutions, promoting market growth for renewable energy.
– The facility would operate within a controlled industrial site, ensuring biogas is managed efficiently while minimising environmental and health impacts.

2.3.2 Clean Energy Australia report

The Clean Energy Australia report is an annual report published by the Clean Energy Council which provides an overview of Australia's clean energy sector (CEC, 2024). The latest release from 2024 reported that that:

– 39.4% of Australia's electricity was generated from renewable sources in 2023, which was an increase from the 35.9% reported in 2022.
– 24,985 gigawatt hours (GWh) of renewable energy was generated in NSW in 2023, which was an increase from 21,765 GWh reported in 2022.
– 3.1 gigawatts (GW) of rooftop solar capacity was added in 2023, which was an increase from the 2.7 GW reported in 2022.
– 56 large-scale generation projects were under construction by the end of 2023. Source: Clean Energy Council 2024 Annual Report (CEC, 2024)

Figure 2.4 illustrates Australia's annual electricity generation sources in 2023 and shows the proportion of different renewable energy sources being utilised.



Source: Clean Energy Council 2024 Annual Report (CEC, 2024)

Figure 2.4 Annual renewable electricity generation in 2023 by technology type

Consistency with the project

The Clean Energy Australia Report 2024 highlights the growing contribution of renewable energy sources, including bioenergy, to the national electricity grid. In 2023, renewable energy accounted for nearly 40% of Australia's total electricity generation, with landfill gas and biogas continuing to play a key role in the country's energy transition.

The project aligns with this trend by sustaining and enhancing the existing landfill biogas-to-energy conversion through the adoption of modern technology and expanded capacity. By optimising landfill biogas capture and combustion, the project would improve efficiency, increase electricity output, and reduce greenhouse gas emissions. Additionally, landfill biogas provides a continuous baseload source of renewable energy, complementing variable sources such as wind and solar.

By integrating advanced emissions controls and efficiency improvements, the project would support Australia's clean energy transition goals while ensuring long-term, sustainable management of landfill biogas. This aligns with the broader national strategy of expanding bioenergy's role in the renewable energy mix, contributing to both energy security and environmental benefits.

2.3.3 Australia's Bioenergy Roadmap

The Bioenergy Roadmap (The Roadmap) presents the vision for a future bioenergy industry that decreases emissions, promotes regional growth, increases energy reliability, and leads to better waste management outcomes, by 2030. The Roadmap is underpinned by the following four frameworks:

– Showcase where bioenergy has a comparative advantage and where it can complement other low emissions alternative technologies.
– Identify current barriers to the development of the bioenergy sector.

– Provide findings for industry and government to drive commercial outcomes.
– Highlight opportunities to inform and empower the broader community.

The Roadmap also presents the following four themes for bioenergy in Australia, which are:

– Theme 1: Enabling market opportunities in hard-to-abate sectors
– Theme 2: Enabling market opportunities where bioenergy can complement other low emissions alternatives
– Theme 3: Developing resources
– Theme 4: Building ecosystems.

Consistency with the project

The project would capture and utilise landfill biogas generated from solid waste, converting it into renewable electricity**.** This process directly contributes to the emissions reduction targets outlined in the Roadmap by destroying methane, a greenhouse gas over 28 times more potent than CO_2 that would otherwise be released into the atmosphere. By maximising landfill biogas recovery and energy conversion efficiency**,** the facility supports NSWs waste reduction and renewable energy goals**,** ensuring that valuable resources are recycled at the highest order into shared energy resources rather than destroyed through flaring alone.

The project would improve energy resilience and fuel security by generating dispatchable baseload power**,** reducing reliance on fossil fuels, with supporting the growth of more renewables, thereby contributing to Australia's diversification of energy sources. This is particularly important as the country transitions away from coal fired power generation.

The proposed bioenergy facility is forecast produce up to 190,000 MWh of electricity annually**,** which would generate enough energy to power approximately 30,000 homes**,** reinforcing the role of bioenergy in supporting regional energy needs while reducing pressure on existing grid infrastructure.

2.4 NSW plans and strategies

2.4.1 NSW Circular Economy Policy Statement

In March 2018, the NSW Government endorsed the development of a circular economy policy for NSW to build on NSWs strong track record in waste avoidance and resource recovery.

The NSW Government released the *NSW Circular Economy Policy Statement: Too Good to Waste* (EPA, 2019) (the NSW Circular Economy Policy) to help guide decision making during the transition to a circular economy. A circular economy changes the typical cycle of production, use and disposal to further integrate resource reduction, re-use and recycling. This aims to keep products in use for as long as possible, increasing the economic, social and environmental benefits for NSW.

The NSW Circular Economy Policy forms the basis for the NSW Waste Strategy. The circular economy principles provided in the policy capture the intent of the National Waste Policy principles and go beyond waste management.

The policy statement provides a framework for implementing initiatives throughout a product's life cycle, based on seven key principles:

1. Sustainable management of all resources
2. Valuing resource productivity
3. Design out waste and pollution
4. Maintain the value of products and materials
5. Innovate new solutions for resource efficiency
6. Create new circular economy jobs
7. Foster behaviour change through education and engagement.

Consistency with the project

This project is consistent with the NSW Circular Economy Policy as it would promote innovation for resource recovery as per principle No.5. The project recognises the value of landfill biogas being used as a resource rather than treated only as a waste product. The renewable energy produced from landfill biogas would be capable of servicing various sectors enabling the circular energy re-use of landfill biogas produced at the LHRRP.

2.4.2 NSW Energy from Waste Policy Statement

The NSW Energy from Waste Policy Statement (EPA, 2021) (the Energy from Waste Statement) outlines the value of recovering energy and resources from thermal waste treatment procedures. The statement provides guidelines for the design, operation, monitoring, and emissions standards for facilities capable of utilising waste treatment processes for energy generation.

The Energy from Waste Statement also lists eligible waste fuels, which are fuels that the EPA considers representing a low risk of harm to human health and the environment due to their origin, composition and consistency, which includes landfill biogas.

The Energy from Waste Statement also provides criteria for facilities that use eligible waste fuels, which are the following:

– ability to demonstrate to the EPA that the proposed waste consistently meets the definition of an EPA-approved eligible waste fuel
– confirm there are no practical, higher order reuse opportunities for the waste
– fully characterise the waste and/or undertake proof of performance
– meet the relevant emission standards as set out in the Protection of the Environment Operations (Clean Air) Regulation 2010.

Consistency with the project

Landfill gas and biogas is identified as an eligible waste fuel, which the project proposes to derive from the breakdown of organic landfilled wastes to use in producing renewable energy to circulate to the local electricity network. The project would be consistent with the four criteria for waste fuels facilities, as discussed below.

– **Consistently meets definition**: Landfill biogas is recognised by the EPA as an eligible waste fuel due to its origin, composition, and consistency. The facility would capture and utilise landfill gas in a controlled and regulated process, ensuring compliance with the EPA's requirements.
– **No higher-order reuse opportunities:** Landfill biogas has limited alternative reuse opportunities due to its dispersed and variable nature. The most effective way to manage and utilise this resource is through on-site energy generation, which reduces emissions and displaces fossil fuel-based electricity generation.
– **Fully characterises waste:** The project would implement ongoing monitoring and biogas quality assessments to fully characterise the landfill biogas composition. This would ensure compliance with regulatory requirements and optimise combustion efficiency for renewable energy production.
– **Meets emission standards:** The project would be designed and operated to meet the strict emissions standards set out in the Protection of the Environment Operations (Clean Air) Regulation 2010. Advanced biogas treatment and emissions control technologies will be incorporated to minimise air pollution and ensure compliance with environmental regulations.

By aligning with the Energy from Waste Policy Statement, the project not only supports responsible waste management but also contributes to NSW’s renewable energy and emissions reduction goals, providing a reliable and sustainable energy source for the local electricity network.

2.4.3 Eligible Waste Fuels Guidelines

The NSW EPA Eligible Waste Fuels Guidelines (2022) (Eligible Waste Fuels Guidelines) set out the regulatory framework for the use of specific waste-derived materials as fuel for energy generation in NSW. These guidelines ensure that the combustion of waste-derived fuels occurs in an environmentally responsible manner, aligning with broader sustainability objectives such as reducing landfill dependency, lowering greenhouse gas emissions, and promoting resource recovery.

The guidelines identify specific waste types as eligible waste fuels (EWF), including landfill gas, provided they meet strict environmental and operational criteria. Compliance with these requirements ensures that facilities using such fuels operate safely and with minimal environmental impact, mitigating risks associated with air emissions, odour, and residual waste.

Consistency with the project

The project is designed to align with the principles and requirements set out in the NSW EPA Eligible Waste Fuels Guidelines 2022. Key considerations include:

- **Utilisation of landfill gas –** the facility is designed to recover and combust landfill biogas, a recognised EWF to generate renewable energy. By harnessing this biogas, the project directly supports waste-to-energy objectives while reducing methane emissions, a potent greenhouse gas.
- **Environmental and compliance standards –** the upgraded facility would incorporate modern biogas processing and combustion technologies that adhere to emissions control standards, ensuring compliance with EPA requirements and minimising potential environmental impacts.
- **Operational efficiency and sustainability –** by replacing the existing power station with an upgraded facility, the project enhances energy efficiency, improves safety measures, and aligns with the circular economy principles promoted by the NSW Waste and Sustainable Materials Strategy 2041.
- **Long-term resource recovery benefits –** given the continued generation of landfill biogas for decades after LHRRP's closure, the new facility provides a sustainable long-term solution for energy recovery, further reinforcing NSW's commitment to responsible waste management practices.

2.4.4 NSW Waste and Sustainable Materials Strategy 2041

The NSW *Waste Avoidance and Resource Recovery Act 2001* commits the NSW Government to refreshing and updating its waste strategy every five years, to review and continually improve the state's policies and targets for waste reduction and landfill diversion.

The updated waste strategy – the *NSW Waste and Sustainable Materials Strategy 2041* (DPIE, 2021a) (the NSW Waste Strategy) has been released for stage 1, covering the period 2021 to 2027. The strategy sets out the long term vision for managing waste, planning for infrastructure, reducing carbon emissions, creating jobs, and refocusing the way NSW produces, consumes and recycles products and materials.

The NSW Waste Strategy updates NSW's priorities for waste and resource recovery to reflect the *NSW Circular Economy Policy Statement* (discussed in section 2.4.1), the *Net Zero Plan Stage 1:2020–2030 (*discussed in section 2.4.6) and the *National Waste Policy Action Plan* (which was prepared under the *National Waste Policy 2018,* described in section 2.3.1).

The strategy recognises that NSW is committed to making the transition to a circular economy over the next 20 years. Transitioning to a circular economy means that we use our resources efficiently and make them as productive as possible.

The strategy identifies the following key challenges to the management of waste in NSW:

- NSW is running out of space to deal with residual waste.
- Recycling is under pressure.
- Waste and materials usage significantly contribute to carbon emissions.
- Waste can damage our environment.

The strategy provides a 10 year target for 80% average recovery rate from all waste streams by 2030 and targets to halve the amount of organic waste sent to landfill and create zero emissions from organic waste by 2030.

The strategy recognises the need to expand and modernise the waste and resource recovery infrastructure in NSW to meet the challenge of developing a circular economy. It states that NSW needs a strong pipeline of infrastructure investment to maintain and improve capacity to collect, sort, process and dispose of waste.

The *NSW Waste and Sustainable Materials Strategy: A guide to future infrastructure needs* (DPIE 2021b) was also released in conjunction with the NSW Waste Strategy. The guide sets out the investment pathway required for NSW to meet future demand for recycling.

The guide recognises that a key focus of the strategy is ensuring we have the right infrastructure to process the material we expect to enter the waste stream over the next two decades.

Consistency with the project

The project is consistent with the NSW Waste Strategy as it directly supports the goal of achieving zero emissions from organic waste by 2030. By enabling the continued capture of landfill biogas emissions from the LHRRP landfill, the project ensures that methane, a potent greenhouse gas, is effectively managed and converted into renewable electricity. This not only reduces environmental impacts but also enhances the sustainability of waste management practices.

Furthermore, the project contributes to the modernisation of waste and resource recovery infrastructure by incorporating advanced biogas capture and energy recovery technologies. This aligns with the strategy's objectives of fostering investment in infrastructure that supports a circular economy and improving resource efficiency. By enhancing landfill biogas capture capabilities and promoting renewable energy generation, the project plays a crucial role in reducing emissions, improving air quality, and creating long term environmental and economic benefits for the region.

2.4.5 EPA Environmental Guidelines – Solid waste landfills

The NSW *Environment Protection Authority's Environmental Guidelines: Solid Waste Landfills* (EPA, 2016) (the solid waste landfill guidelines) provide minimum standards to guide the design, construction, operation, monitoring and reporting, and post-closure management of landfills.

The minimum standards from the guidelines are as follows:

– Landfills should be sited, designed, constructed and operated to cause minimum impacts to the environment, human health and amenity.
– The waste mass should be stabilised, the site progressively rehabilitated, and the land returned to productive use as soon as practicable.
– Wherever feasible, resources should be extracted from the waste and beneficially reused.
– Adequate data and other information should be available about any impacts from the site, and remedial strategies should be put in place when necessary.
– All stakeholders should have confidence that appropriately qualified and experienced personnel are involved in the planning, design and construction of landfills to high standards.

Consistency with the project

This project is consistent with the solid waste landfill guidelines as it aligns with the minimum standards outlined for landfill design, operation, and management. The project would ensure that landfill biogas is effectively captured and either used for energy recovery through electricity generation or treated by flaring, in accordance with best-practice environmental management.

Specifically, the project meets the guidelines in the following ways:

– **Minimising environmental and human health impacts** – the upgraded landfill biogas capture system would reduce methane emissions, improve air quality, and contribute to climate change mitigation.
– **Progressive rehabilitation and site management** – by improving gas capture efficiency, the project supports the long-term stabilisation of waste mass and enables sustainable site management.
– **Resource recovery and beneficial reuse** – the project maximises the recovery of landfill gas as a renewable energy source, promoting resource efficiency and aligning with circular economy principles.
– **Monitoring, reporting, and remediation** – the project would adhere to regulatory requirements, including the Protection of the Environment Operations (Clean Air) Regulation 2010, ensuring robust environmental monitoring and compliance with emission standards.
– **Qualified personnel and high standards** – The project involves experienced professionals in landfill gas management, ensuring best-practice design, construction, and operation.

The proposed development is consistent with Section 5 – Landfill Gas Management and Monitoring, of the Guidelines in that it is connected to the existing biogas extraction network and provides an effective control for treatment of the extracted landfill biogas.

Through these measures, the project would uphold the EPA's minimum standards and contributes to the responsible management of landfill sites.

2.4.6 Net Zero Plan Stage 1: 2020-2030

The Net Zero Plan Stage 1: 2020-2030 (the Net Zero Plan) (NSW Government, 2020) presents the objectives set out by the NSW government to achieve net zero emissions by 2050. The Net Zero Plan recognises the approach to achieving net zero is to create new jobs, cut household costs, and attract investment.

The Net Zero Plan is split into four parts, which are:

1. A global challenge with local opportunities
2. Progress and projections
3. The net zero priorities, which are:
    - Priority 1: Drive uptake of proven emissions reduction technologies that grow the economy, create new jobs or reduce the cost of living.
    - Priority 2: Empower consumers and businesses to make sustainable choices.
    - Priority 3: Invest in the next wave of emissions reduction innovation to ensure economic prosperity from decarbonisation beyond 2030.
    - Priority 4: Ensure the NSW Government leads by example.
4. Keeping track.

Consistency with the project

The project is consistent with the objectives of the *Net Zero Plan Stage 1: 2020-2030* as it contributes to emissions reduction while supporting economic growth and investment in clean energy infrastructure.

Specifically, the project aligns with:

– **Priority 1: Driving uptake of proven emissions reduction technologies** – by modernising the existing LHRRP gas management infrastructure and increasing its capacity to capture and convert landfill gas into renewable electricity, the project directly supports the transition to lower emission energy sources. This also creates new employment opportunities in construction, operation, and maintenance, contributing to local and regional economic growth.

– **Priority 3: Investing in the next wave of emissions reduction innovation** – the project enhances landfill gas management technology, improving efficiency and reducing methane emissions beyond 2030. This supports long-term decarbonisation efforts while fostering economic opportunities in the renewable energy sector.

Additionally, the project supports the broader goals of the *Net Zero Plan* by attracting investment in sustainable infrastructure, reducing reliance on fossil fuels, and reinforcing NSW's leadership in emissions reduction initiatives.

2.4.7 Draft NSW Waste and Circular Infrastructure Plan

The NSW Environment Protection Authority (EPA) released Draft NSW Waste and Circular Infrastructure Plan – Chapter 1 in May 2025, with a strong focus on protecting the declining availability of landfill airspace in Greater Sydney. The draft plan highlights that without intervention, existing landfill capacity in the metropolitan region will be exhausted by 2030, leading to a potential waste management crisis. This scenario could force Councils and businesses to transport residual waste to regional areas or interstate, significantly increasing costs for households and industry.

The draft plan sets out a series of immediate actions to safeguard Sydney's remaining landfill capacity, including the safe management of residual waste streams that cannot be recycled, and the accelerated rollout of infrastructure to process food and garden organics. The plan also emphasises the need for new or expanded waste infrastructure within the metropolitan area to ensure secure, long-term solutions for waste disposal and resource recovery.

For proponents of new waste and resource recovery facilities, including bioenergy developments, the release of Chapter 1 provides important strategic context. It demonstrates the NSW Government's recognition of the urgency in addressing Sydney's waste infrastructure shortfall and reinforces the policy support for projects that can contribute to reducing landfill reliance, recovering value from residual waste streams, and supporting the transition to a circular economy.

Consistency with the project

The project provides an alternative to landfill disposal by capturing and utilising landfill biogas, directly supporting the Plan's focus on protecting limited landfill airspace in Greater Sydney. Second, it contributes to the broader transition towards a circular economy by converting a residual waste stream into renewable energy, thereby reducing reliance on fossil fuels and maximising resource recovery. By securing approvals for modernised infrastructure in 2026, the project aligns with the Plan's call for urgent investment in waste and energy infrastructure to ensure continuity of services and avoid a future capacity shortfall.

2.5 Regional, local plans and strategies

2.5.1 Greater Sydney Regional Plan

The Greater Sydney Region Plan – A Metropolis of Three Cities (Greater Sydney Commission, 2018) sets out a strategic plan for Greater Sydney, with the vision to implement three CBD areas to enable jobs and essential services to be more accessible. The Greater Sydney Plan sets out the following:

– a 40-year vision (to 2056) and establishes a 20-year plan to manage growth and change for Greater Sydney in the context of social, economic and environmental matters
– informs district and local plans and the assessment of planning proposals
– assists infrastructure agencies to plan and deliver for growth and change
– informs the private sector and the wider community of the growth management and infrastructure investment intentions of government.

The plan includes 11 key Directions, each addressing critical areas such as housing, transport, sustainability, and economic development. A key focus is the Direction: An Efficient City, which highlights the importance of integrating waste management into strategic land use, transport, and infrastructure planning to accommodate the anticipated growth of Greater Sydney. This framework emphasises the role of effective waste management in creating sustainable and well-connected urban spaces, ensuring that the needs of a growing population are met in an environmentally responsible way.

Consistency with the project

The project is consistent with the plan as it aligns with the following objectives:

– Objective 33: A low-carbon city contributes to net-zero emissions by 2050 and mitigates climate change.
– Objective 34: Energy and water flows are captured, used and re-used.
– Objective 35: More waste is re-used and recycled to support the development of a circular economy.

The project aligns with Objective 33 as it would contribute to achieving net-zero emissions by enabling the continued generation and use of renewable energy derived from landfill biogas from the LHRRP. The project would ensure that energy (in the form of landfill biogas) is captured for use, thereby consistent with Objective 34. As per Objective 35, landfill biogas is a byproduct of organic landfilled waste which can be used as part of a circular economy.

2.5.2 Sutherland Shire Local Strategic Planning Statement

The Sutherland Shire Local Strategic Planning Statement (Sutherland Shire Council 2020) (Sutherland Shire LSPS) sets out the local vision for the Sutherland Shire LGA for the next 20 years, with a focus on its planning principles and land use decisions. The Sutherland Shire LSPS outlines 23 planning priorities accompanied by proposed actions in the following categories:

– infrastructure and collaboration
– liveability
– productivity
– sustainability.

Each planning priority is supported by actions for its implementation, with shared responsibility among Sutherland Shire Council, State agencies, and local community groups/organisations such as schools, interest groups, and sports associations.

Consistency with the project

The project is broadly consistent with the strategic direction of the Sutherland Shire LSPS to bring about land use outcomes for priorities in infrastructure, employment and the environment, particularly the following planning priorities:

Specifically, the project aligns with:

– **Planning Priority 15: Grow Industrial and Urban Services Jobs** – the project would generate local employment opportunities, including an estimated 15 full time equivalent (FTE) positions during construction This supports the LSPS goal of strengthening industrial and urban services employment within the Sutherland Shire.
– **Planning Priority 22: Efficiency and Innovation** – by incorporating modern landfill biogas capture and energy recovery technology, the project promotes innovation in waste management and sustainability. The continued generation of renewable energy contributes to local energy security and supports the broader transition to a low-carbon economy.

The project incorporates provisions for ongoing landfill biogas management, ensuring the safe and effective capture and treatment of gas emissions beyond the operational life of the landfill. This long-term environmental management is critical to enabling the future conversion of the site into recreational parkland, as identified in broader strategic planning for post-closure land use. By maintaining appropriate controls and infrastructure for biogas monitoring and extraction, the project facilitates a staged transition to public open space, aligning with community expectations and the LSPS vision for enhanced liveability and sustainable land use outcomes within the Sutherland Shire.

2.5.3 Sutherland Shire Community Plan

The Sutherland Shire Community Strategic Plan (Sutherland Shire CSP) (SSC, 2025) has been developed through extensive engagement with the local community, government agencies, and key stakeholders. The CSP outlines the long-term vision, values, and priorities for the Sutherland Shire, identifying key strategic outcomes and collaborative actions to support a resilient, sustainable, and inclusive future.

The updated CSP is underpinned by the following strategic outcomes:

– Informed and collaborative leadership that fosters community trust and responsive governance.
– A sustainable natural environment, protected and enhanced for future generations.
– A thriving, connected, and inclusive community that values wellbeing and celebrates diversity.
– A resilient and innovative economy, supporting education, local jobs, and business growth.
– Liveable neighbourhoods and healthy built environments, with accessible, safe and inclusive places.
– Climate-ready and future-focused infrastructure that supports smart, sustainable development.

Consistency with the project

The project aligns with the updated Sutherland Shire Community Strategic Plan (CSP) 2025 by contributing to environmental sustainability, economic resilience, and efficient land use and infrastructure planning.

- **Environmental protection and sustainability:** The project utilises a brownfield site, avoiding impacts on natural ecosystems and protecting surrounding native vegetation. The upgrade to landfill biogas combustion technology reduces greenhouse gas emissions and advances circular economy outcomes.
- **Economic development and local employment:** With the creation of at least 15 full time equivalent jobs during construction and support for ongoing roles in the renewable energy and waste sectors, the project stimulates local employment and contributes to a future focused economy.
- **Efficient and sustainable land use:** Reinvesting in an existing industrial site maximises land use efficiency without compromising open space or residential amenity. The project reinforces the LHRRP as a key precinct and facilitates the long-term transition of the site toward public parklands, following the completion of landfill activities.

Overall, the project supports the vision of the CSP 2025 by integrating innovative waste and energy infrastructure, fostering local economic opportunities, and delivering measurable environmental benefits aligned with community and Council goals.

2.6 Site location and features

2.6.1 Location

The project is located within the Sutherland Shire local government area (LGA), about 30 kilometres southwest of the Sydney central business district within the suburb of Lucas Heights. Lucas Heights sits between the Royal National Park, Heathcote National Park and the Cubbitch Barta National Estate Area, which is managed by the Department of Defence as a part of the Holsworthy Barracks.

The bioenergy facility would be located on Lot 102 DP 1009354 (existing power station site) which has an area of approximately 1.80 hectares.

An overview of the project site context and surrounding land use is shown on Figure 2.5.

2.6.2 Land ownership

The LHRRP consists of two land parcels, one owned by Cleanaway and the other owned by the Australian Nuclear Science and Technology Organisation (ANSTO). ANSTO leases its area of the LHRRP to Cleanaway for waste management or other agreed purposes. The bioenergy facility is proposed to be located within the lease area on land owned by ANSTO. Cleanaway would grant LMS a commercial sublease to build and operate the bioenergy facility.

A letter of owner's consent has been provided by ANSTO dated 14 August 2025, as a separate document to this EIS.

2.6.3 Zoning

The project site is zoned SP1 – Special Activities under the Sutherland Shire Local Environmental Plan 2015 (Sutherland Shire LEP).

The objectives of the SP1 – Special Activities zone are:

- to provide for special land uses that are not provided for in other zones
- to provide for sites with special natural characteristics that are not provided for in other zones
- to facilitate development that is in keeping with the special characteristics of the site or its existing or intended special use, and that minimises any adverse impacts on surrounding land.

Development permitted with consent includes development for the purposes shown on the Land Zoning Map, including any development that is ordinarily incidental or ancillary to development for that purpose. The Sutherland LEP Land Zoning Map records the project site as 'waste recycling'.

An amendment to the Sutherland Shire LEP was made in 2016 to permit additional uses on part of the LHRRP site. The amendment inserted Section 29 in Schedule 1 Additional Permitted Uses of the LEP and includes:

Use of certain land at New Illawarra Road, Lucas Heights

(1) This clause applies to land at New Illawarra Road, Lucas Heights, being Lot 101, DP 1009354, Lot 3, DP 1032102 and Lot 2, DP 605077 (also known as Lucas Heights Resource Recovery Park) and identified as "29" on the Additional Permitted Uses Map.

(2) Development for the purpose of a waste or resource management facility is permitted with development consent if the consent authority is satisfied that the development—

(a) improves the resource recovery capabilities of the land, and

(b) increases the waste disposal capacity of the land to meet the needs of the community, and

(c) ensures landfill is of a type and degree of compaction that is capable of supporting the future use of the land for recreation purposes, and

(d) minimises the environmental impacts of the continued operation of the land on local residents and the environment

Section 29 applies to land which is identified as "29" on the Sutherland Shire LEP 'Additional Permitted Uses Map', which includes the project site. In accordance with the zoning provisions of the Sutherland Shire LEP, the project being considered ancillary to the existing LHRRP would enable improved resource recovery and environmental outcomes at the site. The project is permitted with consent.

2.6.4 Surrounding land use

The immediate surrounding area is undeveloped with the exception of the LHRRP and supports substantial areas of vegetated land as shown on Figure 2.5.

Special land use activities are key features of the local area which include Defence activities, ANSTO and its associated facilities and the LHRRP. These activities correspond to land zoning of RE1 Public Recreation, SP1 – Research and Technology and SP2 Defence.

There is also minimal heavy industry or commercial use in the immediate adjacent area.

LHRRP

The LHRRP landfill currently services a significant proportion of Sydney's putrescible waste and is a key strategic asset for waste management of the Greater Sydney region. The project site is contained entirely within the boundaries of the LHRRP.

ANSTO

ANSTO's Lucas Heights Research Facility is located to the southeast of the project site on the southern side of New Illawarra Road. The facility has a 1.6 kilometre buffer boundary zone. No residential development is permitted within the ANSTO buffer zone. Approximately 116 hectares of the LHRRP is located within the buffer boundary zone including the project site.

Conservation areas

The Lucas Heights Conservation Area is located 500 metres north of the project site at the northern boundary with the LHRRP. The Mill Creek Mountain Bike Club trails are located within this Conservation Area.

The Gandangara State Conservation Area is located approximately 1.5 kilometres north of the project site.

Paper Size ISO A4

0 100 200 300 400

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

LMS Energy
Lucas Heights Bioenergy facility

Project site and surrounding land use

Project No. **12649882**
Revision No. **0**
Date **16/09/2025**

FIGURE 2.5

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Print date: 16 Sep 2025 - 15:39

Data source: GHD: Site Boundary (2025), Site Features (2025). NSWSS: SVTM (2025), NPWSR (2025), Cadastre (2025). Nearmap WMS Server: .
Created by: dbbanatin

2.6.5 Sensitive receivers

The following sensitive receivers are located within the vicinity and surrounding area of the project site:

- ANSTO, about 400 metres to the southeast
- Sutherland PCYC Minibike Club, about 150 metres southwest within the LHRRP
- Lucas Heights Motel and Function Centre, about 1.4 kilometres to the east
- users of the Mill Creek Mountain Bike Club trails about 500 metres to the north
- The Ridge Sporting Complex, athletic track, bike park and golf course, about 2.5 kilometres to the northeast
- low density residential areas, about 2.3 kilometres to the east.

Refer to Figure 6.2 and Figure 6.3 for the location of identified sensitive receivers in relation to the project site.

2.6.6 Natural and built features

Climate and meteorology

The local climate is similar to that of the broader Sydney metropolitan region with warm to hot summers and cool to mild winters.

The mean daily maximum temperatures range from 26 °C in summer to 16 °C in winter, and the mean daily minimum temperatures range from 17 °C in summer to 7 °C in winter. The Lucas Heights area experiences significant diurnal and seasonal variations in meteorological conditions.

According to meteorological data collected by ANSTO, the average annual rainfall in the region is 1,027 millimetres (Bureau of Meteorology, 2024). Average monthly rainfall ranges from between 51 and 128 millimetres, the driest months are in winter and early spring, with higher rainfalls experienced between November and March.

For much of the year, winds are of light to moderate strength, increasing in the afternoons. The winds are generally stronger during winter and spring and lighter during summer and autumn. Wind direction is predominantly from the southwest and southeast, with south easterlies present in summer and autumn and south westerlies present in winter. Winds occur from most directions in spring.

Topography, hydrology and drainage

The local region is characterised by gently undulating rises and low hills. The project site is relatively flat with elevation ranging between 156 to 160 metres Australian Height Datum (MLEI, 2025).

The project site is within the catchment area of Bardens Creek, which is inferred to flow northward from its source at the western edge of the LHRRP toward the Georges River. The terrain steepens as it approaches Mill Creek, located 1.5 kilometres to the northwest, reflecting the region's dissected plateau landform. Bardens Creek begins flowing approximately 250 metres north of the project site. Both Bardens Creek and Mill Creek ultimately flow into the Georges River near Alfords Point before reaching Botany Bay.

There are no waterways within the project site. The project site is not located in an area identified as flood prone land by the Sutherland LEP, hence flooding is not expected to occur over the project site. Runoff from the landfill is managed through a dedicated drainage system designed to collect and divert surface water away from the project site, minimising the risk of erosion and off-site discharge.

Geology and soils

The project site is located on the dissected Hawkesbury sandstone of the Woronora Plateau, which was uplifted during the Triassic Period such that it now dips downwards in a northerly direction and forms part of the Sydney Basin.

The dominant surface geology is made up of Hawkesbury Sandstone, which is approximately 200 metres thick in the Lucas Heights region. It is a medium to coarse grained sandstone and consists of a series of lenticular (and therefore laterally discontinuous) beds of quartz sandstones. The thickness of the individual beds varies up to a maximum of around 15 metres with beds generally around 1.5 to 3 metres thick. The sandstone formation dips in a northerly direction and contains two sets of tectonic joints, which control the drainage for Mill Creek and Bardens Creek (Stroud et-al, 1985).

The 1:100,000 Wollongong – Port Hacking soil landscape map (Environment Climate Change and Water, 2010) indicates the site is underlain by Lucas Heights (lh) soil landscape, which is part of residual landscape. As reported by (Hazelton & Tille, 1990), soils comprise moderately deep and hard yellow Podzolic and Soloths soils which consists of loose, grey, brown, fine sands and loam, sometimes with clay.

The landscape is formed from sandstone and shale parent material and consists of a surface layer of sand and subsurface layers of sandy clay and clay. The soils are highly permeable, with very low general fertility.

The project site is not mapped as containing any acid sulfate soils.

Geotechnical investigation

A geotechnical investigation undertaken by GHD in August 2025 for the project site (GHD, 2025a).

Investigations found that the upper layers consist of fill material, including gravel and sandy clay, placed during previous site works to level the ground. Beneath this, natural soils derived from weathered sandstone were encountered, generally extending only a few metres before transitioning into sandstone bedrock. Across the site, bedrock was found at depths of around 1 to 4 metres below the surface indicating a thin soil profile.

The sandstone bedrock is part of the Hawkesbury Sandstone formation, which is a common and stable rock type in the Sydney region. The site has already been reprofiled to about a 1 metre depth to create a level platform for existing infrastructure. These conditions provide a predictable geotechnical setting for the project with manageable excavation requirements and generally favourable soil conditions.

Vegetation

The project site is located in the upper catchment of Bardens Creek, within a landscape characterised by rugged terrain and dissected plateaus. The project site has undergone significant historical disturbance associated with industrial activity and land clearing. As a result, the vegetation within the site is highly modified and predominantly comprises areas of bare ground covered with blue metal gravel and hardstand .

Remnants of native vegetation remain in the surrounding land parcels area to the north south and east of the site.

Beyond the immediate site, vegetation within the LHRRP consists primarily of Scribbly Gum (*Eucalyptus haemastoma*) and Red Bloodwood (*Corymbia gummifera*), species typical of the dry sclerophyll forests found in this part of Sydney broader landscape includes patches of heathland and woodland communities, interspersed with areas of regrowth and modified vegetation.

Section 7.2 provides a detailed description of the existing vegetation near the project site around the LHRRP perimeter.

The project site is located on low risk bushfire prone land (classified as Vegetation Buffer) on the northern portion of the project site and partially within high risk bushfire prone land (classified as Category 1) at the entrance to the project site on Little Forest Road.

Access

The project site is accessible primarily from Little Forest Road via New Illawarra Road where the existing main entrance is located. The site also has rear access to the LHRRP internal access tracks. The LHRRP is accessed primarily from Little Forrest Road via New Illawarra Road.

Little Forest Road is a two way sealed road which also provides access to the project site. New Illawarra Road is a two lane carriageway and is a gazetted State road managed by Transport for NSW.

Utilities and services

A search of nearby utilities and services was undertaken in October 2025. This indicated that the following services were located within or nearby the project site:

– 250 millimetre diameter landfill biogas pipeline servicing the existing onsite power station
– AusGrid 33 kilovolt (kV) feeder
– Optus and Telstra assets
– potable water connection within LHRRP approximately 60 metres north of the project site.

The project site has an existing sewer lateral connecting to wastewater infrastructure on Little Forest Road.

Power

A high voltage 33 kV underground cable is located within the project site which connects to the Lucas Heights Zone Substation at the ANSTO site.

Telecommunications

Optus assets and Telstra assets are located on Little Forest Road adjacent to the project site.

2.6.7 Future land use

Approximately two years after the landfill closure the new recreational spaces will be transferred to Sutherland Shire Council for management pending agreement between ANSTO and the Council. Further assessment of the potential impacts to future site users and potential land use conflicts in relation to the project is provided in section 7.1.

2.7 Alternatives and options considered

2.7.1 The “do nothing” option

If the proposed bioenergy facility is not developed, the “do nothing” option would result in significant environmental, operational, and regulatory challenges for the LHRRP and its landfill biogas management strategy.

Insufficient capacity for future landfill biogas management

The current landfill biogas infrastructure, including the existing power station is approaching end of design life and will not be able to sustain beneficial utilisation of landfill biogas forecast to be generated over the coming decades, consistent with approved landfill operations and after care requirements. Combined with the new flaring facility, the capacity of this upgraded plant exceeds the capacity of the existing infrastructure which is expected to be required to meet current forecast peak biogas collection volumes. Without the new bioenergy facility, the site would struggle to effectively capture and process increasing volumes of landfill gas, leading to higher uncontrolled emissions and potential safety issues with regard to landfill biogas containment.

Development of a new bioenergy facility is required to ensure the ongoing management and utilisation of landfill gas when the existing power station is decommissioned.

Loss of renewable energy generation

The proposed bioenergy facility would provide a sustainable source of renewable energy by converting landfill biogas into electricity. Without it, the site would lose a major opportunity to generate clean energy, reducing its contribution to NSW’s renewable energy targets and circular economy objectives.

Without the bioenergy facility, more landfill biogas would have to be flared instead of converted into energy. While flaring helps control emissions, it wastes a valuable energy resource and reduces the efficiency of landfill biogas recovery.

Insufficient capture of landfill biogas

The NSW Environmental Protection Authority (EPA) prefers that landfill gas generated at landfills is collected and treated by oxidisation where feasible through either energy recovery or flaring to minimise environmental and health risks. At the LHRRP, failure to adequately capture and manage landfill gas could lead to increased emissions, potentially resulting in non-compliance with the site's EPL. Without the project, there is a risk that landfill biogas capture would be insufficient to meet regulatory requirements, leading to greater scrutiny from the EPA and increased operational and compliance costs.

Long-term post-closure challenges

Following the cessation of landfilling, residual landfill biogas would continue to be generated for a number of years. Without a modern bioenergy facility, there may not be adequate infrastructure to efficiently capture and utilise this gas, increasing the risk of emissions and delaying the site’s transition to post-closure land use.

2.7.2 Consideration of alternatives

In evaluating the most effective approach for landfill biogas management at the LHRRP, several alternatives to the proposed bioenergy facility were considered.

One option was to maintain the existing power station, but this was deemed unfeasible due to its limited capacity and end of life assets, which would be insufficient to handle the forecasted increase in landfill biogas production.

Another alternative was to rely solely on flaring, which, while effective in controlling emissions, does not utilise landfill gas for energy generation, resulting in wasted renewable energy potential and reduced alignment with NSW's circular economy and sustainability objectives.

2.7.3 Site selection

A range of locations within the LHRRP were considered for the proposed bioenergy facility. LMS in liaison with Cleanaway considered the preferred site location based on the following site selection criteria:

– location and design of existing biogas infrastructure
– availability of land through existing Cleanaway/ANSTO ownership or lease availability
– constructability issues, such as access, topography and ground conditions
– natural hazard risk, including susceptibility to flooding
– potential for environmental and social impacts.

Based on the constraints analyses undertaken it was concluded that the existing power station site is in an optimal location with respect to these criteria, further analysis of this criteria is provided below.

Original project location

The bioenergy facility was initially proposed to be located along the western boundary of the existing power station, adjacent to the existing landfill and future recreational parkland. Following further assessment, an opportunity was identified to relocate the proposed facility within the existing power station site itself. This revised location offers several key advantages:

– Improved integration with existing gas and energy infrastructure, supporting more efficient operations and potential synergies with current facilities.
– Increased separation from the future open space parklands, reducing potential visual and amenity impacts on surrounding community areas.
– Optimised land use, making use of already industrially zoned and disturbed land, thereby minimising new environmental disturbance.

This refinement represents an overall improvement in site suitability and aligns with the project's objectives of efficiency, compatibility, and environmental responsibility.

Proximity to existing infrastructure

The facility needed to be positioned where it could efficiently integrate with the existing biogas extraction and electricity distribution infrastructure, ensuring effective capture and utilisation of landfill biogas. Located adjacent to the existing landfill biogas infrastructure and power connections, the disturbance footprint associated with the proposed bioenergy facility is minimised. Developing the existing power station site allows for direct connection to the biogas extraction system and operational efficiencies including condensate management and blower sizing.

The site has established vehicle access and internal sealed roads, minimising the need for extensive new road construction. It also features suitable topography and ground conditions, reducing the complexity of site preparation and construction.

Land ownership and contractual arrangements

The site is located within land already leased by Cleanaway from ANSTO, eliminating the need for additional land acquisition and streamlining approvals and development timelines.

The contractual arrangements for the existing power station are set to conclude on 31 December 2025, requiring the development of a new bioenergy facility to ensure the ongoing management and utilisation of landfill biogas. The transition to a new bioenergy facility would ensure continuity in landfill biogas capture and use, presenting controlled emissions and optimising energy recovery.

Cleanaway and ANSTO already have an established relationship, with existing approvals in place for landfill operations and associated infrastructure within the LHRRP. The project aligns with ongoing landfill biogas management activities at the site and involves the replacement of the existing power station with a modernised facility that maintains the current function while addressing future capacity and efficiency needs.

The facility represents a continuation of an essential operation, ensuring landfill biogas is captured and utilised for renewable energy generation, consistent with existing land use arrangements. The transition to the new facility would be managed in accordance with existing agreements, maintaining operational continuity and regulatory compliance.

Low environmental risk

The existing power station site has been identified as highly suitable for the proposed development due to its low environmental sensitivity and previously disturbed condition. The site is primarily cleared and a heavily modified landform associated with existing infrastructure, making it largely devoid of significant natural features or ecological constraints. Importantly, no clearing of native vegetation is required.

It is located outside flood-prone areas and buildings would be positioned an appropriate distance from Category 1 bushfire prone land, contributing to a lower overall environmental risk profile and supporting operational resilience.

Development on a brownfield site prevents further land disturbance in greenfield or sensitive environmental areas, reducing erosion and sedimentation risks. There are no ecologically sensitive areas, waterways, or habitats of conservation significance within the immediate vicinity of the project site. Additionally, the highly modified nature of the landform and shallow slope gradient reduces the need for extensive site preparation, minimising potential environmental impacts associated with construction.

Consideration of existing and future LHRRP operations

The project would be located outside of the active landfilling operations at the LHRRP ensuring that its development and operation would not interfere with ongoing landfill activities. This separation significantly reduces the risk of operational conflicts, such as disruptions to waste disposal processes, access limitations for landfill vehicles, or potential safety hazards associated with overlapping activities.

The project site also falls outside the designated future post-closure parkland area, ensuring that long-term land use planning objectives for the LHRRP remain unaffected. As part of the landfill's post-closure strategy, areas designated for public parkland and green space rehabilitation would not be encroached upon by the bioenergy facility, preserving the integrity of planned environmental restoration and community-use initiatives.

Based on these considerations, the constraints analysis concluded that the chosen site is optimal, offering operational efficiencies, minimising environmental and constructability challenges, and ensuring compatibility with existing infrastructure within the LHRRP.

2.7.4 Technology selection

The generator technology selected for this project provides an efficient means of methane destruction and power generation in accordance with Section 5.5 of the Environmental Guidelines: Solid Waste Landfills, Second edition 2016. The Caterpillar G3516 lean burn genset has been selected due to its proven track record of reliable performance on landfill sites around the world. LMS has significant operational experience using the G3516 and it is used at various other LMS sites across Australia and in New Zealand. The G3516 provides effective destruction of methane in the landfill biogas while maintaining high efficiency for power generation. The capability to operate with the impurities and variability often present in landfill biogas is a standout feature.

The design and selection of ancillary equipment, including, gas conditioning, flares, transformers, and switch-rooms aligns with best practice activities for power stations and landfill biogas.

3. Description of the project

This chapter provides a description of the project for the purposes of the EIS. It describes the infrastructure proposed and estimated land requirements. An indicative construction methodology is provided, including timing, likely resources, access and facilities. A description of how the project would be operated, maintained and decommissioned is also provided.

3.1 Overview

The project involves upgrading the existing renewable energy infrastructure to deliver a modernised bioenergy facility at the existing power station site, supporting the operations of LHRRP. The upgraded facility would have a generation capacity of approximately 22 megawatts (MW).

The project would capture and recover landfill biogas generated from the LHRRP landfill to generate electricity, which would be exported to the existing electricity network.

The project would allow continued operation of the existing power station, whilst the new bioenergy facility is being constructed. Elements of the existing site would be retained as identified on Figure 3.1 and Figure 3.2.

3.1.1 Project infrastructure

The proposed physical infrastructure and design outcomes for the project are provided in Table 3.1.

Table 3.1 Key project infrastructure and design outcomes

Project element	Description
Bioenergy facility generators	20 x 1.1 MW modular lean burn generator sets
Ancillary infrastructure	**New proposed infrastructure** – Gas delivery and metering system – Transformers to step up the electrical output voltage from LV to HV to match the local grid voltage – Electricity metering, protection and communication equipment – Covered storage bund for chemical and coolant storage – HV Switchroom / Control room – Lightning poles – External lighting – Safety showers **Retained/ upgraded infrastructure** – Gas delivery, metering and condensate removal system – Lunchroom / Toilet – Offices / Workshop – Car parking for on site operators – External lighting – Gas conditioning and gas delivery infrastructure – Waste oil and clean oil tanks **Buildings to be decommissioned** – Workshop x 2 – Existing generators – Existing flare facility – Cooling towers.

Project element	Description
Utilities connections	**Proposed new connections** – New underground HV electricity line to the Ausgrid 33 kilovolt (kV) distribution network as an extension of the connection from the existing on site electrical infrastructure to the Lucas Heights Zone Substation. **Existing utilities** – Fibre connection to the Lucas Heights Zone Substation – Potable water connection from LHRRP.
Hours of operation	– 6am to 6pm for operational staff – Remote operation 24 hours per day, 7 days per week
Workforce	– 6 full time equivalent (FTE) staff during operation. – 15 FTE staff during construction
Estimated capital expenditure	$49,804,000 AUD (excl GST)

3.1.2 Project application area

The project application area encompasses Lot 102 DP1009354 (existing power station site) and incorporates the refers to the total land area required for both the construction and operation of the project.

The application area also includes the permanent structures and facilities essential for the functioning of the bioenergy plant. An outline of the project application area is shown on Figure 3.1.

3.2 Project design

3.2.1 Bioenergy facility

Power generation system

Twenty 1.1 MW modular lean burn generator sets are proposed within the bioenergy facility. Each generator set would comprise a reciprocating lean burn gas engine purpose built for landfill biogas combustion.

Installation of the generators would comprise a modernised system that includes separate self-contained modules and associated ancillary equipment including high voltage switchgear for the export of the electricity exported to the local Ausgrid distribution network as shown on Figure 3.1.

The custom designed generator enclosures would be fully insulated to attenuate noise, with engine exhaust emitted through a muffler and emissions stack located on top of the modules, approximately 10.2 metres from ground level with emission sampling locations incorporated. Each generator module would house all the components required to operate as a stand-alone unit and are specially designed as fully enclosed bunded systems.

The modularised generator equipment is scalable both from a development perspective, and operationally, allowing flexibility to operate mixed modes (i.e. a combination of either flaring and/or generation) as required. This ensures the ability to combust the maximum available gas, 24 hours per day. The change between flaring or generation or a combination is controlled via Control System and provides remote monitoring for round the clock tracking.

A modular layout of the proposed facility is shown on Figure 3.2. An example of a modular facility layout is shown on Figure 3.3.

Flaring facility

An enclosed flaring facility is being developed as related development and would eventually become an integral part of the bioenergy facility's operation. The flaring facility operated by LMS, would provide a contingency measure during commissioning, maintenance, and occasional shutdown of the bioenergy facility, ensuring consistent gas combustion to support the operation of the existing landfill at LHRRP.

The flare installation has been approved as a modification to SSD 6835, to ensure sufficient combustion capacity is maintained for the landfill operations in the transition between power generating facilities and is shown adjacent to the western boundary of the project site on Figure 3.2.

Potential impacts associated with the construction and operation of the flare have been independently assessed as part of a modification report. The cumulative effects of the bioenergy facility and flare installation will be considered as part of this EIS.

The flaring facility Control System manages the staging and operation of the flares and provides a means of communication and control back to the station master Programmable Logic Controller. The station Control System interfaces with all plant and equipment and is capable of automatically catering to different states of operation, responding to electricity market events and ensures safe operation of generator modules and flares.

Existing power generation facility

The existing power generation facility is comprised of 15 MW of generation and associated ancillaries. This existing facility will be operated by LMS from 31 December 2025 in combination with the recently approved flaring facility (SSD 6835 MOD 3) to provide biogas recovery from the LHRRP.

The existing facility location provides a suitable basis for the new development and includes an area that was left vacant for future expansion during the original development in 1999. The vacant area would be utilised for the development of the new 22 MW bioenergy facility and the existing power station would continue to operate during construction and commissioning of the new facility.

Existing workshops and storage facilities on the site would be demolished or relocated to make way for the new bioenergy facility. The existing flare compound would also be decommissioned.

Ancillary facilities including the lunchroom, amenities buildings and processing infrastructure would be retained or upgraded for future operations, refer to Table 3.1.

Paper Size ISO A4

0 10 20 30 40

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

LMS Energy
Lucas Heights Bioenergy facility

Project application area

Project No. **12649882**
Revision No. **0**
Date **20/10/2025**

FIGURE 3.1

\\ghdnet\ghd\AU\Sydney\Projects\21\12649882\GIS\Maps\Deliverables\12649882_EIS.aprx
Print date: 20 Oct 2025 - 12:43

Data source: GHD: Site Boundary (2025), Project Application Area (2025). NSWSS: Cadastre (2025). Nearmap WMS Server: .
Created by: dbbanatin

N

10 5 0 10 20

SCALE BAR (m)

SCALE 1:500 FOR A1 SIZE
SCALE 1:1000 FOR A3 SIZE
GDA94 / MGA ZONE 56
NEARMAP AERIAL IMAGE DATED 01/06/25

FOR INFORMATION

No	DATE	DRN	DESN	CHKD	APP	DESCRIPTION
F	28/10/25	SA	FL	–	–	FI – DRAWING TITLE CHANGE
E	24/10/25	SA	FL	–	–	FI – LABEL SIZE INCREASED
D	15/09/25	SA	FL	–	–	FI – STORAGE SHED MOVED
C	08/09/25	SA	FL			FI – BUILDING POSITION CHANGES
B	07/08/25	SA	DM	–	–	FI – CSB ADDED
A	25/07/25	SA	DM	–	–	DIP – DESIGN IN PROGRESS

REVISIONS

DRAWING NUMBER	DESCRIPTION

REFERENCE DRAWINGS

LMS ENERGY™

DRAWN: S.A.
DATE: 25/07/25
DESIGN: D.M.
DATE: 25/07/25
APPRVD:
DATE:
A.B.N. 39 059 428 474

LUCAS HEIGHTS BIOENERGY FACILITY

BIOENERGY FACILITY
SITE LAYOUT (FIGURE 3.2)

SCALE	DRAWING NUMBER	SHEET	SHEETS	SIZE	REV
1:500	20057-DA-056-01	OF 01		A1	F

Figure 3.3 Artist impression of the proposed modular bioenergy facility

3.2.2 Key supporting infrastructure

Ancillary infrastructure for the bioenergy facility would include the following:

– biogas delivery, metering, filtration and condensate removal system
– biogas quality monitoring
– electrical transformers
– site office/lunchroom and amenities, maintenance workshop/dry storage shed
– high voltage (HV) switch room/ control room
– bunded storage for oil, coolant and chemicals
– internal all weather roads
– lightning protection and earth grid
– security fence on boundary.

Proposed new ancillary infrastructure

Gas delivery infrastructure

The landfill biogas collection network for the LHRRP connects to the existing power station. New gas connections to the generators would be established from the existing landfill biogas network within the project site footprint.

Condensate collected at the facility would be returned to the LHRRP leachate management system via the existing gas infrastructure.

Gas monitoring

Biogas enters the facility via two fuel rails each with separate sets of biogas flow and quality metering devices. Measurement of biogas shall comply with *National Greenhouse and Energy Reporting (Measurement) Determination 2008 Division 2.3.6* for direct measurement.

Monitoring equipment is capable of measuring flow, temperature, pressure and percentage methane in biogas. Instrumentation used is consistent with the typical approach used by LMS for biogas monitoring at other facilities and is calibrated during commissioning and regularly during operations.

LMS proposes to retain part of the existing biogas delivery infrastructure and add new biogas delivery skids to support biogas supply to the 20 new generators.

Electrical transformers

The bioenergy facility would include multiple transformers each suitable for connection to two generators. The transformers shall be fitted with appropriate double HV bushings and LV terminations. All fittings on the transformers would be accessible with both the HV and LV compartments fitted.

Bulk oil storage and chemical store

The existing power station operates with two 20,000 litre bunded oil tanks for clean oil and waste oil near the southern end of the site. The integrity and capacity of the existing bulk oil tanks for use in ongoing operations will be reviewed as part of detailed design and commissioning and if required replaced or supplemented with new bunded tanks at the same location with a combined capacity of up to 70,000 litres. Tanks would have short hoses for ease of handling.

A modular chemical storage bund containing coolant is located adjacent the oil tanks. Minor chemicals would be stored in the existing workshop to be retained on site.

High voltage switch room/ control room

The HV Switchroom, provides the equipment required for operation and electrical isolation of the facility. This includes the HV switchgear, tariff metering, LV switchboard and protection and station Control Panel.

Fire management infrastructure

The generator modules used are AS3814 Type B compliant gas appliances and include the necessary ventilation, fire detection and smoke detection systems. A fire detection signal is provided in each module and would provide a signal to the overarching station fire panel in the event of fire.

The HV switchroom includes a very early smoke detection apparatus and suppression gas to protect switchgear and personnel in the event of electrical fire. Fire and smoke detectors are also included for the switchroom and control room.

An adjacent water supply is located within the LHRRP and is accessible via gate on the western boundary and may be used by fire authorities for asset or bushfire fighting.

A firefighting and safety equipment plan has been developed for the facility and is attached as Appendix C.

Existing infrastructure to be retained or upgraded

Site office

The site has an existing workshop, site office and lunchroom which would be retained as part of the new facility as shown on Figure 3.2.

Workshops and storage containers

One workshop within the proposed facility footprint will be relocated to the area currently occupied by the existing flare, which is to be removed. Existing containers adjacent to the workshops will also be moved to the location of the existing generators, as illustrated on Figure 3.2.

Internal roadways and access

The bioenergy facility would be accessed via an existing entry/exit point at Little Forest Road. Rear access to the LHRRP is also provided on the eastern boundary. These access points are be linked by internal access roads, as shown on Figure 3.2. All existing internal access roads would be retained as part of the new facility. A new internal access road would be formed along the southern boundary.

The site has nine existing carparks which would be retained for further operations. Staff and visitors would use the main site entrance from Little Forest Road.

Landscaping, fencing, lightning protection and external lighting

The existing facility includes landscaping, fencing, lightning protection and external lighting. Five lightning poles are installed evenly around the generator modules, each approximately 20 metres in height (subject to final engineering), providing protection in the event of a direct strike.

The site is securely enclosed by a 2.4 metre high security fence with two double gate access points for vehicles. Fencing incorporates appropriate safety signage to identify operational hazards. External lighting is installed and positioned to minimise light spill to the surrounding area.

Utility connections

Grid export connection

The facility would export electricity generated from landfill biogas into the AusGrid 33 kilovolt (kV) network through a new 37 metre underground HV line connection to the existing AusGrid termination pole as shown on Figure 3.1.

From the AusGrid pole, electricity would be transmitted via the existing 33 kV feeder to the Lucas Heights Zone Substation, approximately 750 metres to the southeast at the ANSTO site.

Communications

An existing fibre conduit extends to the site from the Ausgrid Lucas Heights Zone Substation.

A potable water supply is available to service the amenities and safety systems on site. The development requires minimal water inputs.

Domestic wastewater (blackwater and greywater) would be collected and disposed of via the existing wastewater management infrastructure which is a pumped septic system which returns to the ANSTO site. The project site has an existing sewer lateral connecting to infrastructure on Little Forest Road.

3.2.3 Design standards and requirements

The design of the project has been, and would continue to be, prepared in accordance with relevant standards and design requirements, including:

- Fire Safety Guideline – Fire Safety in Waste Facilities (FRNSW, 2020)
- *Fire safety guideline: Access for Fire Brigade Vehicles and Fire Fighters* (FRNSW 2019)
- *Noise Policy for Industry* (NPfI) (EPA, 2017)
- *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (EPA, 2022)*
- *Approved Methods for the Sampling and Analysis of Air Pollutants in NSW (EPA, 2022)*
- AS 1158.1 Lighting for roads and public spaces
- AS 1170 Structural Design Actions (series)
- AS 1345 Identification of the Contents of pipes, conduits and ducts
- AS 1375 Industrial Fuel Fired Appliances
- AS/NZS 1554 Structural steel welding (series)
- AS 1657 Fixed platforms, walkways, stairways and ladders – Design, construction and installation
- AS 1940 The storage and handling of flammable and combustible liquids
- AS 2067 Substations and high voltage installations exceeding 1 kV a.c.
- AS 2374 Power Transformers Minimum Energy Performance Standard (MEPS) requires for distribution transformers
- AS/NZ 4282 Control of obtrusive effects of outdoor lighting
- AS/NZS 3000 Electrical Installations
- AS/NZS 3008 Electrical Installations – Selection of cables
- AS 3600 Concrete structures
- AS 3814 Industrial and commercial gas-fired appliances
- AS 4041 Pressure piping
- AS 4100 Steel Structures
- AS/NZS 5601.1 Gas installations, Part 1: General installations
- AS/NZS 60079 Explosive Atmospheres (series)
- AS 62271.1 High-voltage switchgear and control gear – Common specifications
- AS 62271.102 High voltage switchgear and control gear – Alternating current disconnectors and earthing switches
- AS 62271.200 High-voltage switchgear and control gear – A.C. metal-enclosed switchgear and
- control gear for rated voltages above 1kV and up to and including 52kV
- AS 62271.201 High-voltage switchgear and control gear – AC insulation-enclosed switchgear and control gear for rated voltages above 1 kV and up to and including 52 kV
- AS 62271.301 High voltage switchgear and control gear – Dimensional standardization of terminals
- AS 60076.1 Power transformers – General
- AS 60044.1 Instrument Transformers Part 1: Current Transformers
- AS/NZS 61439.1 Low-voltage switchgear and control gear assemblies – General rules.

3.3 Construction

3.3.1 Overview

Construction of the project would commence in the first quarter of 2026 (Q1), with an estimated duration of 6 to 8 months (weather permitting and subject to planning approval). Construction activities would include:

Early works (site establishment)

– site compound set-up to isolate the construction area from existing power station operations and set-up of environmental controls
– demolition of existing site sheds and flare compound
– minor civil works for site levelling and compaction

Mobilisation and structure installations (project construction)

– generator assembly and placement onto concrete pads using cranes
– installation of biogas delivery skids and placement onto concrete foundations
– ancillary connections (electricity through trenching) (gas, electrical, water, oil, compressed air)

Testing and commissioning

– test and commission of generators and ancillary equipment
– demobilisation.

3.3.2 Site preparation

The preparation of the bioenergy facility site would include any services relocations, earthworks or stabilisation required to provide a suitable work area for construction to proceed. Site preparation would also include the establishment of areas for laydown of materials and equipment.

Trenching

Trenching would be required for the installation of earth grid, piping, conduit and HV cable connections within the project application area. Trenching would be undertaken progressively using an open cut method, involving excavation, pipeline or conduit installation and backfilling.

Typical trench dimensions would be approximately 1 metre deep and 0.6 metres wide (actual trench subject to detailed design). Once a section of the trench is excavated, a suitable bedding material such as sand would be placed at the base, followed by the installation and joining of pipeline or conduit sections. The trench would then be backfilled, primarily using the originally excavated material.

3.3.3 Project construction

Generator assembly

The construction of the generators and related components would include the establishment of foundations and installation of pre-fabricated components including the generator modules, radiator, muffler and related components.

The construction of the HV switchroom would similarly mainly involve installation of one pre-fabricated room, associated access platforms and stairs.

The construction of ancillary components would include the establishment of the various other buildings, systems and infrastructure at the site.

Construction workforce

It is anticipated that labour requirements for the duration of the project would be up to 15 FTE workers.

Construction hours

Construction hours would be in accordance with the existing approved hours for construction at the LHRRP which include:

– Monday to Friday: 7am to 5pm
– Saturday to Sunday: 8am to 5pm.

Some construction activities would be undertaken outside the standard construction hours, which may include safety critical works when the site contains minimal staff, deliveries of oversized loads to avoid peak traffic times and emergency works.

Plant and equipment

Table 3.2 provides a list of the major pieces of plant and equipment expected to be required during the construction phase. The type and quantity of plant and equipment may vary depending on the construction staging and construction methods and would be determined by the construction contractor(s).

Table 3.2 Construction equipment

Construction equipment		
Excavators	Concrete trucks	Concrete pumps and agitators
Trucks	Vacuum trucks	Generators
Dozers	Front end loaders	Graders
Mobile cranes (various sizes)	Welding machines	Contractor service vehicles
Rollers	Semi-trailers	

Construction traffic

Traffic generation during construction is expected to comprise:

– 10 heavy vehicle movements per day
– 30 light vehicle movements per day.

All construction traffic would access the construction compound site via the main site entrance from Little Forest Road.

3.3.4 Construction waste streams

Construction waste streams would include:

– minimal spoil – to be reused on site
– minimal waste concrete – transferred off site for recycling
– minimal general waste from construction staff – to be taken off site with staff
– existing site infrastructure – transferred off site for recycling (approx. 95%) or disposal.

3.3.5 Construction program

Construction of the project would occur over a period of about 6-8 months. An indicative construction program is provided in Table 3.3. Based on current planning; construction of the project is planned to commence in Q1 of 2026.

Table 3.3 Indicative construction programme

Description	Start	End
Mobilisation, Civil Works & Asset Landing	Q1 2026	June
Mechanical Install	May	July
Electrical Install – LV & HV	June	July
Site Finishing	July	August
Commissioning	August	September
Cleanup & Demobilisation	October	November

3.3.6 Construction environmental management plan

Construction of the project would be undertaken in accordance with a construction environmental management plan (CEMP). The plan would detail mitigation measures to manage risks associated with the construction activities including removal of waste, generation of dust and noise, and any other environmental impacts identified in Chapter 8 of this report and conditions of approval.

3.3.7 Testing and commissioning

A testing program would be completed as part of the construction and commissioning of the site. Inspections of all installed equipment and infrastructure will be conducted as part of the testing plan. All equipment would be commissioned and tested on site to ensure it meets the functional requirements and safe operation.

Commissioning would include final inspection and testing of the gas delivery skids and associated mains to ensure operation as intended.

Landfill biogas currently supplied to the existing power station would be redirected to the new bioenergy facility. Once the bioenergy facility is fully operational, it would become the primary means of gas destruction at the site with backup provided by the adjacent flaring facility. This phased approach would minimise disruption to landfill biogas extraction and combustion, ensuring destruction occurs in line with its rate production.

Upon construction completion, all construction equipment would be demobilised and removed from the site.

Commissioning of the bioenergy facility is undertaken in conjunction with Ausgrid ensuring appropriate approvals and network clearance is obtained before permission is granted to export electricity.

3.3.8 Decommissioning of existing power station

Prior to construction of the new bioenergy facility, two existing workshops would be dismantled. Subject to condition assessment, LMS may relocate and repurpose these within the site. LMS proposes to continue to operate the existing power station until the energisation of the bioenergy facility is completed which is currently forecast for 30 June 2026. The new facility would incorporate many of existing power stations fit for purpose facilities including the offices, biogas delivery infrastructure, HV connection point and oil storage (refer to Figure 3.2). The retention and reuse of existing infrastructure (where fit for use) provides an important waste minimisation strategy for the proposed development.

Decommissioning of the balance of the existing power station would commence following the commissioning and energisation of the new bioenergy facility and would broadly include:

– disconnection and isolation of electrical and gas infrastructure
– safe removal and recycling of redundant generator units and ancillary equipment
– dismantling of associated infrastructure not required for future use
– management and disposal of decommissioned materials in accordance with relevant environmental regulations and site waste management procedures
– repurposing of the area for use consistent with site-wide operational needs.

This phased approach ensures that the transition to the new facility does not interrupt biogas capture and destruction, maintaining compliance with environmental and safety standards throughout the process.

The decommissioning process involves disconnecting the current power station from the current electrical feed and removal from service of all the associated generation infrastructure considered to be nearing end of design life. Nominally this includes the generator modules, transformers, and related ancillary equipment located within areas shown in red on Figure 3.1. Specialist and appropriately licenced contractors would be engaged to remove any hazardous materials, including waste and transformer oils. It is anticipated more than 95% of all remaining waste from this decommissioning activity would be aggregated for recycling.

In addition to the removal of above grade infrastructure, LMS would manage any excavation and contaminated spoil within the site in accordance with mitigation measures included in Appendix E to ensure protection of the environment and workers. Where required (for disposal) this remediation activity would be undertaken by appropriately licenced specialists and validated through independent reporting.

All remaining infrastructure at and below grade (including roadways, generator slabs and biogas delivery pipeline and earth grid) associated with the existing facility will be retained for use to support the ongoing operation of the new bioenergy facility and provide contingency for a potential future expansion contingent upon a higher than expected landfill biogas recovery from the LHRRP.

The decommissioning activities summarised here would be undertaken within 36 months of the commissioning of the new bioenergy facility.

3.4 Operation

3.4.1 Overview

Twenty 1.1 MW modular lean burn generator sets are proposed within the bioenergy facility.

The custom designed generator enclosures would be fully insulated to attenuate noise, with engine exhaust emitted through stainless steel stacks located on top of the modules, approximately 10.2 metres from ground level. Each generator module would house all the components required to operate as a stand-alone unit and are specially designed as fully enclosed bunded systems.

The modularised generator equipment is scalable, allowing flexibility to operate mixed modes (i.e. a combination of either flaring and/or generation) as required. This ensures the ability to combust the maximum available biogas, 24 hours per day is seamless with programmable logic controls and remote monitoring ensuring continuous tracking.

3.4.2 Operational workforce and hours of operation

A staffing requirement of six FTE would be required to operate the bioenergy facility, nominal working hours would be in accordance with the LHRRP Environment Protection Licence (EPL) #5065 L4 Hours of Operation, Other landfilling operations.

The bioenergy facility would be in operation 24/7 with remote operation outside of working hours 6am to 6pm.

3.4.3 Operational environmental management plan

Operation of the project would be undertaken in accordance with an operations environmental management plan (OEMP). The OEMP would incorporate the operations' phase environmental management measures described in this EIS, and identify who is responsible for their implementation, monitoring and maintenance, and when the measures are to be implemented. All operation personnel and contractors would be informed of the relevant requirements of the OEMP as part of the site induction.

3.5 LHRRP post closure decommissioning

The bioenergy facility is designed to remain operational even after landfilling activities are expected to cease at the LHRRP around 2037 to the early 2040s. Landfills continue to generate residual biogas for decades after closure, and the facility would play a critical role in capturing and utilising this biogas to minimise emissions and produce renewable energy. Operations would continue for as long as landfill biogas is available, with the facility expected to have a lifespan of 25 to 30 years.

Once the facility reaches the end of its operational life, the proponent would evaluate whether to reinvest in the project to extend its lifespan or proceed with decommissioning. This decision would be based on commercial and environmental factors, including the availability of landfill biogas and the feasibility of ongoing operations.

The modular design of the facility is such that individual generator modules can be progressively decommissioned, allowing continued operation of the facility in line with the rate of biogas production at the site over time.

4. Statutory context

This chapter provides a summary of the planning approval requirements for the project under the relevant legislation.

4.1 Planning approval pathway and permissibility

4.1.1 Approval pathway

The project requires development consent in accordance with the requirements of Part 4 of the EP&A Act and Part 2.2 of the State Environmental Planning Policy (Planning Systems) 2021 (Planning Systems SEPP).

Section 4.36 of the EP&A Act provides that a State Environmental Planning Policy (SEPP) may declare any development, or any class or description of development, to be State Significant Development (SSD). The project is deemed SSD in accordance with section 2.6 (b) of the Planning Systems SEPP, as the project is classified under Schedule 1 – Electricity generating works and has a capital investment value exceeding $30 million.

As the project is declared SSD pursuant to Part 4, Division 4.7, section 4.12 of the EP&A Act, an EIS is required. In accordance with section 4.5(a) of the EP&A Act, the consent authority for the project is the NSW Minister for Planning and Public Spaces or the Independent Planning Commission.

4.1.2 Permissibility

Application of the Sutherland Shire Local Environmental Plan

The project site is located within the Sutherland Shire LGA and is subject to the provisions of the Sutherland Shire Local Environmental Plan (LEP) 2015. The site is zoned SP1 Special Activities under the Sutherland Shire LEP.

The objectives of the SP1 – Special Activities zone are:

– To provide for special land uses that are not provided for in other zones
– To provide for sites with special natural characteristics that are not provided for in other zones
– To facilitate development that is in keeping with the special characteristics of the site or its existing or intended special use, and that minimises any adverse impacts on surrounding land.

Development permitted with consent includes development that is ordinarily incidental or ancillary to development for that purpose. The Sutherland LEP Land Zoning Map identifies the modification site as ‘waste recycling’. In accordance with the zoning provisions of the Sutherland LEP, bioenergy facility is required for the management of landfill biogas and is ancillary to the purpose of waste recycling and is permissible with consent.

Application of the Transport and Infrastructure SEPP

Section 2.36(1)(b) of the State Environmental Planning Policy (Transport and Infrastructure) 2021 applies to development for the purpose of electricity generating works and provides that development for this purpose is permissible with consent, if carried out on any land in a prescribed non-residential zone.

Section 2.35 provides the following relevant definition of electricity generating works:

> *electricity generating works means a building or place used for the following purposes, but does not include a solar energy system—*
>
> *(a) making or generating electricity,*
>
> *(b) electricity storage*.

Pursuant to section 2.35 definitions, section 2.36 (b) provides for electricity generating works associated with a waste resource management facility to be carried out on non-residential land with consent.

Application of the Planning Systems SEPP

Pursuant to Section 2.6(1)(b) of the Planning Systems SEPP, if a development is specified in Schedule 1 or 2 of the SEPP, it is declared to be SSD.

Schedule 1, Section 20 of the Planning Systems SEPP specifies electricity generating works with an estimated development cost (EDC) of more than $30 million to be declared as SSD.

The project would have an EDC of more than $30 million, as outlined in section 4.1.1. Therefore, the project is SSD pursuant to Part 4, Division 4.7, section 4.12 of the EP&A Act.

4.2 Relevant approvals under NSW legislation

4.2.1 Approvals not required for State significant development

In accordance with Section 4.41 of the EP&A Act, the following approvals are not required for declared SSD:

- a permit under Section 201, 205 or 219 of the *Fisheries Management Act 1994*
- an approval under Part 4, or an excavation permit under section 139, of the *Heritage Act 1977*
- an Aboriginal heritage impact permit under Section 90 of the *National Parks and Wildlife Act 1974*
- a bush fire safety authority under Section 100B of the *Rural Fires Act 1997*
- a water use approval under Section 89, a water management work approval under Section 90 or an activity approval (other than an aquifer interference approval) under Section 91 of the *Water Management Act 2000.*

4.2.2 Approvals that must be applied consistently

Any authorisations under certain legislation, identified in Section 4.42 of the EP&A Act, cannot be refused if it is necessary for carrying out an approved SSD project and is to be substantially consistent with the SSD approval. These authorisations are:

- an aquaculture permit under section 144 of the *Fisheries Management Act 1994*
- an approval under the *Coal Mine Subsidence Compensation Act 2017*, section 22
- a mining lease under the *Mining Act 1992*
- a production lease under the *Petroleum (Onshore) Act 1991*
- an environment protection licence under Chapter 3 of the *Protection of the Environment Operations Act 1997* (POEO Act) for any purpose referred to in section 43 (scheduled activities or development work)
- a consent under section 138 of the *Roads Act 1993*
- a licence under the *Pipelines Act 1967*.

The approvals relevant to the project that must be applied consistently are summarised in Table 4.1.

Table 4.1 Approvals that must be applied consistently

Act	Approval requirement	Relevance/where considered
Protection of the Environment Operations Act 1997	An environment protection licence under Chapter 3 of the POEO Act is required for scheduled activities or development work listed in Schedule 1.	An environmental protection licence would be required to operate the project, as the bioenergy facility is considered a 'premises-based activity' for electricity generation, which is classified as a Scheduled activity in Schedule 1.

4.2.3 Other NSW approvals and requirements

No other NSW approvals are considered to be required for the project.

4.3 Pre-conditions and mandatory matters for consideration

Table 4.2 outlines, together with a reference to where relevant information is provided in the EIS, the following:

– the statutory pre-conditions relevant to the application for approval of the project, which must be met by the proponent before the approval authority can grant approval
– mandatory considerations, which are the matters that the approval authority is required to consider in deciding whether to grant approval
– the application of relevant environmental planning instruments.

Table 4.2 Environmental Planning Instruments considered in the Environmental Impact Assessment for the project

Legislation	Purpose/description	Where addressed in this EIS
Pre-conditions/mandatory considerations		
EP&A Act Section 2 Objects of the Act	The objects of the EP&A Act are guiding principles that need to be considered by planning authorities when making decisions under the Act.	Table B.1 in Appendix B (Statutory compliance).
EP&A Act Division 4.7	Section 4.5(a) provides that the approval of the Minister for Planning is required to carry out State significant development. Section 4.39 provides that the proponent must submit an EIS for approval to carry out the State significant development.	This EIS has been prepared in accordance with the requirements of Division 4.7 of the EP&A Act.
Contaminated Land Management Act 1997	The *NSW Contaminated Land Management Act 1997* is administered by the EPA. It establishes a process where the significant contamination of land is investigated and, where appropriate, remediated.	The presence of contamination at the project site and anticipated impacts of the project are considered in section 7.7.
Environment Protection and Biodiversity Conservation Act 1999	The EPBC Act is the Australian Government's central piece of environmental legislation. It provides a legal framework to protect and manage nationally and internationally important flora and fauna, ecological communities, and heritage places defined as Matters of National Environmental Significance (MNES).	The project is located in an existing disturbed environment and is not considered to have potential for significant impacts upon any MNES.
Biodiversity Conservation Act 2016	Part 7 of the *Biodiversity Conservation Act 2016* (BC Act) applies to approvals under the EP&A Act. Section 7.9 requires a development application for State significant development to be accompanied by a Biodiversity Development Assessment Report (BDAR). Section 7.14 requires the consent authority to take into consideration the likely impact of the proposed development on biodiversity values as assessed in the BDAR.	A BDAR waiver request was submitted on 18 September 2025 by the proponent, seeking to waive the mandatory requirement to submit a BDAR with this EIS. A response was received from NSW DPHI on 22 October 2025 confirming that a BDAR is not required for the project. The BDAR waiver demonstrates the project is not likely to have any significant impact on biodiversity values. Therefore, a BDAR is not required to accompany this EIS. Consideration of the potential biodiversity impacts is addressed in section 7.2 (Biodiversity).

Legislation	Purpose/description	Where addressed in this EIS
Environmental planning instruments		
State Environmental Planning Policy (Resilience and Hazards) 2021 (Resilience and Hazards SEPP)	Section 3.10 – 3.12 stipulates a person who proposes to make a development application of potentially hazardous industry must prepare a preliminary hazard analysis (PHA) in accordance with the DPE guidelines and current circulars: – Applying SEPP 33 – Multi-level Risk Assessment – Hazardous Industry Planning Advisory Paper (HIPAP) No 6 – Guidelines for Hazard Analysis. Section 4.6 stipulates that a consent authority must not consent to the carrying out of development unless: – It has considered whether the land is contaminated, and – If the land is contaminated, it is satisfied that the land is suitable in its contaminated state (or will be suitable, after remediation) for the purpose for which the development is proposed to be carried out, and – If the land requires remediation to be made suitable for the purpose for which the development is proposed to be carried out, it is satisfied that the land will be remediated before the land is used for that purpose.	The project can be classified as a potentially hazardous industry under the Resilience and Hazards SEPP. A preliminary risk screening is required to determine of the project is potentially hazardous and if a standalone Preliminary Hazard Assessment is required. The potential hazards and risks of the project, and their potential impacts, have been examined in section 6.5. Previous landfilling activity is not known to have occurred at the project site and previous site investigations for previous development applications at the site have not revealed any evidence of landfilling activities. The site is located near known contaminated land however land uses that have previously occurred at the site are unlikely to cause contamination. Contaminated land is further addressed in section 6.6 (Soils and contamination).

4.4 Commonwealth legislation

4.4.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the Australian Government's central piece of environmental legislation. It provides a legal framework to protect and manage nationally and internationally important flora and fauna, ecological communities, and heritage places defined as Matters of National Environmental Significance (MNES). Approval from the Australian Government Minister for the Environment is required for:

– an action which has, would have, or is likely to have a significant impact on MNES.
– an action likely to have a significant impact on the environment in general (for actions by Commonwealth agencies or actions on Commonwealth land) or the environment on Commonwealth land (for actions outside Commonwealth land).

An 'action' is considered to include a project, development, undertaking, activity, or series of activities. MNES include:

– world heritage areas
– national heritage places
– wetlands of international importance (i.e., Ramsar wetlands)
– nationally listed threatened species and ecological communities
– listed migratory species
– Commonwealth marine areas
– The Great Barrier Reef Marine Park
– nuclear actions
– a water resource, in relation to coal seam gas development and large coal mining development.

The project would not have a significant impact on MNES. Therefore, a referral to the Australian Minister for the Environment and Water under the EPBC Act is not considered necessary.

4.4.2 Native Title Act 1993

The *Native Title Act 1993* provides for the recognition and protection of native title across Australia. A review of the National Native Title Register (Commonwealth of Australia 2014a) on 12 March 2025 did not identify any Native Title determinations that determined Native Title to exist within the project area, or in the Sutherland Shire LGA.

It is noted that an active Native Title claim application which exists over the project site was found via a search of the Native Title Vision mapping database on 12 March 2025 (Commonwealth of Australia 2014b). This application is by the South Coast People (Tribunal No NC2017/003) and was accepted for registration in 2018.

Tribunal File No. NC2017/003, being an undetermined claim under the Native Title Act 1993 (Cth), provides the South Coast People with a legal interest in Crown land within the claim area. The project is located on freehold land which is not covered by Tribunal File No. NC2017/003 therefore the claim application does not apply to the project.

4.4.3 National electricity law and rules

Any person owning, controlling or operating a generating system connected to the National Electricity Market (NEM) with a nameplate rating greater than 5 MW must be registered with the Australian Energy Market Operator (AEMO).

The proposed facility will be subject of an application to AEMO for registration as a new generating system in the classification of Non Scheduled Generator

Part 2, Div. 1, Section 11 of the National Electricity Law states that:

> *(1) "A person must not engage in the activity of owning, controlling or operating, in this jurisdiction, a generating system connected to the interconnected national electricity system...unless;*
>
> *(a) the person is a Registered participant in relation to that activity; or*
>
> *(b) the person is the subject of a derogation that exempts the person, or is otherwise exempted by AEMO, from the requirement to be a Registered participant in relation to that activity under this Law and the Rules."*

If a person is required to register, penalties apply for failing to do so. See NEL Part 2, Div. 1, Section 11.

5. Stakeholder engagement

This chapter summarises the community and stakeholder engagement undertaken prior to and during preparation of the EIS, and the consultation proposed to be undertaken during future stages of the project.

5.1 Introduction

The purpose of community and stakeholder engagement is to ensure that local communities and relevant stakeholders are meaningfully involved in the planning, design and evaluation of the project. Engagement has been undertaken in accordance with the Community and Stakeholder Engagement Plan and with reference to the guidelines *Undertaking Engagement Guidelines for State Significant Projects* (DPHI, 2024).

The following engagement objectives have been established to guide the projects communication and consultation efforts:

- foster and maintain positive relationships with the community and key stakeholders
- keep the local community and key stakeholders informed about the projects progress and scope
- provide the community members and stakeholders clear opportunities to ask questions and identify areas of concern regarding the project
- provide timely and transparent feedback between the stakeholders and the project team
- develop solutions that reflect the community needs and expectations where feasible
- effectively and proactively identify and manage emerging issues through the project life cycle
- respond to stakeholder feedback and complaints in a timely, respectful and constructive way
- monitor, review and evaluate stakeholder feedback to assess the effectiveness and success of engagement activities.

5.1.1 Identification of stakeholders

Stakeholders were identified as those that may be interested in, or who may be affected by the LMS bioenergy facility project. Stakeholders were divided into three main groups. These were:

- community stakeholders
- landholders or site operators
- government stakeholders.

The stakeholders identified so far are listed in Table 5.1.

Stakeholders will continue to be identified and expanded as needed during all phases, including during the environmental impact assessment/approvals phase, and if approved, during construction and operation.

Table 5.1 Stakeholders identified

Stakeholder group and subgroups	Stakeholders	Consultation method
Surrounding community and businesses	– Community reference group (CRG) comprising representatives from the local community Council – LHRRP staff – Residents in Barden Ridge and Engadine – Local schools including Lucas Heights Community School, Engadine West Public School and Shire Christian School – Local businesses at Barden Ridge – Advocacy groups, including Sutherland Shire Environment Centre and Landcare who look after the nearby Lucas Heights Conservation Area	– 1800 phone line and email address available during working hours throughout the project – Distribution of the project newsletter to stakeholder groups and networks – All collateral available on proponent webpage – Attendance at a CRG meetings – Availability to meet online or in person for stakeholders who request it

Stakeholder group and subgroups	Stakeholders	Consultation method
	– Sporting and recreation groups, including 'the Ridge' sporting and recreation precinct, and users of the nearby mountain biking trail	
Government agencies	Commonwealth agencies: – Department of Defence (Holsworthy Army Barracks) – ANSTO State agencies: – Department of Planning, Housing & Infrastructure (DPHI) – Department of Climate Change, Energy, the Environment and Water (including NSW EPA, Environment and Heritage Group) – Fire and Rescue NSW – NSW Rural Fire Service – Other NSW government agencies invited to comment prior to SEARs being released Local agencies: – Sutherland Shire Council Other: – Emergency services	– Statutory consultation email – Attendance at ongoing meetings with key regulatory stakeholders such as DPHI and the NSW EPA – Briefings as needed with other organisations identified as part of the SEARs – Regular briefings with Sutherland Shire Council – Submission of draft EIS chapters and specialist reports to Sutherland Shire Council for review prior to submission
Directly impacted stakeholders / site owners	– ANSTO – Cleanaway – Sutherland Shire Council – Lucas Heights Resource Recovery Park staff	– Regular meetings with these stakeholder groups required as the project progresses – SIA interviews

5.1.2 Engagement approach

LMS undertook a range of activities with the aim of informing stakeholders and community members of the project, the locations to seek further information, and opportunities for them to provide feedback.

The consultation methodology had three key phases: planning, delivery and reporting.

Planning

As part of the planning phase, GHD completed the following:

– Reviewed previous consultation in the area to understand any existing issues or concerns about the site that may need to be addressed.
– Developed a communication and stakeholder consultation plan to guide consultation activities throughout the EIS development phase, in line with the SSP guidelines.
– Completed a stakeholder identification and analysis register of stakeholder groups, businesses and landowners within a 2 kilometre radius of the site, and stakeholders who were listed in the SEARs.
– Using learnings from the activities above, developed the following collateral items to support communication activities with community and stakeholders about the project:
    - factsheet
    - briefing presentation
    - factsheet project update.

Delivery

Activities undertaken as part of delivery phase included:

– attending one out of cycle and one regular CRG meetings facilitated by Cleanaway at Lucas Heights Resource Recovery Park
– notifying nearby community stakeholders such as sporting clubs, schools, and businesses about the opportunity to comment during the EIS exhibition phase
– statutory engagement with government departments, government agencies, and emergency services.

Reporting

Reporting activities undertaken as part of the consultation phase included:

– developing a stakeholder register
– recording any community and stakeholder feedback.

5.1.3 Engagement activities

The consultation activities and tools used during delivery are described in Table 5.2.

Table 5.2 Communication and consultation activities

Type	Explanation and purpose	Target stakeholders
Community Reference Group meeting	To understand the needs and concerns of the community, and to maintain an ongoing channel of communication for any further consultation. The CRG meeting, facilitated and hosted by Cleanaway also provides access to discussion across many invited stakeholders.	– Community members – Cleanaway – Sutherland Shire Council – Elected officials
Project notification email	To inform stakeholders of the proposed project, as well as the opportunity to ask any questions about the project. Project notification also informed recipients about the opportunity to formally comment during the EIS exhibition phase.	– Community members – local and regional community, sport, and environmental groups – local businesses
Statutory consultation	To inform stakeholders of those projects and provide an opportunity for them to provide comments for consideration in the EIS, as per the requirements of the SEARs.	– Government stakeholders – Emergency services
Fact sheet	The fact sheet provided the following: – a background to LMS – an introduction to LMS and Cleanaway's partnership for the project – an artist's impression of the bioenergy facility and project location – an outline of project need and community benefit – opportunities to offer feedback on the project and contact for further enquiries – how a bioenergy facility works.	– Community stakeholders – Cleanaway – Sutherland Shire Council – Elected members
Presentation	The project presentation provided the information in the fact sheet, as well as: – projections of LHRRP biogas collection until 2040 – a detailed site layout – generator module layout.	– Community reference group – Cleanaway – Sutherland Shire Council
Project website	The project website provides information developed from the fact sheet and presentation. The project website will offer updates as the project progresses, and collateral has referred to the website as the source for project developments.	– Community members – Industry stakeholders – Government stakeholders
Statutory consultation letter	To inform stakeholders as per the requirements of the SEARs and receive immediate feedback, and formal feedback during the EIS exhibition phase	– Government stakeholders – Emergency services

5.1.4 Engagement to date

Consultation for the project began prior to the Scoping Report stage with some government agencies and the community and continued during preparation of the EIS. The engagement that was undertaken is summarised in Table 5.3.

Table 5.3 Engagement undertaken

Stakeholder	Description of communication
DPHI	LMS, Cleanaway and GHD representatives held a pre-scoping meeting with DPHI on 11 October 2024 to provide an overview of the scope of the proposed bioenergy facility and likely environmental risks. Further meetings were held with DPHI on 6 February 2025 and 12 March 2025 to discuss the interaction between the flare installation and bioenergy facility and the approach to the approvals process. Further consultation with DPHI was undertaken with regard to an amendment to the site location and a formal amendment notification was provided on 3 September 2025. A response was received from DPHI on 26 September 2025 confirming the current SEARs were applicable to the revised site layout.
Sutherland Shire Council	Cleanaway provided Sutherland Shire Council's Chief Executive Officer with a briefing on the bioenergy facility project on 20 December 2024. Ongoing correspondence with Sutherland Shire Council has continued throughout the preparation of the EIS. LMS and GHD met with Sutherland Shire Council in person at Council offices on 19 February and presented an outline of the bioenergy facility, proposed planning pathway, project timing and background. LMS and GHD have arranged to meet with Council via on line meetings during the EIS preparation phase to discuss review of draft EIS documentation and any outstanding queries regarding the project. Draft EIS chapters and technical reports were provided to SSC for review prior to submission. The comments were addressed in the final version of the EIS.
ANSTO	As site head lessee, Cleanaway has introduced the project to ANSTO and will continue to liaise regarding landowner consent. A letter of owner's consent has been provided by ANSTO dated 14 August 2025 and has been provided separately to this EIS. GHD conducted an interview with ANSTO on 20 May 2025 to discuss the project and potential impacts.
Community reference group	An off cycle CRG meeting was held on 8 May 2025 and attended by two local residents, SSC, and Cleanaway. LMS and GHD staff presented an outline of the project, approval process and key assessments being undertaken as part of the EIS. A CRG meeting was attended on 11 September 2025 to provide an update on the project including an outline of the rationale for moving the proposed generator units to inside the existing power station compound. The meeting minutes for both CRG meetings are provided in the Engagement Outcomes report (Appendix E).
Community	Community stakeholders were issued a project notification email with project factsheet and link to project web page. A project factsheet update was also provided to outline the relocation of the bioenergy facility footprint and expected exhibition timeframe for the EIS.
NSW DCCEEW - NSW EPA	NSW EPA issued an agency advice letter dated 24 February 2025 that identified requirements for the EIS. LMS had a meeting with NSW EPA on 4 April 2025 to discuss licencing requirements for the project. During the meeting, NSW EPA noted general support for the project noting the environmental benefits.
NSW DCCEEW - Environment and Heritage	A BDAR waiver application was initially submitted on 23 May 2025 and it was determined that the project was not likely to have significant impacts on biodiversity values and a BDAR waiver was granted for the project. Following confirmation of the relocation of the bioenergy facility footprint to within the existing power station compound a revised BDAR waiver was submitted on 18 September 2025 and is currently under assessment.

Stakeholder	Description of communication
NSW DCCEEW – Water Group	Project notification letter issued on 3 June 2025
Heritage NSW	Agency advice letter dated 24 February 2025 Letter submitted on 20 February 2025 regarding heritage assessment requirements for the project.
Transport for NSW	Agency advice letter dated 20 February 2025
Fire and Rescue NSW	Agency advice letter dated 12 February 2025
NSW RFS	Agency advice issued on 5 May 2025. A response letter including draft bushfire assessment report was submitted on 6 June 2025.
Department of Defence	Project notification letter issued on 3 June 2025

5.2 Display of the EIS

Following completion of the EIS, DPHI will place on public exhibition for at least 28 days for public comments. Figure 5.1 illustrates the process for approval and the current consultation stage.

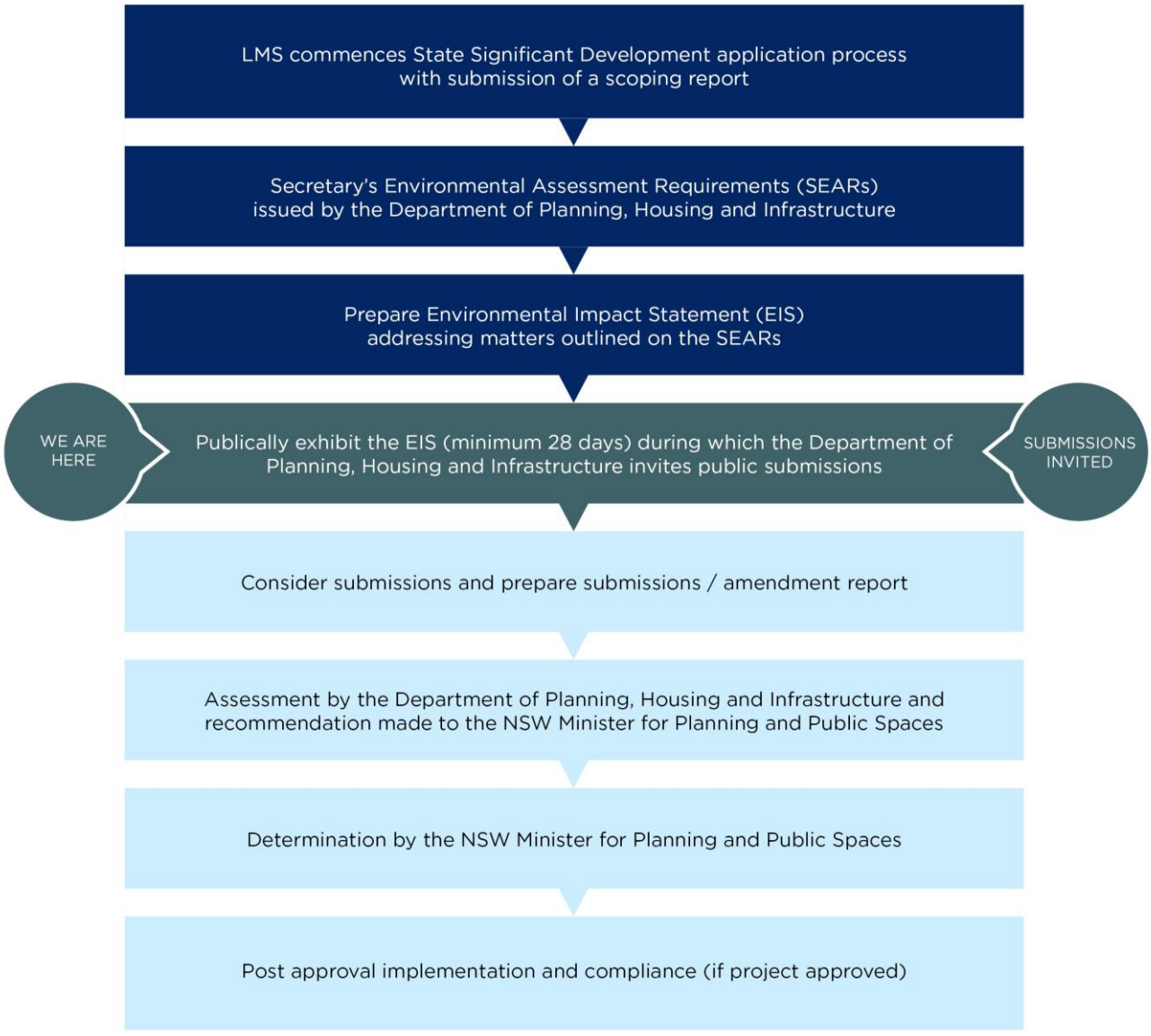


Figure 5.1 Approval and consultation process

5.3 Sentiment and key issues raised during engagement

5.3.1 Sentiment

Agency and community sentiment towards the project has generally been positive due to the ongoing environmental benefits associated with the project. Beyond the immediate project surrounds there has not been much interest received as summarised in Table 5.4. Only one response was received by the community email from the Cronulla Model Aero Club who reported no objections to the project.

5.3.2 Key issues raised during engagement

A number of issues were raised by various stakeholder groups during the preparation of the Scoping Report and the EIS.

Table 5.4 Key issues raised during engagement

Stakeholder	Key issues	EIS response
Community Reference Group	Will the site contain gas storage?	The scale of gas output and resulting energy generation makes gas storage infeasible currently.
	Will the operational noise level change in comparison to the current facility?	LMS cannot be certain of changes to noise, but the project will aim to minimise noise impacts. Beyond 20 m of the site, operational noise is expected to generate minimal sound. Noise reporting would be available in the EIS that addresses potential noise impacts.
	What is the expected design life for the proposed facility, in comparison to the current facility?	The new bioenergy facility will have a design life of 20 to 30 years and will enable ongoing gas management at LHRRP through the remaining landfilling and into post closure period of operations
	Are Sutherland Shire Council satisfied with the project location?	Council indicated they had previously discussed with LMS a preference to utilise the existing power station site and were keen to review further details of the refined project
	Will the operational noise level change in comparison to the current facility?	LMS cannot be certain of changes to noise, but the project will aim to minimise noise impacts. Beyond 20 m of the site, operational noise is expected to generate minimal sound. Noise reporting would be available in the EIS that addresses potential noise impacts.
	How would the current facility be decommissioned?	The existing generators will be progressively decommissioned following the energising of the new bioenergy facility and above ground components will be removed from site for recycling or parts stored for maintenance purposes.
	Will LMS employ local expertise?	LMS will aim to employ locals where possible. LMS will seek local expertise and consider bringing in apprentices
	Will the project contain a BESS?	There are no current plans for installation of a BESS as part of the project, although it may be considered in the future. BESS is not within scope of current project.
	Will the development consider feral cats?	Confirmed feral animal management is within the remit of Council and landfill operations.
	Have LMS encountered problems with lithium batteries?	LMS have a BESS in SA - measures have been put in place. A bushfire risk and hazard assessment is required as part of approval process for these.
Sutherland Shire Council	Potential impacts to future parklands users.	Potential impacts to the future land use are addressed in section 7.1 and various other impact assessment chapters such as air quality (section 6.2), noise (section 6.3) and hazards (section 6.4).
	Visual impact	The project is located within a designated infrastructure area and is consistent in form, scale, and function with existing adjacent facilities, including the existing power station. As such, the project would not introduce a new or uncharacteristic visual element into

Stakeholder	Key issues	EIS response
		the landscape but would instead reinforce the existing visual themes. Potential visual impacts are addressed in section 7.1.
	Traffic and access	Key issues for traffic and access are addressed in *Technical Report 6 – Traffic impact assessment.* Traffic generated as a result of the project during construction and operation is expected to be minimal.
NSW EPA	Air quality and noise and vibration potential impacts are a key issue to be addressed	Astute Environmental completed *Technical Report 1 – Air quality assessment*. The assessment findings indicate that construction and operational impacts to sensitive receivers would be negligible following implementation of mitigation measures. GHD completed *Technical Report 2 – Noise and vibration assessment*. The report concludes that operational noise levels are expected to remain within acceptable limits across the majority of impacted receiver sites where localised noise exceedances were predicted.
Fire and Rescue NSW	FRNSW will likely recommend a Fire Safety Study (FSS) be developed in accordance with the Hazardous Industry Planning Advisory Paper No 22 as a condition of consent.	*Technical Report 3 – Preliminary hazard analysis* and *Technical Report 4 – Bushfire hazard assessment* identify that a FSS will be undertaken during the post approval phase of the project.
NSW RFS	The project should be assessed against the aims and objectives of Planning for Bush Fire Protection (NSW RFS, 2019). NSW RFS identifies that a FSS and Bush Fire Design Brief should be prepared.	As outlined in *Technical Report 4 – Bushfire hazard assessment,* an assessment was undertaken in accordance with the requirements of Planning for Bush Fire Protection (NSW RFS, 2019).
Heritage NSW	A Statement of Heritage Impact (SOHI) should be prepared by a suitably qualified heritage consultant in accordance with Guidelines for preparing Statements of Heritage Impact	A due diligence assessment was undertaken in accordance with the Due Diligence Code to examine the potential presence of Aboriginal sites or artefacts. Further detail is provided in section 7.3.
ANSTO	Vibration impacts to ANSTO during construction.	*Technical Report 2 – Noise and vibration assessment* outlines the vibration assessment undertaken in accordance with Assessing Vibration: A Technical Guideline (DEC, 2006). No exceedances of human comfort vibration are anticipated during construction of the project.
	Project impacts on nearby stakeholders including Mill Creek MTB	Mill Creek MTB has been identified as a nearby sensitive receiver and has been assessed for potential air quality, noise and vibration, traffic and access and visual impacts.

Amendments that were unable to be implemented

Issues raised by stakeholders that were not implemented as part of the EIS are summarised in Table 5.5.

Table 5.5 Amendments not implemented in EIS

Stakeholder	Key issues	EIS response
NSW RFS	A Fire Safety Study (FSS) and Bush Fire Design Brief should be prepared as part of the EIS	A FSS is proposed to be undertaken in the post approvals stage as per the hazard related assessment process documented in HIPAP No. 2 Fire Safety Study Guidelines (2001). A Bush Fire Design Brief has not been prepared as part of the assessment. We consider that the bushfire assessment report adequately addresses the potential bushfire risks associated with the project and meets the requirements of Planning for Bush Fire Protection (NSW RFS, 2019).

5.4 Future engagement

5.4.1 Engagement during exhibition of EIS

Stakeholder engagement will continue during public exhibition of the EIS. This stakeholder engagement will be undertaken by DPHI, and LMS will receive feedback from community submissions and agency stakeholders as a result. DPHI will:

– publish the EIS online via the Major Projects Planning Portal
– notify the public exhibition in accordance with the requirements in the EP&A Act and the EP&A Regulations 2021
– in some cases, arrange for a community information session to explain the assessment and submission process and to listen to community views on the project.

Stakeholders who are interested in, or who may be potentially impacted by, the project will be encouraged to make a formal submission via DPHI's Major Projects Planning Portal. The enquiry lines (1800 phone line and email) will remain open during exhibition of the EIS.

5.4.2 Engagement following EIS exhibition

Following exhibition of the EIS, all stakeholder feedback will be reviewed and addressed in a Response to Submissions report. If further engagement is required to respond to the issues raised (e.g., to clarify issues of concern or to seek feedback on proposed refinements to the project), the details of that engagement will be outlined in the Response to Submissions report.

5.4.3 Future engagement at post-approval stage

If approved, engagement with key stakeholders would continue through construction, operation, decommissioning, and rehabilitation of the LMS bioenergy facility. Details of the key methods of engagement likely to be used during future stakeholder engagement are listed in Table 5.6.

Table 5.6 Methods that may be used during ongoing stakeholder engagement

Engagement method	Purpose
Meetings	To facilitate discussion about construction/operation activities and timing; impact on the stakeholder; and to seek feedback and comments for consideration.
Phone calls	To set up meetings with key stakeholders.
Emails	To facilitate ongoing liaison with key project stakeholders and to enable direct enquiries about construction/operation from the general community.
Website updates	To provide an overview of the construction/operation activities; answers to frequently asked questions; and access to key documents. To update the community on the progress of construction/operation and to provide reference sources for further information.
Subscriber update	Using an email database gathered during the planning and design phase, update subscribers on the progress of construction/operation and to provide reference sources for further information.
Letters	To make contact with key project stakeholders during construction/operation.
Media	To update the community on the progress of construction/operation.
Enquiry lines (phone and email)	To provide community stakeholders with lines of enquiry to the construction/operation team.

6. Assessment of key impacts

6.1 Introduction

A risk assessment was undertaken during scoping report preparation to identify the potential environmental, social, and economic matters that are likely to be impacted by construction, operation and decommissioning of the bioenergy facility.

The following key issues were identified during the risk assessment to require detailed assessment in the EIS (as confirmed in the SEARs):

– Air quality
– Noise and vibration
– Hazard and risk – industrial
– Hazard and risk – bushfire
– Soils and contamination
– Water resources
– Traffic and access.

The above matters are addressed in this chapter.

An assessment of potential cumulative impacts has been undertaken for relevant key issues in accordance with the SEARs. A summary of the results is provided in section 7.7. A compilation of mitigation measures (excluding mitigation measures that are built into the physical layout and design of the project and captured in the project description) is provided in Appendix E.

6.2 Air quality

This section provides a summary of the potential air quality impacts of construction, commissioning and operation of the project. A full copy of the assessment is provided in Technical Report 1 – Air quality assessment, prepared by Astute Environmental Consulting (Astute).

6.2.1 Methodology

Legislative and policy context to the assessment

The assessment was undertaken in accordance with the SEARs and with reference to the requirements of relevant legislation, policies and/or assessment guidelines, including:

– Protection of the Environment Operations (Clean Air) Regulation) 2022
– Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (Approved Methods) (NSW EPA, 2022b)
– *Protection of the Environment (Operations) Act 1997* (POEO Act)
– Protection of the Environment Operations (General) Regulation 2022, Part 5.4 (Air pollution)
– Environmental Guidelines Solid Waste Landfills (Second Edition 2016).

Study area

The study area is defined as a 2.5 kilometre radius from the project site with the potential to be directly affected or indirectly affected by the project, including nearest residential suburbs. Sensitive receivers within this distance have been identified in section 6.2.2.

Key tasks

The air quality assessment involved:

– identifying and classifying sensitive receivers
– modelling meteorology for the area using TAPM/CALMET which are atmospheric dispersion models that are used to generate meteorological data for air quality assessments
– estimating combustion emissions from the project
– predicting local air quality impacts using CALPUFF (an advanced non-steady-state meteorological and air quality modelling system)
– comparing the dispersion modelling outputs with the criteria from the *Modelling and Assessment of Air Pollutants in New South Wales* (Approved Methods) (NSW EPA, 2022)
– assessing cumulative impacts in accordance with the Approved Methods using local sources of air emissions by combining the effect of the existing environment and the proposed project, representing the total predicted impact once the project is added to existing background conditions.
– identifying mitigation measures.

The assessment considered potential cumulative impacts from the project in consideration with baseline readings from the existing environment and other key sources of potential pollutants in the locality.

A conservative approach was adopted in the assessment to account for uncertainty in model inputs and assumptions, particularly given that predicted dust and particulate matter (PM) concentrations were close to the relevant criteria.

6.2.2 Existing environment

Local meteorology

Representative year

Meteorological data was obtained from the LHRRP ultrasonic weather station covering the period from September 2022 to August 2023, which was representative year with the most complete set of data available. This time period was used in the CALMET meteorological modelling used to determine climatic factors discussed in the following sections.

Wind

Wind roses were prepared using CALMET modelling for the project site for the representative year. The wind roses indicate winds occur predominantly from the west and southeast as shown on Figure 6.1. Annual wind speeds were determined to be calm to light for 56% of the time.

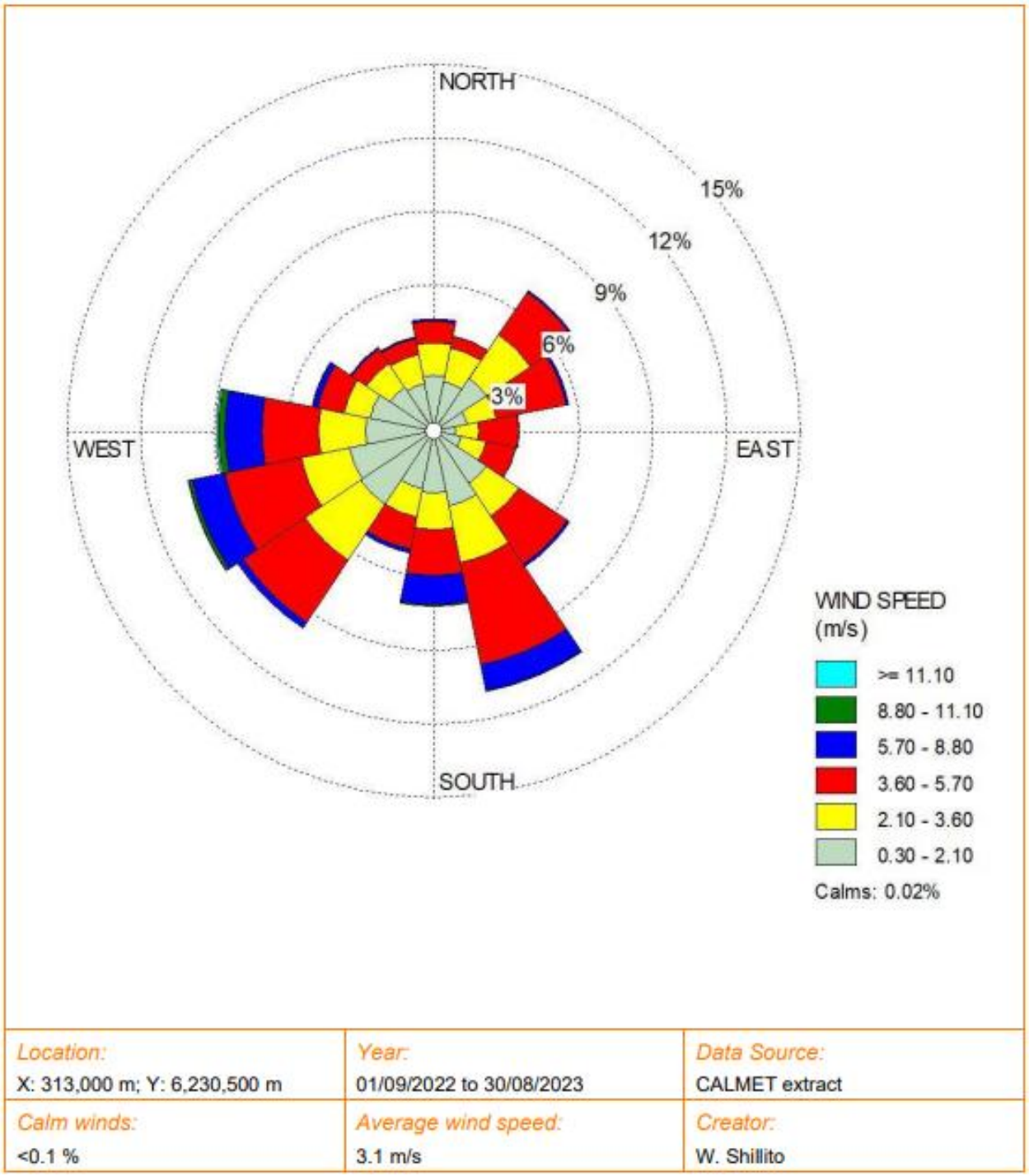


Figure 6.1 Wind rose for the project site for the representative year (Sep 2022-Aug 2023) (Astute, 2025)

Atmospheric stability

Atmospheric stability is a key factor in dispersion modelling and is used to describe turbulence in the atmosphere, which is an important factor in the dispersion of pollutants. Atmospheric modelling is measured using stability classes A to F, with A being the most unstable and F being the most stable.

The stability classes predicted for the project site indicate that neutral to stable conditions (D-F) occur approximately 82% of the time, while more unstable conditions (A-C) occur 18% of the time.

Atmospheric mixing

Atmospheric mixing is the height of vertical mixing of air and suspended gases or particles above the ground, which is another key factor in pollutant dispersion modelling. The higher the mixing height indicates more potential for pollutant dispersion.

The modelling indicates that the mixing height is normally relatively low after sunrise and increases as a result of heat from the sun on the earth's surface. This pattern was observed for the local area indicating an increased likelihood of pollutant dispersion during the daylight hours (refer to Figure 5.5 of Technical Report 1).

Dust monitoring

Cleanaway conducts monthly dust deposition monitoring around the boundary of the LHRRP approximately once a month at six locations. Data was available for the months January 2023 to November 2023.

Total suspended particulate monitoring was undertaken between April 2017 and January 2021. The annual average was 16.7 micrograms per cubic metre (µg/m^3), which is well below the target value of 90 µg/m^3 as determined by the LHRRP Air Quality and Odour Management Plan (Cleanaway, 2021). The monitoring results indicate a history of low concentrations of nuisance dust (suspended solids and dust fallout) within the LHRRP and project site.

Background air quality

The nearest air quality monitoring station to the project site is located at Liverpool in the Liverpool Council depot, which is located 14 kilometres to the northwest of the project site. Background concentrations were adopted from this monitoring station and were used in the assessment as provided in Table 6.1.

Table 6.1 Adopted background air quality data from the Liverpool monitoring station

Pollutant	Averaging period	Statistic	Value (µg/m^3)
Sulphur dioxide (SO_2)	1 hour	Maximum	68.6
	24 hour	Average	12.1
Nitrogen dioxide (NO_2)	1 hour	Maximum	76
	Annual	Average	18
Carbon monoxide (CO)	15 minutes	Maximum	2,639
	1 hour	Maximum	2,000
	8 hours	Maximum	1,691
Ozone (O_3)	1 hour	Maximum	205
	Annual	Average	30
Particulate matter less than 2.5 microns ($PM_{2.5}$)	24 hour	Maximum	22.1
	Annual	Average	6.7
Particulate matter less than 10 microns (PM_{10})	24 hour	Maximum	43.4
	Annual	Average	17.2

A review of the National Pollutant Inventory (NPI) was undertaken to identify comparable facilities within a 10 kilometre radius of the project, given the localised nature of emissions from gas generators.

One comparable facility was identified; EDL Lucas Heights 1, located approximately 3 km northeast of the project site as shown on Figure 6.2. Reported emissions to air for the 2023 NPI reporting year (DECCEEW, 2025) are summarised in Table 4-3 of Technical Report 1 which presents relevant pollutant loads modelled in this assessment, detailed further in section 6.2.3. The emissions from the EDL Lucas Heights 1 have been assessed to determine cumulative impacts as it is a comparable industry with gas fired combustion from landfill biogas.

Sensitive receivers

Receivers sensitive to air quality can be categorised as:

– residential dwellings
– non-residential land uses (including education, recreational, commercial and industrial land uses).

Sensitive land uses in the study area include both residential and non-residential based on a desktop review using aerial imagery. Non-residential land uses include educational institutes, passive and active recreation, temporary accommodation and commercial premises.

A total of 33 sensitive receivers were identified within the study area (refer to Figure 6.2). The nearest sensitive receivers are as follows:

– R08 (potential future parkland area) is located approximately 400 metres to the west and northwest within the current LHRRP active landfill area
– R09 (Sutherland PCYC MiniBike Club) boundary is located approximately 200 metres to the southwest within the LHRRP.

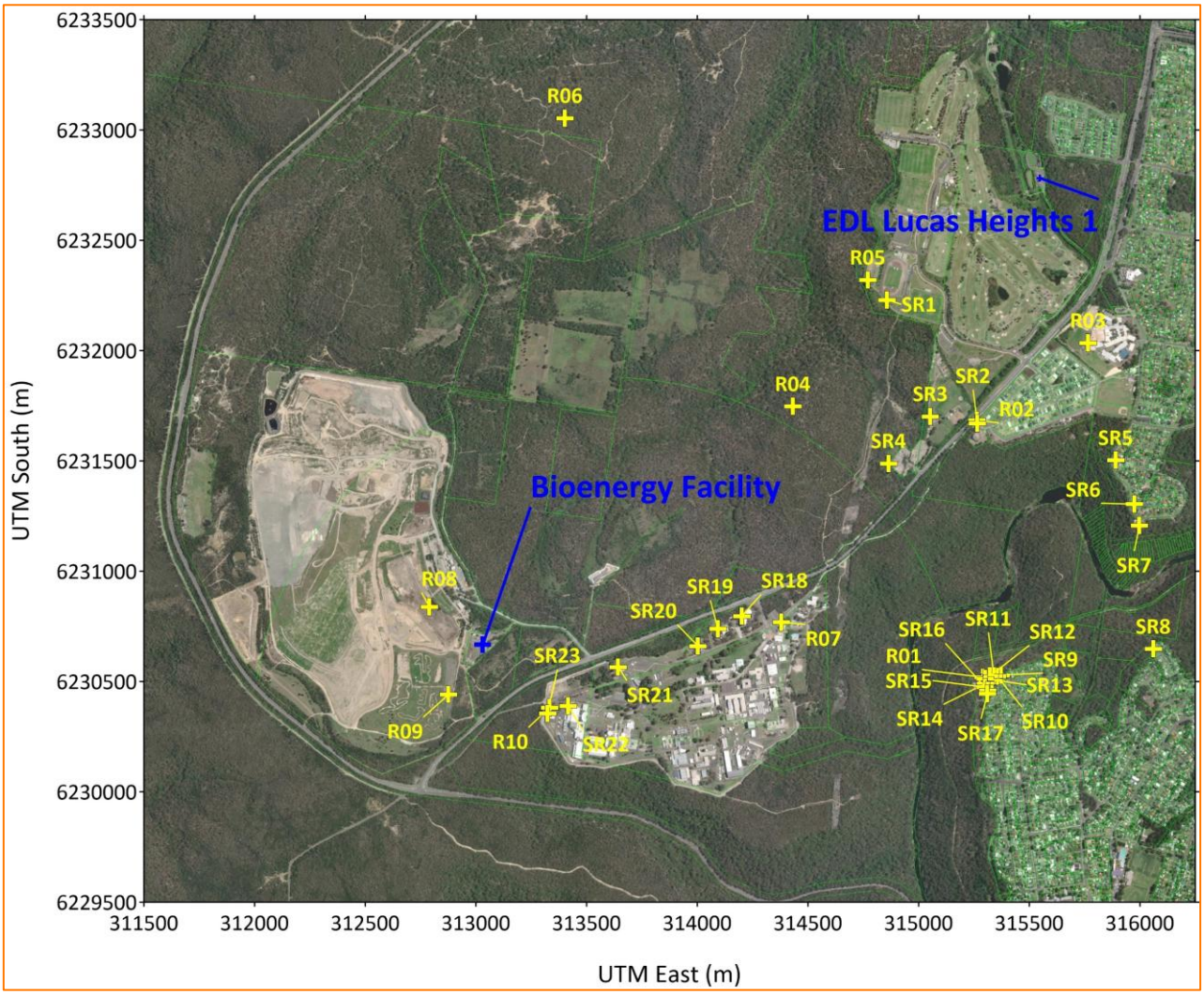


Figure 6.2 Sensitive receivers (Astute, 2025)

6.2.3 Assessment criteria

Modelled pollutants

Air quality assessment

The following air pollutants that have the potential to impact local air quality were assessed:

– Oxides of nitrogen (NOx) as nitrogen dioxide (NO_2)
– Carbon monoxide (CO)
– Total Volatile Organic Compounds (TVOCs) in the form of benzene
– Hydrogen sulphide (H_2S) and sulfuric acid mist (H_2SO4)
– Particulate matter less than 10 microns (µm) in diameter (PM_{10})
– Particulate matter less than 2.5 µm in diameter ($PM_{2.5}$).

The assessment criteria for each pollutant is provided in Table 6.2.

Table 6.2 Pollutant assessment criteria

Pollutant	Averaging period	Concentration (µg/m3)
Hydrogen sulphide (H_2S)	1 second	2.07 (population 500)
Sulfuric acid mist (H_2SO4)	1 hour	18
Sulphur dioxide	1 hour	215
	24 hour	57
PM_{10}	24 hours	50
	Annual average	25
$PM_{2.5}$	24 hours	25
	Annual average	8
Nitrogen Dioxide (NO2)	1 hour	164
	Annual average	31
Carbon Monoxide (CO)	15 minutes	100,000
	1 hour	30,000
	8 hours	10,000
Benzene	1 hour	29

Concentration limits

The standards of gas concentration for selected pollutants used in the assessment is provided in Table 6.3.

Table 6.3 Gas treatment concentration discharge limits

Pollutant	Standard of concentration (mg/m3, dry STP at 7% O2)	Source
No_x (oxides of nitrogen)	450	Protection of the Environment Operations (Clean Air) Regulation 2022
VOCs as n-propane equivalent	40	
H_2S (hydrogen sulfide)	5	
H_2SO4 (sulfuric acid mist)	100	

6.2.4 Potential impacts

Construction

The key sources of air emissions associated with the construction of the bioenergy facility are expected to include the following:

– wheel generated dust from the delivery of infrastructure from heavy equipment, employee light vehicles and smaller earthmoving vehicles
– dust emissions from wind erosion of exposed areas
– dust emissions from the construction and demolition of infrastructure.

Dust emissions from these sources are expected to be short-term and mainly consist of coarse particles from earthworks. These particles tend to settle quickly near the source, so any impacts are likely to be limited to the immediate area rather than affecting distant sensitive receivers.

Dust associated with construction will be readily managed via a construction environmental management plan (CEMP). Therefore, the residual risk for sensitive receivers following mitigation would be negligible.

Operation

Modelling was completed for the 33 sensitive receivers against each of the pollutants identified in section 6.2.3. The results of this modelling are summarised in this section.

Carbon monoxide and nitrogen dioxide

The predicted modelling for carbon monoxide (CO) and nitrogen dioxide (NO_2) are summarised in Table 6.4.

Table 6.4 Predicted modelling results for selected pollutants at sensitive receivers

Sensitive receiver	Pollutant	15 minute maximum (µg/m³) Isolation/ Cumulative	1 hour maximum (µg/m³) Isolation/ Cumulative	8 hour maximum (µg/m³) Isolation/ Cumulative	Annual average background (µg/m³) Isolation/ Cumulative
R01 – R10 SR1 – SR23	CO	264 – 4,844	160.4 – 3,671	62 – 2,948	
R01 – R10 SR1 – SR23	NO_2		75.9 – 160.4		0.5 – 23.4
Criteria limit (Cumulative)	CO	**100,000**	**30,000**	**10,000**	
	NO_2		**164**		**31**

The modelling results indicate that the predicted ground-level concentrations for both the 1 hour NO_2 and the annual average concentrations comply with the impact assessment criteria. No exceedances were reported at any of the sensitive receivers for any of the CO background concentration limits. The highest readings were recorded at R08 and R09 which were more than 94,000 µg/m³ below the 15 minute maximum limit and more than 26,000 µg/m³ below the 1 hour maximum criteria limit.

Benzene and total volatile organic compounds

The predicted ground level concentrations of TVOC's and benzene is summarised in Table 6.5. The assessment assumed that all TVOC's present were in the form of n-propane which is a conservative compound concentration used if the exact concentration of TVOC's are unknown.

Table 6.5 Predicted ground level concentrations of Benzene and VOCs

Sensitive receiver	TVOC 1 hour maximum (µg/m³) Isolation/Cumulative	Benzene 1 hour maximum (µg/m³) Isolation/Cumulative
R01 – R10 SR1 – SR23	4.4 – 46.9	0.01 – 0.08
Criteria limit (Cumulative)	**N/A**	**29**

The results show the predicted ground level concentration of benzene based on the percentage of TVOC's for the 1 hour maximum are predicted to comply with the applicable criteria.

Particulate matter

The predicted maximum 24 hour average and annual average particulate matter concentrations (PM_{10} and $PM_{2.5}$) in isolation and including background data are summarised in Table 6.6 and Table 6.7.

Table 6.6 Predicted incremental (isolation) modelling results for $PM_{2.5}$ and Pm_{10} at sensitive receivers

Sensitive receiver	$PM_{2.5}$ 24 hour isolation (µg/m³)	$PM_{2.5}$ Annual average isolation (µg/m³)	PM_{10} 24 hour isolation (µg/m³)	PM_{10} Annual average Isolation (µg/m³)
R01 – R10 SR1 – SR23	0 – 0.6	0 – 0.04	0 – 0.6	0 – 0.4
Criteria limit	**N/A**	**N/A**	**N/A**	**N/A**

Table 6.7 Predicted cumulative modelling results for $PM_{2.5}$ and PM_{10} at sensitive receivers

Sensitive receiver	$PM_{2.5}$ 24 hour background (µg/m³)	$PM_{2.5}$ Annual average background (µg/m³)	PM_{10} 24 hour background (µg/m³)	PM_{10} Annual average background (µg/m³)
R01 – R10 SR1 – SR23	22.1 – 22.2	6.7 – 6.74	43.4 – 44.0	17.20 – 17.24
Criteria limit (Cumulative)	**25**	**8**	**50**	**25**

The results demonstrate the predicted ground level concentration of PM_{10} and $PM_{2.5}$ for both the project increment (isolation) and cumulative when considering background data for the 24 hour maximum and annual average are predicted to comply with the criteria.

Hydrogen sulphide, sulphur dioxide and sulfuric acid mist

Hydrogen sulphide (H_2S), Sulphur dioxide (SO_2) and sulfuric acid mist (H_2SO_4) were identified as relevant pollutants for assessment, and appropriate ambient air quality criteria and emission discharge limits were outlined in accordance with NSW regulatory guidance. The results are provided in Table 6.8.

Table 6.8 Predicted SO2, H2S and H2SO4 ground level concentrations – in isolation and with background concentrations

Sensitive receiver	SO_2 1 hour maximum (µg/ m³)		SO_2 24 hour maximum (µg/ m³)		H_2SO_4 – 1 hour maximum (µg/ m³)	H_2S – 1 hour maximum (µg/ m³) 99th percentile Cumulative
	Isolation	Cumulative	Isolation	Cumulative		
R01 – R10 SR1 – SR23	5.5 – 46.3	74.1 – 114.9	0.7 – 19.1	12.8 – 31.2	0.7 – 5.7	0.01 – 0.18
Background	**N/A**	**68.6**	**N/A**	**12.1**	**N/A**	**N/A**
Criteria limit (Cumulative)	**N/A**	**286**	**N/A**	**57**	**18**	**2.7**

The results demonstrate the predicted ground level concentrations of H_2S, SO_2 and H_2SO_4 including background data for all the averaging periods are predicted to comply with the criteria.

Impact summary

Given the above, it is considered that there would be negligible operational impacts to sensitive receivers with regard to air quality for the pollutants identified. The bioenergy facility is demonstrated to be compliant with the adopted odour and air quality assessment criteria for the identified sensitive receivers.

Cumulative impacts

Several nearby developments within the LHRRP may overlap with the project and contribute to cumulative air quality impacts. However, given the separation distances, timing of construction, and modern emission controls, cumulative air quality impacts are expected to be minor and manageable.

6.2.5 Mitigation measures

Approach to mitigation and management

Mitigation measures proposed to manage impacts, including proposed techniques, are outlined in this section. Responsibility for implementing each measure, timing, frequency, risk of failure, and an analysis of the consequences of any residual impacts are also provided.

The project will include implementation of measures to mitigate residual impacts, specified in a CEMP and an Operations Environmental Management Plan (OEMP). The CEMP and OEMP will provide detailed environmental controls to manage key environmental issues during construction and operational phases respectively, and both will be reviewed and updated as necessary throughout the project. They will include, as a minimum, industry-standard and site specific measures for the management of air quality.

Summary of mitigation measures

Measures that will be implemented to minimise and manage potential air quality impacts are provided in Table 6.9.

Table 6.9 Mitigation measures – air quality

ID	Environmental aspect	Mitigation measure	Responsibility	Timing
AQ1	Air quality	The CEMP will include measures to minimise the potential for impacts on air quality including dust suppression (e.g. water spraying), vehicle speed limits, and management of exposed surfaces.	Contractor	Pre-construction / Construction
AQ2	Emissions testing	Stack emission testing will be documented in the OEMP. Testing to occur in accordance with the Approved Methods for the Sampling and Analysis of Air Pollutants in NSW (NSW EPA, 2022b) as follows: – within 4 weeks of commissioning – within 9–15 months from commissioning, and – every 5 years to confirm ongoing compliance.	LMS	Commissioning / Operation

6.3 Noise and vibration

This section provides a summary of the potential noise and vibration impacts of construction and operation of the project. A full copy of the assessment is provided in Technical Report 2 – Noise impact assessment.

6.3.1 Methodology

Legislative and policy context to the assessment

The assessment was undertaken in accordance with the SEARs and with reference to the requirements of relevant legislation, policies and/or assessment guidelines, including:

– Approved methods for measurement and analysis of environmental noise in NSW (EPA, 2022)
– AS1055:2018 Acoustics – Description and measurement of environmental noise (Australian Standard, 2018)
– BS 7385-2:1993 Evaluation and measurement for vibration in buildings Part 2 – Guide to damage (British Standards, 1993)
– Noise Policy for Industry (NPfI) (EPA, 2017)
– Interim Construction Noise Guideline (ICNG) (DECC, 2009)
– Assessing Vibration: A Technical Guideline (AVTG) (DEC, 2006).

Study area

The study area is defined as a 2.5 kilometre radius from the project site with the potential to be directly affected or indirectly affected by the project, including nearest residential suburbs. Sensitive receivers within this distance have been identified in section 6.3.2.

Key tasks

The key potential sources of noise and vibration impacts considered by the assessment are:

– noise and vibration generated by construction activities
– noise generated by operating the bioenergy facility.

The noise impact assessment generally involved:

– identifying and classifying sensitive receivers
– characterising the existing ambient noise environment based on noise monitoring at two representative residential locations
– determining appropriate assessment criteria for potential construction and operation impacts including future land use impacts
– identifying mitigation measures.

Noise monitoring

Long-term noise monitoring was undertaken at two residential locations to quantify and characterise the existing ambient noise environment across the study area. The monitoring locations in relation to the project site and sensitive receivers are shown on Figure 6.3.

The full noise monitoring methodology is outlined in Appendix A of Technical Report 2 including the results of the attended noise monitoring survey.

6.3.2 Existing environment

Sensitive receivers and noise catchment areas

Sensitive receivers

Receivers sensitive to noise and vibration can be categorised as:

– residential dwellings
– non-residential land uses (including education, recreational, commercial and industrial land uses (refer to Figure 6.3).

Sensitive land uses in the study area include both residential and non-residential based on a desktop review using aerial imagery. Non-residential land uses include educational institutes, passive and active recreation, temporary accommodation and commercial premises.

A total of 10 sensitive receivers were identified within the overall study area (refer to Figure 6.3). The nearest sensitive receivers are as follows:

– R08 (potential future parkland) is located approximately 400 metres to the west and northwest within the current LHRRP active landfill area
– R09 (Sutherland PCYC MiniBike Club) is located approximately 150 metres to the southwest within the LHRRP.

It is noted that the sensitive receivers in this assessment are noise-sensitive receivers correspond to the 10 nearest receptor locations (SR01–SR23) used in the Air quality assessment. Consideration of additional receptors in the Air quality assessment was undertaken due to the complex nature of dispersion of air pollutants where the noise assessment has assessed the closest receivers in all directions potentially impacted by the project.

Noise catchment areas

Within the study area, there are two main existing residential noise catchment areas:

– **NCA1:** the Engadine North area
– **NCA2:** the Ridgeway residences in Barden Ridge.

Noise monitoring was conducted in both of these areas to establish the rating background level and characterise the existing acoustic environment.

An additional noise catchment area (NCA3) was condsidered with regard to future suburban residential areas which includes R04 Gandangara and R06 Gandangara North shown on Figure 6.3.

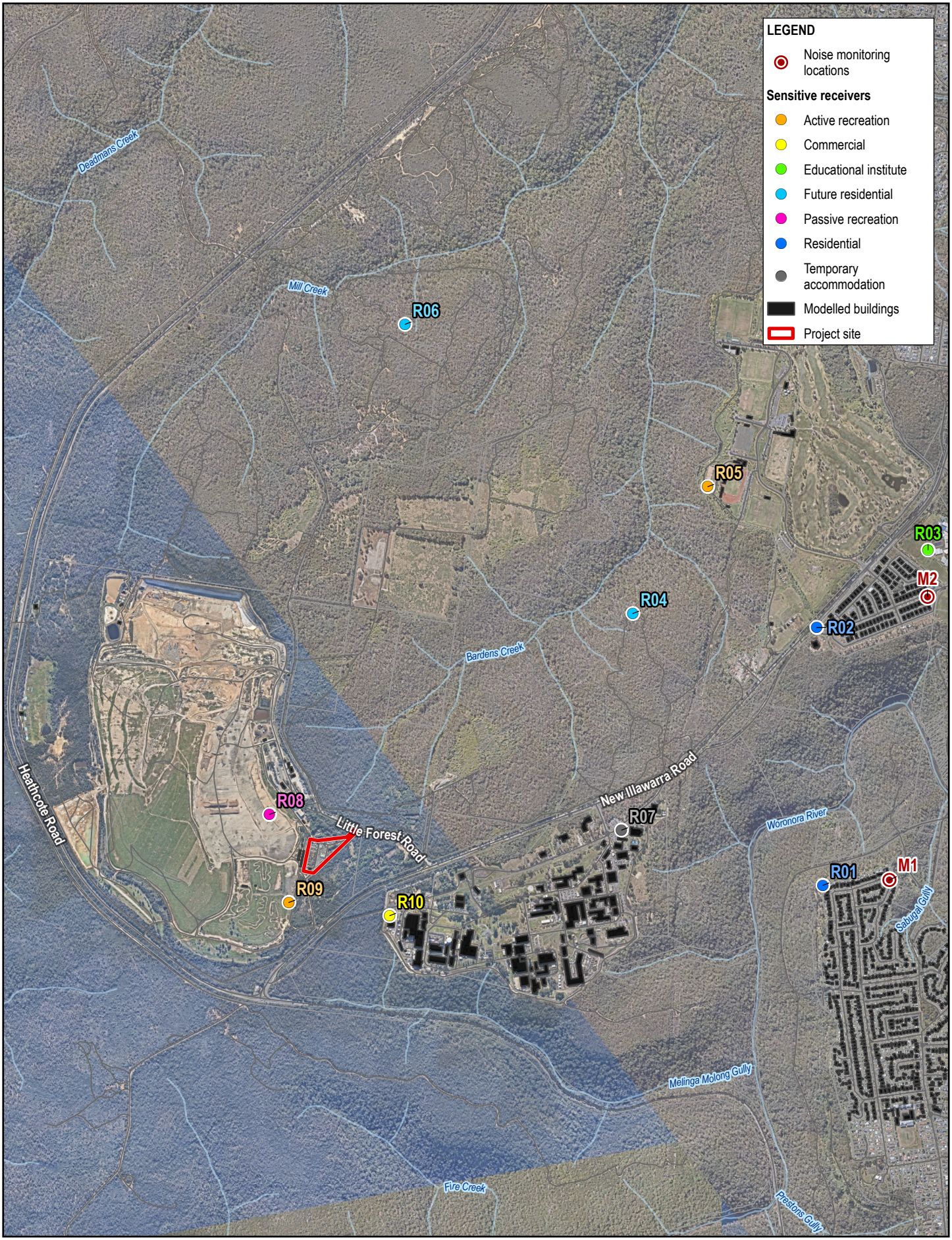
Background noise levels

Long term noise monitoring was undertaken between 12 March 2025 to 6 April 2025 at two residential monitoring locations. The noise monitoring locations are shown on Figure 6.3 and the unattended noise monitoring results are provided in Table 6.10, which includes the existing power station noise.

Table 6.10 Unattended noise monitoring results

Location	Monitoring dates	Address	Rating Background Level[1] $L_{A90(Period)}$, dBA			Ambient noise descriptors[1] $L_{Aeq(period)}$, dBA		
			Day	Evening	Night	Day	Evening	Night
M1	25/03/2025 – 06/04/2025	28 Andromeda Crescent, Engadine	35 (34)[2]	31	30 (28)[2]	54	51	52
M2	12/03/2025 – 25/03/2025	56 Namatjira St, Barden Ridge	37	37	33	55	53	45

Note 1: The *Noise Policy for Industry (NPfI)* (EPA, 2017) defines day, evening and night-time periods as:
- Day: 7am to 6pm Monday to Saturday and 8am to 6pm Sunday
- Evening: 6pm to 10pm
- Night: 10pm to 7am Monday to Saturday and 10pm to 8am Sunday.
Note 2: Where the measured background level is above the minimum RBL provided in Table 2.1 of the NPfI, the minimum RBL is adopted in accordance with the NPfI.



Paper Size ISO A4

0 250 500 750 1,000

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

LMS Energy
Lucas Heights Bioenergy facility

Sensitive receivers

Project No. **12649882**
Revision No. **0**
Date **16/09/2025**

FIGURE 6.3

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Print date: 16 Sep 2025 - 15:39

Data source: LPMA: DTDB/DCDB, 2019. Nearmap WMS Server: .
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Local meteorology

A review of meteorological conditions at the Holsworthy Aerodrome automatic weather station for the years 2020 to 2024 was undertaken to determine the significance of noise enhancing meteorological conditions and atmospheric conditions on noise propagation.

The climate of the local area is summarised as:

– Light winds (less than 3 metres per second (m/s)) occur frequently (over 30% of the time) during the day in summer, autumn, and winter.
– Very light winds (less than 2 m/s) are common across all seasons, especially:
  - affecting eastern and northeastern areas in autumn, winter, and spring
  - affecting northern areas in summer.

Based on local climate data, an average temperature of 10 degrees Celsius (°C) and relative humidity of 70% was adopted to provide a conservative representation of local climate conditions for environmental noise propagation in this assessment.

6.3.3 Assessment criteria

A summary of the criteria used to undertake the construction noise and vibration assessment is provided in this section. Further information is provided in section 4 of Technical Report 2.

Construction noise

Construction noise management levels

Construction noise criteria were determined in accordance with the *Interim Construction Noise Guideline*. This guideline provides a clear understanding of ways to identify and minimise noise from construction. The guideline also identifies 'feasible' and 'reasonable' work practices to mitigate potential impacts.

The *Interim Construction Noise Guideline* recommends standard construction working hours where noise from construction activities is audible at residential premises:

– Monday to Friday 7am to 6pm
– Saturday 8am to 1pm
– no construction work is to take place on Sundays or public holidays.

Construction noise management levels (NMLs) for standard and out of hours periods are provided in Table 6.11.

It is noted that the NMLs are not mandatory limits. Where construction noise levels are predicted or measured to be above the NMLs, feasible and reasonable work practices are proposed to minimise noise impacts.

Table 6.11 Construction noise management levels

Receiver type	Receivers	Standard construction hours		Outside standard construction hours[1]		
		Noise affected	Highly noise affected	Day	Evening	Night
Engadine residences (NCA1)	R01	45	75	40	36	35
Ridgeway Residences (NCA2)	R02	47	75	42	42	37
Lucas Heights Community School	R03	55 (external – when in use) for classrooms				
The Ridge Sports Complex Sutherland PCYC Minibike Club	R05 R09	65 (when in use) for active recreation areas				
Gandangara Gandangara North	R04 R06	60 (when in use) for passive recreation areas				

Receiver type	Receivers	Standard construction hours		Outside standard construction hours[1]		
		Noise affected	Highly noise affected	Day	Evening	Night
Lucas Heights Motel ANSTO, Lucas Heights	R07 R10	70 (when in use) for commercial premises				

Note: 1. Works outside standard construction hours are not proposed during the evening or night period.

Construction vibration

Compactors and rollers are identified as vibration intensive equipment with the greatest vibration emissions, with the recommended safe working distances required to meet both human comfort and cosmetic damage criteria, as defined in *BS 7385-2:1993 Evaluation and measurement for vibration in buildings Part 2 – Guide to damage* (British Standards, 1993) referred to in Table 6.12.

Table 6.12 Vibration safe working distances

Equipment	Human comfort (OH&E Vibration guideline)	Cosmetic damage (BS 7385)
Vibratory roller (13-18 tonnes)	100 m	20 m
Vibratory roller (7-13 tonnes)	100 m	15 m
Vibratory roller (4-6 tonnes)	40 m	12 m
Vibratory roller (2-4 tonnes)	20 m	6 m
Vibratory roller (1-2 tonnes)	15 m	5 m

Operational noise

Intrusive noise criteria, amenity criteria, and project specific noise trigger levels were determined for the operation of the project in accordance with the *Noise Policy for Industry*. The project noise trigger levels are provided in Table 6.13 and Table 6.14.

Table 6.13 Project noise trigger levels (residential receivers)

NCA / Receivers	Assessment period	Intrusive noise level, $L_{Aeq(15min)}$, dBA	Project amenity noise level, $L_{Aeq(15min)}$ dBA	Project noise trigger level, $L_{Aeq(15min)}$, dBA
NCA1 (suburban residential): R01 Engadine residences	Day	40	48	**40**
	Evening	36	43	**36**
	Night	35	38	**35**
NCA2 (suburban residential): R02 Ridgeway residences	Day	42	48	**42**
	Evening	42	43	**42**
	Night	37	38	**37**
NCA3 (Future suburban residential): R04 Gandangara and R06 Gandangara North	Day	40	48	**40**
	Evening	35	43	**35**
	Night	35	38	**35**

Table 6.14 Project noise trigger levels (non-residential receivers)

Receiver	Receiver type	Recommended amenity noise level, $L_{Aeq(period)}$ dBA	Project amenity noise level, $L_{Aeq(15min)}$ dBA
R03: Lucas Heights Community School	Classrooms	45 (external)[1]	43
R05: The Ridge Sports Complex R09: Sutherland PCYC Minibike Club	Active recreational area	55	53
R08: Potential future recreational area	Passive recreational area	50	48
R10: ANSTO, Lucas Heights	Commercial premises	65	63
R07: Lucas Heights Motel	Temporary accommodation	45 (night)	43 (night)

Note: 1. Correction applied to internal noise level assuming a reduction of 10 dB is achieved through an open window.

6.3.4 Potential impacts

Construction

Construction noise

To assess the potential impacts of construction noise, indicative construction scenarios (including equipment and plant that could be used) were identified. This information was used to model maximum construction noise levels that may be experienced at each sensitive receiver for each stage of construction.

Three indicative scenarios were developed to assess potential construction noise impacts which include:

– site establishment
– bioenergy facility construction and commissioning
– decommissioning of the existing power station.

The predicted construction noise levels at the modelled receivers are provided in Table 6.15.

The results of noise modelling indicate that noise levels during construction would comply with the established NMLs for all construction scenarios during the project construction hours.

Table 6.15 Predicted construction noise levels

Receiver ID	Location	Noise affected NML, LAeq,15min, dBA	Predicted noise level, LAeq,15min, dBA		
			Site establishment	Project construction	Testing and decommissioning
R01	Engadine residences	45 (Standard) 40 (Day OOH)	30	22	28
R02	The Ridgeway residences	47 (Standard) 42 (Day OOH)	28	20	27
R03	Lucas Heights Community School	55	25	17	23
R04	Gandangara	60	34	26	32
R05	The Ridge Sports Complex	65	29	21	27
R06	Gandangara North	60	29	21	27
R07	Lucas Heights Motel	70	36	28	34
R08	Future recreational parkland	60	56	48	54
R09	Sutherland Mini Bike Club	65	56	48	54
R10	ANSTO, Lucas Heights	70	51	43	49

Construction vibration

No sensitive receivers are located within 100 metres of the project site therefore no exceedances of human comfort vibration criteria are anticipated.

Additionally, safe working distances for cosmetic damage to structures range from 5 to 20 metres, meaning no existing buildings or sensitive receivers within the project site would be affected by structural vibration damage during construction.

Operation

The operational noise levels predicted at the modelled receivers are provided in Table 6.16.

The results indicate that all receivers meet the project noise trigger level, except for the future recreational parkland (R08) which is planned to be developed post-closure of the LHRRP. The predicted noise exceedances at the affected receiver are expected to occur within approximately 400 metres of the project site boundary. Refer also to Figure 7.2 of Technical Report 2.

Table 6.16 Predicted operational noise levels

Receiver ID	Location	Project noise trigger level	Predicted noise level, $L_{Aeq,15min}$, dBA	LFN Correction, dB	Corrected predicted noise level, $L_{Aeq,15min}$, dBA	Compliance
R01	Engadine residences	35	29	+2	31	Yes
R02	The Ridgeway residences	37	29	+2	31	Yes
R03	Lucas Heights Community School	43	27	0	27	Yes
R04	Gandangara	35	33	+2	35	Yes
R05	The Ridge Sports Complex	53	29	+2	31	Yes
R06	Gandangara North	35	30	+2	32	Yes
R07	Lucas Heights Motel	43	35	+5	40	Yes
R08	Future recreational parkland	48	53	0	53	No
R09	Sutherland PCYC MiniBike Club	53	52	0	52	Yes
R10	ANSTO, Lucas Heights	63	49	+5	54	Yes

Impacts to future receivers

The future parkland is proposed to comprise new infrastructure including recreational lawns, picnic facilities, and other features where people are expected to congregate. These areas are planned to be located outside of the areas where the highest noise levels are predicted.

The NPfI requires "*the noise level to be assessed at the most-affected point within the area that is reasonably expected to be used by people, for example, picnic areas or walking tracks."* As such the receiver point R08 was chosen at the worst affected location on the proposed future walking tracks.

Noise levels across the future recreational area range from 65 dBA at the nearest boundary to 30 dBA at the farthest points from the project. The final landform of the future parkland would be characterised by sloped terrain, with gradients between approximately 10 and 19% near the boundary with the project site. Due to the steep topography, these areas are not considered suitable for prolonged public use and are unlikely to attract significant recreational activity. In addition, the natural landform is expected to provide some acoustic shielding, reducing the transmission of noise to more frequented parts of the future parkland.

The bioenergy facility is required to provide ongoing landfill biogas management during the post closure period to enable the use of the land as a future parkland. Peak generation of the facility is expected to have declined post closure therefore operational noise is likely to be lower than assessed during landfilling operations.

During finalisation of the design of the future parkland (R08), noise from the project should be considered as part of the master plan development process. Areas where noise levels are likely to be higher, closer to the project, can be used as vegetated buffer and open space buffer zones. It is recognised that this master plan would continue to be refined over time and subject to agreement with Council and ANSTO as landowner.

Impact summary

While localised noise exceedances are predicted within approximately 500 metres of the project site boundary, affecting parts of the future parkland, the impact is limited in spatial extent. Considering the size of the site, the nature and location of existing and planned infrastructure, and the dominant sources of ambient noise, operational noise levels are expected to remain within acceptable limits across the majority of the impacted receiver site.

Mitigation measures are provided in section 6.3.5 in order to mitigate point source noise impacts during construction, operation, testing and decommissioning at the affected receiver.

Cumulative impacts

To ensure noise from the project does not result in cumulative impacts from other nearby projects, the noise limits for modelling were set 5 dB lower than the usual recommended level. This procedure follows EPA guidelines and helps protect nearby homes and other sensitive areas from the noise of multiple projects.

The worst-case scenario would be if construction on this project occurs at the same time as another nearby project, such as the adjacent flare modification project. If that happens, the combined noise could be approximately 3 dB higher than if only one project was occurring.

Total noise levels were still found to be below the exceedance criteria for all receivers; therefore, no additional noise control measures are required.

6.3.5 Mitigation measures

Approach to mitigation and management

Mitigation measures proposed to manage impacts, including proposed techniques, are outlined in this section. Responsibility for implementing each measure, timing, frequency, risk of failure, and an analysis of the consequences of any residual impacts are also provided.

The project will include implementation of measures to mitigate residual impacts, specified in a CEMP and OEMP. The CEMP and OEMP will provide detailed environmental controls to manage key environmental issues during construction and operational phases respectively, and both will be reviewed and updated as necessary throughout the project. They will include, as a minimum, industry-standard and site-specific measures for the management of noise.

Summary of mitigation measures

Measures that will be implemented to minimise and manage potential noise impacts are provided in Table 6.17.

Table 6.17 Recommended mitigation measures – noise

ID	Control type	Environmental Safeguard	Responsibility	Timing
NV1	Construction noise and vibration management	The CEMP will detail processes, responsibilities and measures to manage noise and vibration and minimise the potential for impacts, including mitigation measures NV2 to NV7 and the management measures listed in section 8.1 of Technical Report 2. Measures that mitigate potential noise and vibration at the source will be prioritised.	Contractor	Pre-construction / Construction / Operation
NV2	Plant noise levels	The noise levels of plant and equipment should have an operating sound power lower to the levels presented in Table 5.1 of Technical Report 2 or similar.	Contractor	Pre-construction / Construction

ID	Control type	Environmental Safeguard	Responsibility	Timing
NV3	Maintain equipment	Regularly inspect and maintain equipment to ensure it is in good working order. to prevent excessive noise emissions from deteriorating or faulty components, particularly for critical noise sources such as radiator fans, attenuators, and exhaust openings. Equipment must not be operated until it is maintained or repaired, where maintenance or repair would address the annoying character of noise identified.	Contractor	Construction
NV4	Plant noise levels	Selection and design of low-noise equipment to ensure operational sound power levels remain at or below the reference levels used in the assessment. This includes the following design measures: – acoustic enclosure for CAT G3516LE generators – intake attenuators – discharge attenuators – silencers on generator exhausts – selection of low-noise radiator fans.	LMS Energy	Detailed design
NV5	Noise monitoring	Compliance noise monitoring to be completed within 12 months of commencement of operation. Noise monitoring undertaken at the boundary of the power station will be compared to the predicted noise levels presented in Table 5.3 of Technical Report 2 and used to validate predicted noise levels at sensitive receivers presented in this report.	LMS Energy	Operation

6.4 Hazards and risk – industrial

This section provides a summary of the potential industrial hazard and risk impacts of construction, operation and decommissioning of the project. A full copy of the preliminary hazard assessment (PHA) is provided in Technical Report 3.

6.4.1 Methodology

Legislative and policy context to the assessment

The assessment was undertaken in accordance with the SEARs and with reference to the requirements of relevant legislation, policies and/or assessment guidelines, including:

– State Environment Planning Policy (Resilience and Hazards) 2021
– Hazardous Industry Planning Advisory Paper No 4 – Risk Criteria for Land Use Safety Planning (HIPAP No. 4) (DoP, 2011b)
– Hazardous Industry Planning Advisory Paper No 6 – Guidelines for Hazard Analysis (HIPAP No. 6. (DoP, 2011b).

Study area

The study area is defined as a 2.5 kilometre radius from the project site with the potential to be directly affected or indirectly affected by the project, including nearest residential suburbs.

Key tasks

The PHA included:

– determination of whether the risk posed by the project complies with the risk criteria outlined in the *Advisory Paper No 4 – Risk Criteria for Land Use Safety Planning* (HIPAP No 4) (DoP, 2011b)
– determination of whether the risk posed by the project complies with the risk criteria outline in the *Hazardous Industry Planning Advisory Paper No 6 – Guidelines for Hazard Analysis* (HIPAP No. 6) (DoP, 2011b)
– consideration of the *Applying SEPP 33: Hazardous and Offensive Development Application Guidelines* (DoP, 2011c) (Applying SEPP 33) to determine if the project is potentially hazardous or offensive
– dangerous goods and hazardous materials screening against Applying SEPP 33 thresholds of dangerous goods to determine if the project poses significant offsite risks during construction and operation
– identification of risk reduction options and mitigation measures.

A quantitative risk assessment was undertaken to quantify the risks of hazards in the project against the relevant risk criteria described in detail in section 6.4.3.

Specifically, the PHA has considered hazards and risks related to the proximity of the project site to other facilities, the ongoing land use and the consideration of future sensitive receivers (future recreational parkland).

6.4.2 Existing environment

Sensitive receivers

A description of the nearest sensitive receivers to the project site is provided in section 6.3.2. Refer also to Figure 6.3.

Dangerous goods storage

During construction and operation, a range of hazardous materials, including dangerous goods and non-dangerous goods, would be used and stored within the project site.

During operation, the bioenergy facility would source biogas from the adjacent landfill via existing and upgraded biogas delivery infrastructure.

LMS gas analysis results suggest the biogas will contain around 50% methane and 40% carbon dioxide, with around 9% nitrogen and 1% oxygen, along with other trace elements.

For modelling purposes, biogas has been assumed to contain approximately 57% methane and 43% carbon dioxide. Because methane is flammable, operating the bioenergy facility may give rise to hazards.

Quantities of dangerous goods stored or transported to the site during construction, such as diesel storage for on-site power generators, would be covered by the contractor in the Construction Management Safety Plan (CSMP) and are unlikely to exceed the SEPP (Resilience and Hazards) threshold.

Operation

Dangerous goods and hazards screening

A summary of the chemicals used and/or stored onsite during operation of the project is provided in Table 6.18.

Although none of the dangerous goods exceed threshold quantities that would normally require a detailed assessment, a PHA was undertaken due to the presence of nearby sensitive land uses (refer to Note 1 of Table 6.18). As a result, the project is classified as a 'potentially hazardous industry' due to its proximity to existing and future public spaces.

Table 6.18 Operations dangerous goods screening

Chemical / product	UN #	Expected storage quantity	DG class	Packing group	Combined storage threshold	Exceedance of SEPP (Resilience and Hazards) threshold
Biogas (refer to Note 3)	1049	70 kg	2.1	NA	100 kg	Does not exceed threshold (Note 1)
LPG	1049	90 kg	2.1	NA	10,000 kg	Does not exceed threshold
Sulphur Hexafluoride (SF6)	1956	200 kg	2.2	NA	200 kg	Note 2
Waste oil	3082	30,000 L	Class 9	NA	NA	Note 2
Clean oil – Motor or Gear Oil/Petroleum Oils	1267	30,000 L	Class C1/C2 (Note 3)	NA	NA	Note 3
Transformer oil / Mineral oil	1993	30,000 L	Class C2	NA	NA	Note 4

Notes:
1. The combined storage does not exceed 100 kg for biogas, a DG Class 2.1. However, as the nearest sensitive development, the Sutherland MiniBike club is located southwest of the project, and there will be a public park directly to the west in the future, it has been decided to undertake a level 3 PHA for this project. Refer SEPP33 Figure 6, Class 2.1 - Flammable gases.
2. For the purpose of the SEPP 33 screening analysis, Class 2.2 and Class 9 Waste oils are excluded.
3. Refer to Chapter 3 of Technical report 3 for composition and other details.
4. If combustible liquids of Class C1 or C2 are present on site and are stored in a separate bund or within a storage area where there are no flammable materials stored, they are not considered to be potentially hazardous. If, however, they are stored with other flammable liquids, that is, Class 3PGI, II or III, then they are to be treated as Class 3PGIII, because under these circumstances they may contribute fuel to a fire.

6.4.3 Hazard consequence and risk modelling results

Modelling criteria

A hazard identification (HAZID) assessment was undertaken for the project. Refer to Chapter 6 of Technical Report 3 for the full assessment.

The release of biogas from the bioenergy facility was assessed as a potential hazard during commissioning and operation. Loss of containment of biogas and subsequent release of biogas from the bioenergy facility may result in fires in the event of ignition. Fire scenarios modelled are classified as:

- **Jet fire**: could occur whenever there are pressurised flammable gases or liquids (such as the biogas through the pipeline) and results in ignition of the escaping biogas.
- **Flash fire**: could occur when a vapour cloud of highly flammable or flammable materials burns, but no significant overpressure is created at the flame front and therefore the energy released from the combustion does not result in an explosive blast to cause property damage.
- **Vapour cloud explosion**: is an explosion occurring after the release of a large quantity of flammable biogas, which ignites following the formation of a flammable cloud within the upper and lower flammable limits in a confined area causing a damaging pressure wave.

Consequence and risk modelling assessments were undertaken for three worst-case scenarios (refer to Table 6.1 of Technical Report 3). The modelled scenarios likely to cause offsite impacts were as follows:

- transformer fire or explosion
- biogas pipework or flange leak or break inside a generator enclosure
- biogas pipework or flange leak or break on an above ground section of the generator fuel gas header.

The modelling determined the potential for fire (jet fire, flash fire and vapour cloud explosion) impingement on:

- onsite operators comprising construction, operation and maintenance workforce
- nearby equipment
- offsite personnel and the public including visitors to the LHHRP, users of the PCYC MiniBike Club and members of the public using the future recreational parkland.

Consequence modelling was undertaken under all weather conditions to determine the fire impact distance from the modelled biogas release location. Heat radiation contours were overlaid on the project site layout to describe the scale of the impact and determine if there would be any offsite impacts.

The modelling considered credible worst-case scenarios, including jet fire, flash fire and vapour cloud explosion, to capture the scale and extent of thermal radiation effects. Heat radiation contours were generated and overlaid on the project site layout to illustrate the spatial distribution of impacts, with the highest thermal loads concentrated nearest the fire source and diminishing with increasing distance.

These contours provide a visual representation of the potential consequence zones, showing that the effects of all modelled fire scenarios would be contained within the project site boundary and would not extend to sensitive land uses or offsite receptors.

Further analysis of the modelled scenarios was undertaken to determine if the risks of each modelled scenario would meet the HIPAP 4 risk criteria for:

- **Individual risk**: measures the risk to a person at a specific location from hazardous incidents.
- **Societal risk:** assesses the acceptability of risks that could cause multiple fatalities, even if rare.

Individual risk is a measure of the risk to an individual continuously exposed at a specific location within the effect zone of a hazardous incident. The individual risk criteria listed in Table 6.19 are suggested in HIPAP 4. The risk level represents the frequency at which the relevant exposure type should not be exceeded.

Table 6.19 Individual fatality risk criteria

Risk levels (individual fatality risk per year)	Land-Use	Limit of exposure at the following locations
0.5 x 10^{-6}	Sensitive	Hospitals, child-care facilities, and old age housing
1 x 10^{-6}	Residential	Residential developments and places of continuous occupancy such as hotels and tourist resorts
5 x 10^{-6}	Commercial	Commercial developments, including offices, retail centres and entertainment centres
10 x 10^{-6}	Recreational	Sporting complexes and active open space areas
50 x 10^{-6}	Industrial	Target for site boundary

The most sensitive property in proximity to the project site is currently the PCYC MiniBike Club, which is classified as active recreation land use. The other immediately adjacent land users within the LHRRP are industrial sites. Following completion of landfilling activities at the LHRRP, the site is proposed to be transformed to parkland so consideration of the adjoining landfill as a recreational use has also been undertaken.

Modelling results

Individual risk

The assessment shows that the risk to individuals near the LHRRP facility is low and within acceptable safety limits. The main potential hazard comes from a full bore rupture at the generator or landfill biogas delivery system location, which is near to the western and southern boundaries of the project site as shown on Figure 6.4.

However, the modelling shows that even in this worst-case scenario, the risk does not extend beyond the site boundary. The highest level of individual risk remains well below the threshold set by HIPAP 4 for sensitive places like hospitals or childcare centres. This means that people outside the facility, including those using nearby recreational areas, (including the future parkland) are not exposed to unacceptable levels of risk.

Figure 6.4 Individual risk contours

Societal risk

Societal risk looks at the chance of an incident affecting multiple people at once. While the chance of a fatal accident is very low, the assessment still considers the potential impact of a biogas release and potential impact to users of the LHRRP, including users of the future parkland.

The results show that the overall societal risk from the facility is very low. The risk graph provided as Figure 6.5 shows the LHRRP facility falls well within the “negligible” zone, meaning the societal risk indicated by the blue dot is considered tolerable and does not require further action under the HIPAP 4 guidelines.

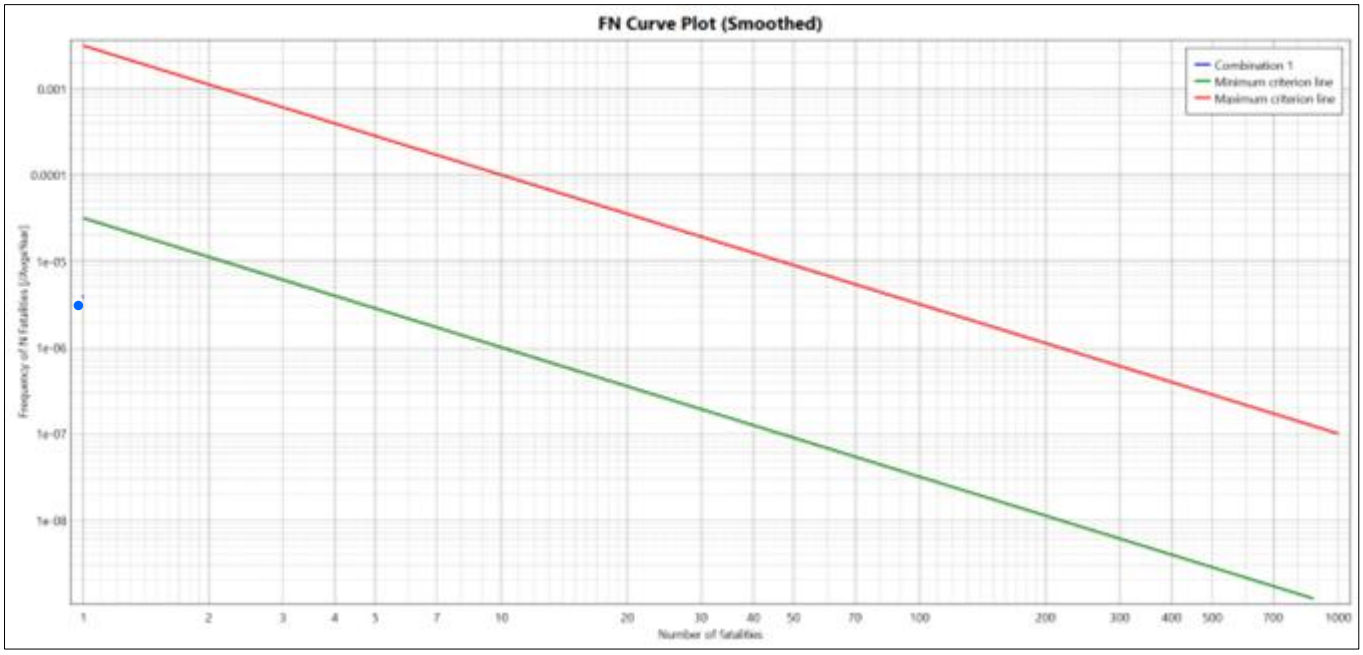


Figure 6.5 Societal risk results (indicated by the blue dot)

6.4.4 Mitigation measures

Approach to mitigation and management

Mitigation measures proposed to manage impacts, including proposed techniques, are outlined in this section. Responsibility for implementing each measure, timing, frequency, risk of failure, and an analysis of the consequences of any residual impacts are also provided.

LMS will document comprehensive safety management systems for the bioenergy facility comprising:

– chemical and spill management systems
– fire prevention and protection systems summary
– bushfire assessment and bushfire emergency management and evacuation plan (refer to section 6.5)
– emergency planning
– site security
– traffic management
– welding and hot work.

The project will include implementation of measures to mitigate residual environmental impacts, specified in an Operational Environmental Management Plan (OEMP). The OEMP will provide detailed environmental controls to manage key environmental issues. The OEMP will be reviewed and updated as necessary throughout the relevant phases of the project.

Summary of mitigation measures

Measures that will be implemented to minimise and manage potential industrial hazard impacts are provided in Table 6.20.

Table 6.20 Mitigation measures – industrial hazards

ID	Environmental aspect	Mitigation measure	Responsibility	Timing
HM1	Hazard management	LMS will document comprehensive safety management measures detailed in HM3 – HM5 for the site in the Safety Management Plan).	LMS	Operation
HM2	Fire safety	A fire safety study during detailed design to HIPAP No. 2 should be included as a condition of development consent to cover the fire safety strategy and fire protection systems for the bioenergy facility, including any fire water storage on-site, and retention systems to contain fire water in any fire scenario.	LMS	Detailed design
HM3	Hot work permit system	A hot work permit system will be required on-site for any welding or cutting activities.	Contractor	Pre-construction / Construction
HM4	Loss of LPG containment	Where cylinder valve covers are fitted, such as for the LP Gas Cylinders, these are not to be removed during handling and storage. All gas cylinders are to be stored in dedicated cylinder cages or racks in accordance with AS4332-2005 – *The storage and handling of gases in cylinders*.	LMS	Operation
HM5	Final hazard assessment	If substantial changes are made to the design, such as a large increase in the proposed pressure of the biogas fuel for the gas engines, LMS should conduct a final hazard analysis to HIPAP No.6. The FHA should include a revised estimate of the risk at the site boundary for worst case events.	LMS	Pre-construction

6.5 Hazards and risk – bushfire

The section provides a summary of the potential bushfire risk impacts of construction, commissioning and operation of the project. Further information is provided in Technical Report 4 – Bushfire hazard assessment.

6.5.1 Methodology

The assessment was undertaken in accordance with the SEARs and with reference to the requirements of relevant legislation, policies and/or assessment guidelines, including:

– *Environmental Planning and Assessment Act 1979* (EP&A Act)
– *Rural Fires Act 1997*
– Planning for Bushfire Protection A guide for councils, planners, fire authorities and developers (NSW RFS 2019) (PBP)
– Australian Standard (AS) AS3959:2018 Construction of buildings in bushfire-prone areas (Standards Australia 2018).

Study area

For the purposes of the assessment the project site and study area have been defined as follows:

– **Project site:** the area that would be directly disturbed by construction and operation of the bioenergy facility.
– **Study area:** the area that includes the project site and the surrounding area up to 140 metres, as defined by the PBP, shown on Figure 6.6.

Key tasks

A desktop assessment was undertaken that included review of:

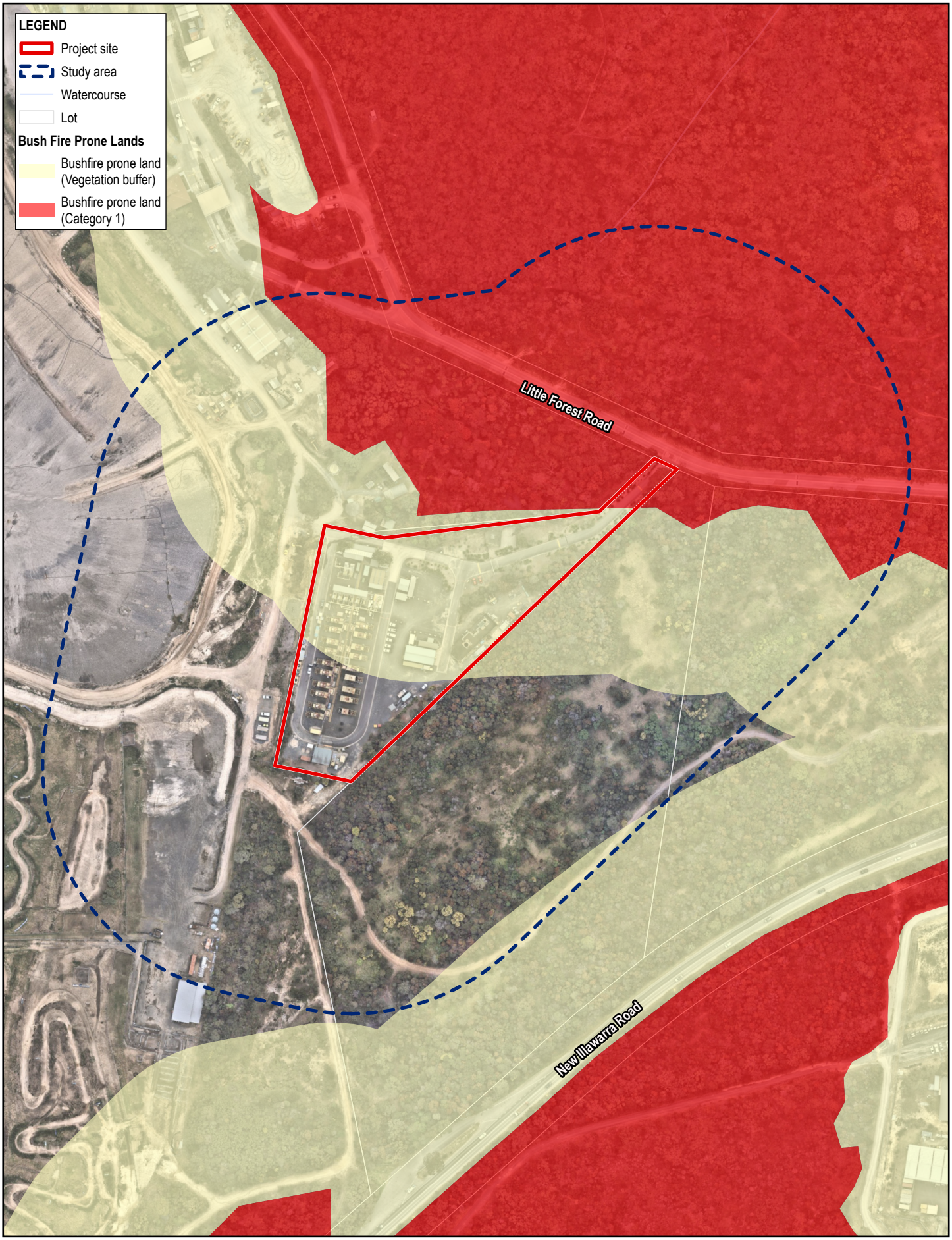
– bushfire prone land mapping via the NSW Planning Portal Spatial Viewer
– vegetation types, classification, structure and fuel characteristics based on survey data presented in previous biodiversity assessment reports and bushfire assessments
– existing LHRRP infrastructure and assets and the project description, including design, construction, commissioning and operation activities along with relevant LMS procedures and guidelines
– bushfire history (mapped locations and years for both planned and unplanned fire)
– regional weather and characteristics of the project site and study area topography
– potential bushfire behaviour and risk scenarios
– proposed changes/upgrades to access and egress.

6.5.2 Existing environment

Bushfire prone land

The project site would be located partially on bushfire prone land (Vegetation Buffer) and Vegetation Category 1 bushfire prone land (NSW RFS, 2015) as shown on Figure 6.6.

The 100 metre Vegetation Buffer area is located around the perimeter of the LHRRP and is associated with the adjoining Vegetation Category 1 land (the highest bushfire risk classification) that surrounds the LHRRP.



Paper Size ISO A4

0 15 30 45 60

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

LMS Energy
Lucas Heights Bioenergy facility

Project No. **12649882**
Revision No. **0**
Date **20/10/2025**

Bushfire prone land

FIGURE 6.6

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Print date: 20 Oct 2025 - 12:43

Data source: GHD: Site Boundary (2025), Site Features (2025). NSWSS: SVTM (2025), NPWSR (2025), Cadastre (2025). Nearmap WMS Server: .
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Fire danger index

Fire danger index (FDI) is a relative scale reflecting fire severity potential, with increasing FDI reflecting increasing fire rate of spread, intensity and difficulty of its suppression.

The LHRRP, including the project site, is within the 'Greater Sydney Region' and has a corresponding FDI of 100 which is the highest risk classification for the potential chance for a fire to start (NSW RFS, 2019).

Environmental features

Vegetation cover

The project site is predominantly covered by hardstand areas, garden beds, and narrow strips of exotic grasses and native shrubs along its perimeter. More mature trees are concentrated along the southern and northern boundaries, where the site adjoins more contiguous forested areas. This proximity to established vegetation has supported the growth of several larger native trees within the project site itself, particularly near its edges.

The vegetation communities surrounding the project site are identified as Coastal Dry Sclerophyll Forest (GHD, 2025). Further description of the vegetation found within the project site is provided in section 7.2.

Topography

The site is generally flat, with a 4 metre variation of topography across the project site based on survey information provided by MLEI Stormwater Management Plan prepared for the project (MLEI, 2025) (refer to Figure 5.1 of Technical Report 6). Land generally slopes down towards the north with an average gradient of around 3%.

Local meteorology

The nearest operational weather station to the project is the Holsworthy Aerodrome Weather Station (066161) located approximately 7 kilometres to the southeast. Meteorological data was obtained for the years 2012 to 2024 to understand historical weather patterns for the locality.

Wind

As described in section 6.3.2, the prevailing wind direction is predominantly from the southwest. During spring and summer, wind direction is predominantly from the east with stronger gusts in the evening and from the southwest during the night. During summer, the predominant wind direction is from the south and east.

Refer to Figure 6.1 for the seasonal prevailing wind direction and frequency for the local area.

Temperature and rainfall

The mean annual minimum and maximum temperatures range between 5.5 °C and 29.2 °C (Bureau of Meteorology, 2025). Historically (between 2012 and 2025), the mean number of days per year exceeding 30 °C and 40 °C is 48.4 days and 2.2 days respectively.

The mean annual rainfall recorded between 2012 and 2025 is 877.9 millimetres. Mean monthly rainfall tends to be higher from January to March accompanied by a greater mean number of days of rain when compared to the winter/spring period.

Historic bushfire events

There is one recorded bushfire within the project site in December 1997 (SEED, 2025). Outside of the LHRRP and project site the following bushfires were recorded:

– 1989-90 wildfire
– 2001-2002 wildfire
– Cambridge Avenue wildfire in December 2002
– Moorebank Avenue, Holsworthy wildfire in April 2018.

There was no cause recorded for these fires.

6.5.3 Determination of bushfire attack level

Under Section 8.3.1 of the *Planning for Bush Fire Protection* (PBP) the bioenergy facility structures are classified as Class 5 to 8 and Class 10 under the National Construction Code, covering non-residential buildings such as offices and industrial facilities.

While these classes are not subject to specific bushfire construction requirements, the PBP still requires that appropriate bushfire protection measures be implemented to meet its overall aims and objectives for commercial and industrial developments without a residential component, therefore a bushfire attack level (BAL) assessment was still warranted.

The BAL of the project was determined by combining the attributes of vegetation coverage, slope and Fire Danger Index (FDI) in accordance with the Australian Standard AS 3959:2018 *Construction of buildings in bushfire-prone areas.* The BAL for the project site is provided in Table 6.21.

Table 6.21 Determination of BAL for the project site

Nearest bushfire prone vegetation	Direction	Effective slope class	Distance from structures to bushfire prone vegetation	Likely worst-case BAL for the proposed structures
Woodland	East	Upslope < 5 degrees	49 m	BAL 12.5
Woodland	South	Upslope < 5 degrees	>100 m	BAL 12.5
Woodland	North	Downslope < 5 degrees	56 m	BAL 12.5

The BAL values are categorised as BAL 12.5 which means an increased risk from ember attack and radiant heat (up to 12.5 kilowatts per square metre **(**kW/m²)); requires ember protection measures.

Although BAL ratings don't formally apply to industrial or commercial buildings (Classes 5 – 8 and 10), a conservative approach was used for this assessment. A buffer area, called an Asset Protection Zone (APZ), was included around the building to reduce exposure to heat from a potential bushfire. This zone keeps radiant heat levels below 12.5 kW/m², ensuring there is a managed vegetation zone between buildings and nearby bushfire prone vegetation. Refer to Figure 5.1 of Technical Report 4.

6.5.4 Potential impacts

Construction

Bushfire risk from project construction

The accidental ignition of vegetation has the potential to escalate into a bushfire. Potential ignition sources during construction would include:

– hot works (e.g. cutting, welding, etc.)
– storage of combustible fuels
– vehicles/machinery operating around long grass
– accidental ignition (e.g. from cigarettes).

Ignition prevention controls would be confirmed during construction planning and include measures such as using a permit-to-work system to control hot works activities and compliance with total fire bans. These and other measures to manage the risk of igniting vegetation during construction would be included in a fire management plan, described further in section 6.5.5.

In the unlikely event of a bushfire originating from the project, it may spread at a fast speed, cut off access to parts of the site, impact construction areas, and may spread to the surrounding LHRRP. The PHA identified that the risk of ignition of vegetation resulting in a bushfire during construction would be 'intermediate' which means that while a bushfire could happen, it's not highly likely. If a bushfire were to occur, it could have moderate consequences, such as damaging construction areas, blocking access, and potentially spreading off-site.

Although vegetation clearance is not anticipated, APZs would be maintained within the project site. The proposed construction works are not at a scale which would materially alter the consequences of bushfires on public safety or change bushfire behaviour. Section 6.5.5 includes effective risk controls to minimise ignition during construction.

Bushfire risk originating outside of construction area

As part of the project footprint and LHRRP surrounds is located in bushfire prone vegetation, construction workers may potentially be exposed to bushfire risks while travelling to/from the site.

Bushfires may occur as a result of either natural causes (e.g. lightning strike) or as a result of human activity and the timing and location of bushfire ignitions is therefore not entirely foreseeable or predictable. During construction, it would be possible for significant bushfire safety risks to arise and systems for maintaining workforce safety need to be developed, specifically a Bushfire Emergency Management and Evacuation Plan. The bushfire risk to construction workers would be as low as reasonably practicable given the recommended management measures detailed further in section 6.5.5.

Operation

Bushfire risk from project operation

The risk of fire or explosion at the project site is assessed in detail as part of Technical Report 3 and discussed in section 6.4.

Transformer fire or explosion was identified as a scenario with potential to cause a bushfire. The bioenergy facility would be managed through a central supervisory control and data acquisition system that monitors all operations, triggers alarms for abnormal conditions, and notifies on site or on call staff. Transformer safety is ensured through oil monitoring, and an oil bund designed to contain spills and firefighting runoff.

Routine inspections and maintenance including vegetation management and fire risk mitigation works would be carried out using light vehicles and small machinery. Fire risks from maintenance activities are well managed through established controls.

The bioenergy facility would be equipped with a number of safety features to address the risk of starting fires and are considered to have a low vulnerability to bushfire impact due to their robust, non-combustible and highly reliable design and fire safety features.

Fire safety mitigation measures detailed in section 6.5.5 would be implemented to manage the fire risk during operation.

Bushfire risk originating outside of bioenergy facility

Historical fire activity in the study area indicates there is one recorded fire within the LHRRP in December 1997.

As discussed in section 6.5.3, in the event of a bushfire approaching the project site boundary, the bioenergy facility structures would be subject to variable degrees of radiant heat and ember attack. Radiant heat is unlikely to threaten building elements (such as unscreened glass).

Based on local vegetation, slope and distance to unmanaged vegetation, the worst-case BAL is predicted to be 12.5. To manage the risk of external bushfire impacts, APZs are proposed to limit radiant heat exposure to BAL 12.5. The required APZ distances range from 45 to 54 metres depending on slope and direction of vegetation as follows:

– 45 metres from the east and south
– 54 metres from the north.

Refer to Figure 5.2 of Technical Report 4 for the proposed APZ layout. The APZs would be maintained for the lifetime of the structures in accordance with measure BF2 in section 6.5.5. Rehabilitation of the landfill would create parkland to the west, which would be separated by internal access tracks and low level plantings.

The bushfire risk to the facility during operation is considered to be acceptable with the implementation of the APZs around the permitter of the bioenergy facility buildings and structures.

Cumulative impacts

Potential sources of fire generated within the LHRRP that may impact the project site include:

– landfill surface or sub-surface fire within the waste mass
– garden organics facility fire
– plant or equipment fire.

Appropriate fire prevention, detection and suppression (firefighting) measures would be provided as described in section 6.5.5. Site operational procedures would also include preventative measures and actions for plant and equipment in the event of a landfill fire. These measures will reduce the likelihood and extent of onsite fires and potential for damage to property and personnel should a fire occur.

6.5.5 Mitigation measures

Approach to mitigation and management

Mitigation measures proposed to manage impacts, including proposed techniques, are outlined in this section. Responsibility for implementing each measure, timing, frequency, risk of failure, and an analysis of the consequences of any residual impacts are also provided.

The project will implement a Bushfire Emergency Management and Evacuation Plan and will contain bushfire protection measures for construction and operation of the project based on guidance from PBP, LMS standard operating procedures and Cleanaway's standard bushfire risk management procedures for LHRRP which were developed in consultation with the NSW Rural Fire Safety Service.

A draft Bushfire Emergency Management and Evacuation Plan has been prepared and is attached as Appendix A to Technical Report 4.

Summary of mitigation measures

Measures that will be implemented to minimise and manage potential bushfire impacts are provided in Table 6.22.

Table 6.22 Mitigation measures – bushfire hazard

ID	Environmental aspect	Mitigation and management measure	Responsibility	Timing
BF1	Bushfire Emergency Management and Evacuation Plan	A Bushfire Emergency Management and Evacuation Plan will be prepared and implemented for construction of the project in accordance with the Guide to Developing a Bush Fire Emergency Management and Evacuation Plan (RFS, 2014). Evacuation procedures will be consistent with the LHRRP Emergency Response Plan (Cleanaway, 2025).	LMS	Construction / Operation
BF2	Asset protection zone	A BAL-29 APZ would be applied to the structures where combustible goods are stored and site offices are located. The southeasternmost generator units do not have enough space to support a BAL-29 APZ due to proximity to the boundary, however it is recommended that the APZ be established up to the boundary to minimise the risk of ember attacks and radiant heat to the most vulnerable units.	LMS / Contractor	Operation
BF3	Bushfire management	Details of fire management are to be outlined in the bush fire emergency management and evacuation plan, including: – Requirements for emergency access and egress including nomination of an alternative access route. – Formal preparedness procedures for staff and contractors to maintain awareness of and respond to escalating forecast fire danger including identification of firefighting equipment and fire water supply. – Formal pre-rehearsed procedures for staff and contractors to respond to respond to a formal bushfire warning being issued by emergency services, including identification of escape routes and refuge areas.	LMS Energy / Contractor	Construction / Operation

ID	Environmental aspect	Mitigation and management measure	Responsibility	Timing
BF4	Construction requirements	Building work will comply with BAL-12.5 construction requirements as applicable to Class 5 to 8 structures. The southeasternmost generator units will comply with BAL-FZ.	LMS / Contractor	Construction
BF5	Water supply and fire suppression	A reticulated potable water supply will be provided on site to service amenities, hose reels, and safety systems. The high-voltage switchroom will be fitted with an internal fire and smoke detection system.	LMS	Operation
BF6	Access	The site is accessible directly via Little Forest Road.	LMS	Construction/ Operation

6.6 Soils and contamination

This section provides a summary of the potential contamination impacts of construction, operation and decommissioning of the project. A full copy of the assessment is provided in Technical Report 5 – Preliminary Site Investigation (PSI).

6.6.1 Methodology

Legislative and policy context to the assessment

The assessment was undertaken in accordance with the SEARs and with reference to the requirements of relevant legislation, policies and/or assessment guidelines, including:

– National Environment Protection Council (NEPM, 2013), National Environment Protection (Assessment of Site Contamination) Amendment Measure (No. 1)
– NSW Environment Protection Authority (EPA) (NSW EPA, 2020), Guidelines for Consultants Reporting on Contaminated Land
– *Contaminated Land Management Act 1997*
– State Environmental Planning Policy (Resilience and Hazards) 2021).

Study area

The study area for the PSI has been defined as the project site and surrounding area, with the potential to be directly or indirectly affected by the project.

Key tasks

The PSI included:

– assessing the likelihood for contamination to exist on the site from past or present activities at the project site
– site inspection by an experienced GHD environmental scientist
– review of background site information, including:
  - historical aerial photography to assess past land uses and contamination risks
  - topographic, soil, geological, and hydrogeological maps to understand environmental conditions and potential contaminant migration pathways
– searches and reviews of publicly available databases
– interview with an LMS staff member to obtain knowledge of the site history
– review of existing contamination and geotechnical reports which include:
  - Geotechnical investigation undertaken by Douglas and Partners (Douglas Partners, 2025)
  - Cleanaway Lucas Heights Landfill Annual Environmental Management Report (AEMR) 2024
  - Contamination Assessment prepared by GHD to support a number of new activities within the LHRRP (GHD, 2015)
  - Geotechnical investigation undertaken by GHD in August 2025 for the project site (GHD, 2025a)
– preparation of a preliminary conceptual site model
– preparation of a PSI report, in accordance with the NSW EPA *Contaminated Land Guidelines* (NSW EPA, 2020).

6.6.2 Existing environment

Site history

The project site is a 1.80 hectare parcel of disturbed land within the operational footprint of the LHRRP in Lucas Heights, NSW. It lies within the existing power station site and to the east of a capped landfill waste cell. Historical landfilling operations occurred adjacent to the site during the 1980s, however the project site itself has not previously been used for waste disposal.

A review of aerial photographs from 1949 to 2025 was undertaken to understand how the project site and surrounding areas have changed over time. Key findings from the review are summarised below.

– Early imagery (1949-1965) shows the project site located within largely undeveloped bushland, with gradual vegetation clearance and early signs of development, particularly to the south where the ANSTO facility was being established.
– By 1988, significant changes had occurred, including the construction of the current LHRRP and surrounding landfill areas. The ANSTO facility was fully developed with buildings and access roads.
– From 2005 to 2011, the landfill expanded to the north and west of the project site, with some development of the existing power station observed within the project site.
– Recent imagery (2020-2025), the project site and surrounding areas underwent moderate changes. A small building was added near the south-east boundary, and four additional generators were installed on-site.

The imagery confirms a gradual transition from natural bushland to a developed industrial renewable energy generation facility with ongoing changes in land use and surface conditions. Refer to Chapter 4 of Technical Report 4 for a full description of the project site history.

Existing infrastructure

A capped unlined waste cell lies immediately to the west of the project site, and underground landfill gas extraction infrastructure is present beneath the site.

The LHRRP includes several key facilities and systems that could influence contamination risks or inform site sensitivity which include:

– The site is located adjacent to active and former landfill cells currently operated by Cleanaway. A leachate management system is in place to collect and treat leachate, including an 8 megalitre leachate pond and associated treatment infrastructure.
– Former and closed landfilling areas west of the project site have been filled and capped but may still pose residual contamination risks due to potential buried waste of fill material and potential leachate generation.
– The LHRRP includes biogas extraction wells and pipelines that manage landfill biogas, which helps contain greenhouse gas emissions and mitigates explosion risks.

Drainage systems including swales, channels, and sediment dams are used to manage stormwater runoff and prevent contaminated water from spreading beyond operational areas. These systems help minimise the risk of surface water contamination but may concentrate pollutants in controlled areas. Drainage through and around the project site includes stormwater channels and a leachate management trench.

Previous investigations

Douglas Partners conducted a soil contamination assessment at the Lucas Heights site to support its divestiture (Douglas Partners, 2025). The investigation targeted areas around the existing power station infrastructure, including fuel tanks, generators, and chemical storage. Hydrocarbon odours and staining were observed near generator modules, and laboratory testing identified elevated concentrations of petroleum hydrocarbons and heavy metals (notably zinc, copper, and arsenic) in three boreholes.

Contaminant levels generally fell below human health criteria for industrial land use, with some ecological criteria exceedances near infrastructure. The affected areas are capped, fenced, and within a highly modified industrial setting, posing negligible ecological risk.

A geotechnical investigation was undertaken by GHD in August 2025 (GHD, 2025a) to inform planning and preliminary design. Four boreholes were drilled around site infrastructure, encountering fill material to depths of up to 1.4 metres, underlain by consistent residual soils and sandstone bedrock. No anthropogenic or waste materials were observed in the fill.

Groundwater was present in all boreholes, with seepage observed at the north-western corner of the gravel pad. This was considered to be a temporary perched water table resulting from recent rainfall, as previous investigations in adjacent areas under dry conditions did not record groundwater.

Potential contaminants

Site history review and interviews with Cleanaway identified eight areas of potential environmental concern (AECs) within the project site:

- **AEC 01 –** Imported fill material of unknown origin, quality, and extent
- **AEC 02 –** Infrastructure associated with the underground gas extraction system and existing power station
- **AEC 03 –** Potential leaks and spills from generator modules, oil pipework, and sumps
- **AEC 04 –** On-site chemical storage areas
- **AEC 05 –** Use of condensate separation vessels
- **AEC 06 –** Waste storage and handling areas
- **AEC 07 –** Storage of hydrocarbons in above-ground storage tanks
- **AEC 08 –** Intermediate bulk containers storing oily water and coolant mixtures.

The following offsite AECs were also identified:

- **AEC 09 –** Potential underling mixed waste and soil in fill
- **AEC 10 –** Nearby landfill cell with potential for landfill biogas and leachate migration
- **AEC 11 –** Workshop located near the site boundary.

Contaminants of potential concern include heavy metals, hydrocarbons, pesticides, industrial chemicals and landfill biogas (methane, carbon dioxide, hydrogen sulphide).

The location of each AEC in relation to the project site is shown on Figure 6.7.

6.6.3 Risk assessment

A preliminary conceptual site model was developed to assess source-pathway-receptor (SPR) linkages. SPR is a framework used in contamination assessments to determine whether there is a potential risk to human health or the environment as follows:

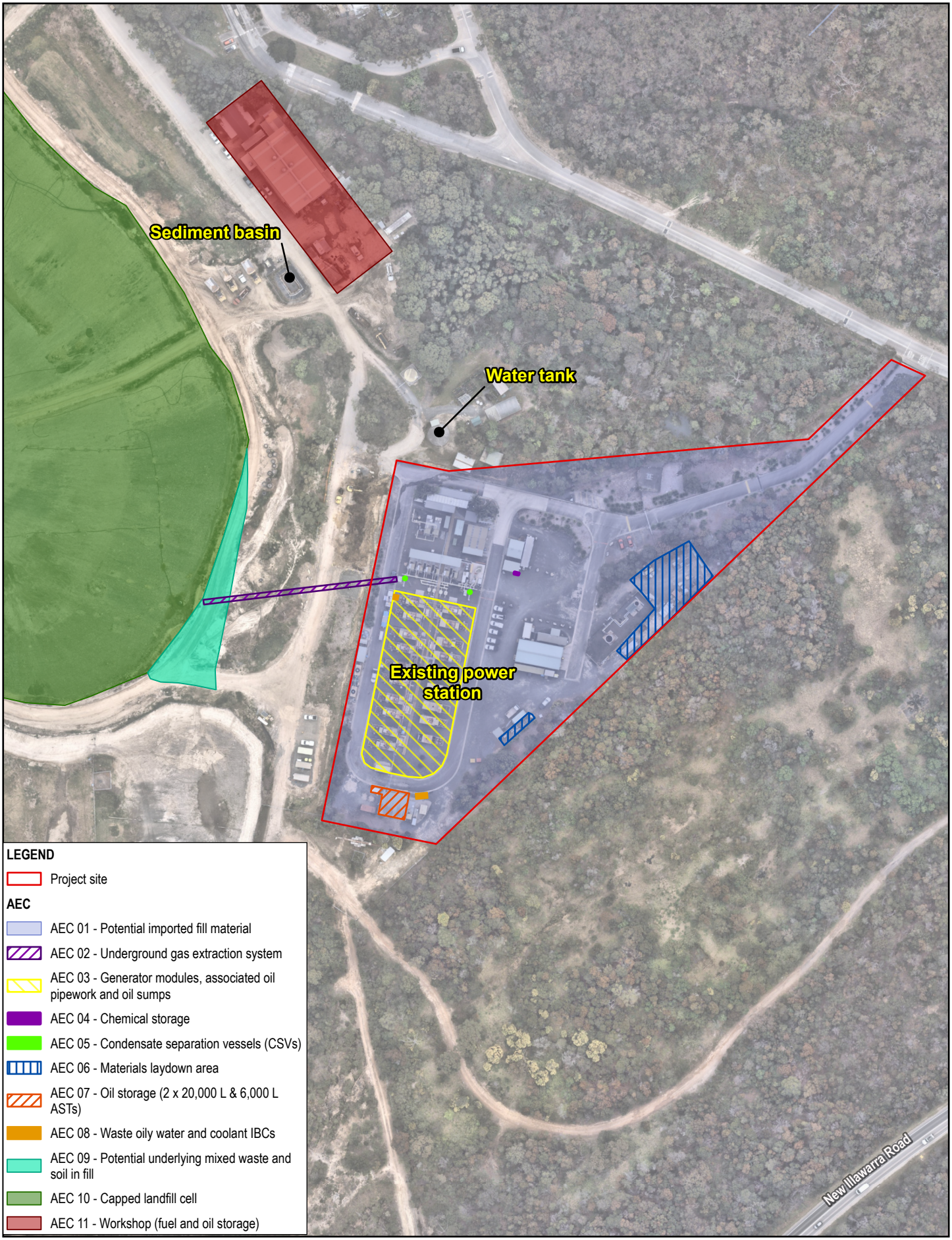
- **Source:** The origin of contamination (e.g. waste material, chemical spill).
- **Pathway:** The route by which the contamination can move (e.g. soil, air, water).
- **Receptor:** The person, organism, or environmental feature that could be affected (e.g. construction worker, groundwater, vegetation).

The following SPR linkages were considered in the site model:

- construction workers exposed to potential contamination in soils and gas via excavation and trenching
- future workers associated with operation that may encounter landfill gases, hydrocarbon impacted soil, or leachate impacted by landfilling activities.

Potentially complete SPR linkages were identified for:

- **AEC 02 –** there could be potential for biogas inhalation due to leaks from the underground pipework at the project site affecting construction and future workers.
- **AEC 03 –** hydrocarbon impacted soils have been identified on the site and there is the potential for exposure to contamination via direct contact / ingestion of contaminated soil during construction phase and future works.
- **AEC 10 –** there could be potential for gas inhalation due to migration of landfill biogas from the waste cell to the west affecting future workers.



Paper Size ISO A4

0 20 40 60 80

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

LMS Energy
Lucas Heights Bioenergy facility

Project No. **12649882**
Revision No. **0**
Date **20/10/2025**

Areas of environmental concern

FIGURE 6.7

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Print date: 20 Oct 2025 - 13:07

Data source: LPMA: DTDB/DCDB, 2019. Nearmap WMS Server:
Created by: dbbanatin

Risks to ecological receptors and groundwater was assessed as low due to site disturbance, depth to groundwater and topographic positioning (hydraulically upgradient).

SPR linkages are considered complete when all three elements are present and connected, indicating a potential risk that may require the need for mitigation.

Complete SPR linkages for human receptors were identified as:

– construction workers/visitors may encounter contamination in the form of fill, landfill biogas, leachate, landfill waste during excavations and earthworks
– future workers during operation may encounter landfill biogas or leachate impacted by landfilling activities.

6.6.4 Potential impacts

Construction

Construction of the project would involve earthworks, trenching, and installation of underground services within the project site. These activities may temporarily disturb subsurface conditions and potentially mobilise any existing contamination, presenting risks to workers, adjacent environments, and future infrastructure.

Potential impacts during construction include:

– **Exposure of workers to contaminants in soils or fill materials**: The PSI identified an area of environmental concern (AEC 01) involving fill material of unknown quantity. Excavation activities could expose construction workers to contaminants through dermal contact, inhalation of dust, or accidental ingestion.
– **Potential migration of landfill biogas:** Landfill biogas infrastructure runs beneath part of the site. While the current system is actively managed, trenching and subsurface construction works could temporarily alter soil gas dynamics and create preferential pathways for biogas migration into excavation areas or pipe trenches.
– **Mobilisation of contaminants via surface runoff:** If rainfall occurs during earthworks, exposed surfaces could lead to sediment-laden runoff and potential migration of any dislodged contaminants toward drainage channels.

Mitigation and management during construction would include implementation of a site-specific Construction Environmental Management Plan (CEMP). These measures will ensure the risks to health and the environment during construction are low and appropriately managed in accordance with regulatory expectations, detailed further in section 6.6.5.

Operation

Operation of the bioenergy facility would introduce new permanent infrastructure including modular generators, ancillary equipment, a switchroom, and associated utilities. The site would be surfaced with concrete slabs, hardstand areas, gravelled porous surfaces and buried services.

Potential impacts during operation include:

– **Accumulation of landfill gas in enclosed structures:** Although the risk is low, the potential for landfill biogas migration (AEC 02 and 03) to enter underground conduits and accumulate in enclosed spaces remains a possibility if preferential pathways develop over time. In the context of landfill biogas migration, a preferential pathway means a path of least resistance that allows landfill biogas to travel away from the landfill and potentially enter other areas such as underground conduits, service trenches or building foundations.
– **Worker exposure during future intrusive works:** Maintenance activities involving excavation (e.g. repairs to buried utilities) could expose future workers to contaminants in fill or landfill biogas if not properly managed.
– **Long-term environmental risks:** The project is located near capped waste cells and legacy infrastructure, passive migration of contaminants (e.g. landfill biogas, leachate) over extended timeframes could pose a risk if not monitored.

Mitigation measures during operation will include in the continued operation of the LHRRP landfill biogas monitoring program**.**

Design controls in new infrastructure such as:

– sealed conduits and risers to reduce biogas ingress
– ventilation or monitoring systems in enclosed buildings.

The likelihood of contamination from identified AECs is considered low and does not warrant further assessment. The adjacent LHRRP site is managed under existing plans, including an OEMP and Pollution Incident Response Management Plan (PIRMP). These, along with ongoing environmental monitoring, active biogas extraction, and leachate management systems, provide effective controls to minimise potential exposure to contaminants.

Decommissioning

Decommissioning of the existing power station would involve the removal of the redundant above ground electrical generation equipment infrastructure and repurposing of the vacated area for ongoing use supporting the operation of the proposed replacement power station.

The extent of subsurface disturbance required for decommissioning is expected to be minor in nature, however if residual contamination is identified during decommissioning, it will be managed in accordance with the OEMP and PIRMP. Given the limited scale of decommissioning works, contamination related impacts are expected to be minor and temporary, provided that mitigation measures are effectively implemented.

6.6.5 Mitigation measures

Approach to mitigation and management

Mitigation measures proposed to manage impacts, including proposed techniques, are outlined in this section. Responsibility for implementing each measure, timing, frequency, risk of failure, and an analysis of the consequences of any residual impacts are also provided.

The project will include implementation of measures to mitigate residual impacts, specified in a detailed CEMP and OEMP. Both plans will provide detailed environmental controls to manage key environmental issues. They will be reviewed and updated as necessary throughout the relevant phases of the project.

Summary of mitigation measures

Measures that will be implemented to minimise and manage potential contamination impacts are provided in Table 6.23.

Table 6.23 Mitigation measures – soils and contamination

ID	Environmental aspect	Mitigation measure	Responsibility	Timing
C1	Soil and contamination management	Preparation of a Construction Environmental Management Plan (CEMP) to manage potential contaminant exposure risks during construction works and to manage unexpected finds. A monitoring program should be implemented which includes a higher frequency of monitoring events that aligns with construction activities, particularly those that will disturb the ground surface. The CEMP should include an Unexpected Finds Protocol (UFP), while a site-specific Construction Safety Management Plan (CSMP) will be developed.	LMS / Contractor	Pre-construction / Construction
C2	Environmental monitoring	To reduce the potential for future workers to be exposed to contamination (if present), implement an environmental monitoring programme to assess for the presence of landfill gas at the project site (surface and subsurface) targeting underground services and buildings/structures where enclosed spaces are likely.	LMS	Operation

6.7 Water resources

This section provides a summary of the potential water impacts of construction and operation of the project. A full copy of the assessment is provided in Technical Report 6 – Water impact assessment.

6.7.1 Methodology

Legislative and policy context to the assessment

The assessment was undertaken in accordance with the SEARs and with reference to the requirements of relevant legislation, policies and/or assessment guidelines, including:

– *Water Management Act 2000* (WM Act)
– Managing Urban Stormwater: Soils and Construction (Landcom, 2004)
– NSW Flood Risk Management Manual (2023)
– Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC, 2000 and ANZG, 2018)
– NSW Aquifer Interference Policy (DPI, 2012)
– NSW Water Quality and River Flow Objectives (DECCW, 2006)
– Australian Rainfall and Runoff (2019, updated 2024).

Study area

The study area for the purpose of this assessment includes the river catchments surrounding the project site and LHHRP within an approximate 2 kilometre radius.

Key tasks

The water impact assessment included:

– a desktop review of the existing baseline water (surface and groundwater) environment of the study area for the project site, which includes the site, watercourses, drainage patterns and potential water users downstream of the site
– a desktop assessment of the potential impacts of constructing and operating the project on water quality (surface and groundwater), erosion and sedimentation and flood risk
– reviewing potential interactions with other projects in the region to assess broader water-related implications
– identifying measures to avoid, minimise and manage identified impacts on water.

6.7.2 Existing environment

Local meteorology

Climate statistics obtained for the study area show that there is an average annual rainfall total of 1,020 millimetres which is representative of a temperate climate. Temperatures range from lows of 6 to 7 ºC to highs of 16 to 17 ºC in the winter months and maximums typically reaching 25 to 27 ºC in the summer months.

Strong seasonality in evapotranspiration is observed throughout the year, with the highest monthly totals observed in January and December during summer.

Topography

The project site varies in elevation and slopes down from approximately 160 metres Australian Height Datum (AHD) to 156 metres AHD from northeast towards the southwest corner of the project site (MLEI, 2025).

Soils and geology

The project site is located on the Woronora Plateau within the Sydney Basin and sits on Triassic-aged Hawkesbury Sandstone, a coarse grained quartz sandstone with minor shale. Beneath this are older claystone and sandstone layers.

Soils within the project site correspond to Podzolic soils (mapped by the Australian Soil Classification soil type map of NSW). Podzolic soils are typically acidic, low in fertility, and often found in areas with high rainfall. These soils have a low water holding capacity.

Geotechnical investigations

Geotechnical investigations for the project (Douglas Partners, 2025) recorded shallower water levels; however, these are considered likely to reflect perched water or soil moisture following rainfall, rather than the regional groundwater table. Previous studies at the site (Cleanaway, 2025) consistently show groundwater to occur at greater depths under normal conditions.

GHD carried out a geotechnical investigation for LMS at the project site on 5 to 6 August 2025 to collect data for planning and preliminary design. The work focused on the gravel areas around the site offices, workshop, and east of the generator modules. Four boreholes were drilled to depths of 4.9 to 8 metres below ground level (GHD, 2025).

Surface water

The project site does not contain any permanent or semi-permanent watercourses. The project site is located within the Bardens Creek catchment, which is part of the larger Georges River catchment.

Bardens Creek is an ephemeral second order stream located about 1 kilometre to the northeast, with a small first order tributary about 250 metres from the site. Bardens Creek confluences with Mill Creek 3.5 kilometres downstream.

The existing power station is serviced by a drainage system that directs onsite runoff to the perimeter of the facility, where it is conveyed via kerbs and gutters along access roads towards existing sedimentation basins to the north and northeast. Runoff from upstream areas is intercepted along the western boundary and conveyed through an existing culvert, which discharges north of the project site.

The current drainage system is considered to provide an appropriate level of service for managing both onsite flows and upstream runoff. Refer to the stormwater plan provided in Figure 4.4 of Technical Report 6 which describes the existing drainage network.

Groundwater

Groundwater receptors / users

A total of 19 groundwater bores were identified within 1 kilometre of the project site which all serve monitoring purposes for the LHRRP. A review of all groundwater bores within a 5 kilometre radius did not identify any private landowner bores, domestic or stock water bores indicating that groundwater in proximity to the project site and LHHRP is not being extracted or consumed.

There are no high priority groundwater dependent ecosystems (GDEs) identified as being mapped within one kilometre of the project site. Areas of low probability GDE vegetation are mapped immediately to the north and east of the project site within approximately 400 metres. The nearest high priority GDE is located 2.2 kilometres from the project site.

Groundwater levels and yield

Recent geotechnical investigations undertaken by GHD (GHD, 2025a) found shallow saturated layers (0.1 to 1.2 metres below ground level) attributed to rainfall or minor perched water. Previous studies indicate that true groundwater occurs much deeper, at around 8 metres below ground level. Transmissivity (the rate at which water moves through underground rock or soil) beneath the site is assessed to be low which indicates groundwater is unsuitable for extraction practices such as domestic or industrial supply.

Overall, the project site is characterised by a moderately deep groundwater system, with potential for localised perched or transient water to occur following rainfall events.

Water quality

Surface water quality

As reported in the LHRRP Annual Review (Cleanaway, 2025) and the Mill Creek Aquatic Ecology Spring 2024 and Autumn 2025 Baseline Report (GHD, 2025) showed water quality in Mill Creek is generally fair but shows some signs of stress with low oxygen levels, elevated nutrients, and occasional high metal concentrations likely caused by runoff from the LHRRP.

Groundwater quality

Cleanaway conducts groundwater monitoring at three bores near the LHRRP, as required by Environmental Protection Licence 5065. Ammonia levels in these bores for the years 2017 to 2024 are low and remain below the 1 milligram per litre limit set by the licence.

Flooding

A review of the Sutherland Shire LEP flood mapping (Sutherland Shire Council, 2024b) indicates the project site and wider LHRRP are not located within a flood prone area as it is located at the highest elevation of the catchment. No flood studies have been completed for the project site and no further assessment on flooding was required.

6.7.3 Potential impacts

Construction

Surface water drainage

Construction activities such as excavation and stockpiling are unlikely to significantly modify existing surface water flow paths across the site. While these works may intercept both formal and informal drainage lines, any impacts would be limited to localised water pooling or temporary redirection of flow.

Surface water runoff from the construction of the bioenergy facility, together with small quantities of runoff from the upgradient catchment, would continue to be directed into the Bardens Creek catchment. Minor earthworks associated with construction have the potential to alter local runoff patterns within the site. To manage these risks, mitigation measures will be applied to prevent inundation of construction areas and to enable effective stormwater conveyance.

Given the relatively small works area within the Bardens Creek catchment, the resulting changes to local runoff patterns during construction are expected to be minor and are assessed as having a low to negligible impact on regional hydrology. A detailed Erosion & Sediment Control Plan (ESCP) will be prepared, incorporating clean water diversions and other controls, as detailed in section 6.7.4.

Surface water quality

Activities associated with construction of the project that have the potential to impact surface water quality include:

– minor earthworks including removal of existing infrastructure in which soil may enter waterways and increase turbidity
– handling and operation of equipment and substances such as fuels, coolant, and bulk oils which may have the potential to enter downstream waterways
– handling, storage and removal of buried soils that are potentially contaminated which may enter local drainage pathways and migrate downstream.

Erosion and sedimentation

The construction disturbance footprint for the bioenergy facility is small in comparison to the overall operational footprint of the project site. A soil loss hazard assessment was undertaken which found the erosion risk to be very low throughout the year. As such, any potential sedimentation impacts to the Bardens Creek catchment are expected to be minor and manageable.

Trenching up to 1.5 metres deep for the 33 kV power connection would not occur near Bardens Creek or other waterways. With progressive backfilling and rehabilitation of these areas, standard erosion and sediment controls would be adequate to ensure soil loss and mobilisation is minimised.

All erosion and sediment controls would be incorporated into an ESCP as part of the broader stormwater design.

Handling of hazardous materials

Construction may involve handling hazardous materials that could pose a risk to downstream waterways, such as through plant maintenance, refuelling, accidental spills, concrete slab installation, and disturbance of potentially contaminated soils. Risks may increase due to potential contamination from subsurface waste or imported fill, as identified in the Preliminary Site Investigation (GHD, 2025a). If disturbed, these materials could be mobilised into surface water, particularly during rainfall or water use onsite.

While the presence of contaminated or low-quality fill can elevate the risk to water quality if disturbed, this has been investigated further through additional geotechnical boreholes and sampling undertaken by GHD in a geotechnical investigation (GHD, 2025a). These investigations aim to better define the extent, nature, and potential risk associated with any imported or underlying fill materials at the site.

These risks are generally well understood and manageable, with most expected to have negligible water quality impacts to Bardens Creek with the appropriate mitigation, discussed further in section 6.7.4.

Groundwater quality

Construction may pose a risk to groundwater quality due to potential contamination from fuel or chemical spills and leaching through in situ contaminated materials. Groundwater was assumed to be around 8 metres below ground level which reduces the likelihood that surface spills or leachate would reach and impact groundwater through subsurface migration.

These risks are considered typical and manageable through standard measures such as bunding, proper storage of hazardous materials, and upgradient drainage mitigation to prevent runoff entering excavations. These controls will form part of the stormwater design. With these measures in place, groundwater quality impacts are expected to be negligible.

Groundwater receptors / users

There are no registered water supply works within 5 kilometres of the project site and the project does not require groundwater abstraction or interception. Therefore, no impacts to current or future water supply works are expected. No high priority GDEs are located within or near the project site.

As construction would not cause any groundwater drawdown, no impacts to these receptors are anticipated, and the project complies with the Level 1 Minimal Impact Considerations of the NSW Aquifer Interference Policy, indicating no anticipated change to groundwater levels.

Operation

The final operational configuration of the project would utilise and be similar to the existing stormwater drainage system on site. Impacts associated with hydrology and drainage during operation are anticipated to be minor to negligible.

Potential water quality impacts during operation of the project were identified as follows:

– stormwater runoff from impervious areas which transport pollutants such as sediments, nutrients, and hydrocarbons into downstream waterways
– storage of hazardous materials to be used onsite, such as oils and coolants.

Surface water quality

During operation, only minor changes to the site drainage system are expected, with runoff continuing to be directed to existing sedimentation basins. As a result, impacts to offsite stormwater quality are anticipated to be negligible.

The main potential risks to surface water quality relate to the storage and handling of operational materials such as oils, coolants and other liquids. These materials will be stored in covered and bunded areas, with waste products removed from site by licensed contractors. While accidental spills may occur, the proposed containment measures are expected to minimise the likelihood of contaminants reaching downstream waterways.

Given the like-for-like nature of the project and the continuation of existing drainage and sediment controls, operational impacts to surface water quality are expected to be low and manageable, with no measurable change anticipated in Bardens Creek or the Georges River.

Groundwater quality

During operation, potential risks to groundwater include leaks or spills of chemicals during maintenance. These risks will be managed under an Operational Environment Management Plan (OEMP), which outlines appropriate containment and response measures. The bioenergy facility would be developed predominantly on existing impervious surfaces; there is low potential for any spilled substances to leach into the ground and migrate to groundwater.

Groundwater receptors / users

No groundwater extraction is proposed during operation, and no registered water supply works, private landowner bores or high priority GDEs exist within 1 kilometre of the project site. Therefore, no operational impacts to groundwater users or receptors are anticipated.

Decommissioning

Decommissioning and rehabilitation of the project during the LHRRP post-closure period is expected to entail similar activities and equipment as construction, therefore is not anticipated to have any additional water impacts.

Cumulative impacts

A cumulative assessment was undertaken with consideration to other planned or approved projects within the Georges River catchment. A search of the NSW Major Projects Website on 24 August 2025 identified relevant projects in Sutherland Shire and Georges River Council areas, which include the LHRRP Western Extension and the adjacent flare modification project. While the individual impacts of these projects may be minor, their combined effects could be relevant if construction or operational activities overlap with the project.

Although other projects may discharge to the Georges River catchment, the proposed Western Extension area lies within a separate sub-catchment. As a result, it drains to a different receiving environment, reducing the potential for cumulative impacts on stormwater quality. The flare modification project, which may have otherwise overlapped in timing, is expected to be completed prior to construction of this project. As both projects incorporate independent stormwater treatment and erosion controls, cumulative water quality impacts are not anticipated.

6.7.4 Mitigation measures

Approach to mitigation and management

Mitigation measures proposed to manage impacts, including proposed techniques, are outlined in this section. Responsibility for implementing each measure, timing, frequency, risk of failure, and an analysis of the consequences of any residual impacts are also provided.

The project will include implementation of measures to mitigate residual impacts, specified in a Construction Environmental Management Plan (CEMP) and OEMP. Both plans will provide detailed environmental controls to manage key environmental issues. They will be reviewed and updated as necessary throughout the relevant phases of the project.

The CEMP would contain environmental control measures and a detailed Stormwater Management Plan (SMP) and Erosion and Sediment Control Plan (ESCP).

Summary of mitigation measures

Measures that will be implemented to minimise and manage potential water impacts are provided in Table 6.24.

Table 6.24 Mitigation measures – water resources

ID	Environmental aspect	Mitigation measure	Responsibility	Timing
W1	Soil and water management	A detailed Construction Environmental Management Plan (CEMP) would be prepared and implemented for the Project. The CEMP would contain environmental control measures and a detailed Stormwater Management Plan (SMP) and Erosion and Sediment Control Plan (ESCP). The ESCP will outline the implementation of erosion and sediment control measures in accordance with Blue Book (Landcom, 2004), a key resource for the design and construction of stormwater management. It is expected that erosion and sediment controls would be installed in accordance with *Managing Urban Stormwater: Soils and construction – Volume 1* (Landcom, 2004). Specific controls that are applicable to the project would be included in the ESCP, including: – Minimising the risk of erosion and sedimentation, with a priority on minimising the extent and duration of disturbance. Disturbed areas should be vegetated and stabilised as soon as practicable to do so. – Handling, management and disposal of soils, including the management of unexpected finds of contaminated materials, as recommended in the Preliminary Site Investigation (GHD, 2025a). – Handling of hazardous materials and procedures to manage spills to reduce and address soil and water contamination, including fuel storage and management of transformer oils. – Identifying procedures, approvals and requirements in case of unexpected groundwater interception. – Prior to any soil disturbance or activities that pose a water quality risk during construction, drainage and other erosion sediment and environmental controls would first be implemented, in accordance with the ESCP.	Contractor / LMS	Pre-construction / Construction
W2	Detailed design water management	The management of stormwater quantity and quality should be considered as part of the detailed design of the project. The detailed design of the stormwater management system would be undertaken following project approval and should include the following: – Sizing of stormwater infrastructure to convey stormwater around the facility with consideration to Landcom, 2004 and DECC, 2008. – Incorporate any detailed design mitigation measure identified within the Contamination Preliminary Site Investigation (GHD, 2025a), with regard to potential contaminated soil and any geotechnical concerns.	LMS	Pre-construction

ID	Environmental aspect	Mitigation measure	Responsibility	Timing
W3	Environmental controls	Operational controls relevant to water should be included in the site-specific Operational Environment Management Plan (OEMP). The relevant document should include the following measures relevant to water: – Procedures to maintain drainage features at the site, including open channels, culverts, water quality controls and outlets. These should be maintained in accordance with the manufacturer's specifications and kept free-draining. – Identifying procedures to appropriately handle hazardous materials such that they can be contained within the site during the operational phase. Specified responses to a pollution incident should be documented for the unlikely event that hazardous materials are conveyed outside of the site boundary, or this is threatened.	LMS	Operation

6.8 Traffic and access

This section provides a summary of the potential traffic and transport impacts of the construction, operation and decommissioning of the project. A full copy of the assessment is provided in Technical Report 7 – Traffic impact assessment.

6.8.1 Methodology

Legislative and policy context to the assessment

The assessment was undertaken in accordance with the SEARs and with reference to the requirements of relevant legislation, policies and/or assessment guidelines, including:

– Guide to Road Design Part 3: Geometric Design (Austroads, 2021)
– Guide to Road Design Part 4A: Unsignalised and Signalised intersection (Austroads, 2021)
– Guide to Traffic Management Part 6: Interchanges, Intersections and Crossing Management (Austroads, 2020)
– Guide to Traffic Impact Assessment (Transport for NSW, 2024)
– NSW Planning Guidelines for Walking and Cycling
– Australian Standard 2890.1 (2004) – Off-street car parking
– Australian Standard 2890.1 (2018) – Off-street commercial vehicle facilities
– Roads and Maritime Services Traffic Modelling Guidelines (Roads and Maritime Services, 2013).

Study area

The study area includes the local and State road network and any public and active transport facilities in the vicinity of the project site.

Key tasks

The traffic impact assessment included:

– a desktop review to gain an understanding of existing conditions, traffic operations and any additional potential safety issues within the vicinity of the project site
– reviewing available traffic data and site access arrangements to determine the existing performance of the surrounding road network
– undertaking traffic surveys at key intersections
– reviewing anticipated workforce and traffic numbers
– assessing the capacity of the road network at key intersections to accommodate additional traffic generated by the project
– assessing potential traffic, transport and access impacts
– providing management and mitigation measures.

Traffic survey and road performance

Traffic surveys were undertaken at the intersection of New Illawarra Road / Little Forest Road to determine the traffic volumes or level of service in proximity to the project site. Level of service (LOS) is a qualitative measure used to describe how well a road, intersection, or transport facility operates from the perspective of drivers, passengers, or other users.

An intersection traffic performance assessment was undertaken based on the available traffic count data and the expected peak generated traffic for the project during the weekday peak traffic periods between 5.30am to 8.30am and 3.30pm to 6.30pm on Thursday 20 March 2025. SIDRA 9.1 intersection modelling software (SIDRA) was used to assess the proposed peak hour operating performance of intersections on the surrounding road network.

The traffic implications from the construction and operational activities were assessed based on road network capacity, safety and amenity. Future traffic performance was compared against existing conditions to analyse the impact of the project on the road network.

Potential impacts on public transport, pedestrians and bicycle riders were also assessed by inspecting how the traffic generated by the project would potentially interact with existing facilities.

Swept path analysis

A swept path assessment was undertaken to confirm that the proposed site layout would allow heavy vehicles to safely enter and exit the project site. A B-double 26 metre truck transporting the HV switchroom was simulated in the assessment which is the largest potential vehicle load and size to be used for the project. Refer to section 4.8 of Technical Report 7 for the full assessment.

6.8.2 Existing environment

Road network

The following local and State (classified) roads are located in the vicinity of the project site:

- **New Illawarra Road:** a major arterial State road that runs from Lucas Heights towards the southern suburbs of Sydney. New Illawarra Road serves as a key connection between the **A6 (Heathcote Road)** and the **A1 (Princes Highway).**
- **Heathcote Road:** a major arterial State road in New South Wales connecting the southwestern suburbs of Sydney with the Sutherland Shire. Heathcote Road serves as a key connection between the **A1 (Princes Highway)** and the **A34 (Newbridge Road).**
- **Little Forest Road:** a local road that links New Illawarra Road and LHRRP. The road has a posted speed limit of 40 kilometres per hour with no public transport or pedestrian facilities.

Heavy vehicle routes

The nearest key freight routes to the project site authorised to accommodate vehicles up to the size of a 26 metre B-double truck are New Illawarra Road and Heathcote Road.

Public and active transport

Public transport

There are no public or active transport facilities in proximity to the project site. The nearest public transport facilities are over 4 kilometres away from the project site access point.

Active transport

Active transport facilities are limited to bicycle paths that can be found north of New Illawarra Road. There are currently no dedicated footpaths and cycling lanes that provide direct access to the project site.

The area features numerous mountain bike trails which are part of the Mill Creek mountain bike trails. The trail head is located near Little Forest Road to the north of the LHRRP site entrance and extends into the Lucas Heights Conservation Area.

Sutherland Shire Council are currently constructing a car park to serve the Mill Creek Mountain Bike trails which is located approximately 300 metres southeast of the site near the intersection of Little Forest Road and New Illawarra Road. This car park would provide 52 car parking spaces and an access pathway for mountain bikers to ride off road along the Little Forrest Road.

Road crash information

Road crash data was obtained from the NSW Centre for Road Safety, covering the period from 2019 to 2023. A total of 38 crash incidents were recorded within a 2 kilometre radius of the project site. The nearest crash incident occurred within 100 metres of the New Illawarra road and Little Forest Road intersection.

Traffic volumes and performance

Existing traffic volumes

GHD traffic study

Traffic surveys were undertaken at the intersection of New Illawarra Road and Little Forest Road to determine the traffic volumes in proximity to the project site. The results are shown on Figure 6.8. The highest volume of traffic experienced is within the following time periods:

– weekday AM peak hour between 6.45 to 7.45am
– weekday PM peak hour between 3.30 to 4.30pm.

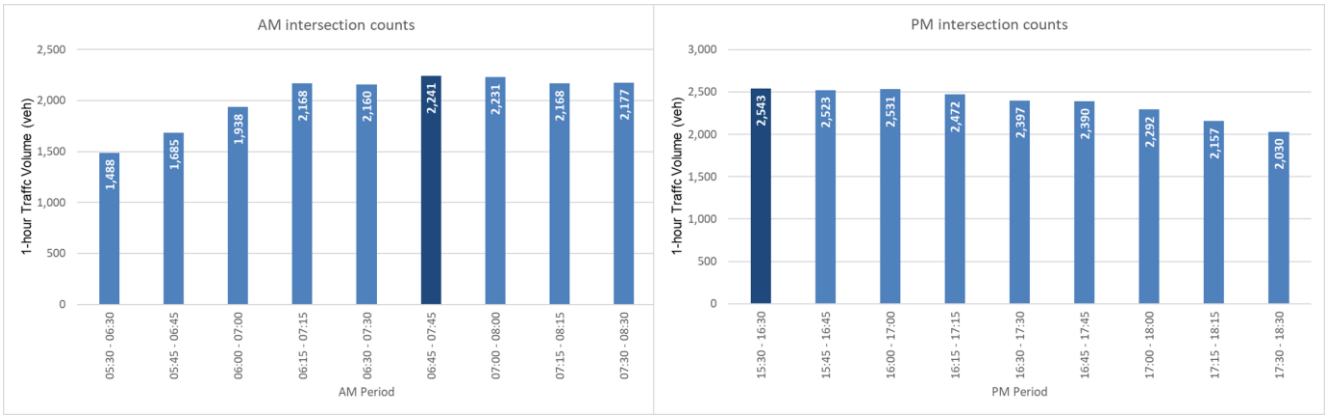

Figure 6.8 Hourly traffic volumes for Little Forest Road / New Illawarra Road intersection (AM/PM)

Cleanaway traffic study

Cleanaway undertook a traffic analysis from January 2022 until September 2025 focusing on the transfer truck movement**s** associated with the LHRRP landfill operations (Cleanaway, 2025). The analysis was not presented as a formal report but rather as a comparative graph illustrating queue lengths of transfer trucks when landfill opening times were adjusted from 3am to 5am**.**

The findings indicate that the peak traffic period occurs at the 5am landfill opening**,** when a queue of Cleanaway bulk waste transport truck**s** and Council vehicles typically forms to access the LHRRP on Little Forest Road. This queue is generally cleared within approximately 30 minutes of the LHRRP opening.

Intersection performance

Hourly traffic volumes collected during the survey were analysed using SIDRA to identify the current operation of the New Illawarra Road and Little Forest Road intersection. The results of the SIDRA analysis are provided in Table 6.25.

The results indicate that the intersection currently operates within practical capacity of a LOS rating of “D” during both morning and evening peak periods which is approaching unstable flow, where traffic is near capacity.

During the AM peak period, right turn movements from the north and west approaches experience delays of 55 seconds and 41 seconds, respectively which may result in localised delays.

Table 6.25 New Illawarra Road / Little Forest Road current intersection performance

Approach	Intersection Leg	AM Peak			PM Peak		
		Ave delay (sec)	Level of service (LOS)	95th % queue (m)	Ave delay (sec)	Level of service (LOS)	95th % queue (m)
South	New Illawarra Road	8	A	< 5	7	A	< 5
North	New Illawarra Road	55	D	9	19	B	< 5
West	Little Forest Road	41	C	< 5	20	B	< 5
Total		**55**	D	**9**	**20**	**B**	**< 5**

LEGEND *Free flow* *Congested*

Note 1: The average delay for priority-controlled intersections is selected from the movement on the approach with the highest average delay.
Note 2: The level of service for priority-controlled intersections is based on the highest average delay per vehicle for the most critical movement.
Note 3: The degree of saturation (DoS) is defined as the ratio of the arrival flow (demand) to the capacity of each approach.
Note 4: Average delay is given in seconds per vehicle.

6.8.3 Potential impacts

Construction

Traffic generation and potential impacts

Construction vehicle movements would comprise both heavy and light vehicles and would vary across the construction program, depending on the construction activity being undertaken. Construction would create additional traffic on the road network around the project site, this would include traffic during the construction, and decommissioning stages.

It is estimated that 20 heavy vehicles would occur per day (10 inbound and 10 outbound) during construction with four heavy vehicle movements (2 inbound and 2 outbound) have been assumed during the morning and afternoon peak hours.

The potential impacts on the road network were quantified by adding the traffic generated by construction of the project to the expected future traffic volumes on the road network, as demonstrated in Table 6.26.

*Table 6.26 **Future intersection performance – 2026, with construction***

Intersection	AM Peak			PM Peak		
	Average Delay (s)	Level of service (LOS)	95th % queue (m)	Average Delay (s)	Level of service (LOS)	95th % queue (m)
South: New Illawarra Road	8	A	< 5	8	A	< 5
North: New Illawarra Road	56	D	11	17	B	< 5
West: Little Forest Road	46	D	5	24	B	< 5
Total	**56**	D	**11**	**24**	B	< 5

LEGEND *Free flow* *Congested*

Note 1: The average delay for priority-controlled intersections is selected from the movement on the approach with the highest average delay.
Note 2: The level of service for priority-controlled intersections is based on the highest average delay per vehicle for the most critical movement.
Note 3: The degree of saturation (DoS) is defined as the ratio of the arrival flow (demand) to the capacity of each approach.
Note 4: Average delay is given in seconds per vehicle.

The assessment results indicate that the Little Forest Road and New Illawarra Road intersection is expected to operate within capacity with a satisfactory level of service at all time periods.

Peak heavy vehicle traffic on Little Forest Road occurs around 5am, coinciding with Cleanaway bulk waste transport and Council vehicles which typically queue to access the LHRRP. As project construction is proposed between 7am and 5pm, it would avoid the early morning peak period, thereby minimising potential conflicts with heavy vehicles accessing the LHRRP and maintaining safe, efficient site access.

Other impacts

Parking

Construction and personal vehicles would park within the boundaries of the project site using existing carpark facilities. Therefore, vehicle parking demand generated by construction would have no impact on parking spaces on roads external to the project site and LHRRP.

Heavy vehicles

Heavy vehicles are expected to access/egress the project site via the existing entrance on Little Forrest Road. A swept path analysis was undertaken for a 26 metre B-double truck which is simulated to represent the largest potential vehicle used by the project. The switchroom is the largest piece of infrastructure to be transported into the project and was modelled in the analysis.

The swept path analysis shown on Figure 4.7 of Technical Report 7 indicates there are some locations that may impacted by the vehicle movements however do not indicate access would be prevented entirely. Heavy vehicle access requirements would be incorporated into the Construction Traffic Management Plan. Swept paths would be confirmed by the contractor by providing a detailed route analysis from the point of origin to/from the site.

Active transport

There is no formal active transport infrastructure in proximity to the project site. Therefore, the expected vehicle activity associated with the operation of the project is expected to have a negligible impact on the active transport infrastructure in proximity to the project site.

No potential impacts on other forms of transport have been identified. Mitigation measures are proposed in section 6.8.4 to minimise any potential impacts to other road users.

Operation

Traffic generation and potential impacts

The impacts of the project on the road network during operation were quantified by adding the traffic generated by the project's operational activities to the expected future traffic volumes on the road network.

Future baseline traffic for the year 2035 was estimated by applying a growth rate of 1% per annum to the existing traffic volumes. A comparison of the future intersection performance with and without the operation of the project is provided in Table 6.27 and Table 6.28.

Table 6.27 ***Future intersection performance – 2035, without operation***

Intersection	AM Peak			PM Peak		
	Average Delay (s)	Level of service (LOS)	95th % queue (m)	Average Delay (s)	Level of service (LOS)	95th % queue (m)
South: New Illawarra Road	8	A	< 5	7	A	< 5
North: New Illawarra Road	136	F	19	23	B	< 5
West: Little Forest Road	67	E	7	33	C	< 5
Total	**136**	F	**19**	**33**	C	**< 5**

Table 6.28 ***Future intersection performance – 2035, with operation***

Intersection	AM Peak			PM Peak		
	Average Delay (s)	Level of service (LOS)	95th % queue (m)	Average Delay (s)	Level of service (LOS)	95th % queue (m)
South: New Illawarra Road	8	A	< 5	7	A	< 5
North: New Illawarra Road	140	F	21	21	B	< 5
West: Little Forest Road	68	E	7	41	C	< 5
Total	**140**	F	**21**	**41**	C	**< 5**

LEGEND *Free flow* *Congested*

Note 1: The average delay for priority-controlled intersections is selected from the movement on the approach with the highest average delay.
Note 2: The level of service for priority-controlled intersections is based on the highest average delay per vehicle for the most critical movement.
Note 3: The degree of saturation (DoS) is defined as the ratio of the arrival flow (demand) to the capacity of each approach.
Note 4: Average delay is given in seconds per vehicle.

The results indicate that the intersection is expected to operate at a LOS of 'F' during the morning peak hours, with or without the operation of the project. An LOS of 'F' represents severely congested conditions, where demand exceeds capacity, resulting in very long delays, extensive queues, and a breakdown in traffic flow. This indicates that the intersection is already operating beyond its design capacity during the morning period, and the project is not expected to materially worsen performance.

In contrast, during the afternoon peak hours, the intersection is expected to operate at LOS of 'C', both with and without the project. LOS 'C' reflects stable operating conditions, where traffic flows freely with moderate delays and acceptable manoeuvrability, indicating that the intersection would continue to function efficiently during this period.

The expected increases in traffic during operations would be offset by a similar reduction of operational movements for the existing power station which would be decommissioned. As such, traffic generated by the operation of the bioenergy facility is not expected to have a significant impact on the operation of the road network, which is already expected to operate near or over capacity by 2035.

Other impacts

Heavy vehicles

As discussed in section 6.8.1, a swept path analysis was undertaken for a 26 metre B-double truck transporting the switchroom which is simulated to represent the largest potential vehicle used by the project. The analysis indicates that a 26-metre B-double truck would be able to enter and exit the site within no obstructions. Negligible heavy vehicle movements are anticipated during operation of the project.

Active transport

There is no formal active transport infrastructure in proximity to the project site. Therefore, vehicle activity associated with the project's operation is anticipated to have a negligible impact on nearby active transport infrastructure. Mitigation measures are proposed in section 6.8.4 to minimise any impacts to other road users.

Parking

Parking for all vehicles associated with the project would be contained within the boundaries of the project site. As such, vehicle parking demand generated by the project would have no impact on parking spaces or roads surrounding the project site and LHRRP.

Decommissioning of the project

The traffic volumes associated with decommissioning of the bioenergy facility are likely to be less than the volumes associated with construction and would therefore have a negligible impact on the surrounding traffic and transport facilities.

Cumulative impacts

Other nearby projects that could contribute to traffic in the area includes visitors using the Mill Creek mountain bike club car park and trails during operation.

During operation, the Mill Creek mountain bike car park is expected to significantly improve traffic conditions along Little Forest Road by reducing the need for informal roadside parking for people accessing the mountain bike trails. The parking area currently under development will alleviate congestion and improve overall traffic flow and safety near project site main entrance.

Access to the mountain bike trail network from the new car park requires only a single road crossing, ensuring that rider movements are concentrated off Little Forest Road and managed safely, with minimal disruption to vehicle traffic. Construction traffic would also avoid the peak queuing times for heavy vehicles accessing the LHRRP during normal operations. As a result, the impact of this project on traffic along Little Forest Road and New Illawarra Road is expected to be minimal.

6.8.4 Mitigation measures

Approach to mitigation and management

Mitigation measures proposed to manage impacts, including proposed techniques, are outlined in this section. Responsibility for implementing each measure, timing, frequency, risk of failure, and an analysis of the consequences of any residual impacts are also provided.

The project will include implementation of measures to mitigate residual impacts, specified in a Construction Traffic and Pedestrian Management Plan (CTPMP). The plan will provide detailed controls to manage key access issues. They will be reviewed and updated as necessary throughout the relevant phases of the project.

The CTPMP will include, as a minimum, industry-standard measures for the management of traffic, as well as site-specific measures for the management of traffic movement and generation during construction.

Summary of mitigation measures

Measures that will be implemented to minimise and manage potential traffic impacts are provided in Table 6.29.

Table 6.29 Mitigation measures – traffic

ID	Environmental aspect	Mitigation measure	Responsibility	Timing
T1	Traffic and pedestrian management Plan	The Construction Traffic and Pedestrian Management Plan (CTPMP) will be updated prior to the commencement of construction to maintain the safety of all workers and road users within the vicinity of the project site. The CTPMP will include measures (as detailed in sections 5.2.1 – 5.23 of Technical Report 7. The CTPMP will provide guidance on the safe and efficient management of staff and vehicle access to the site. At a minimum, the CTPMP will provide a description of: – the proposed activities – the type and number of vehicles that would be generated during each stage of the works – access arrangements and routes for vehicles entering and egressing the site. The CTPMP will outline strategies to: – manage vehicular traffic movement associated with the project – minimise the impact of site-generated vehicle traffic on the operation of the adjoining road network – facilitate the continuous, safe, and efficient travel of workers, contractors, and the general public.	LMS / Contractor	Pre-construction / Construction

7. Assessment of other impacts

The following issues identified during the risk assessment require standard assessment in the EIS (as confirmed in the SEARs):

– Visual landscape and future land use
– Biodiversity
– Cultural heritage
– Greenhouse gas emissions
– Social and economic
– Waste
– Cumulative impacts.

These issues are addressed in section 7.1 through section 7.7. A compilation of mitigation measures (excluding mitigation measures that are built into the physical layout and design of the project and captured in the project description) is provided in Appendix E.

7.1 Visual landscape and future land use

This section provides a summary of potential landscape, visual and future land use impacts associated with the construction, operation, and decommissioning of the project. This section also considers the future landform and any potential conflicts with the project and the LHRRP post closure rehabilitation strategy.

7.1.1 Methodology

Legislative and policy context to the assessment

The following legislation, guidelines and/or policies are relevant to the project include:

– Visual Impact Assessment Guideline (DPE, 2019)
– *Guidelines for Landscape and Visual Impact Assessment*, 3rd Edition (Landscape Institute & IEMA, 2013)
– *Local Character and Place Guideline* (NSW Government, 2019)
– *Better Placed: An integrated design policy for the built environment of New South Wales* (Government Architect NSW, 2017).

Key tasks

The landscape and visual impact assessment involved:

– desktop analysis, including analysing aerial photographs and topographic maps, and review of relevant strategies, plans and guidelines
– an existing conditions assessment was undertaken to determine the existing natural and landscape features within the study area
– site visit and analysis to understand the existing landscape and visual context
– understanding the key visual features of construction and operation
– assessing the potential for landscape character and visual impacts during construction and operation, and determining the potential significance of impacts by assessing sensitivity and magnitude
– assessing the potential future land use impacts and potential conflicts with the LHRRP post-closure rehabilitation strategy
– recommending mitigation and management measures.

Study area

The study area to assess the visual impact of the project is defined as the area within 2.5 kilometres of the project site. This area encompasses the project site, the LHRRP and the surrounding landscape and visual environments that the project could affect.

7.1.2 Landscape and existing visual environment

Landscape context

The project is located within the LHRRP, a large and established waste and resource management facility in the Sutherland Shire local government area. The site is situated within a broader bushland setting and is characterised by a modified industrial landscape surrounded by remnant native vegetation, steep landforms, and security controlled access points.

The LHRRP itself contains a range of built infrastructure associated with waste processing and energy recovery, including landfill cells, an organics recycling facility, and an existing power station. While the internal landscape is highly modified and functional in appearance, the site is visually contained due to perimeter vegetation, topography, and restricted public access.

Surrounding the LHRRP are several key land uses and landscape features, including:

– bushland associated with ANSTO's exclusion zone and LHRRP perimeter
– ANSTO facilities, located approximately 400 metres to the southeast across New Illawarra Road
– Holsworthy Military Reserve, located to the west, northwest and southwest of the LHRRP opposite Heathcote Road
– Mill Creek mountain bike trail network and carpark, located approximately 300 metres to the southeast
– Lucas Heights Conservation Area, approximately 1 kilometre to the north, forming part of the Mill Creek reserve and mountain bike trails
– residential areas of North Engadine and Barden Ridge, located approximately 2 kilometres to the east.

The overall character of the surrounding landscape is defined by heavily vegetated ridgelines, with limited development outside the LHRRP boundary. Views into the LHRRP from surrounding areas are mostly filtered or screened by mature vegetation, fencing, and topographical features.

Landscape character zones

The study area has been divided into the following Landscape Character Zones (LCZs), based on land use, vegetation, topography and the presence of current and anticipated future built form.

LCZ 1 – LHRRP operational precinct

This zone comprises the developed core of the LHRRP, including active landfill areas, the existing power station (project site), garden organics facility, and internal access roads. The landscape character is highly modified and functional, with large areas of hardstand and waste management infrastructure. Vegetation within this zone is limited and mostly confined to planted screening along internal boundaries.

LCZ 2 – Conservation and recreational reserves

This zone includes the Lucas Heights Conservation Area and Mill Creek recreational areas. This zone is characterised by natural bushland and mountain bike and walking trails, contributing to visual amenity and recreational value. Topography and vegetation generally limit long-range views into the LHRRP from this zone.

LCZ 3 – Urban edge

This zone includes residential suburbs approximately 2 kilometres east of the site, including North Engadine and Barden Ridge. Dwellings are situated on elevated terrain but have limited or no direct views into the LHRRP due to intervening vegetation and distance.

LCZ 4 – Future recreational parkland

This zone comprises the LHRRP active landfill area that is planned to be rehabilitated and transformed into a community parkland following the completion of landfill operations. Approximately 149 hectares of land is currently proposed to be progressively recontoured and revegetated to support passive recreation (subject to ANSTO consent), including open grassed spaces, tree plantings, shared pathways, and park infrastructure. Further discussion is provided in section 7.1.3.

Visual catchment

The visual catchment of the project is primarily restricted to within the LHRRP boundary and immediate surrounds due to dense vegetation, built form, and topography. Views into the site from public areas are extremely limited.

Some partial views may be available from:

– internal operational areas within the LHRRP
– ANSTO staff areas or elevated secure points east of New Illawarra Road
– designated mountain bike trail entry points or car parks (though typically screened)
– hilltops within Holsworthy Military Reserve, though access is restricted
– no elevated public vantage points or lookouts provide clear views into the project site. The visual catchment is highly contained.

Refer to Figure 7.1 which provides an overview of the existing power station (project site) looking southeast from within the LHRRP.

Figure 7.1 Viewpoint of the existing power station from within the LHRRP looking east

Representative viewpoints

Viewpoints were selected to reflect the types of visual receivers who may experience some level of exposure to the project. These include:

– on-site workers and visitors to the LHRRP and nearby PCYC MiniBike Club
– future recreational users of the proposed community parkland post-closure of the LHRRP
– peripheral vantage points with intermittent or filtered views toward the infrastructure area.

Given the presence of dense vegetation, steep terrain, and fencing, the visibility of the site from surrounding areas is low. The assessment has focused on the most proximate and relevant receiver locations, acknowledging that many external areas do not have a direct line of sight to the project site.

The project site is only partially visible from Little Forest Road due to the presence of tall mature trees around the LHRRP perimeter.

7.1.3 Future land use

Post closure landform

The LHRRP is planned to undergo a significant transformation following the completion of landfill operations, which are currently forecast to conclude between 2037 and the early 2040s. In accordance with SSD 6835, the site is proposed to be progressively rehabilitated and repurposed into a large scale community recreational parkland known as the future parkland at the conclusion of landfilling operations.

The proposed post-closure landform includes approximately 149 hectares of open space intended for passive recreational use. The vision for the site includes:

– broad areas of open grassland and tree plantings
– integrated walking and cycling paths
– vehicular access routes and parking areas
– gradual recontouring of landfill areas to support recreation and ecological restoration.

The future parkland is intended to provide long term community benefit, while ensuring the safe and environmentally responsible closure of the former landfill facility. The final design of the parkland, including access points, recreational infrastructure, and landscaping treatments, would be determined in consultation with key stakeholders, including Sutherland Shire Council and ANSTO, closer to the closure date.

The project site is located within a designated infrastructure area to the east of the future recreational parkland as shown on the draft masterplan on Figure 7.2. While it is positioned near to proposed open space, its future visual interaction with public areas would be limited due to topography.

The master plan image is not to scale or a surveyed plan. The image represents a concept impression of proposed landscaping to be carried out as part of the post closure obligations of the LHRRP which will be subject to further refinement in consultation with relevant stakeholders. The proposed bioenergy facility footprint is confirmed to not impede the future recreational parkland.

Paper Size ISO A4

NOT TO SCALE

N

GHD

LMS Energy
Lucas Heights Bioenergy facility

Proposed parkland master plan

Project No. **12649882**
Revision No. **0**
Date **16/09/2025**

FIGURE 7.2

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Print date: 16 Sep 2025 - 15:41

Data source: GHD: Site Boundary (2025), Site Features (2025). NSWSS: SVTM (2025), NPWSR (2025), Cadastre (2025). Nearmap WMS Server: .
Created by: dbbanatin

7.1.4 Assessment criteria

Landscape assessment criteria

The landscape assessment considers how the project may affect the physical and perceptual characteristics that define a landscape's character. This includes geology, landform, vegetation, land use, and built form.

The assessment is based on:

– sensitivity of the landscape, determined by its value and susceptibility to change (refer to Table 7.1)
– magnitude of change, based on the scale, duration, and reversibility of the projects influence (refer to Table 7.2).

The combination of these factors determines the significance of landscape change using defined assessment criteria.

Table 7.1 Landscape susceptibility to change

Landscape susceptibility	Definition
High susceptibility to change	The type of development proposed could have a detrimental effect on the landscape character, condition or value. Mitigation measures are unlikely to reduce the impacts of the change.
Moderate susceptibility to change	Any change caused by the type of development would be unlikely to have a significant adverse effect on the landscape character, condition or value that could not be mitigated.
Low susceptibility to change	Development of this type is unlikely to have an adverse effect on the landscape character, condition or value. Mitigation measures would be effective in neutralising adverse effects.

Table 7.2 Magnitude of change criteria (landscape)

Rating	Criteria
High	A substantial/obvious change to the landscape character due to total loss of, or change to, elements, features or characteristics of the landscape. Would cause a landscape to be permanently changed and its quality diminished.
Moderate	Discernible changes in the landscape character due to partial loss of, or change to elements, features or characteristics of the landscape, however, has potential to be partly mitigated. The change would be out of scale with the landscape character, and at odds with the local pattern and landform and would leave an adverse impact on the landscape character.
Low	Minor loss or alteration to one or more key landscape character elements, features or characteristics, or the introduction of components that may be new but may not be uncharacteristic within the existing landscape character.
Negligible	Almost imperceptible or no change in the landscape character as there is little or no loss of/or change to the elements, features or characteristics of the landscape.

Visual assessment criteria

The visual assessment considers how the project may alter views and affect visual amenity for surrounding receivers, including residents, road users, and recreational users.

The assessment is based on:

– sensitivity of the visual receiver, based on viewer type, distance, and value of the view (refer to Table 7.3)
– magnitude of visual change, considering extent, contrast, and duration of change in views (refer to Table 7.4).

Table 7.3 Sensitivity criteria (visual)

Rating	Criteria
High	Occupiers of residential properties, at home or going to or from, with long viewing periods, within close proximity to the proposed development; Communities that place value upon the urban landscape and enjoyment of views of their setting.
Moderate	Outdoor workers who have a key focus on their work who may also have intermittent views of the study area; Viewers at schools, or similar, when outdoor play and recreation areas are located within close proximity but viewing periods are limited. Occupiers of residential properties with long viewing periods, at a distance from or screened from the study area.
Low	Road users in motor vehicles, trains or on transport routes that are passing through or adjacent to the study area and therefore have short term views; Viewers indoor at their place of work, schools or similar.
Negligible	Viewers from locations where there is screening by vegetation or structures where only occasional screened views are available and viewing times are short; Road users in motor vehicles, trains or on transport routes that are passing through/adjacent to the study area and have partially screened views and short viewing times.

Table 7.4 Magnitude of change criteria (visual)

Rating	Criteria
High	A substantial/obvious change to the existing view due to total loss of, or change to, elements, features or characteristics of the view. Would cause a view to be permanently changed and its quality diminished.
Moderate	Discernible changes in the existing view due to partial loss of, or change to elements, features or characteristics of the view, however, has potential to be partly mitigated. The change would be out of scale with the existing view and would leave an adverse impact on the view.
Low	Minor loss or alteration to one or more key view elements, features or characteristics, or the introduction of components that may be visible but may not be uncharacteristic within the existing view.
Negligible	Almost imperceptible or no change in the view as there is little or no loss of/or change to the elements, features or characteristics of the view.

Determining significance

The overall significance of potential landscape and visual changes is determined by combining the sensitivity of the receiver and the magnitude of change using the matrix provided in Table 7.5.

Table 7.5 Significance of impact matrix

		Magnitude of impact			
		High	**Moderate**	**Low**	**Negligible**
Sensitivity	**High**	High Impact	High-Moderate	Moderate	Negligible
	Moderate	High-Moderate	Moderate	Moderate-Low	Negligible
	Low	Moderate	Moderate-Low	Low	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

7.1.5 Potential landscape impacts

The landscape impact assessment considers how the project may affect the physical, aesthetic, and perceptual qualities of the landscape within and around the project site and LHRRP. The assessment follows the criteria outlined in section 7.1.4 considering both the sensitivity of the landscape character zones (LCZs) and the magnitude of change introduced by the project.

As described in section 7.1.2, the landscape within the study area have been divided into four LCZs. These zones vary from heavily modified infrastructure precincts to natural bushland and future recreational areas. The project is located entirely within LCZ 1 within the LHRRP operational precinct and existing power station site.

Construction

During construction, landscape impacts would be confined to the project site. Works would include land preparation, construction of new infrastructure including minor works to servicing corridors, removal of below ground infrastructure and vehicle movement within an established operational setting.

- **LCZ 1 – LHRRP operational precinct:** This zone is of low sensitivity, given its existing industrial character and highly modified condition. The magnitude of change during construction is low, as the new works are consistent with the current land use. Significance of impact: **Low.**
- **LCZ 2 – Conservation and recreational reserves:** This zone is of moderate sensitivity due to its natural bushland setting. Construction activities would not be visible from the majority of the zone, resulting in a negligible magnitude of change. Significance of impact: **Negligible.**
- **LCZ 3 – Urban edge:** Residential areas approximately 2 kilometres east have high sensitivity, however construction would not be visible due to vegetation and topography, resulting in a negligible magnitude of change. Significance of impact: **Negligible.**
- **LCZ 4 – Future recreational parkland:** This zone would not be established during construction and therefore has not been assessed.

Operation

During operation, the project would function as a permanent piece of energy infrastructure, replacing the existing power station, resembling a similar layout and character to the current operation. The new facility would be consistent with the industrial land use character of the LHRRP and would not significantly alter the surrounding landscape.

- The project site is located within an established industrial precinct that contains existing mature vegetation and landscaped buffers comprising native species along site boundaries, providing effective visual screening and integration with the surrounding environment. Given these existing landscaping treatments, the preparation of detailed landscaping plans specific to this project is not considered necessary. Refer to section 7.2 for further description on the existing landscaping treatments within the project site. **LCZ 1 – LHRRP operational precinct:** The operational landscape character remains unchanged. The magnitude of change is low, and the sensitivity remains low. Significance of impact: **Low.**
- **LCZ 2 – Conservation and Recreational Reserves**: Operational infrastructure would not be prominent or visible. Magnitude of change remains negligible, and sensitivity moderate. Significance of impact: **Negligible.**
- **LCZ 3 – Urban edge**: No material change in visible landscape features from residential areas. Significance of impact: **Negligible.**
- **LCZ 4 – Future recreational parkland:** As the area transitions to passive recreation, sensitivity is expected to increase. However, due to visual separation, sloped terrain (10-19%), and restricted recreational use near the project site, the magnitude of change remains low. Significance of impact: **Moderate–Low.**

Decommissioning

Decommissioning of the project during the LHRRP post-closure period would involve the removal of above ground infrastructure and rehabilitation of the project site, where appropriate. These activities are expected to be of short duration and limited in scope, resulting in minor, temporary impacts.

If the project is decommissioned in the future, above ground infrastructure would be removed and the site potentially restored to a similar condition as surrounding areas. Landscape impacts during this phase would be short term and limited in extent. Across all LCZs, the magnitude of change would range from low to negligible, depending on visibility.

7.1.6 Potential visual impacts

LHRRP operational precinct

Refer to Figure 7.3 which provides an overview of the project site from within the LHRRP operational footprint.

Figure 7.3 Viewpoint of the existing power station looking south from the northern boundary within the LHHRP

Table 7.6 Visual impact assessment of construction and operation phase

Criteria	Comments
Location and view direction	Internal operational areas of the LHRRP looking toward the project site. Viewpoints represent staff, contractors, and operational visitors. Views are typically short-range and occur within or adjacent to infrastructure areas.
Description of existing view	The existing environment is highly modified and functional, dominated by engineered landforms, landfill cells, buildings, stockpiles, and heavy vehicle activity. Vegetation is sparse and mostly consists of perimeter plantings and isolated landscape buffers.
Anticipated change to view	During construction, views of vehicles, machinery, and stockpiles would be visible and consistent with existing industrial character. During operation, the new facility would be of similar scale and form to existing infrastructure of the existing power station. There would be no significant change to the dominant view composition within the precinct.
Sensitivity to change	**Low** – Viewers are site workers engaged in operational activities, with limited sensitivity to visual change.
Magnitude of change	**Low** – The project aligns with the existing land use and visual character of the precinct.
Significance of impact	**Low** – Low sensitivity combined with low magnitude of change results in a low impact significance.

Conservation and recreational areas

The Mill Creek mountain bike trail network is located approximately 500 metres north of the project site, within the Lucas Heights Conservation Area and the bike trail car park is located approximately 300 metres to the southeast. The car park and trail entrance are surrounded by dense native bushland and situated on lower terrain, which significantly limits outward views toward the project and as shown on Figure 7.4 and Figure 7.5.

Figure 7.4 Looking west toward the LHRRP from Little Forest Road to the mountain bike trails car park area (Google maps, 2020)

Figure 7.5 Looking southwest from Litte Forest Road at the project site entrance (LMS Energy, 2025)

Table 7.7 Visual impact assessment of construction and operation phase

Criteria	Comments
Location and view direction	Lucas Heights Conservation Area and Mill Creek mountain bike trails, located north and southeast of the project site. Viewpoints represent recreational users engaging in bushwalking and mountain biking.
Description of existing view	Natural bushland setting with walking and bike trails, steep terrain, and a dense canopy. Views are typically enclosed by vegetation, though occasional filtered long-range views to cleared areas of project site may be possible from Little Forest Road at the site entrance.
Anticipated change to view	Construction activity would not be visible. During operation, the new facility may be partially visible from some higher or cleared locations, but would be distant, visually consistent with the existing built form, and unlikely to dominate the landscape.
Sensitivity to change	**Moderate** – Recreational users may have an appreciation for natural views, but most views are enclosed, and the project is peripheral to recreational use.
Magnitude of change	**Low** – Distant and intermittent views of infrastructure, similar to existing forms.
Significance of impact	**Moderate to Low** – A combination of moderate sensitivity and low magnitude results in a Moderate–Low impact.

Urban edge

Fairview Avenue is located approximately 2 kilometres east of the project site, within the residential suburb of Barden Ridge. Dwellings along Fairview Avenue are situated on elevated land, however views toward the project site are screened by dense vegetation within the surrounding bushland reserves and along the ANSTO precinct exclusion zone, as shown on Figure 7.6.

Figure 7.6 Looking north from Fairview Avenue toward to the LHRRP and ANSTO site with ANSTO buildings in the background (Google Maps, 2021)

Table 7.8 Visual impact assessment of construction and operation phase

Criteria	Comments
Location and view direction	Residential areas of North Engadine and Barden Ridge, approximately 2 km east of the project site looking north. Dwellings are situated on ridgelines.
Description of existing view	Urban residential setting with private garden outlooks. Views to the project site are blocked or filtered by intervening vegetation and topography. No direct views of the project site are currently available from most dwellings.
Anticipated change to view	No significant change to view is anticipated. The project would remain screened by topography and vegetation. Night lighting may be imperceptible or blend with existing low-level site lighting.

Criteria	Comments
Sensitivity to change	**High** – Residential viewers are generally considered highly sensitive, though views toward the project site are limited.
Magnitude of change	**Negligible** – No material change to the existing view is expected.
Significance of impact	**Negligible** – Despite high sensitivity, negligible magnitude results in a Negligible visual impact.

Future recreational parkland

A key viewpoint for assessing the project's visual impact is the area designated for future recreational use within the rehabilitated LHRRP. This parkland, planned as part of the post-closure strategy, would include open space, grassed areas, and shared paths intended for passive recreation. Figure 7.7 provides a perspective of how the facility would look from the direction of the future recreational parkland.

Figure 7.7 ***Render of the bioenergy facility during operation and the adjacent future recreational parkland looking east (LMS Energy, 2025)***

Table 7.9 ***Visual impact assessment of operation phase***

Criteria	Comments
Location and view direction	A future recreational parkland is to be established in the landfill post-closure period under the voluntary planning agreement with Sutherland Shire Council. Viewpoints represent future users of the rehabilitated area, looking east toward the project site.
Description of existing view	A modified, grassed landform resulting from progressive landfill capping. The area will be recontoured and revegetated for passive recreation, including open grassed areas, scattered tree plantings, and paths. The project site lies to the east, on steeper terrain, currently separated by a slope of 10-19%. The bioenergy facility would be visible in some locations but generally screened by topography and vegetation.

Criteria	Comments
Anticipated change to view	The new facility would be located in the designated infrastructure area which forms the existing power station footprint east of the proposed parkland. During operation, the facility would be similar in scale and form to the existing power station and would remain partially screened by slope and vegetation. Lighting may be visible as a soft glow in the evening but will be directed and shielded. Recreational activity would be concentrated on more level land further west, over 400 m from the project site as shown on the proposed master plan provided as Figure 7.2.
Sensitivity to change	**Moderate** – Future recreational users are expected to have a moderate sensitivity due to the amenity-based nature of parkland use, though the project site lies within a dedicated infrastructure area outside the main activity zones.
Magnitude of change	**Low** – Limited visibility of new infrastructure, consistent with the scale and character of existing development. Screening and separation reduce the visual influence.
Significance of impact	**Moderate – Low** – Based on moderate sensitivity and low magnitude, the significance of visual impact is assessed as Moderate–Low.

Decommissioning

Decommissioning works during the LHRRP post-closure period may result in impacts on landscape character and visual amenity; however, potential landscape and visual impacts would be less than during construction. The removal of the above ground facilities would have minor to negligible impacts on surrounding sensitive receivers while work is underway, and negligible ongoing impacts once removal is completed.

Cumulative impacts

Cumulative visual impacts have been considered in the context of the existing and foreseeable developments within the LHRRP and the surrounding precinct, including infrastructure associated with landfill operations, organics processing, resource recovery, and renewable energy generation.

The LHRRP is a long established, highly modified site with a predominantly industrial character. The project is located within a designated infrastructure area and would be consistent in form, scale, and function with the existing power station. As such, the project would not introduce a new or uncharacteristic visual element into the landscape but would instead reinforce the existing visual theme within the precinct.

Future changes within the LHRRP are expected to involve the continuation of existing waste and energy functions, construction of new garden organics facility and the progressive rehabilitation of landfill areas into community parkland. These changes have been considered in the development of the project's layout, siting, and mitigation measures to ensure compatibility with the long term land use vision.

How potential impacts have been avoided

Potential visual impacts of the project have been avoided through early planning, appropriate siting, and design integration. Key avoidance measures include:

– siting of the bioenergy facility within an existing industrial area, minimising new visual exposure in undeveloped or sensitive landscapes
– retaining existing screening such as vegetation, landform, and built structures to limit visibility from surrounding areas
– designing infrastructure to match existing buildings, using neutral tones and forms to avoid visual contrast or clutter
– implementing compliant lighting design consistent with the principles of AS/NZS 4282:2019 to prevent light spill into the future parkland
– considering the future parkland interface early, ensuring the facility is compatible with nearby future public open space.

These steps reduce the need for additional mitigation by avoiding impacts at the source.

7.1.7 Mitigation measures

Approach to mitigation and management

Mitigation measures proposed to manage impacts, including proposed techniques, are outlined in this section. Responsibility for implementing each measure, timing, frequency, risk of failure, and an analysis of the consequences of any residual impacts are also provided.

The proposed visual mitigation measures are intended to support the long term experience and amenity of future site users, particularly in the context of the planned future parkland to west of the project site. These measures demonstrate a proactive and integrated approach to landscape design, visual compatibility, and lighting management, ensuring that future users benefit from a thoughtfully designed and visually cohesive environment.

Summary of mitigation measures

The following mitigation is proposed to minimise and manage visual impacts to future site users, provided in Table 7.10.

Table 7.10 Mitigation measures – visual

ID	Environmental Aspect	Mitigation Measure	Responsibility	Timing
V2	Visual amenity	External finishes and colours of the new bioenergy facility will be selected to match or complement the existing infrastructure, with neutral, recessive tones to minimise contrast with the surrounding environment.	LMS	Detailed design / Construction
V3	Lighting	All external lighting will be directed downward, shielded, and comply with AS/NZS 4282:2019 (Control of the obtrusive effects of outdoor lighting) to avoid light spill into surrounding areas, particularly the future parkland.	LMS	Operation

7.2 Biodiversity

This section provides a summary of the potential biodiversity impacts as a result of construction and operation of the project. A full copy of the assessment is provided in Lucas Heights Bioenergy facility – BDAR Waiver (GHD, 2025) attached as Appendix F.

7.2.1 Methodology

Legislative and policy context to the assessment

The following legislation, guidelines and/or policies are relevant to the BDAR Waiver:

– NSW BioNet Department of Climate Change, Energy, the Environment and Water (DCCEEW) Species Sighting Search for records of threatened species listed under the BC Act and EPBC Act which have been recorded within the locality (NSW DCCEEW, 2025)
– Commonwealth DCCEEW Protected Matters Search Tool (PMST) for MNES listed under the EPBC Act which may occur in the area (DCCEEW, 2025)
– NSW DCCEEW threatened biota profiles for descriptions of the distribution and habitat requirements of threatened biota
– NSW DCCEEW online species profiles and threats database
– aerial photography of the project site
– State-wide vegetation mapping (SVTM) (NSW DCCEEW, 2024).

Key tasks

A desktop review of databases and existing literature was conducted to scope for any known presence of threatened flora and fauna on the project site. Following collation of database records and species and community profiles, a 'likelihood of occurrence' assessment was prepared with reference to the habitats (if present) within the project site, which were included in the BDAR Waiver.

7.2.2 Existing environment

Desktop review

A desktop review of databases and existing literature was conducted to scope for any known presence of threatened flora and fauna on the project site. Following collation of database records and species and community profiles, a 'likelihood of occurrence' assessment was prepared with reference to the habitats (if present) within the project site, which were included in the BDAR Waiver prepared for the project.

A PMST search was undertaken on 10 June 2025, and a NSW DCCEEW BioNet search was undertaken on 12 June 2025, both within a 10 kilometre radius of the project site.

The database search results identified the following matters of national significance as potentially occurring in the locality:

– five listed threatened ecological communities
– sixty-six listed threatened species
– twelve listed migratory species.

Certain species included in the above list may occur in the buffer area generated by the search only and not within the project site.

A review of the NSW State Government NSW State Vegetation Type Map identified a small area of mapped native vegetation corresponding to Plant Community Type (PCT) 3615 *Sydney Hinterland Apple-Blackbutt Gully Forest* within the project site as shown on Figure 7.8.

Paper Size ISO A4

0 10 20 30 40

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56

N

GHD

LMS Energy
Bioenergy facility BDAR waiver

Vegetation

Project No. **12649882**
Revision No. **0**
Date **15/09/2025**

FIGURE 7.8

\\ghdnet\ghd\AU\Sydney\Projects\21\12649882\GIS\Maps\Deliverables\12649882_EIS.aprx
Print date: 15 Sep 2025 - 15:32

Data source: GHD: Site Boundary (2025), Site Features (2025). NSWSS: SVTM (2025), NPWSR (2025), Cadastre (2025). Nearmap WMS Server: .
Created by: dbbanatin

Field survey

A field survey was undertaken by LMS in June 2025. Photos from the survey were interpreted by a GHD ecologist to assess the ecological values and potential impacts associated with the project site and confirm the presence/absence of PCTs and threatened species habitat.

The project site consists of highly modified and cleared industrial land with a history of clearing and ground disturbance which commenced as early as 1956. Historical imagery of the project site and LHRRP is provided in Appendix A of Technical Report 5 of for the years 1949 to 2025.

The natural soil profile across the project site has been modified and reprofiled during historical land use and construction of the existing power station.

Flora

The vegetation present within the project site comprises:

– planted native understorey species such as Matt Rush (*Lomandra longifolia*), which has been planted in rows and mulched adjacent to internal access roads
– areas of more mature tree species comprising Eucalyptus and Corymbia species
– areas of exotic tree species containing palm trees and ferns.

Approximately 0.0485 hectares of PCT 3615 *Sydney Hinterland Apple-Blackbutt Gully Forest* is mapped within the project site according to the SVTM. The projects development footprint would not be located within any mapped PCT areas within the project site.

Fauna

The field survey found that there is no suitable habitat at the project site for any threatened and/or migratory species known or predicted to occur within the locality. These include species such as various gastropods, mammals and reptiles.

No threatened fauna species were observed during the site visit. In addition, no signs of fauna activity (such as scats, tracks, scratching’s, or calls) were recorded, and the site's habitat characteristics were assessed as unsuitable for threatened species known or predicted to occur within a 10 kilometre radius.

The project site contains some mature trees; however, the development footprint is confined to an existing hardstand area that avoids these trees and other sensitive habitat features.

Key findings include:

– The site offers limited roosting or nesting habitat for arboreal mammals or hollow dependent birds and bats.
– The ground layer is dominated by hard standing, garden beds and boundary plantings offering limited foraging opportunities and no structural complexity to support small mammals, reptiles, or ground-dwelling birds.
– The lack of a native canopy or shrub layer further reduces the site's ability to support fauna that rely on vertical vegetation structure.
– The site is heavily fragmented by existing industrial infrastructure, boundary fencing, sealed roads, and cleared areas, isolating it from nearby patches of native vegetation.

7.2.3 Potential impacts

Construction

Construction activities, including trenching for underground service connections, have been designed to avoid the patches of native vegetation. Consequently, direct impacts such as vegetation clearing, habitat loss, or fragmentation are not expected. Given these factors, minimal native vegetation, lack of fauna habitat, lack of connectivity, and limited ecological value, including the temporary nature of the works, the potential impacts on local flora and fauna are considered to be low.

Construction of the project is unlikely to disrupt any significant wildlife populations or ecological processes, and the design has developed to ensure minimal disturbance to the surrounding native vegetation.

Operation

The operation of the project would be consistent in nature, scale, and intensity with that of the existing power station, which would be progressively decommissioned following the commissioning of the new facility. Both facilities share similar operational characteristics and are located within the same disturbed industrial setting of the LHRRP. Biodiversity impacts associated with the proposed project are expected to be equivalent to, or less than, those already established under the existing power station.

The project site is not suitable for fauna movement due to its fragmented and isolated patches of native vegetation, which do not form a continuous or functional ecosystem. The lack of connectivity between these patches significantly reduces the ability of native wildlife to move through the area, limiting their access to food, shelter, and breeding sites.

The project site is a closed site and is not accessible for natural fauna migration. The presence of artificial barriers such as fences, roads, and industrial infrastructure further restricts movement, making it an unsuitable habitat for sustaining a diverse or viable population of native species. Without ecological corridors linking the park to larger, intact natural areas, the likelihood of fauna utilising the site remains low.

Given the site's past disturbances, the project would result in minimal impacts to biodiversity and would not contribute to further habitat degradation or species disturbance.

Decommissioning

Decommissioning of the existing power station would involve the removal of the redundant above ground electrical generation equipment infrastructure and repurposing of the vacated area for ongoing use supporting the operation of the proposed replacement power station. These activities are expected to be of short duration and limited in scope, resulting in minor, temporary impacts.

Given the small project footprint and limited soil disturbance within an already disturbed and industrial setting, decommissioning works are not anticipated to result in significant biodiversity impacts. No native vegetation would be cleared, and existing native vegetation to the north of the site would continue to be avoided during construction and operation.

Activities such as dismantling of equipment would be carried out using existing access routes, further avoiding disturbance to native vegetation and soil profiles. As such, the likelihood of dust, noise, or erosion affecting nearby vegetation or fauna is considered negligible.

How potential impacts have been avoided

The bioenergy facility would be developed predominantly on existing impervious surfaces within the boundaries of the existing power station. Trenching works for the electrical grid export connection would require the removal of two small garden beds but would avoid naturally occurring mapped PCTs. LMS has designed the project layout to retain all native vegetation patches mapped within the project site, as shown on Figure 7.8.

7.2.4 Mitigation measures

Measures that will be implemented to minimise and manage potential impacts to biodiversity during construction of the project are provided in Table 7.11.

Table 7.11 Mitigation measures – biodiversity

ID	Environmental aspect	Mitigation and management measure	Responsibility	Timing
B1	Unexpected presence of fauna	Ensure physical barriers are in place to minimise the potential for wild fauna to enter the construction site, and ensure works cease temporarily to avoid harm to any fauna. Native trees within 10 m of the construction footprint will be fenced of as NO-GO-ZONES as per the CEMP.	Contractor	Construction

7.3 Cultural heritage

This section provides a summary of the potential impacts to Aboriginal and historic heritage as a result of construction and operation of the project. A cultural heritage due-diligence assessment was undertaken by GHD for the project and is provided as Technical Report 8.

7.3.1 Methodology

Legislative and policy context to the assessment

The following legislation, guidelines and/or policies are relevant to the study:

– Commonwealth legislation, which includes:
  - *Environmental Protection and Biodiversity Conservation Act 1999*
  - *Native Title Act 1993*
  - *Aboriginal and Torres Strait Islander Heritage Protection Act 1984*
– NSW legislation, which includes:
  - *Environmental Planning and Assessment Act 1979*
  - *National Parks and Wildlife Act 1974*
– Sutherland Shire Local Environmental Plan 2015
– Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales (DECCW, 2010) (the Due Diligence Code).

Desktop assessment

Aboriginal heritage

A due diligence assessment in accordance with the Due Diligence Code was undertaken to examine the presence of Aboriginal sites or artefacts.

The desktop assessment involved:

– searches of the Aboriginal Heritage Information System (AHIMS)
– searches of the NSW State Heritage Inventory, Register of National Estate, and the National Trust Heritage Register
– review of all legislation relevant to heritage matters within the project site, listed above
– review of previously undertaken Aboriginal heritage assessments and archaeological reports
– review of the environmental context of the project site, consisting of:
  - geology
  - geomorphology
  - hydrology
  - topography
  - flora and fauna
– review of past archaeological investigations
– assessment of the project against the five-step assessment process set out in the Due Diligence Code.

No on-site investigation was carried out for the assessment.

Historic heritage

A desktop assessment of publicly available information was undertaken to identify the existing historic heritage features on or near the project site. The desktop assessment involved searching the following heritage registers on 11 August 2025:

– Protected Matters Search Tool (PMST) for items on the World heritage, National Heritage List and Commonwealth heritage lists

– State Heritage Register and State Heritage Inventory
– Sutherland Shire Local Environmental Plan (LEP) 2015.

7.3.2 Existing environment

Historical context

Several developments occurred near the project site in the 1940s, including the establishment of Defence Road No.512 between 1940 and 1943 (Roads and Maritime Services 2025; Land & Water Conservation 1960) and the damming of the Woronora River in 1941.

Further development occurred in the area with the establishment of the high flux nuclear reactor in 1955 (in the current ANSTO facility) and rifle clubs in the 1960s and 1970s (Byron, 2023).

Heritage listed items

There are no historic heritage items or areas identified within the project site or LHRRP. The nearest items found within 1 kilometre of the project site are listed in Table 7.12.

There are no State or National heritage items within 1 kilometre of the project site.

Table 7.12 Historic heritage items within 1 kilometre of project site

Item Name	Address / location	Register	Listing No.	Distance from project site (approx.)
Trees - *Eucalyptus paniculata* (Grey Ironbark)	Within ANSTO grounds bounded by Little Forest Road and New Illawarra Road	Sutherland Shire LEP	2802	Nearest mapped area of trees is 1 km north
Cubbitch Barta National Estate Area	2/-/DP1216308	Commonwealth Heritage List	105405	0.8 km southwest at nearest point within Holsworthy Barracks Reserve.

Aboriginal context

The project site is within the Aboriginal custodian group of the Tharawal People and is managed and coordinated by the Gandangara Local Aboriginal Land Council. The Tharawal People were attributed to inhabit “From south side of Botany Bay and Port Hacking to north of Shoalhaven River. Inland to Campbelltown and Camden” (Tindale, 1974). The Tharawal people had a complex social structure upheld by strong belief systems. They believed that their ancestors came to inhabit the land around Illawarra Lakes through the retelling of the Whale Dreaming Story.

A search of the Native Title Vision map found that the entire project site is subject to an active Native Title claim submitted by the South Coast People (Tribunal No. NC2017/003). No native title determinations exist for the project site.

Aboriginal heritage sites

A search of the Aboriginal Heritage Information Management System (AHIMS) undertaken on 19 August 2025. The search did not identify any previously recorded AHIMS sites within the project site. Four previously recorded AHIMS sites that have now been removed were found within 1 kilometre of the project site, with the nearest destroyed site located within the active landfill area of the LHRRP approximately 500 metres west of the project site.

Environmental context

The environmental context of the project was examined to better understand the potential for Aboriginal sites and artefacts to be present. The key indications of potential for Aboriginal sites to be present are summarised in the following sections.

Geology

The project site is wholly encompassed within the Mittagong Formation within the Sydney Basin. The Mittagong formation is a transition of several metres of alternating sandstones and shales (Martyn, 2025). The variability is in part due to the nature of the dwindling flood plain and braided river system which deposited the Hawkesbury Sandstone. This vast system eventually lost its strength and became a plain of scattered sandbanks, swamps and lagoons.

Soil landscapes

The project site is mapped within the lh Lucas Heights 9029 Residual soil landscape, which is dominated by loose, greyish brown fine sandy loams. The soil type is characterised by bleached, stony, hard setting sandy clay loam; earthy, yellowish brown sandy clay loam; pedal and yellowish brown clay (NSW Government, 2025a).

It is unlikely that the original soil profile remains intact at the site, as the site is thought to be disturbed at a depth greater than 1 metre due to previous works to construct the existing power station and associated infrastructure. The expected depth for Aboriginal artefacts to occur would be in the first 10 to 20 centimetres of an undisturbed soil profile (if present).

Hydrology

The nearest water source to the project site is Bardens Creek and its tributaries which are approximately 300 metres northeast of the project site. Bardens Creek converges with Mill Creek to the north. Bardens Creek is a confined, bedrock margin controlled headwater containing a bedrock base. Both Mill Creek and Bardens Creek directly and indirectly feed into the Georges River to the north (NSW Government, 2025b). Georges River is one of the main river systems in southern Sydney which supported multiple Aboriginal groups along its length.

Flora and fauna

The flora and fauna within the project site and surrounding area of the LHRRP are influenced by a combination of geological, geomorphological, and climatic factors, including surface hydrology and weather events (NSW Government, 2025). The broader plateaux landscapes within the Lucas Heights soil landscape are primarily shaped by soil depth and the availability of surface water, which are key determinants of vegetation patterns and faunal habitats.

Regionally, the landscape supports extensive areas of cleared eucalypt low-open forest and eucalypt low woodland, typically with a sclerophyllous shrub understorey (NSW Government, 2025). These ecosystems provide habitat for a range of native fauna and are characteristic of the LHRRP's natural environment.

However, within the project site itself, native flora cover is minimal and fauna presence is unlikely, as discussed in section 7.2. The site is classified as brownfield and forms part of an existing industrial renewable power generation facility where past land use has significantly altered natural habitats. As such, native ecological values are considered to be highly degraded, absent or artificial, due to the presence of planted exotic vegetation.

Geotechnical investigation

A geotechnical investigation was undertaken by GHD for the project site (GHD, 2025a). The investigation indicates that the project site has been subject to significant past disturbance, with a layer of fill material (gravel and sandy clay) placed across the site to depths of around 1.4 metres. Beneath this, only shallow residual soils derived from weathered sandstone are present before transitioning into Hawkesbury Sandstone bedrock. The existing re-profiling of the site, combined with shallow soil development and fill, indicates that the potential for intact cultural deposits or archaeological material to be present is low.

Land use history

Previous investigations of the LHRRP and specifically the project site have concluded that the area is highly disturbed. The LHRRP has been extensively utilised since 1987 with the establishment of the Lucas Heights waste management disposal facility. Initially this was a small portion to the south of the current project site that has gradually expanded between 1988 and 2004 and then rapidly expanded between 2004 and 2005.

Site prediction

The former landscape of the project site has been cleared of vegetation with extensive landscape reprofiling occurring since 1988. Landscape reprofiling was conducted for the LHRRP waste disposal where the original

landscape has been covered in an estimated layer of fill ranging 20 to 40 metres deep. For this reason, the likelihood of the project site containing any cultural heritage values for Aboriginal or non-Aboriginal heritage is considered to be low.

The most likely Aboriginal heritage sites or artefacts to be located within the project site are low density Aboriginal artefact scatters or isolated artefacts out of a stratified context.

7.3.3 Potential impacts

Construction

The due diligence assessment found no Aboriginal heritage items at the project site based on publicly available desktop information therefore impacts to Aboriginal heritage are not anticipated during construction. No landscape features were identified that are likely to indicate presence of Aboriginal features on or near the project site. The due diligence assessment found that the chance of presence, and hence harm, to Aboriginal sites or artefacts is minimal due to the extensive disturbance present at the project site and surrounding area.

An unexpected finds protocol is therefore recommended (refer to section 7.3.4).

As there are no heritage-listed items or sites identified within close proximity to the project site, no direct or indirect impacts on items or sites of local, State or national heritage significance are anticipated as a result of construction of the project.

Operation

Impacts to Aboriginal and historic heritage are not anticipated due to operation of the project. Operation of the project would not involve any intrusive works or excavation works, therefore discovering or impacting unknown Aboriginal items during operation is considered highly unlikely.

7.3.4 Mitigation measures

Measures that will be implemented to minimise and manage potential impacts to Aboriginal heritage are provided in Table 7.13.

Table 7.13 Mitigation measures – Aboriginal heritage

ID	Environmental aspect	Mitigation measure	Responsibility	Timing
AB1	Unexpected finds of heritage items	In the event of an unexpected find of an Aboriginal item, works within the area will cease and a suitably qualified heritage professional will be engaged to assess the significance and management of the finds. An unanticipated discovery protocol will be implemented in the CEMP that details measures to be undertaken if heritage objects/sites not previously recorded in the project site are detected during construction works (unexpected finds).	Contractor	Construction

7.4 Greenhouse gas emissions

This section provides a summary of the greenhouse gas assessment prepared by Astute Environmental Consulting which is incorporated into Technical Report 1 – Air quality assessment.

7.4.1 Methodology

The greenhouse gas assessment involved:

– reviewing ozone data from the nearest monitoring station to confirm background concentrations
– identifying relevant aspects of energy use and greenhouse gas emissions from construction and operation of the project
– preparing activity estimates using the design and preliminary construction information for the project
– identifying appropriate energy content and emissions factors
– estimating the projected tonnes of carbon dioxide equivalent emissions and total greenhouse gas emissions attributable to the project.

Emission categories

Potential emissions are calculated across three different categories (known as 'scopes') to help differentiate between direct emissions from sources that are owned or controlled by a project, and upstream indirect emissions that are a consequence of project activities, but which occur at sources owned or controlled by another entity.

The three greenhouse gas emissions scopes as outlined in the National Greenhouse Accounts Factors (DISER, 2020) are:

– **Scope 1** – Direct emissions generated by the project, including emissions generated by the use of diesel fuel in project construction plant, equipment or vehicles.
– **Scope 2** – Indirect emissions from the consumption of purchased electricity for project equipment or operation of the bioenergy facility.
– **Scope 3** – All other indirect emissions (that are not included in Scope 2) generated as a consequence of the project, including emissions associated with the extraction, production and transport of materials used in construction.

Scope 3 emission sources were considered outside of this assessment and are not considered further. A summary of the greenhouse gas emission sources for construction and operation is provided in Table 7.14.

Table 7.14 Greenhouse gas emissions sources

Stage	Emission Source	Description
Construction	Diesel combustion for generators, plant, and vehicles	Emissions from mobile and stationary equipment used for site establishment and infrastructure installation
Operation	Combustion of landfill gas in gas engines	Primary emissions source; biogas is combusted in 20 Caterpillar G3516 generators to produce electricity
	Diesel combustion for maintenance vehicles	Mobile emissions from periodic site access and upkeep
	Fugitive methane emissions from gas handling equipment (valves, seals, pipes)	Direct methane emissions from minor leaks in gas engines, seals, valves, and other components of the biogas capture and combustion system

The following gases with the potential to have ozone depleting impacts were assessed:

– Methane (CH_4)
– Carbon dioxide (CO_2).

Each gas was assumed to be 57% methane and 37% carbon dioxide of the total composition. The methane in biogas is regarded as a greenhouse gas, with a global warming potential of 28. However, the carbon dioxide both from the fugitive release and produced from the combustion of methane in biogas is considered biogenic and thereby is regarded as having a global warming potential of zero (does not contribute to climate change).

Further information about the methodology is provided in chapter 4 of Technical Report 1.

7.4.2 Greenhouse gas assessment

The project would capture and combust otherwise fugitive landfill biogas to generate renewable electricity, while reducing (fugitive) greenhouse gas emissions and air quality issues associated with potential odour generation. It is noted that the bioenergy facility is proposed to replace the existing power station which is approaching the end of its design life and will ensure continued combustion of landfill biogas throughout the remaining land filling and post-closure periods for the LHRRP.

Scope 1 emissions refer to direct emissions from combustion of biogas in 20 Caterpillar G3516 gas generators. These emissions include nitrous oxide resulting from the combustion process, as well as un-combusted methane released in the generators exhaust which have been quantified in accordance with NGER methodologies (in CO2-e) and modelled as part of the air quality assessment.

The combusted and un-combusted CO2-e in tons per year for the Scope 1 emissions are summarised on Figure 7.9 where the total reduction is 1,068,604 t CO2-e (tonnes of carbon dioxide equivalent per year).

Without the project, no landfill biogas would be captured for renewable electricity generation, with annual GHG emissions (assuming 50% methane) calculated to be 1,082,543 tCO2-e. However, once the project is operational, greenhouse gas emissions would reduce by approximately 99% to 13,939 tCO2-e per annum.

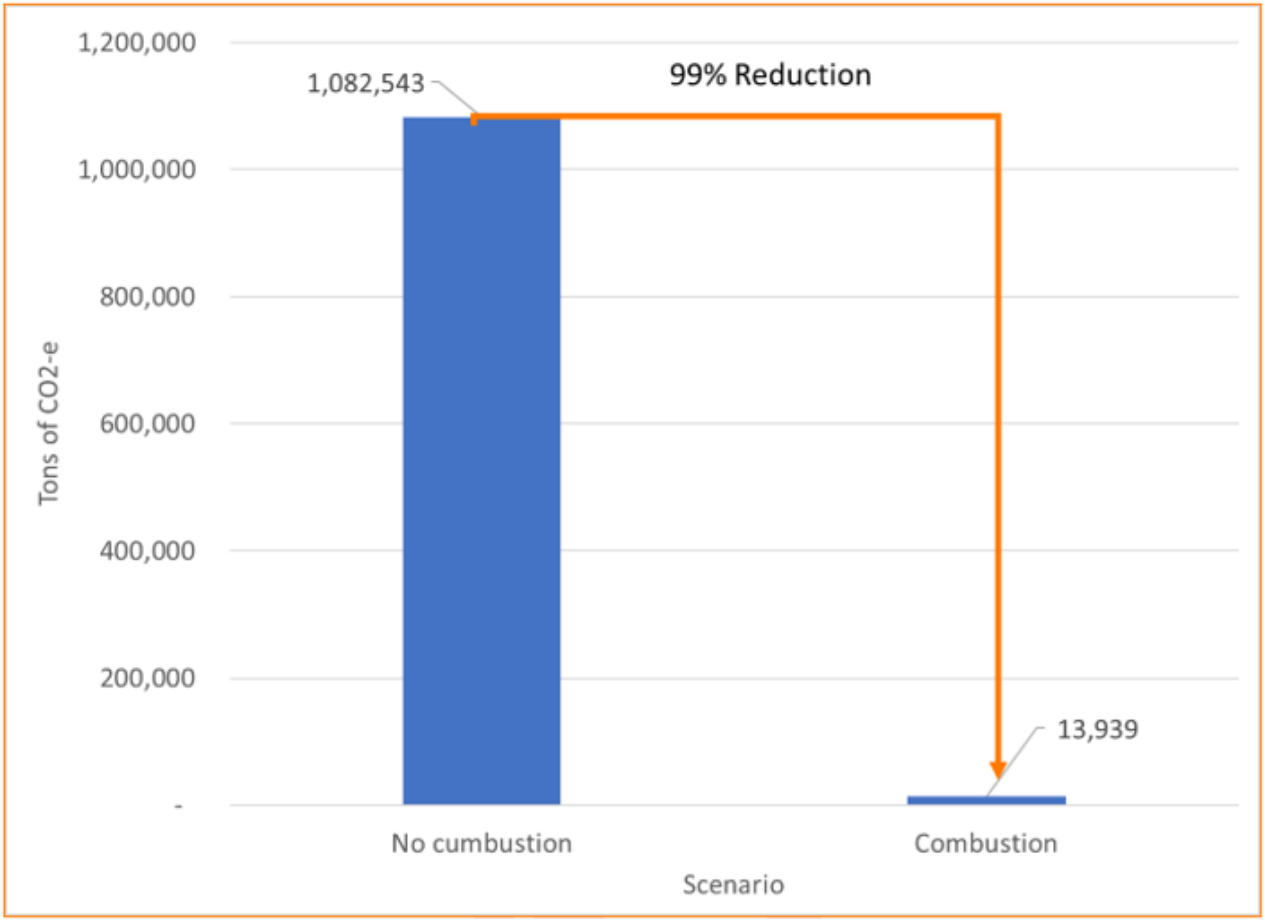

Figure 7.9 Annual greenhouse gas emissions comparing combustion and no combustion scenarios (Astute, 2025)

Scope 2 emissions, associated with the import of electricity from the grid, have also been calculated. LMS estimates that about 15,263 kilowatt hours (kWh) of electricity would be used each year. Based on current carbon emissions from the electricity grid, this would result in about 7.9tCO2-e in 2025. Overall, these emissions (Scope 2) are minimal compared to the direct emissions (Scope 1).

Overall, the bioenergy facility would reduce uncontrolled landfill biogas emissions compared to if the project did not proceed and landfill biogas continued to escape to the atmosphere. Although the facility will produce some direct (Scope 1) emissions, these are outweighed by the reduction in fugitive landfill biogas emissions, resulting in a net climate benefit.

The project contributes to NSW and Australia's emissions targets by displacing higher emission electricity generation and enhancing biogas capture. It is also noted that post LHRRP closure, the project would continue to combust landfill biogas until the bioenergy facility decommissioning is completed.

7.5 Social and economic

This section provides a summary of the potential social impacts and benefits of construction and operation of the project. A full copy of the assessment is provided as Technical Report 9 – Social impact assessment.

7.5.1 Methodology

Legislative and policy context to the assessment

The following legislation, guidelines and/or policies are relevant to the social impact assessment (SIA) includes:

– Social Impact Assessment Guideline (DPE, 2023)
– Sutherland Shire Community Strategic Plan 2022-2032
– Sutherland Shire Economic Strategy 2018
– Community Development Strategy 2021-2031.

These local policies provide a context for understanding community values, priorities, and expectations, particularly around environmental stewardship, amenity, public health, and economic opportunities.

Key tasks

Scoping potential impacts

The assessment began with a scoping process that identified key social impact themes likely to arise from the project. These included potential impacts on local amenity, access and connectivity, economy and employment, and community health and wellbeing. The scoping exercise drew on a review of project information, stakeholder input, and other technical studies (e.g. noise, air quality, traffic).

Establishing a social baseline

The social baseline was developed to understand the existing conditions against which social impacts could be measured. This included analysis of demographic and health data from the ABS, local land use, infrastructure, and economic conditions within the local and regional study areas. Key features such as population profiles, household types, employment trends, and social infrastructure were documented.

Community and stakeholder engagement

Stakeholder engagement informed all stages of the SIA and included both consultation for the EIS and targeted engagement for the SIA. Engagement activities were undertaken between October 2024 and May 2025 and involved local stakeholders such as Sutherland Shire Council, recreational groups, businesses (e.g., ANSTO), and community organisations. These engagements confirmed low levels of concern but provided input into impact identification and management measures.

Description and assessment of social impacts and benefits

A detailed assessment of potential social impacts was carried out using the methodology from the SIA Guideline, incorporating both likelihood and magnitude of effects. Information from stakeholder engagement, baseline analysis, and technical studies was triangulated to assess potential changes in community wellbeing, amenity, access, and economic participation. Both positive and negative impacts were considered.

Recommended social impact mitigation measures

Mitigation measures were developed in accordance with adaptive management principles, ensuring that the project remains responsive to evolving social conditions.

7.5.2 Existing Environment

Local study area

The local study area includes Lucas Heights, Engadine, Barden Ridge, and Holsworthy. Lucas Heights itself has no residential population and is primarily used for industrial, waste, and scientific purposes, including the LHRRP and ANSTO facilities. Engadine and Barden Ridge are established residential suburbs with low to medium density housing and a high proportion of family households. Community infrastructure includes schools, parks, childcare centres, and local shops.

Recreational land uses near the project site include the Mill Creek mountain bike trails, Gandangara State Conservation Area, and the Sutherland PCYC Minibike Club.

The boundaries of the study area are described in Figure 2.1 of Technical Report 9.

Regional study area

The regional study area comprises the Sutherland Shire LGA, a well-established and socio-economically advantaged community in the southern suburbs of Sydney. It has a population of over 230,000 people with high education levels, a strong service economy, and a growing aging population. Natural features such as the Georges River, Royal National Park, and bushland reserves are highly valued by residents.

Community values, opportunities and challenges

Key community values include environmental protection, public health, recreation, and local amenity. Opportunities exist to contribute to sustainability through improved waste to energy infrastructure. Challenges include addressing perceptions of risk related to industrial activities and ensuring that local amenity and access to recreational spaces are not diminished.

Socio-economic indicators

The local suburbs score in the highest SEIFA (Socio-Economic Indexes for Areas) deciles, indicating strong socio-economic advantage. Engadine and Barden Ridge have high proportions of couple families with children. Asthma rates are slightly higher than average, highlighting sensitivity to air quality. Labour force participation is lower in Barden Ridge (39%) compared to Engadine (47%) and the broader LGA (65%).

Economy and industry

Key industries in the LGA include construction, healthcare, education, and professional services. The construction sector is the largest contributor to gross regional product. The project may offer limited but valued employment and procurement opportunities in these sectors.

Housing and accommodation

Housing is predominantly low-density, owner-occupied dwellings, with strong representation of family households. Engadine has a more diverse housing stock and higher population density than Barden Ridge.

Stakeholder engagement

Key outcomes from community engagement include:

– Lucas Heights contains no residents but is surrounded by sensitive recreational and research uses
– community feedback indicated general support for the project, especially due to environmental benefits
– concerns were minimal but focused on air quality, amenity, and access during construction
– there is potential to support local values through well managed construction and communication.

7.5.3 Potential Impacts

Construction

Changes to local amenity

Construction may generate noise, dust, and increased traffic. However, given the separation from residential areas and the existing industrial land use of the LHRRP, these impacts are expected to be minor. Recreational users nearby may experience temporary disruption, but stakeholder feedback suggests general tolerance, especially with appropriate communication.

Economy and employment

Construction would generate up to 15 full time employment positions. Although the roles are specialised, some local businesses may benefit through supply opportunities. While direct economic benefits are modest, they align with local aspirations for economic participation in sustainable infrastructure projects.

Access

Increased traffic during construction could temporarily affect access along Little Forest Road, especially for recreational users of the mountain bike trails carpark. However, this road already services industrial activities, and the traffic volume increase is not expected to significantly disrupt access.

Operation

Changes to local amenity

The facility would be a like-for-like replacement of the existing power station with improved technology and design features. It is expected to operate quietly and cleanly, with minimal impacts on local amenity.

Economy and employment

Operational staffing includes six full time employment positions ensuring continuity of employment at the LHRRP. While not a major employment generator, the facility supports ongoing waste infrastructure and aligns with economic development goals in the region.

Access

Operational access will be consistent with existing traffic patterns at the LHRRP. No significant access impacts are anticipated during normal operations.

Community values

The project aligns well with community values relating to environmental sustainability, responsible waste management, and clean energy. Community support is likely to remain strong provided operations remain safe, clean, and well-communicated.

Community health and wellbeing

There are no significant health risks associated with the project's operation. In fact, replacing the older energy infrastructure with a cleaner and more efficient system may improve local air quality. Community concerns about hazards can be addressed through continued engagement and transparent reporting.

Cumulative impacts

Potential cumulative social and economic impacts associated with the project are associated with the Mill Creek carpark and cycleway project due to potential overlap with the project's construction period.

In particular, the screening identified potential accessibility pressures along Little Forest Road during the construction phase of the Mill Creek Carpark and Cycleway project, due to the concurrent use of the road by heavy vehicles, trailers, and mountain bike users.

7.5.4 Mitigation Measures

Mitigation measures were developed in accordance with adaptive management principles, ensuring that the project remains responsive to evolving social conditions.

The measures provided in Table 7.15 are designed to ensure that social impacts remain low, that risks are well managed, and that the project delivers meaningful social value to the surrounding community.

Table 7.15 Mitigation measures – social

ID	Environmental aspect	Mitigation measure	Responsibility	Timing
SO1	Social impacts, communication and engagement	LMS Energy will continue to develop and implement the CSEP to guide the management and delivery of community and stakeholder engagement in the lead up to and during construction, and as required during operation and decommissioning, to ensure that: – accurate and accessible information about the project is provided – feedback from the community is encouraged – opportunities for input are provided – community members and stakeholders with the potential to be affected by construction activities are notified in a timely manner about the timing of activities and potential for impacts – enquiries and complaints are managed, and a timely response is provided for concerns raised. The plan will include approaches and protocols to: – communicate with potentially affected residents, other community members, businesses and other key stakeholders to provide information about the project, and the likely nature, extent and duration of changes – identify and engage with vulnerable persons that might be affected by the project – communicate information about potential access changes – share information about the project with other regional stakeholders to assist with managing cumulative impacts on local and regional communities.	LMS Energy	Pre-construction, Construction Operation, Decommissioning
SO2		An enquiries and complaints management systems will be developed, outlined in the CSEP, and implemented during all phases of the project. The complaints management systems will be maintained throughout the construction period and for a minimum of 12-months after construction finishes.	LMS Energy	Pre-construction, construction, operation, decommissioning

7.6 Waste

This section identifies the key waste streams that would be generated during construction, decommissioning and operation of the project and their likely classifications. It includes a description of the measures to be implemented to manage, reuse, recycle and safely dispose of this waste.

7.6.1 Methodology

Legislative and policy context to the assessment

The plans, policies and guidelines relevant to waste management include:

– *Waste Avoidance and Resource Recovery Act 2001*
– *Protection of the Environment Operations Act 1997*
– Protection of the Environment Operations (Waste) Regulation 2014
– NSW Waste and Sustainable Materials Strategy 2041 Stage 1: 2021-2027 (DPIE, 2021)
– NSW Circular Economy Policy Statement: Too Good to Waste (EPA, 2019)
– Draft NSW Waste and Circular Infrastructure Plan (NSW EPA, 2025)
– Waste Classification Guidelines (EPA, 2014)
– Sutherland Shire Council Waste Management Strategy 2022-2042.

Desktop assessment

A desktop assessment was carried out, which included the following tasks:

– reviewing the construction method and project description to identify potential waste generating activities
– reviewing the proposed decommissioning plan to identify the key waste streams to be removed from site during these activities
– identifying potential waste types, quantities and preliminary waste classifications in accordance with relevant legislation and guidelines
– identifying environmental issues and consequences if waste is not managed appropriately
– identifying waste management options
– providing measures to avoid, reduce and manage wastes in accordance with waste hierarchy and circular economy principles.

Limitations

The estimated waste quantities and types are indicative and have been identified for the purpose of determining potential waste management options. Although the actual quantities of waste generated by the project may differ from the estimates made, the identified waste management options would remain appropriate based on the waste stream identified and are scalable.

7.6.2 Existing environment

The project site is located within the LHRRP at the existing power station site in the southeastern corner of the LHRRP. The area is heavily disturbed and was subject to significant vegetation clearing prior to 1956 as supported by historical aerial imagery. The project site is currently operating as a landfill biogas power station and was constructed between 1997 and 2005.

A soil contamination investigation was undertaken by Douglas Partners (2025) that identified the following existing infrastructure at the project site:

– two 20kL above ground storage tanks containing hydrocarbons with concrete bunding
– nineteen LFG powered generator modules (15 operational modules) with sumps to collect engine oil overflows
– above ground LFG distribution lines to the modules
– eight transformers

– a chemical storage shed containing 200 litre drums of lubricating oil
– eight blowers and associated above-ground pipework
– two cooling towers and an underground cooling water system
– a flare compound with two LFG flares.

Douglas Partners (2025) soil analysis findings as summarised in the Contamination Assessment (GHD, 2025) identified the presence of potential contaminants of concern within the decommissioning works area. These included elevated arsenic, copper and zinc and at three borehole locations.

Geotechnical investigations were undertaken by GHD in August 2025 in the area where the new infrastructure is proposed to be located. Findings indicate the presence of fill and residual soil layers at a typical depth of 1 to 4 metres below ground level with shallow sandstone bedrock below. The fill comprises a 100 millimetre thick gravel layer underlain by a sandy clay up to 1.4 metre depth below ground level. This was considered to be a temporary perched water table resulting from recent rainfall, as previous investigations in adjacent areas under dry conditions did not record groundwater. Further detail on the soil and fill landscape is provided in section 2.6.

7.6.3 Potential impacts

Construction and decommissioning

Waste generating activities, waste streams, quantities and classifications during construction

Potential impacts during construction relate to generation and management of waste and associated potential impacts if waste is not managed appropriately.

The key waste streams expected to be generated during construction are:

– vegetation from site clearance activities, anticipated to be minimal
– spoil from site preparation, minor earthworks, drainage and trenching for electricity connection
– excess construction waste from material offcuts and concrete slab construction
– food and general waste generated by construction staff
– wastewater (grey water and sewage) from construction site offices.

The estimated quantities of these waste streams are provided in Table 7.16.

Minimal spoil is expected to be generated during construction of the project as geotechnical investigation indicated the existing ground conditions are suitable for the proposed site development. Therefore significant earthworks associated with ground improvement and foundation design are not anticipated. The spoil quantity is based on the proposed bulk earthworks plan (MLEI Consulting Engineers, 2025).

The general waste generated by construction staff is based on a conservative waste estimation factor of up to 1 kilogram per person per day.

Table 7.16 Estimated key waste streams quantities – construction

Waste stream	Estimated quantity
Vegetation	Minimal
Spoil	800 m^3
Construction waste (e.g. material offcuts and potentially excess material consisting of concrete and fencing)	Minimal
General waste from construction staff from site offices and lunchroom	2 tonnes
Wastewater (grey water and sewage) from construction site offices	Minimal

Table 7.17 lists the key waste streams that may be produced from construction activities, and their likely classifications.

Table 7.17 Key waste streams and classification – construction

Activity	Waste streams that may be produced	Likely classification of waste streams
General		
Operation of construction site offices and amenities	Food and other organic waste	General solid waste (putrescible)
	Sewage	Liquid waste
	General waste (such as waste paper and cardboard, containers (plastic, glass, metals), pellets, plastic film wrap, cable reels, and metal straps/bands, polystyrene and other packaging waste etc)	General solid waste (non-putrescible)
	Electrical and electronic waste	General solid waste (non-putrescible)
	Waste from vehicle/plant equipment maintenance and operation of equipment (such as adhesives, lubricants, waste fuels and oils, chemicals, engine coolant, batteries, tyres etc)	– General solid waste (non-putrescible) – drained oil filters (mechanically crushed), rags and oily rags (only if they contain non-volatile petroleum hydrocarbons and no free liquids) – Restricted waste, hazardous waste
Bioenergy facility		
Site preparation including foundation works, minor earthworks for site shaping/stabilisation, establishment of laydown areas, and installation / relocation of services	Spoil	– General solid waste (non-putrescible) – Restricted waste, hazardous waste and/or special waste
	Redundant utilities waste such as wiring and piping	General solid waste (non-putrescible)
Construction of concrete slabs	Construction material offcuts and excess	General solid waste (non-putrescible)
Construction of power connection, services installation and related components	Construction material offcuts and excess	General solid waste (non-putrescible)
	Spoil	General solid waste (non-putrescible)

Waste generating activities, waste streams, quantities and classifications during decommissioning

The new bioenergy facility would incorporate many of the existing power station fit for purpose facilities. Following commissioning of the new bioenergy facility, LMS would commence decommissioning of redundant infrastructure identified in Table 7.18.

Decommissioning activities for redundant infrastructure would be undertaken within 36 months of commissioning of the bioenergy facility and include:

– disconnection and isolation from the existing power station power supply
– removal of above ground infrastructure that is nearing the end of its design life.

The likely waste classification assumes that all waste oil and coolant would be drained from generators and transformers prior to transport offsite for recycling purposes.

Table 7.18 Estimated key waste streams quantities – decommissioning

Waste stream	Likely waste classification	Estimated quantity
Landfill gas generator modules	General solid waste (non-putrescible)	15 units
Above ground fuel distribution line connecting above ground storage tanks to operational generator modules	General solid waste (non-putrescible)	Unknown
Transformers	General solid waste (non-putrescible)	8 units
Waste oil from transformers and generators	Liquid waste	Unknown
Waste coolant from generators	Liquid waste	Unknown
Cooling towers and underground cooling water system connecting to generator modules	General solid waste (non-putrescible)	2 units
Landfill gas flares	General solid waste (non-putrescible)	2 units
Spoil material	General solid waste (non-putrescible) (waste classification to be confirmed by further sampling and analysis in accordance with mitigations described in Table 6.23)	To be confirmed

Potential impacts

The potential impacts associated with aspects of waste generation and management during construction and decommissioning are summarised in Table 7.19.

Table 7.19 Potential impacts associated with waste generation and management – construction and decommissioning

Aspect of waste management	Potential impacts
Generation of construction and decommissioning waste	– generation and migration of dust during construction and decommissioning – erosion and sediment due to runoff from disturbed areas – noise from plant and equipment movement – human health risks due to handling of TRH F3 and zinc contaminated fill material
Generation of contaminated fill material	– exposure to contaminated fill material during remedial works – contamination of waterways from runoff from remedial areas – encountering unexpected finds or unsuitable fill during removal of generator module slabs and sumps – oil or coolant spills and leaks during disconnection and decommissioning of generators and other infrastructure
Storage and segregation of waste	– human health risks due to storage/handling of contaminated/unsuitable fill – cross contamination of wastes due to improper segregation – odour from waste storage area – attraction of pests and disease vectors – waste build up from irregular or disrupted collections
Waste transportation	– dust generation from loading and unloading activities and movement of waste on haul roads – noise from waste handling, loading and unloading waste – road traffic noise from movement of waste collection vehicles – traffic generated by haulage of waste to recycle/disposal facilities – odours from loading waste onto vehicles and movement of waste collection vehicles to disposal or recycling facilities – unlawful transport and disposal – incorrect classification of waste materials
Unlicenced waste contractors or facilities handling waste	– regulatory non-compliance – potential illegal dumping of waste – potential for disposal at unlawful unlicensed receival sites

Approach to waste minimisation and re-use

All waste generated during construction and decommissioning would be managed using the waste hierarchy approach of avoidance and re-use before consideration is given to disposal. Where practicable, existing infrastructure would be utilised for the new bioenergy facility to avoid waste generation. This includes offices, workshops, biogas delivery infrastructure, electricity interconnection and oil storage facility.

Procurement of excess materials would be avoided in accordance with relevant guidelines and policies. Most equipment and buildings would be prefabricated reducing onsite generation of construction wastes.

All wastes would be managed in accordance with the waste provisions contained within the POEO Act and other relevant legislative and policy requirements, as outlined in Chapter 4. A contractor would be engaged to undertake the decommissioning works to facilitate safe handling of redundant plant and infrastructure and recovery of recyclable materials.

Should waste be found to be unsuitable for re-use or recycling, disposal methods would be selected based on the classification of the waste material in accordance with the Waste Classification Guidelines (EPA, 2014).

The proposed approach to managing the different types of construction waste in accordance with the waste management hierarchy, including measures to facilitate segregation and prevent cross contamination, are provided in Table 7.20.

The proponent would prepare a detailed Construction Environmental Management Plan (CEMP) that addresses key regulatory requirements and environmental management measures and procedures.

Table 7.20 Construction and decommissioning waste management measures

Waste	Hierarchy	Management measures
Vegetation	Reduce	Clearing would be minimised by removing vegetation only when needed. Proposed drainage lines and development footprint avoids existing vegetation where practicable. Areas to be cleared would be marked to reduce incidental clearing.
	Re-use	As far as practicable, cleared material would be stockpiled for reuse on-site for landscaping purposes.
	Dispose	Any material that cannot be reused would be disposed of at a suitably licensed facility.
Spoil	Reduce	Detailed design would include measures to minimise excess spoil generation. This would include a focus on optimising the stormwater and foundation design to minimise spoil volumes and re-use of material on site.
	Re-use	Spoil classified as ENM from excavation works would be re-used as trench backfill or stockpiled for use in landscaping on site if suitable. This would comprise excavated residual soils, clean fill and sandstone.
	Recycle	Any excess spoil material would be stockpiled on-site and options to recycle the material would be investigated, where practicable.
	Dispose	Any excess spoil materials that are not suitable for re-use would be disposed of at a suitably licenced facility in accordance with the waste classification. Given the current land use, localised contaminated soil or fill is expected to be encountered at the surface in select areas. The material would be managed in accordance with the LMS unexpected finds protocol.
Excess construction materials/ construction waste	Avoid	Procurement of surplus construction materials would be avoided, and precast building components utilised where practicable.
	Recycle	Any excess materials generated on site would be segregated using separate bins for different waste and recyclable materials. The recyclable materials would be removed from site for further processing or re-use at appropriately licenced facilities.
	Dispose	Construction waste that cannot be recycled would be collected and removed offsite for disposal at a suitably licenced facility.
Decommissioned infrastructure	Avoid	Where existing infrastructure is fit for purpose, it would be utilised as part of the new Bioenergy Facility. This includes offices, amenities, workshops and above ground gas conveyance infrastructure.
	Reuse	Above ground fuel distribution lines to the existing landfill gas generator modules would be realigned to connect to the new landfill gas generator units.

Waste	Hierarchy	Management measures
	Recycle	Decommissioned plant and equipment would be transferred off site to licenced recycling facilities.
	Dispose	Residual waste from decommissioning activities would be disposed of to landfill
Waste oil and coolant	Dispose	Oil and coolant would be drained from the decommissioned plant to facilitate recycling. The liquid waste would be handled by a licenced contractor in accordance with the requirements of the Waste Regulations.
General waste	Recycle	Labelled and colour coded receptacles would be provided at the construction site office for general waste from construction personnel to ensure source separation of recyclable materials and residual landfill waste. These wastes would be collected on a regular basis by authorised and appropriately licenced waste collection contractors for offsite recycling or disposal.
	Dispose	
Sewage	Dispose	Liquid waste, such as sewage generated from the site office would be managed via the existing septic system and sewage main.
Hazardous waste	Dispose	Minimal amounts of hazardous waste such as batteries are expected to be generated during construction.

Waste storage locations

Construction and decommissioning waste would be temporarily stored on-site in skip bins within the project site area. Spoil and vegetation would be stored in segregated stockpiled based on intended destination. Materials would be segregated according to classification and clearly signposted in order to maximise the material fitness for use and reduce the risk of cross contamination.

Waste generated by construction staff would be stored in mobile garbage bins in designated storage areas next to the construction office area. Signage identifying the waste storage area at the construction site office would be prominently displayed.

Off-site recycling and disposal

Table 7.21 identifies potential options for off-site disposal and recycling for the key construction and decommissioning waste streams. The destinations would be confirmed by the construction contractor and included in the construction environmental management plan for the project prior to construction commencing.

Table 7.21 Potential recycling and disposal options – demolition and construction

Material	End use	Recycling/disposal options
Spoil classified as excavated natural material	Reused/recycled	Stockpiled for reuse as daily cover in landfill operations
Spoil classified as general solid waste (non-putrescible)	Dispose	Disposal to LHRRP (waste levy may be payable)
Spoil classified as restricted waste	Disposed	Transferred to Cleanaway Elizabeth Drive landfill for disposal
Construction waste (concrete, timber)	Recycled	Temporary storage on site prior to transfer to recycling facility such as Benedict Recycling, Chipping Norton
Metal	Recycled	Temporary storage on site prior to transfer recycling facility such as Mr Metal Recycling
General waste	Disposed	Disposal to LHRRP
Recyclable material	Recycled	Collection via waste contractor and transfer to licenced recycling facility
Liquid waste	Dispose	Cleanaway Port Kembla Liquid Waste Services or other licenced facilities
Sewage	Disposed	Existing septic system and sewage main.
Hazardous waste	Recycled/disposed	Drop off to battery recycler

Operation

Estimated waste quantities and handling

Potential impacts during operation also relate to generation and management of waste and associated potential impacts if waste is not managed appropriately.

The key operational waste streams would be as follows:

– general waste generated by site staff from the lunch room
– wastewater (grey water and sewage) from site office
– waste from vehicle/plant and equipment maintenance and operation of equipment (such as adhesives, lubricants, waste fuels and oils, chemicals, engine coolant, batteries etc).

Typical waste generation rates for offices has been applied for waste generated by the site lunch room sourced from the NSW EPA better Practice Guidelines for Waste Management and Recycling in Commercial and Industrial Facilities (2012), provided in Table 7.22.

Table 7.22 Estimation factor for office waste

	General waste	Recycling
Office	10L/100 m^2 floor space / day	10L/100 m^2 floor space / day

Table 7.23 outlines the key waste streams predicted to be generated, the quantities of waste generated, the likely classifications based on the Waste Classification Guidelines (EPA, 2014) and off-site disposal and recycling destinations. The final destinations for all off-site recycling and disposal would be confirmed prior to operations commencing and updated throughout the life of the facility based on the availability of suitably licensed facilities.

Table 7.23 Operational waste streams, quantities and likely waste classifications

Waste stream	Likely waste classification	Estimated quantity/year	Storage	Potential destination	End use
General waste	General solid waste (non-putrescible)	450 L	240 L Mobile garbage bin (MGB)	LHRRP	Disposal
Recyclable material	General solid waste (non-putrescible)	450 L	240 L MGB	Cleanaway MRF Rooty Hill	Recycling
Waste oil	Liquid waste	160,000 L	20,000 L bulk oil tank	Cleanaway Port Kembla Liquid Waste Services	Disposal
Waste coolant	Hazardous waste	3750 L average per year over 8 year cycle.	Self-bunded IBC	Cleanaway Port Kembla Liquid Waste Services	Disposal
Waste cleaning products (e.g. chemicals, lubricants)	Liquid waste	Nominal	Chemical storage area	Cleanaway Port Kembla Liquid Waste Services	Recycling/disposal
Leachate	Liquid waste	Nominal	3 x condensate storage vessels	LHRRP leachate management system	Disposal
Sewage	Liquid waste	Nominal	Washroom facilities	Existing septic and sewage main	Disposal
Sanitary waste	Clinical waste	Nominal	Designated bins in washroom	Collection and disposal by licenced waste contractor	Disposal
Hazardous materials (e.g. household batteries)	Hazardous waste	Nominal	Designated bins	Collection by accredited battery collector such as Cleanaway	Recycling/disposal

Potential impacts associated with aspects of waste generation during operation are summarised in Table 7.24. Operational waste management activities are not expected to have a significant impact on the environment or human health provided that the waste handling and management measures are implemented.

Table 7.24 Potential impacts – operation

Aspect of waste management	Potential impacts
Storage and segregation of waste	– cross contamination of wastes due to improper segregation – odour from waste storage area – exceedance of storage capacity – attraction of pests and disease vectors – waste build up from disrupted operation or waste removal – fire risk
Waste oil spills or leaks	– disruption to operations caused by waste oil spills or leaks – uncontrolled release of contaminants to the environment
Waste transportation	– dust generation or litter from loading and unloading activities and movement of waste on haul roads – noise from waste handling, loading and unloading waste – odours from loading waste onto vehicles and movement of waste collection vehicles to disposal or recycling facilities – unlawful transport and disposal – incorrect classification of waste materials
Unlicenced waste contractors or facilities handling waste	– regulatory non-compliance – potential illegal dumping of waste from operation activities – potential for disposal at unlawful unlicensed receival sites

Approach to waste minimisation and re-use

All waste generated during operation would be managed using the waste hierarchy approach of avoidance and re-use before consideration is given to disposal.

All wastes would be managed in accordance with the waste provisions contained within the POEO Act and other relevant legislative and policy requirements, as outlined in section 7.6.1.

Should waste be found to be unsuitable for re-use or recycling, disposal methods would be selected based on the classification of the waste material in accordance with the Waste Classification Guidelines (EPA, 2014).

Internal access roads are designed to allow for service vehicle access to allow for maintenance activities and waste collection. The waste generated by operations staff would be stored external to the lunchroom.

The proposed approach to managing the different types of operational waste in accordance with the waste management hierarchy, including measures to facilitate segregation and prevent cross contamination, are provided in Table 7.25.

Table 7.25 Operational waste management measures

Waste	Hierarchy	Management measures
Waste oil	Reduce	Generation of excess waste oil would be minimised as much as possible through optimisation of the design and procurement
	Dispose	Waste oil would be stored in a bunded above ground steel tank. This includes the provision of safety management systems and controls such as minimising ignition sources and safety separation distances to other dangerous goods storages. The waste oil would be collected by a licenced contractor to a treatment facility via road tanker. Waste tracking and reporting requirements would apply for transfer of waste oil off site.
General waste	Recycle	Labelled and colour coded receptacles would be provided at the construction site office for general waste from construction personnel to ensure source separation of recyclable materials and residual landfill waste. These wastes would be collected on a regular basis by authorised and appropriately licenced waste collection contractors for offsite recycling or disposal.
	Dispose	

Waste	Hierarchy	Management measures
		The bins would be stored external to the lunchroom, likely to the north of the building to allow for access for collection.
Sewage	Dispose	Liquid waste, such as sewage generated from the site office would be managed via the existing septic system and sewage main.
Waste coolant	Dispose	Waste coolant would be stored in a self-bunded intermediate bulk container and handled and disposed of by a licenced contractor to a suitably licenced facility.
Sanitary waste	Dispose	Collection by a licenced waste contractor for disposal
Waste cleaning products (e.g. chemicals, lubricants)	Dispose	Collection by a licenced waste contractor for disposal
Hazardous waste	Dispose	Minimal amounts of hazardous waste such as batteries are expected to be generated during operation.

7.6.4 Mitigation measures

The mitigation measures provided in Table 7.26 will be implemented to minimise the potential for waste management impacts during the construction, operation, and decommissioning stages of the project. These measures would be included in the issue-specific environmental management sub-plans for the project.

Table 7.26 Mitigation measures – waste

ID	Environmental aspect	Mitigation and management measure	Responsibility	Timing
WA1	Minimising waste during materials procurement	Detailed design would include measures to minimise quantities of waste requiring off-site disposal and careful procurement of construction materials to minimise excess waste materials.	LMS	Design
WA2	Construction and decommissioning waste classification	All construction and decommissioning waste that is removed from site would be classified in accordance with the *Waste Classification Guidelines* (EPA 2014) and the waste provisions contained within the POEO Act and other relevant legislative and policy requirements with appropriate records retained.	Contractor	Construction
WA3	Preparation of construction and decommissioning waste management plan	A construction and decommissioning waste management plan would be prepared and implemented as part of the CEMP for the project. The plan would adopt the waste hierarchy principles contained in the *Waste Avoidance and Resource Recovery Act 2001* and detail processes, responsibilities and measures to manage waste and minimise the potential for impacts during construction and decommissioning. This would include waste separation, handling, storage, transport and off-site re-use, recycling and disposal locations.	Contractor	Construction
WA4	Preparation of operational waste management plan	The Operational Environmental Management Plan (OEMP) includes a waste management plan which incorporates the requirements of relevant guidance documents and the waste management hierarchy principles contained in the *Waste Avoidance and Resource Recovery Act 2001*. This would include: – all key operational waste streams and expected quantities – waste classification procedures and details of how all waste streams would be recycled or disposed of in accordance with the Waste Classification Guidelines (EPA 2014) and the waste provisions contained within the POEO Act and other relevant legislative and policy requirements – details of off-site recycling and disposal locations – record keeping and reporting requirements.	LMS	Operation

7.7 Cumulative impacts

Cumulative impacts are compounding environmental and community impacts caused by present or reasonably foreseeable future activities. Cumulative impacts may arise from the interaction of the construction or operational activities associated with the project and other proposed projects in the area.

7.7.1 Methodology

Assessment approach

Cumulative impacts are defined as an impact on the environment which results from the incremental impact of the action when added to other current and reasonably foreseeable future actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. The overall effect of cumulative impacts could be positive or negative. This would depend on the nature of the development and its surroundings, other relevant developments within proximity of the project, as well as the nearby communities and environments.

This section integrates the findings of the technical assessments and determines whether the combined effect of these different impacts would be acceptable.

Current and future developments were considered if they were in the study area, and were:

– related to the project or occur within the LHRRP
– other developments within the Sutherland LGA.

The publicly available information on other developments was reviewed to determine if their activities could:

– directly or indirectly impact the same location or sensitive environmental features as the project
– result in similar impacts to the project
– be constructed at the same time as the project.

Legislative and policy context

This cumulative impact assessment was undertaken for the project with reference to the Cumulative Impact Assessment Guidelines for State Significant Projects guidelines (NSW DPIE, 2022c). It meets the requirements of the SEARs issued for the project through consideration of:

– the scale and nature of the predicted impacts, including any cumulative impacts, and whether these impacts will comply with the relevant statutory requirements, standards or performance measures
– the general regional and local land use planning context, any protected areas, other developments in the area, and/or cumulative impacts
– any key linkages between the assessment of different matters or likely cumulative impacts of the project.

Assessment inputs

The cumulative impact assessment was informed by information obtained through the following sources:

– NSW Government Major Projects database
– Sutherland Shire Council development applications database
– feedback during consultation for the project.

Study area

The technical reports provided as attachments as Technical Reports 1 to 9 and are summarised in technical chapters 6 and 7 of this EIS, have considered cumulative impacts for specific key matters. The study area for the cumulative impact assessment was selected based on the likely extent of direct and indirect impacts identified for each technical assessment and is variable for each environmental aspect.

7.7.2 Identifying other developments or activities

A search of the NSW Government Major Projects database was undertaken on 25 August 2025 to identify other SSD or State Significant Infrastructure (SSI) projects that may be relevant to the cumulative impact assessment. To be considered relevant, nearby projects needed to be of similar size, within reasonable proximity and have a timeframe that may overlap with the project.

A scoping process was then undertaken by the respective technical specialist to determine if a project may result in a significant impact and thus warranted further standard or detailed assessment.

The EP&A Act projects portal was searched on 25 August for the Sutherland Shire LGA and neighbouring LGAs that have boundaries with the Sutherland Shire LGA boundary less than 5 kilometres from the project site. These LGAs are namely the Campbelltown and Liverpool LGAs.

No relevant Part 5 applications, either within the past three years or within 10 kilometres of the project site were identified via the Division 5.1 Activities portal (NSW Government, n.d.) and therefore not considered further.

The identified Part 5 projects and other projects with potential for cumulative impacts are outlined in Table 7.27.

There is the potential for the Lucas Heights flare modification, Lucas Heights Western Extension, Eastern FOGO Facility and Mill Creek cycleway construction works to overlap with construction of the project.

Table 7.27 Relevant existing/future projects for cumulative impact assessment

Project name and number	Address / Location	Distance from project (approx.)	Assessment type and project status	Known timing details
SSD Applications				
Lucas Heights RRP Western Extension (SSD-78269209)	Lucas Heights Resource Recovery Facility	670 m northwest	SSD Prepare EIS	Construction timing unknown.
LHRRP Flare Modification SSD-6835 0 MOD 3	Lucas Heights Resource Recovery Facility	Adjacent to the project site	Mod 3 – Modification Approved	Construction of the flare may overlap with early construction phases of the bioenergy facility.
LHRRP Eastern FOGO Facility and Western Borrow Pit SSD-6835 – Mod 4	Lucas Heights Resource Recovery Facility	Within existing Resource Recovery Facility footprint in the LHRRP approx. 500 m northwest	Mod 4 – Scoping letter submitted, prepare MOD report	Construction of the Eastern FOGO facility proposed to occur Q1 2026, subject to approvals.
Other projects				
Mill Creek Carpark and Cycleway Project (No ID number)	Corner of Illawarra Road and Little Forest Road	500 m southeast	Council project (SSC, 2024)	As of June 2025, the Mill Creek Carpark and Cycleway Project in New South Wales is progressing, albeit with some delays and adjustments. Commencement of Stage 2 was proposed for September 2024 pending approval with the landowner for the carpark construction (Sutherland Shire Council, 2025).

7.7.3 Impact assessment

An assessment of potential cumulative impacts with the developments described in Table 7.28, is discussed in Table 7.28.

Due to the distance to other developments, the short term nature of the construction work and the non-concurrent construction periods, significant cumulative impacts are not expected for any environmental matters.

Table 7.28 Cumulative impact assessment

Development / activity	Potential cumulative activities.	Identified cumulative impacts
Lucas Heights Resource Recovery Park (RRP) Western Extension (SSD-78269209)	The Lucas Heights RRP Western Extension is proposed at the same precinct (LHRRP) as the project.	The Lucas Heights RRP Western Extension is proposed within the broader LHRRP precinct but is at an early stage of planning and is not expected to overlap in timing with the proposed works during construction. When developed, the expansion would form part of the established waste management operations within the precinct and would be subject to its own environmental controls and mitigation measures.
LHRRP Flare Modification SSD-6835	The LHRRP Flare Modification construction may coincide with construction of the bioenergy facility, which may lead to increase in traffic activity within the LHRRP.	Construction of the flare is expected to be completed prior to the commencement of construction of the proposed bioenergy facility. Given the timing, proximity, and nature of the works, no cumulative environmental impacts are anticipated during either construction or operation when the two projects are considered together.
LHRRP Eastern FOGO modification SSD-6853	The LHRRP Eastern FOGO facility construction may coincide with construction of the bioenergy facility, which may lead to increase in traffic activity on Little Forest Road.	Both projects would generate relatively low volumes of construction traffic on average throughout the day. The projects would use separate access points, and operate under standard construction hours, avoiding concentrated peak-period LHRRP traffic. As such, the combined traffic generated by both projects would remain within the capacity of the existing road network, and no material cumulative traffic impacts are expected. Importantly, both projects would avoid peak querying times for waste transfer vehicles accessing the LHRRP in the morning hours (5am-7am).
Mill Creek Carpark and Cycleway Project	This project proposes a fenced carpark, an access pathway, and safety structures for the Mill Creek mountain bike trail. Construction or early operation stages of the Mill Creek Carpark and Cycleway Project may overlap with the project, which may lead to cumulative traffic impacts of heavy vehicles and potentially trailers and/or mountain bikes.	Construction of this carpark is already underway and is likely to be completed before construction of the bioenergy facility would occur. During operations, the bioenergy facility would replace the existing power station operations, technical assessments with regard to noise, air and traffic conclude the project would have no cumulative impact to users of the Mill Creek Mountain Bike Trails.

7.7.4 Mitigation measures

Approach to mitigation and management

To minimise potential overlap between construction activities and associated traffic or access impacts, LMS Energy and Cleanaway maintain regular communication regarding the timing and coordination of their respective projects within the LHRRP.

Project schedules and logistics are reviewed collaboratively to avoid conflicts where possible and to ensure safe and efficient operations across the precinct. In addition, ongoing stakeholder engagement is undertaken with relevant agencies and nearby land users to provide project updates and address any emerging issues during construction and operation.

8. Environmental management

8.1 Environmental management framework

8.1.1 Compilation of impacts

The key potential impacts during construction and operation of the project that require mitigation and management are summarised in Table 8.1 and Table 8.2 respectively. Further information is provided in the relevant chapters.

The identified impacts would be mitigated by implementing the environmental management procedures and plans described in sections 8.1.3 and 8.1.4 and the mitigation measures compiled in Appendix E.

Table 8.1 Summary of key potential construction impacts

Issue	Key potential construction impacts
Air quality	Generation of dust and vehicle emissions from earthworks, construction plant and equipment movements, and exposed surfaces.
Noise	Increased noise from construction machinery and vehicle movements, particularly during activities such as ground preparation and equipment installation.
Hazards and risk – industrial	Use and storage of hazardous materials and fuels during construction may pose a low risk of spills, fire, or chemical exposure without appropriate controls.
Hazards and risk – bushfire	Temporary increase in bushfire risk due to presence of ignition sources (e.g. vehicles, equipment), especially during hot, dry weather conditions.
Water resources	Mobilisation of sediments or contaminants in runoff from ground disturbance works during construction
Soils and contamination	Disturbance of existing soils may result in minor erosion or exposure to previously unidentified contamination, particularly during excavation.
Traffic and access	Temporary increases in heavy vehicle and light vehicle traffic movements on the local road network, potential access issues for heavy vehicles.
Biodiversity	Clearing of vegetation for underground servicing corridors avoids all areas of native vegetation through construction within existing cleared industrial site.
Landscape and visual	Temporary landscape character changes and visual impacts due to visibility of construction area and activities and increase in construction traffic.
Aboriginal heritage	Potential discovery of unrecorded Aboriginal heritage items.
Social impact	Temporary amenity impacts on nearby land uses (e.g. noise, dust, traffic) during construction; potential community concern about disruption; short-term local employment opportunities.

Table 8.2 Summary of key potential operation impacts

Issue	Key potential operation impacts
Air quality	Emissions from combustion of landfill gas in generators, including NOx, CO, PM, VOCs, and odorous compounds; however, emissions are controlled and monitored to meet EPA standards.
Noise	Potential exceedances of noise criteria within the future parkland areas in close proximity to bioenergy facility, however no impact is predicted to be caused to residential receivers. Operational noise from gas engines, ventilation systems, and vehicle movements; localised exceedances at adjacent recreational land uses are expected to be minor and manageable.
Hazards and risk- industrial	Potential risks associated with biogas handling, storage of hazardous materials (e.g. oils, LPG), and fire; however, risks are within HIPAP 4 criteria and mitigated by design controls.
Hazards and risk – bushfire	Ongoing exposure to bushfire risk due to proximity to bushland; managed through asset protection zones, vegetation controls, and emergency management plans.

Issue	Key potential operation impacts
Water resources	Minor risk of stormwater pollution if runoff from operational surfaces is not managed; however, controls in place to prevent sediment and pollutant discharge
Traffic and access	Modest increase in daily light vehicle trips (staff and maintenance), and occasional heavy vehicle access for equipment servicing or replacement; low overall traffic impact.
Landscape character and visual impact	Introduction of new structures and buildings, with low visual impact to future and existing receivers.
Biodiversity	No direct biodiversity impact expected during operation as the facility footprint avoids native vegetation.
Social impact	Long-term positive contribution through renewable energy generation, reduced greenhouse gas emissions, and support for circular economy outcomes; minor ongoing amenity impacts (e.g. noise) for some adjacent uses, but overall low given site context.

8.1.2 Approach to environmental management

The approach to environmental mitigation and management for the project involves:

– Project design – as described in Chapter 3, the project incorporates measures to avoid and minimise impacts.
– Mitigation measures – mitigation measures provided in Chapters 6 through 7 are identified as an outcome of the environmental impact assessment and are consolidated in section 8.2.
– Project-specific CEMP and an OEMP – prepared to guide the approach to environmental management during construction and operation, as described in sections 8.1.3 and 8.1.4. The CEMP and an OEMP will:
  - outline the environmental management practices and procedures to be followed
  - documentation processes for demonstrating compliance with the commitments made in this EIS, the submissions report (to be prepared), and relevant approval conditions
  - be prepared generally in accordance with the *Environmental management guidelines for construction* (Buy NSW 2020).

8.1.3 Construction environmental management plan

The management of environmental impacts during construction will be documented in the CEMP, to be prepared prior to the commencement of construction of the project. The CEMP will provide a centralised mechanism through which all potential construction-related environmental impacts will be managed. It will also provide the overall framework for the system and procedures to ensure that environmental impacts are minimised, and that legislative and approval requirements are fulfilled.

The CEMP will define how specific environmental issues are to be managed during construction in accordance with the mitigation measures provided in the EIS and the conditions of approval. It will be prepared generally in accordance with the *Environmental management guidelines for construction* (Buy NSW 2020). The CEMP will include:

– LMS Environmental Policy, objectives, and performance targets for construction
– reference to all relevant statutory and other obligations, including any consents, licenses, approvals, and voluntary agreements required
– management policies, procedures, and review processes to assess the implementation of environmental management practices and the environmental performance of the project against the objective and targets
– requirements and guidelines for management in accordance with:
  - the conditions of consent for the SSD application
  - the mitigation measures specified in this EIS
  - relevant construction management guidelines
  - requirements in relation to incorporating environmental protection measures and instructions in all relevant standard operating procedures and emergency response procedures
  - roles and responsibilities of all personnel and contractors to be employed on site
  - incident and contingency management procedures

- processes for demonstrating compliance with the commitments made in this EIS, the submissions report (to be prepared), and relevant approval conditions
- procedures for complaints handling and ongoing communication with the community
- a monitoring and auditing program, as defined by this EIS and the conditions of the approval.

The CEMP will comprise a main document, issue-specific sub-plans, activity-specific procedures and strategies, and site-based control maps. The CEMP issue-specific sub plans proposed to manage the impacts identified in the EIS (in accordance with the mitigation measures) include:

– construction waste management plan
– soil and water management plan
– unexpected finds procedure
– construction traffic and pedestrian management plan
– dust control protocol
– incident response management plan.

8.1.4 Operational environmental management plan

The Operational Environmental Management Plan (OEMP) plan will:

– describe desired outcomes and processes for the prevention and management of environmental impacts resulting from the operation of the project
– set out the responsibilities and accountabilities of LMS and others in this regard
– identify key management systems that support the delivery of environmental compliance.

The OEMP will include:

– a description of activities to be undertaken during operation
– an environmental risk analysis to identify the key environmental performance issues associated with the operation phase
– statutory and other obligations that the proponent is required to fulfil during operation, including approvals, consultations and agreements required from authorities and other stakeholders under key legislation and policies
– a description of the links with the LMS Environmental Policy, and the EPL to be obtained for the project
– overall environmental policies, guidelines and principles to be applied to operation
– roles and responsibilities for relevant employees involved in operation, including relevant environmental training and induction requirements
– incident and contingency management procedures
– details of how environmental performance will be managed and monitored to meet acceptable outcomes, including what actions will be taken to address identified potential adverse environmental impacts.

Specific plans to manage issue-specific impacts identified in the EIS (in accordance with the mitigation measures) will include:

– operational waste management plan
– operational water management plan
– operational traffic management plan
– complaints register
– incident response management plan
– emergency services information package.

8.2 Mitigation and management measures

Appendix E provides a compilation of the measures proposed to mitigate and manage the potential impacts of the project as detailed in Chapters 6 to 7.

The measures listed may be revised in response to submissions raised during public exhibition of the EIS and/or any design changes made following exhibition. The final list of mitigation measures would be provided in the submissions report. If the project is approved, the conditions of approval, which would include reference to the finalised mitigation measures, would guide subsequent phases of the project. The works would be undertaken in accordance with the conditions of approval and the final list of mitigation measures.

9. Justification and conclusion

9.1 Justification for the project

9.1.1 Approach

Detailed environmental investigations have been carried out as described in Chapters 6 to 7 to:

– understand the existing environment of the project site and surrounds
– inform design of the bioenergy facility and preliminary construction planning
– undertake the environmental impact assessment and prepare the EIS.

To provide a high level of certainty in understanding the environment and identifying potential impacts, all investigations were undertaken by technical specialists experienced in impact assessment using best practice methodologies in accordance with relevant statutory requirements and guidelines. A summary of the investigations undertaken, methodologies applied, and results achieved, are described in Chapters 6 to 7. Further detailed information is provided in the technical reports.

The first step of the impact assessment process involved identifying key potential environmental issues, impacts and risks that would be subject to detailed assessment as part of the EIS. Investigations were informed by the impact scoping exercise and environmental risk assessment and were undertaken in accordance with the SEARs. The results of environmental investigations and consideration of the environmental risk assessment were used to ensure that potential impacts are avoided as far as possible.

Ways to further reduce and minimise unavoidable potential impacts on the environment have also been considered. Mitigation and management measures to minimise any outstanding impacts are identified in this document. These measures, and the proposed approach to environmental management during construction and operation, are provided in Chapter 8.

Avoiding and minimising impacts through design

The approach to design development has included a focus on avoiding and/or minimising the potential for impacts during all key phases of the design process. In this regard, a feedback process has enabled findings from stakeholder engagement and the various technical specialist studies to be captured and shared, allowing a collective understanding of the receiving environment to be built up, and leading to elements of the design being refined or changed to respond to these findings.

Various detailed investigations and assessments have been undertaken, including site visits and modelling. These investigations included a broad study area to identify key constraints early in the design process to assist with avoiding and minimising impacts as far as reasonably practicable.

The overall approach to the design development included the following key steps:

– consideration of site layout options
– stakeholder engagement
– refinement to the design and concept site layout
– detailed investigations and environmental and social impact assessments
– further refinement of the design and concept site layout.

Key features that have been incorporated in the design of the project to avoid and minimise impacts include:

Site layout

– Internal road network allows all delivery vehicles to queue entirely within the site, avoiding congestion on public roads (Little Forest and New Illawarra Road).
– Established entry and exit point providing clear internal circulation, and signage to support efficient and safe vehicle movement.

– Operational infrastructure is located to maximise distance from sensitive uses, such as the PCYC MiniBike Club and future parkland.

Air quality

– Comprehensive air quality assessment conducted, covering construction and worst-case operational scenarios. Predicted concentrations of key pollutants (e.g. NO_2, CO, PM_{10}, $PM_{2.5}$, VOCs, H_2S and H_2SO_4) at 33 surrounding sensitive receivers are below NSW EPA criteria.
– Biogas engines selected to meet modern emission standards. Stack emissions monitoring to ensure ongoing compliance and effectiveness of mitigation systems.
– The bioenergy facility will deliver net greenhouse gas benefits by capturing and combusting methane that would otherwise vent from landfill.

Noise

– Noise modelling assessed impacts at 10 sensitive receiver locations with the majority complying with the established criteria. Localised exceedances identified at the future parkland (R08) however unlikely to have any significant impact to future occupants.
– Acoustic enclosures, attenuators or low-noise equipment to be used for key infrastructure.
– Construction works limited to within the approved operating hours of the LHRRP; no sensitive receivers within vibration impact distances.
– Post-commissioning noise monitoring to confirm compliance with predicted operational levels.

Hazards – Industrial

– The Preliminary Hazard Assessment (PHA) confirms individual and societal risks are well within HIPAP 4 thresholds.
– Dangerous goods stored on site are below SEPP 33 thresholds, but risk modelling conducted due to nearby sensitive uses.
– Worst-case scenarios (e.g. gas leaks, bore rupture or transformer fire) modelled with risk contours applicable to sensitive receivers retained within the site boundary.
– Safety systems include fire protection infrastructure, chemical handling protocols, emergency planning and staff training.
– A Fire Safety Study and Final Hazard Analysis to be completed at detailed design stage.

Water

– The facility design utilises existing hardstand areas and stormwater drainage infrastructure to manage runoff from operational surfaces and prevent uncontrolled discharge.
– Construction and operation activities will be supported by erosion and sediment controls to prevent mobilisation of sediments into downstream water systems.
– The facility's water management approach aligns with relevant stormwater quality objectives and will be implemented through the CEMP and OEMP.

Hazards – Bushfire

– The project site is partially located on bushfire prone land with identified BAL 12.5 conditions to the north, east and south. Bushfire mitigation includes Asset Protection Zones, managed vegetation buffers and compliant evacuation routes.
– Design and operation will follow Planning for Bushfire Protection (NSW RFS, 2019) and AS3959:2018.
– Bushfire Emergency Management and Evacuation Plan (BEMEP) to be developed.

Traffic

– The internal road network is designed to accommodate all truck queuing within the site, avoiding congestion and queue spillback onto Little Forest Road and New Illawarra Road. Construction traffic would not coincide with peak early morning queuing times for heavy vehicles accessing the LHRRP.

– The internal road network allows safe and efficient movement for heavy vehicles into and out of the site.

Visual

– Visual impacts assessed from key public and recreational viewpoints are assessed as low to moderate.
– The built form of the bioenergy facility is designed to be in keeping with the industrial context.
– The bioenergy facility design is consistent with the LHRRP masterplan and the landscape character of the surrounding precinct.

Biodiversity

– The site comprises cleared, disturbed land with exotic plantings, garden beds and more mature native vegetation along its boundaries.
– Vegetation clearing to be minimised via use of existing disturbed areas and hardstand and managed via a CEMP; erosion and sediment controls implemented.

Other

– Construction and operational waste management to follow waste hierarchy and align with NSW Waste and Sustainable Materials Strategy 2041.
– The CEMP and OEMP will embed mitigation measures for air, noise, waste, traffic, biodiversity, heritage, water and hazards across all stages of the project.

9.1.2 Social and economic considerations

Potential positive and negative socio-economic impacts have been considered in section 7.5.

During construction, there is potential for actual or perceived amenity impacts associated with generation of noise and vibration, changes in visual amenity, and increased vehicle movements on the local road network. Any potential actual or perceived construction-related amenity impacts would be temporary in nature (approximately 6 to 8 months).

During operation there is also potential for actual or perceived amenity impacts associated with generation of noise and vibration, changes in visual amenity, and increased vehicle movements on the local road network. Ways to reduce and minimise unavoidable potential amenity and socio-economic impacts have been considered during design development to date and as a result of the environmental investigations. Chapter 8 provides details of these proposed mitigation and management measures.

The project also has a number of significant benefits which must also be considered when determining if the project is in the public and community's interest overall. The benefits of the project are summarised below.

Public interest and community benefits

The project would directly support the delivery of NSW and national objectives for sustainable waste management, renewable energy generation, and emissions reduction as demonstrated in section 7.4. The project aligns with the NSW Waste and Sustainable Materials Strategy 2041 and Circular Economy Policy Statement by enabling the recovery of organic waste and generation of renewable energy from biogas.

Key public and community benefits include:

– **Waste recovery from landfill:** The project would recover biogas from food organics and other organic waste streams and manage biogas generation from organics within the landfill. This would extend landfill life, reduce methane emissions, and reduce the intensity of grid emissions through the production of baseload renewable electricity.
– **Renewable energy generation:** The project would generate up to 22 MW of electricity from biogas, supporting NSW's transition to cleaner energy sources and contributing to energy resilience at the LHRRP. It also contributes baseload electricity to the local Ausgrid distribution network, supporting grid stability through the capacity to power approximately 30,000 homes.
– **Improved waste infrastructure:** The project delivers essential infrastructure to support regional waste strategies, ensuring continued resource recovery capacity for southern Sydney.

– **Local job creation:** The project would support approximately 15 jobs during peak construction and up to six ongoing operational roles in the renewable energy sector.
– **Supporting the local economy:** Construction and operation of the project are expected to increase demand for local trades, goods and services, meals and accommodation services, supporting economic activity in the Sutherland Shire and broader southern Sydney region.
– **Environmentally responsible design:** The project is located within a managed industrial precinct with appropriate environmental buffers and is co-located with complementary waste infrastructure, limiting new disturbance and ensuring operations are consistent with the site's established land use.

With these benefits, the project is in the public interest and consistent with community expectations for sustainable, low-impact waste and energy infrastructure.

9.1.3 Suitability of the site

The bioenergy facility site is considered suitable for the project for the following reasons:

– The project is located within an existing, operational waste management precinct (the existing power station site) which supports co-location of complementary waste processing infrastructure, consistent with strategic planning directions and the existing land use of the LHRRP.
– The facility is permissible with consent in the SP2 Infrastructure zone under the Sutherland Shire Local Environmental Plan 2015 and is consistent with the objectives of the zone, including support for essential public utility infrastructure and waste management.
– The site is situated on previously developed industrial land without the need for additional clearing or disturbance to vegetated areas.
– The site is serviced by existing access roads and internal transport infrastructure and is located in proximity to major arterial roads, including New Illawarra Road and Heathcote Road, providing efficient access for transport and grid connection.
– A contamination assessment (Technical Report 5) found no evidence of contamination that would preclude development. The site forms part of a managed operational area of the LHRRP and is subject to ongoing environmental controls, including a Pollution Incident Response Management Plan (PIRMP) and Operational Environmental Management Plan (OEMP).
– A Preliminary Hazard Assessment, including screening in accordance with SEPP 33 and supporting consequence and risk modelling, concluded that the facility does not constitute a hazardous or offensive industry, and risks can be managed through standard design and operational controls.
– The closest residential receivers are located approximately 1.5 kilometres metres to the east, and technical assessments, including noise, air quality, odour and visual impact studies, confirmed that with the proposed mitigation measures, there would be no significant impact on surrounding sensitive receivers.
– The project is not located in a flood planning area, is not expected to intercept groundwater, and is situated at the top of the catchment, with only minor and manageable impacts to localised surface water flows expected during construction.
– The EIS technical studies demonstrate that the project can be delivered with a low risk of environmental impact, provided mitigation and management measures outlined in this EIS are implemented effectively.

9.1.4 Compatibility with future use

The LHRRP is planned to be progressively rehabilitated and transformed into a community parkland sometime between 2037 to the early 2040s. The broad vision is to include 149 hectares of open space for passive recreation incorporating broad open grassed and planted tree areas with integrated cycling paths and vehicular access. The final design and intended use of the parkland will be determined closer to the landfill’s closure date by Cleanaway, in consultation with Sutherland Shire Council and ANSTO. The latest proposed masterplan for the site is provided on Figure 7.2.

The bioenergy facility is critical environmental management infrastructure with a small footprint located within the existing power station site within a dedicated infrastructure zone located to the east of the broad areas proposed for open space and passive recreation as part of the masterplan.

Active management of landfill biogas will be required throughout the post closure period of the landfill operations. The project will be integral to the ongoing management of biogas during this period, and the bioenergy facility is required to be located in proximity to the landfill biogas collection system to provide effective ongoing combustion of biogas. The project involves the direct replacement of the existing power station infrastructure to extend biogas management throughout the post closure period and is not introducing a new land use in vicinity of the proposed future parkland areas.

The open space parkland areas have been assessed as future receivers as part of the noise, air quality, hazard and visual assessments within the EIS. Minor exceedances to the adopted noise management levels are predicted due to the location of the facility immediately adjoining the future parkland. The areas of parkland closest to the bioenergy facility and most affected by noise will have steep batters based upon final landfill profile and are therefore considered unlikely to receive significant recreational activity. The steep landform will also provide some acoustic shielding of noise to the more frequented central areas of the parkland.

The air quality assessment demonstrates compliance with relevant air quality criteria at a representative location within the future parkland. The hazard and risk assessment demonstrates that users of the future parkland areas are not exposed to unacceptable levels of risk in accordance with relevant risk threshold criteria.

The landscape and visual assessment identified that users of the future parkland would have partial views of the bioenergy facility from the southern portion of the parklands. Views may be partially obscured by the existing trees to the west of the future flare site. The main pedestrian/cycle paths are proposed to be located within the flatter central areas of the parkland which are likely to be more frequented by parkland users. These flatter areas are about 10 to 19 metres higher than the elevation at the project site and the facility is not likely to be a dominant feature or interrupt scenic views from the elevated areas of the parkland.

While minor noise and visual impacts are predicted for the future parkland, the facility has been designed and located to minimise these impacts as far as practicable. It would present as a modern infrastructure comparable to the existing power station. Further consideration as part of the final masterplan process will assist in minimising these impacts.

9.1.5 Ecologically sustainable development

The EP&A Act adopts the definition of ecologically sustainable development contained in the *Protection of the Environment Administration Act 1991*. The following sections provide reasons justifying the project having regard to the principles of ecologically sustainable development defined by Section 193 of the EP&A Regulation. The assessments undertaken are consistent with accepted scientific and assessment methodologies and have considered relevant statutory and agency requirements. The assessments have applied a conservative approach with regard to construction and operational arrangements, and the modelling used.

Precautionary principle

The precautionary principle is defined as ' ... if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation' (EP&A Regulations).

A range of environmental investigations have been undertaken during the development of the project and the environmental assessment process, to ensure that potential impacts are understood with a high degree of certainty. The assessment of the potential impacts of the project is consistent with the precautionary principle.

The project design has evolved to avoid impacts where possible and to reflect the findings of the studies undertaken. For example, acoustic modelling informed the siting of key infrastructure away from sensitive receivers, and noise-generating equipment such as biogas engines will be enclosed within acoustically treated enclosures to minimise operational noise impacts.

The facility has been sited within the existing disturbed footprint of the existing power station to avoid impacts on undisturbed land and vegetation, and to take advantage of existing infrastructure and existing boundary demarcation.

Mitigation and management measures have been proposed to minimise potential impacts related to construction and operation, which will be implemented during these stages.

A conservative approach has been adopted in relation to potential impacts. For example, the noise modelling, and air quality modelling were undertaken for worst-case scenarios. No threat of serious or irreversible damage to the environment arising from the project has been identified.

Principle of inter-generational equity

The principle of inter-generational equity is defined as ' ... the present generation should ensure the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.'

Construction and operation of the proposed bioenergy facility may result in some short-term environmental and social impacts, such as construction-related noise, temporary traffic disruption, and minor changes to visual character. These impacts, however, would be appropriately managed through mitigation and environmental management measures outlined in the EIS.

Importantly, the long-term benefits of the project align strongly with this principle. The facility would capture and convert landfill biogas into renewable energy, reducing greenhouse gas emissions. The project supports circular economy outcomes by recovering value from waste, helps displace fossil fuel-based electricity generation, and contributes to New South Wales' and Australia's transition to a more sustainable and resilient energy system delivering lasting environmental, social, and economic benefits for future generations.

By reducing dependence on fossil fuels and avoiding methane emissions from landfill, the project supports improved environmental outcomes that directly benefit future generations. In addition, the project will generate local employment, enhance energy resilience, and contribute to the state's renewable energy targets.

Overall, the project supports the responsible use of natural energy resources and delivers long-term environmental, economic, and social benefits in line with the principles of inter-generational equity.

Conservation of biological diversity and ecological integrity

The principle of conservation of biological diversity and ecological integrity is defined as ' ... conservation of biological diversity and ecological integrity should be a fundamental consideration.'

An ecological assessment has been undertaken to identify potential impacts on biodiversity. The project site was found to have no intact native vegetation and limited habitat value. The potential impacts from the additional light and noise caused by the project are not considered to significantly increase impacts.

Improved valuation and pricing of environmental resources

The principle of improved valuation, pricing and incentive mechanisms is defined as ' … environmental factors should be included in the valuation of assets and services.'

The assessment has identified the environmental and other consequences of the project and identified mitigation measures where appropriate to manage potential impacts. If approved, the construction and operation of the project would be in accordance with relevant legislation, the conditions of approval, and the construction and operation environmental management plans prepared for the project. These requirements would result in an economic cost to the proponent. The implementation of mitigation measures would increase both the capital and operating costs of the project. This signifies that environmental resources have been given appropriate valuation.

The value of environmental resources is also inherently considered in the development of a design that avoids and minimises impacts.

The design for the project has been developed with an objective of minimising potential impacts on the surrounding environment. The design, project elements, and mitigation and management measures, are selected to avoid and minimise environmental and/or social impacts and are included in the total estimated project cost.

Sustainable building standards for non-residential development

Section 3.2 of SEPP (Sustainable Buildings) 2022 requires consideration of a range of factors in determination of a development consent for non-residential buildings including:

a. the minimisation of waste from associated demolition and construction, including by the choice and reuse of building materials,
b. a reduction in peak demand for electricity, including through the use of energy efficient technology,

c. a reduction in the reliance on artificial lighting and mechanical heating and cooling through passive design,

d. the generation and storage of renewable energy,

e. the metering and monitoring of energy consumption,

f. the minimisation of the consumption of potable water.

The project involves development of twenty 1.1 MW modular lean burn generator sets, which would be considered structures in accordance with definition of a building under the EP&A Act. Each generator set would comprise a reciprocating lean burn gas engine purpose built for landfill biogas combustion. The design and selection of ancillary equipment, including, biogas delivery, flares, transformers, and switch-rooms aligns with best practice activities for power stations and landfill biogas management.

The project would utilise existing office and amenities facilities so would not utilise extensive resources or raw materials to construct any buildings. Generators, switch-rooms and ancillary infrastructure would be delivered to the site as modular units therefore the quantity of raw materials required to assemble the predominant steel structures has not been determined. Generators would be installed on 600 millimetre diameter concrete piles with the remainder of the 683 m^2 operational footprint comprising 100 millimetres of crushed rock on a compacted subbase.

Management of waste throughout the project cycle has been considered in section 7.6.

The project is designed for renewable energy generation through the capture of landfill biogas (predominantly methane) from waste decomposition, preventing its fugitive release into the atmosphere and instead converting it into useable renewable electricity. This process not only contributes to reducing greenhouse gas emissions but also provides a stable and predictable source of baseload renewable energy. Landfill biogas fuelled energy generation occurs continuously, making it a reliable, consistent baseload complement to variable generation sources in the NEM.

The project will have a very small demand for electricity use, which will be monitored throughout operations. LMS estimates that approximately 15,263 kilowatt hours (kWh) of electricity would be used each year. Based on current carbon emissions from the electricity grid, this would result in about 7.9 tonnes of CO_2 emissions in 2025. As the electricity grid becomes cleaner over time, these emissions are expected to drop to just 0.5 tonnes by 2034.

The project will be a net producer of renewable energy, generating in excess of 150,000 megawatt hours (MWh) of electricity per year. This output will significantly exceed the project's own minor operational electricity demand, resulting in a strong net positive energy contribution to the grid.

Potable water requirements are limited to the amenities and safety systems on site and is available from a mains connection within the existing power station site.

9.1.6 Objects of the EP&A Act

The project's consistency or otherwise with the objects of the EP&A Act is summarised in Table 9.1.

Table 9.1 Consideration of the objects of the EP&A Act

EP&A Act objective (EP&A Act Section 1.3)	Comment
(a) to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources,	The project addresses the identified need to increase renewable energy generation capacity in Greater Sydney. The project contributes to NSW's waste and resource recovery targets while supporting the transition to a circular economy. The design incorporates measures to manage potential environmental impacts, particularly in relation to air quality, noise, hazards and traffic.
(b) to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment,	Ecologically sustainable development has been considered in section 9.1.4.

EP&A Act objective (EP&A Act Section 1.3)	Comment
(c) to promote the orderly and economic use and development of land,	The project makes use of previously cleared land within an established waste and resource recovery precinct at the LHRRP, promoting efficient and compatible land use. It supports the economic use of land by integrating with existing infrastructure and enhancing the precinct's energy recovery capabilities. The facility will convert biogas into renewable energy, making productive use of disposed waste.
(d) to promote the delivery and maintenance of affordable housing,	Not relevant to the project.
(e) to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats,	The project has been designed to minimise the impacts to the environment. Potential impacts have been identified within the EIS and mitigation and management measures have been proposed to encourage the protection of the environment.
(f) to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage),	Not relevant to the project.
(g) to promote good design and amenity of the built environment,	The project has been designed to minimise the impacts to the environment. Potential impacts have been identified within the EIS. Management measures have been proposed to encourage the protection of the environment and amenity.
(h) to promote the proper construction and maintenance of buildings, including the protection of the health and safety of their occupants,	The project has considered the requirements of relevant standards and guidelines and identified management measured through the EIS process with a view to ensuring the site and the facility is suitable for its intended future use and safe occupation.
(i) to promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State,	Not relevant to the project.
(j) to provide increased opportunity for community participation in environmental planning and assessment.	The project has involved public consultation during preparation of the Scoping Report and during preparation of the EIS.

9.1.7 Planning agreement/developer contributions

The Minister for Planning and Public Spaces has the discretion to impose a upon an approval a payment of a development contribution after considering the provisions of any applicable development contributions plan. LMS notes that the project would have negligible, if any, impacts on the requirements and demand for local government services and amenities. Conversely, the project contributes significant financial investment with broad community benefit and essential environmental management of an existing waste disposal site.

Furthermore, the project is being implemented as an environmental management initiative to manage gas and minimise greenhouse gas emissions from the LHRRP. In addition, the LHRRP is subject to an existing voluntary planning agreement (VPA) which comprises environmental undertaking and reporting and includes the provision of significant financial contributions.

The project has a limited workforce of six FTE which effectively replaces the workforce from the existing power station and will not significantly alter the demand for services already allowed for under the LHRRP VPA.

9.2 Conclusion

The project responds to a clear and pressing need for infrastructure that can recover energy from waste by capturing landfill biogas and converting it into renewable electricity. By turning biogenic waste emissions into a valuable energy resource, the project supports increased diversion of waste biogas from landfill that would otherwise be vented or flared into the atmosphere, reduces greenhouse gas emissions, and contributes to a circular economy.

The project is consistent with the Sutherland LEP and in particular, the objectives of the SP1 Special Activities zone.

The project has addressed and is consistent with the relevant objects (Section 1.3) of the EP&A Act. In particular:

– to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment
– to promote the orderly and economic use and development of land
– to promote good design and amenity of the built environment
– to promote the proper construction and maintenance of buildings, including the protection of the health and safety of their occupants.

As described in Chapters 6 through 7, the project would incorporate environmental management and design features to ensure that potential impacts are managed and mitigated as far as practicable. The majority of the potential construction related impacts would be effectively mitigated by the implementation of best practice construction management, including the implementation of the environmental management approaches described in section 8.1.2 and the mitigation measures compiled in Appendix E.

The final design for the project would be developed with the objective of minimising potential impacts on the local and regional environment, and the local community as stated in this EIS. The design and construction methodology would continue to be developed with this overriding objective in mind, taking into account the input of stakeholders.

To manage the potential impacts identified by the EIS, the assessment chapters outline a range of mitigation measures that would be implemented during construction and operation of the project. Chapter 8 summarises the mitigation measures that will be implemented. The environmental performance of the project will be managed by the implementation of construction and operational environmental management plans. The plans and framework will also ensure compliance with relevant legislation and any conditions of approval.

With the implementation of the proposed mitigation and management measures the potential environmental impacts of the project would be adequately managed.

Development consent should be granted for the project because it:

– is permissible with consent and consistent with the objectives of the SP1 Special Activities zone
– is an industrial activity to be located within an established industrial area of the LHRRP
– is consistent with the strategic planning directions of relevant State and local planning policies
– will contribute to the State's waste recovery performance in meeting waste reduction targets and is consistent with the orderly and economic use and development of land
– the impacts of the development can be mitigated and managed to ensure an acceptable level of environmental performance
– is in accordance with the Objects of the EP&A Act and is consistent with the ecologically sustainable development principles, because it would achieve an appropriate balance between the relevant environmental, economic and social considerations.

Whilst the project has the potential to result in minor increases in hazard, traffic, noise and amenity impacts, it is a suitable development for the site, sited within the broader LHRRP and will deliver local and regional economic benefits and is considered to be in the public interest.

The revised location within the existing power station site offers improved or equivalent environmental outcomes compared to the original footprint. By co-locating the bioenergy facility with existing biogas infrastructure, the revised location minimises the need for additional land disturbance and avoids encroachment on areas planned for future public parkland. It also allows for more efficient integration with existing utilities and access roads, reducing the overall construction footprint and potential for off-site impacts, offering improved or equivalent environmental outcomes.

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Appendices

Appendix A

Secretary's Environmental Assessment Requirements

Table A.1 General requirements

SEARs requirement	Where addressed in EIS
The Environmental Impact Statement (EIS) must: – comply with these assessment requirements	Throughout EIS
– meet the form and context requirements in sections 190 and 192 of the Environmental Planning and Assessment Regulation 2021 (the Regulation)	Throughout EIS
– have regard to the Department's State Significant Development Guidelines (2021).	Throughout EIS
In addition, the EIS must include: – a clear comprehensive description of the proposal for the site, including details of all activities and processes proposed to be carried out as part of the development. – details of the relationship of the proposal with any existing agreements, consents and licences for the existing power station and details on whether these need to be amended, modified or surrendered	Chapter 4
– consideration of issues discussed in the public authority responses	Appendix D, Chapter 5
– a detailed assessment of the key issues specified below, including: • a description of the existing environment, using sufficient baseline data	Chapter 2, section 2.6, throughout Chapters 6 and 7.
– an assessment of the potential impacts of all stages and activities that form part of the development, including any cumulative impacts, taking into consideration relevant guidelines, policies, plans and statutes	Chapters 6 and 7
– a description of the measures that would be implemented to avoid, minimise, mitigate and if necessary, offset the potential impacts of the development, including proposals for adaptive management and/or contingency plans to manage significant risks to the environment.	Appendix E
The EIS must also be accompanied by: – an Estimated Development Cost (EDC) Report prepared in accordance with the relevant planning circular using the Standard Form of EDC Report	Separate attachment
– high quality files of maps and figures of the subject site and proposed development	Throughout EIS and Appendix C
– an estimate of the retained and new jobs that would be created during the construction and operational phases of the development, including details of the methodology to determine the figures provided	Sections 3.3 and 3.4
– certification that the information provided is accurate at the date of preparation	Certification page
– a declaration from a Registered Environmental Assessment Practitioner that your EIS includes the information specified in the Department's *Registered Environmental Assessment Practitioner Guidelines*.	Registered Environmental Assessment Practitioner EIS Declaration

Table A.2 Key issues

SEARs requirement	Where addressed in EIS
The EIS must address the following specific matters: – Statutory and Strategic Context – including: • a detailed description of the history of the site, including the relationship between the proposed development and all development consents and approved plans previously and/or currently applicable to the site	Section 1.5
– demonstration that the proposal is consistent with all relevant planning strategies, environmental planning instruments, adopted precinct plans, draft district plan(s) and adopted management plans and justification for any inconsistencies. This includes, but is not limited to:	Chapters 2 and 5
– State Environmental Planning Policy (Planning Systems) 2021	Section 4.1.2
– State Environmental Planning Policy (Transport and Infrastructure) 2021	Section 4.1.2
– State Environmental Planning Policy (Biodiversity and Conservation) 2021	Table 4.2
– State Environmental Planning Policy (Resilience and Hazards) 2021	Table 4.2

SEARs requirement	Where addressed in EIS
– State Environmental Planning Policy (Industry and Employment) 2021	Not applicable
– Greater Sydney Regional Plan: A Metropolis of Three Cities	Section 2.5.1
Suitability of the Site – including: – A detailed justification for the proposal and that the site can accommodate the proposed development having regard to its potential environmental impacts, permissibility, strategic context and existing site constraints	Section 9.1.3
– Details of the suitability of the proposed development in relation to future recreational land uses identified for the adjacent land.	Sections 9.1.4 and 7.1.
Community and Stakeholder Engagement – a community and stakeholder engagement strategy consistent with the *Department's Undertaking Engagement Guidelines for State Significant Projects* for all stages of the development, including (but not limited to): – details of how issues raised, and feedback provided during engagement activities have been considered and responded to in the development	Appendix D, Chapter 5
– details of the proposed approach to future community and stakeholder engagement based on the results of consultation.	Appendix D, Chapter 5
Energy From waste – detail how the proposal would operate and comply with the EPA's Energy from Waste Policy Statement 2021, including if applicable, compliance with the Eligible Waste Fuels Guidelines 2022	Section 2.4.2
Hazard and risk including: – a preliminary risk screening completed in accordance with Chapter 3 of State Environmental Planning Policy (Resilience and Hazards) 2021 and Applying SEPP 33 (DoP, 2011), that includes: • a clear indication of class, storage and handling quantities and location of all dangerous goods and hazardous materials associated with the development, including the dangerous goods transported within the landfill gas pipeline • a description of any design measures and controls to minimise fire risk and exposure to future adjacent recreational land uses.	Section 6.5, Technical Report 3
– Preliminary Hazard Analysis (PHA) prepared in accordance with Hazardous Industry Planning Advisory Paper No. 6 – Guidelines for Hazard Analysis (DoP, 2011) and Multi-Level Risk Assessment (DoP, 2011), should the preliminary risk screening indicate that the project is "potentially hazardous	Section 6.5, Technical Report 3
Fire and Incident Management including: – detailed information relating to the proposed structures addressing relevant levels of compliance with the National Construction Code (NCC).	Section 6.4, Technical Report 3 Section 6.5, Technical Report 4
Contamination: – a site contamination assessment in accordance with the Managing Land Contamination Planning Guidelines: SEPP 55 – Remediation of Land (DUAP, 1998), including: – Characterisation of the nature and extent of any contamination on the site and surrounding area.	Section 6.6, Technical Report 5
– A Detailed Site Investigation (DSI) and a Remedial Action Plan, if the Preliminary Site Investigation indicates contamination is present and a DSI is required.	Not applicable
Air quality and odour: – a quantitative assessment of the potential air quality, dust and odour impacts of the development (construction and operation) on surrounding landowners, businesses and sensitive receptors, in accordance with relevant Environment Protection Authority (EPA) guidelines, including:	Section 6.2, Technical Report 1
– a description of the receiving environment and relevant sensitive receptors, including consideration of future recreational land uses	Section 5, Technical Report 1
– quantification of pollutant emission sources from the project and cumulative emissions from nearby sources	Section 6.2, Technical Report 1

SEARs requirement	Where addressed in EIS
– description of emission controls and benchmarking against best practice emission controls	Section 6, Technical Report 1
– consideration of worst-case impacts and comparison with emission limits	Section 6, Technical Report 1
– demonstration of the proposal's ability to comply with the Protection of the *Environment Operations (Clean Air) Regulation 2022*	Section 6.6, Technical Report 1 Section 6.2 of the EIS.
Noise and vibration: – a quantitative noise and vibration impact assessment undertaken by a suitably qualified acoustic consultant in accordance with the relevant Environment Protection Authority guidelines and Australian Standards which includes:	Section 6.3, Technical Report 2
– background noise levels, noise source inventory and worst-case emission scenarios	Chapter 4 of Technical Report 2
– modelling the impacts from operation for comparison with relevant criteria at sensitive receivers, including future recreational users on adjacent land	Chapter 5 of Technical Report 2
– a cumulative impact assessment	Section 7.4 of Technical Report 2 Section 6.3.4.
– proposed mitigation and management measures and details of residual noise and vibration impacts	Chapter 8 of Technical Report 2 Section 6.3.5
– details of any proposed compliance monitoring programs	Section 8.2 of Technical Report 2
Water management including: – a site water balance detailing the water demand, supply and measures to minimise water use and water licensing requirements	Section 6.5 of Technical Report 6
– a description of groundwater and surface water conditions and all works/activities that may intercept, extract, use, divert or receive surface water and/or groundwater (both temporary and permanent)	Sections 4.4, 1.1, 4.7 and 1.1 of Technical Report 6
– an assessment of potential surface and groundwater impacts (both quality and quantity), including potential impacts on watercourses, riparian areas, groundwater, and groundwater-dependent communities	Chapter 6 of Technical Report 6
– details of the proposed stormwater/wastewater drainage design including the capacity of onsite detention system(s), onsite sewage management and measures to treat, reuse or dispose of water	Section 6.2.2 of Technical Report 6
– details of any surface or groundwater mitigation, management and monitoring activities and methodologies	Chapter 7 of Technical Report 6
Traffic and Transport including: – a quantitative traffic impact assessment prepared in accordance with relevant Roads and Maritime Services and Austroads guidelines, that includes:	Technical Report 7
– an estimate of trip generation, arrival/departure profiles and trip distribution	Section 4.1 and Section 4.2 of Technical Report 7
– details of all daily and peak traffic volumes likely to be generated during all key stages of construction and operation, including a description of key access / haul routes, vehicle types and potential queuing impacts	Chapter 4 of Technical Report 7
– plans demonstrating how all vehicle movements likely to be generated during construction and operation can be accommodated on the site to avoid queuing in the street network	Chapter 4 and 5 of Technical Report 7
– details and plans of any proposed the internal road network, access points for the duration of operation, loading area, on-site parking, pedestrian and cycle facilities	Section 4.5 and Section 4.8 of Technical Report 7
– swept path diagrams for the largest vehicles manoeuvring through site access points	Section 4.8 of Technical Report 7
– details of any required road upgrades for the development	Not applicable

SEARs requirement	Where addressed in EIS
a Draft Construction Traffic and Pedestrian Management Plan	Section 5.1 and Appendix C of Technical Report 7
Soils including**:** – an assessment of potential impacts on soil resources and riparian land on and near the site, including:	Section 6.3 of Technical Report 6
– Impacts on soil erosion, salinity and acid sulfate soils	Section 6.3 and 4.6 of Technical Report 6
– Details of earthworks, including cut and fill volumes	
– Description of the proposed erosion and sediment controls during construction.	Chapter 7 of Technical Report 6
Waste including: – details of waste storage, handling and disposal during the development	Sections 7.6.1 to 7.6.3
– details of the measures that would be implemented to ensure that the development is consistent with the aims, objectives and guidance in the NSW Waste and Sustainable Materials Strategy 2041	Sections 7.6.4 and 2.4.4
Visual including: – an assessment of the potential visual impacts of the development on the amenity of the surrounding area, including future recreational areas on the adjacent land	Section 7.1
– detailed plans showing suitable landscaping which incorporates endemic species as well as how it maximise opportunities for green infrastructure, consistent with Greener Places (Government Architect NSW, 2020).	Section 7.1.5
Infrastructure Requirements including: – an assessment of impacts of the development on existing utility infrastructure and service provider assets surrounding the site	Section 2.6.6
– identification of any existing infrastructure or easements on or off the site which may be impacted by construction or operation of the development and details of measures to be implemented to address any impacts	Sections 2.6 and 3.3.8
Bush Fire: – a bush fire assessment report that addresses the aims and objectives of Planning for Bushfire Protection 2019, and includes:	Technical Report 4
– details of proposed operational access for emergency services personnel	Section 6.2 of Technical Report 4.
– details of emergency and evacuation arrangements for occupants/visitors	Section 6.2 of Technical Report 4.
– a draft bush fire emergency management and evacuation plan that provides an outline of how the development will be managed / mitigated to address potential bush fire impacts	Appendix A of Technical Report 4.
Non-Aboriginal Cultural Heritage: – where there is potential for direct or indirect heritage impacts, provide a Statement of Heritage Impact and Archaeological Assessment (if potential impacts to archaeological resources are identified), prepared in accordance with the Guidelines for preparing Statements of Heritage Impact and guidelines Archaeological Assessment and Assessing Significance for Historical Archaeological Sites and Relics	Section 7.3
Biodiversity: – an assessment of the proposal's biodiversity impacts in accordance with the Biodiversity Conservation Act 2016, including the preparation of a Biodiversity Development Assessment Report (BDAR) where required under the Act, except where a waiver for preparation of a BDAR has been granted.	Section 7.2, Appendix F
Social: including a social impact assessment in accordance with the Department's Social Impact Assessment Guideline.	Section 7.5, Technical Report 9

SEARs requirement	Where addressed in EIS
Ecologically Sustainable Development including: – identification of how ESD principles (as defined in section 193 of the EP&A Regulation) are incorporated in the design and ongoing operation of the development	Section 9.1.4
– demonstration of how the development will meet or exceed the relevant industry recognised building sustainability and environmental performance standards	Section 9.1.4
– demonstration of how the development minimises greenhouse gas emissions (reflecting the Government's goal of net zero emissions by 2050) and consumption of energy, water (including water sensitive urban design) and material resources	Section 7.4, Technical Report 1
– if Chapter 3 of State Environmental Planning Policy (Sustainable Buildings) 2022 applies: • demonstrate how the development has been designed to address the provisions set out in in Chapter 3.2(1) • provide a NABERS Embodied Emissions Material Form to disclose the amount of embodied emissions attributable to the development in accordance with section 35BA of the EP&A Regulation.	Section 9.1.4
Planning Agreement/Development Contributions including: – consideration of any applicable State and local development contributions, such as the Housing and Productivity Contribution and/or draft contributions plan(s), and/or details of any Planning Agreement required should a contributions plan not be in place.	Not applicable

Table A.3 Engagement

SEARs requirement	Where addressed in EIS
During the preparation of the EIS, you must consult with the relevant local, State or Commonwealth Government authorities, service providers, community groups and affected landowners. In particular, you must consult with: – Sutherland Shire Council – Department of Climate Change, Energy, the Environment and Water, specifically the: • Environment Protection Authority • Environment and Heritage Group • Water Group – Heritage NSW – Transport for NSW – Fire & Rescue NSW – NSW Rural Fire Service – Australian Nuclear Science and Technology Organisation – Department of Defence – Lucas Heights Resource Recovery Park Community Reference Group – surrounding local landowners, businesses and stakeholders – local and regional community, sport and environmental groups – any other public transport, utilities or community service providers.	Chapter 5, Technical Report 7 Appendix D

Appendix B

Statutory compliance table

Table B.1 Statutory compliance table

Legislation	Purpose/description	Approval / consent / licence required	Where addressed/considered in EIS	
			Section	Appendix/ Tech report
Federal legislation				
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	The EPBC Act is the Australian Government's central piece of environmental legislation. It provides a legal framework to protect and manage nationally and internationally important flora and fauna, ecological communities, and heritage places defined as Matters of National Environmental Significance (MNES). Approval from the Australian Government Minister for the Environment is required for: – An action which has, would have, or is likely to have a significant impact on MNES. – An action likely to have a significant impact on the environment in general (for actions by Commonwealth agencies or actions on Commonwealth land) or the environment on Commonwealth land (for actions outside Commonwealth land).	Not required – no significant impact on MNES.	Section 4.4.1	Appendix F BDAR Waiver
State legislation				
Environmental Planning and Assessment Act (EP&A Act)	The EP&A Act is the principal legislation regulating development in NSW. It establishes a regime for the making of development applications, assessment of their environmental impacts, and the determination of those applications. It also allows for the making of environmental planning instruments such as State Environmental Planning Policies (SEPPs) and Local Environmental Plans (LEPs). The project requires consent by the Minister under Part 4, Division 4.7 of the EP&A Act as it is deemed SSD due to its intended waste receival capacity.	Development consent	Section 4.1	-
Biodiversity Conservation Act 2016	The BC Act covers the listing and protection of threatened species at a state level in NSW. The (BC Act) requires that an SSD or SSI application must be accompanied by a biodiversity development assessment report (BDAR) unless the Planning Agency Head (or delegate) and the Environment Agency Head (or delegate) determine that the proposed development is not likely to have any significant impact on biodiversity values. This determination is referred to as a BDAR waiver (Environment and Heritage 2024)	A BDAR waiver application was submitted on 18 September 2025. A response was received from DCCEEW on 22 October 2025 confirming the project is not likely to have any significant impact on biodiversity values. Therefore, a biodiversity development assessment report is not required.	Section 7.2	Appendix F BDAR Waiver

Legislation	Purpose/description	Approval / consent / licence required	Where addressed/considered in EIS	
			Section	Appendix/ Tech report
Other environmental planning instruments				
Sutherland Local Environmental Plan 2012	The Sutherland LEP is the main local instrument for development permissibility and consent for the Sutherland LGA. The Sutherland LEP, along with the in accordance with the Standard Instrument – Principal Local Environmental Plan, sets out the definition of land uses and land zoning where they are permitted.	No approval/consent required, site is zoned to permit proposed land use of waste or resource management facilities.	Section 2.5.3	Site zoned SP1 Special Activities

Table B.2 Form of the environmental impact statement

EP&A Regulation 2021 Section 190	Where addressed in the EIS
(1) An environmental impact statement must contain the following information— (a) the name, address and professional qualifications of the person who prepared the statement,	Certification page
(b) the name and address of the responsible person,	Certification page
(c) the address of the land— (i) to which the development application relates, or (ii) on which the activity or infrastructure to which the statement relates will be carried out,	Certification page
(d) a description of the development, activity or infrastructure,	Chapter 3
(e) an assessment by the person who prepared the statement of the environmental impact of the development, activity or infrastructure, dealing with the matters referred to in this Division.	Certification page
(2) The person preparing the statement must have regard to— (a) for State significant development—the *State Significant Development Guidelines*, or (b) for State significant infrastructure—the *State Significant Infrastructure Guidelines*.	Throughout EIS
(3) An environmental impact statement must also contain a declaration by a relevant person that— (a) the statement has been prepared in accordance with this Regulation, and (b) the statement contains all available information that is relevant to the environmental assessment of the development, activity or infrastructure, and (c) the information contained in the statement is not false or misleading, and (d) for State significant development or State significant infrastructure—the statement contains the information required under the Registered Environmental Assessment Practitioner Guidelines.	Certification page

Table B.3 Content of the environmental impact statement

EP&A Regulation 2021 Section 190	Where addressed in the EIS
(1) An environmental impact statement must contain the following—	
(a) a summary of the environmental impact statement,	Executive summary
(b) a statement of the objectives of the development, activity or infrastructure,	Section 2.6
(c) an analysis of feasible alternatives to the carrying out of the development, activity or infrastructure, considering its objectives, including the consequences of not carrying out the development, activity or infrastructure,	Section 2.7
(d) an analysis of the development, activity or infrastructure, including—	
(i) a full description of the development, activity or infrastructure, and	Chapter 3
(ii) a general description of the environment likely to be affected by the development, activity or infrastructure and a detailed description of the aspects of the environment that are likely to be significantly affected, and	Chapter 2
(iii) the likely impact on the environment of the development, activity or infrastructure, and	
(iv) a full description of the measures to mitigate adverse effects of the development, activity or infrastructure on the environment, and	
(v) a list of the approvals that must be obtained under another Act or law before the development, activity or infrastructure may lawfully be carried out,	Chapter 5
(e) a compilation, in a single section of the environmental impact statement, of the measures referred to in paragraph (d)(iv),	Appendix B
(f) the reasons justifying the carrying out of the development, activity or infrastructure, considering biophysical, economic and social factors, including the principles of ecologically sustainable development	Section 9.1

Appendix C

Detailed plans and maps

N

10 5 0 10 20

SCALE BAR (m)

SCALE 1:500 FOR A1 SIZE
SCALE 1:1000 FOR A3 SIZE
GDA94 / MGA ZONE 56
NEARMAP AERIAL IMAGE DATED 01/06/25

FOR INFORMATION

No	DATE	DRN	DESN	CHKD	APP	DESCRIPTION
E	24/10/25	SA	FL	–	–	FI – LABEL SIZE INCREASED
D	15/09/25	SA	FL	–	–	FI – STORAGE SHED MOVED
C	08/09/25	SA	FL			FI – BUILDING POSITION CHANGES
B	07/08/25	SA	DM	–	–	FI – CSB ADDED
A	25/07/25	SA	DM	–	–	DIP – DESIGN IN PROGRESS

REVISIONS

DRAWING NUMBER	DESCRIPTION

REFERENCE DRAWINGS

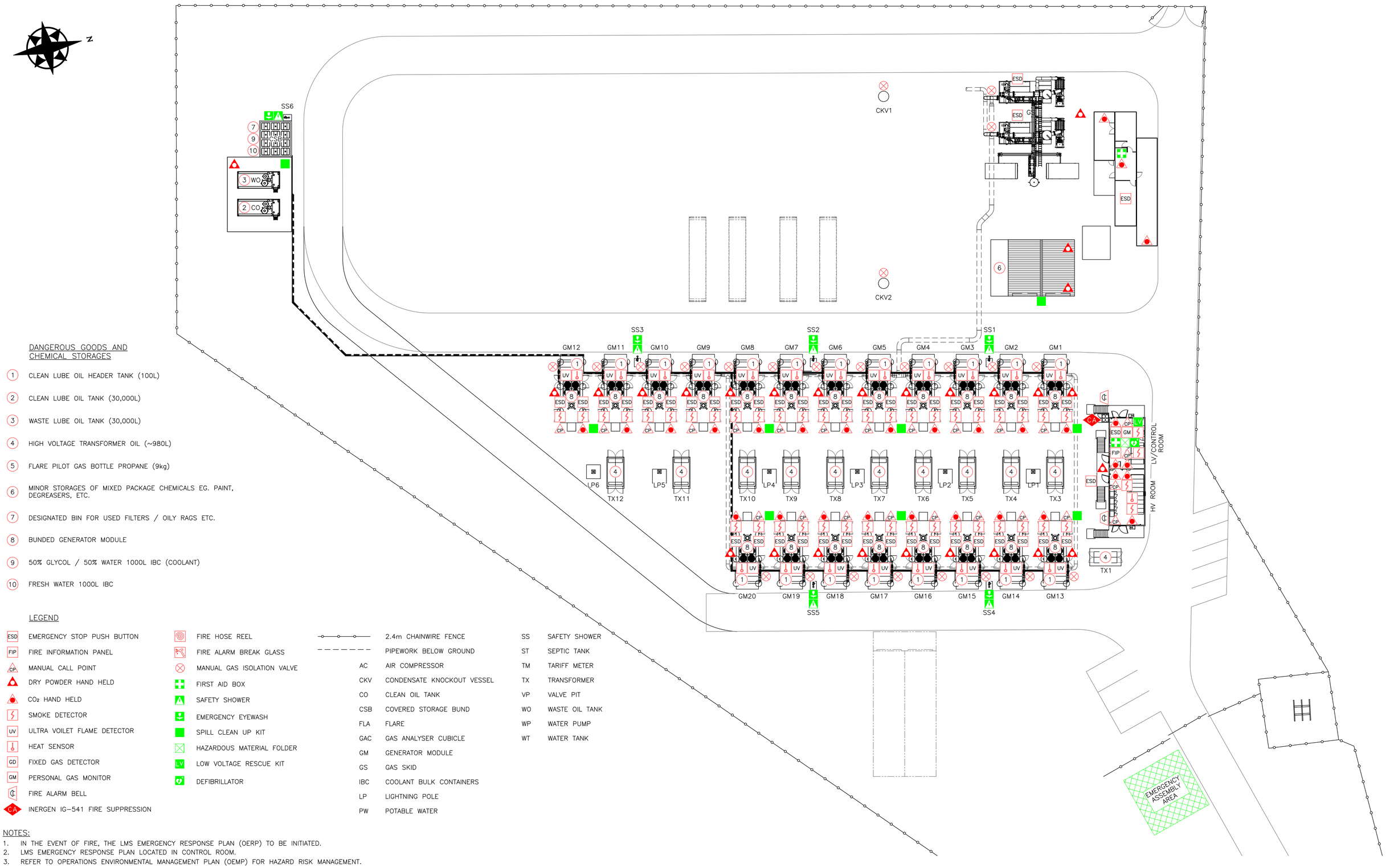
LMS ENERGY™

DRAWN: S.A.
DATE: 25/07/25
DESIGN: D.M.
DATE: 25/07/25
APPRVD:
DATE:
A.B.N. 39 059 428 474

LUCAS HEIGHTS BIOENERGY FACILITY

POWER STATION
RELOCATED CONCEPT LAYOUT

SCALE	DRAWING NUMBER	SHEET	SHEETS	SIZE	REV
1:500	20057-DA-056-01	OF 01		A1	E



DANGEROUS GOODS AND CHEMICAL STORAGES

1. CLEAN LUBE OIL HEADER TANK (100L)
2. CLEAN LUBE OIL TANK (30,000L)
3. WASTE LUBE OIL TANK (30,000L)
4. HIGH VOLTAGE TRANSFORMER OIL (~980L)
5. FLARE PILOT GAS BOTTLE PROPANE (9kg)
6. MINOR STORAGES OF MIXED PACKAGE CHEMICALS EG. PAINT, DEGREASERS, ETC.
7. DESIGNATED BIN FOR USED FILTERS / OILY RAGS ETC.
8. BUNDED GENERATOR MODULE
9. 50% GLYCOL / 50% WATER 1000L IBC (COOLANT)
10. FRESH WATER 1000L IBC

LEGEND

- ESD EMERGENCY STOP PUSH BUTTON
- FIP FIRE INFORMATION PANEL
- CP MANUAL CALL POINT
- DRY POWDER HAND HELD
- CO_2 HAND HELD
- SMOKE DETECTOR
- UV ULTRA VOILET FLAME DETECTOR
- HEAT SENSOR
- GD FIXED GAS DETECTOR
- GM PERSONAL GAS MONITOR
- FIRE ALARM BELL
- CA INERGEN IG-541 FIRE SUPPRESSION
- FIRE HOSE REEL
- FIRE ALARM BREAK GLASS
- MANUAL GAS ISOLATION VALVE
- FIRST AID BOX
- SAFETY SHOWER
- EMERGENCY EYEWASH
- SPILL CLEAN UP KIT
- HAZARDOUS MATERIAL FOLDER
- LV LOW VOLTAGE RESCUE KIT
- DEFIBRILLATOR
- 2.4m CHAINWIRE FENCE
- PIPEWORK BELOW GROUND

AC	AIR COMPRESSOR
CKV	CONDENSATE KNOCKOUT VESSEL
CO	CLEAN OIL TANK
CSB	COVERED STORAGE BUND
FLA	FLARE
GAC	GAS ANALYSER CUBICLE
GM	GENERATOR MODULE
GS	GAS SKID
IBC	COOLANT BULK CONTAINERS
LP	LIGHTNING POLE
PW	POTABLE WATER
SS	SAFETY SHOWER
ST	SEPTIC TANK
TM	TARIFF METER
TX	TRANSFORMER
VP	VALVE PIT
WO	WASTE OIL TANK
WP	WATER PUMP
WT	WATER TANK

NOTES:

1. IN THE EVENT OF FIRE, THE LMS EMERGENCY RESPONSE PLAN (OERP) TO BE INITIATED.
2. LMS EMERGENCY RESPONSE PLAN LOCATED IN CONTROL ROOM.
3. REFER TO OPERATIONS ENVIRONMENTAL MANAGEMENT PLAN (OEMP) FOR HAZARD RISK MANAGEMENT.
4. VEGETATION OUTSIDE OF FENCE TO BE NO CLOSER THAN 10 METRES FROM THE FLARE STACKS.
5. ABOVE & BELOW GROUND PIPEWORK CONTAINS LEACHATE AND LANDFILL GAS (METHANE).

FOR INFORMATION

No	DATE	DRN	DESN	CHKD	APP	DESCRIPTION
A	24/10/25	SA	FL	–	–	FI – FOR INFORMATION

REVISIONS

REFERENCE DRAWINGS

LMS ENERGY™

DRAWN:	S.A.
DATE:	24/10/25
DESIGN:	
DATE:	
APPRVD:	
DATE:	
A.B.N.	39 059 428 474

LUCAS HEIGHTS BIOENERGY FACILITY

BIOENERGY FACILITY
FIRE FIGHTING AND SAFETY EQUIPMENT LAYOUT

SCALE	DRAWING NUMBER	SHEET	SHEETS	SIZE	REV
1:250	20057-DA-057-01	OF 01		A1	A

Appendix D

Engagement outcomes report

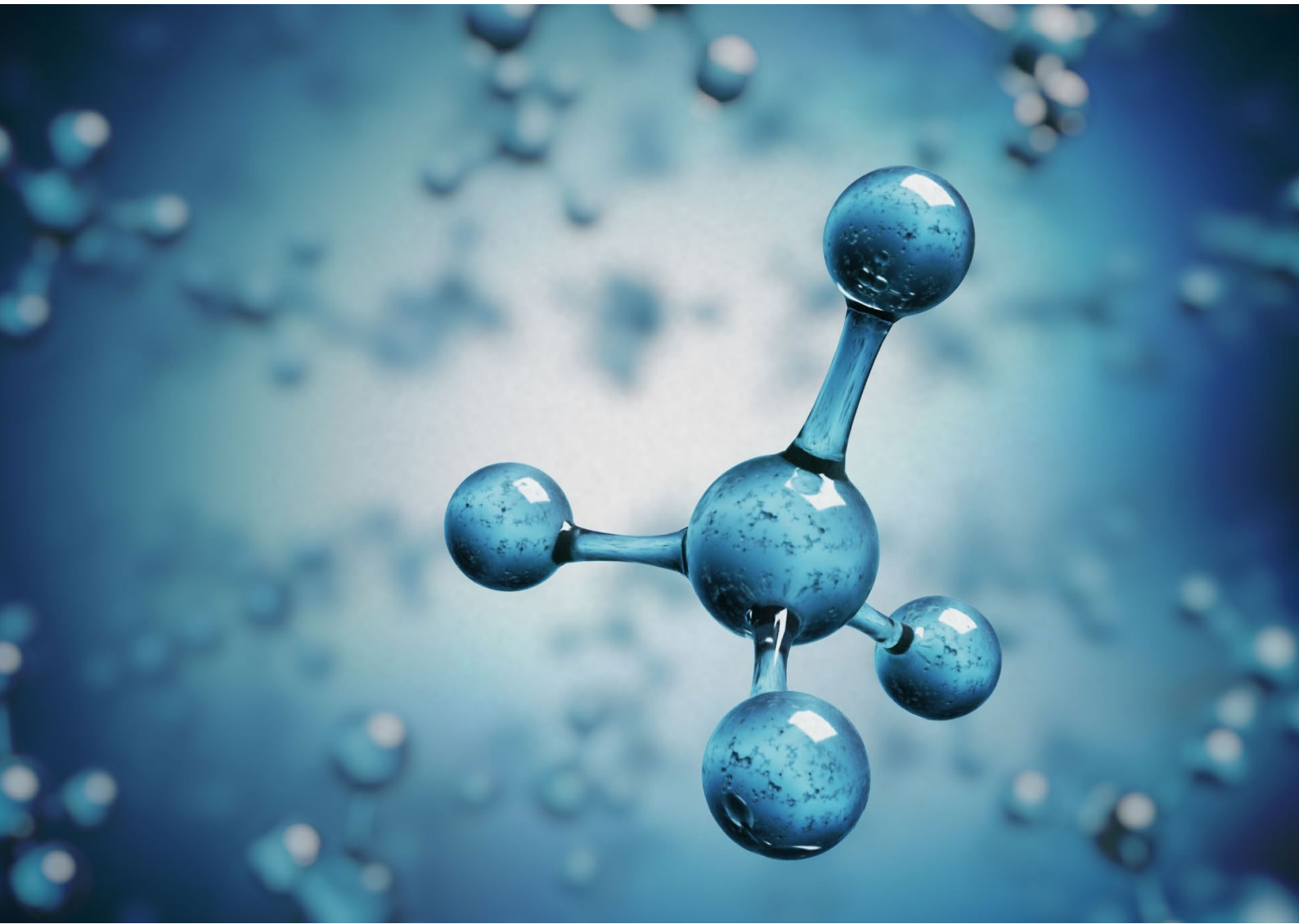
Lucas Heights Bioenergy Facility

Engagement Outcomes Report

LMS Energy Pty Ltd

October 2025

→ **The Power of Commitment**



Project name		Lucas Heights Bioenergy Facility					
Document title		Lucas Heights Bioenergy Facility | Engagement Outcomes Report					
Project number		12649882					
File name		12649882-REP-Lucas Heights Engagement Outcomes Report					
Status Code	**Revision**	**Author**	**Reviewer**		**Approved for issue**		
			Name	**Signature**	**Name**	**Signature**	**Date**
S3	A	M.Vukovic	C.Pignatelli	On file	K Rosen	On file	19/05/2025
S3	B	M.Vukovic	C.Pignatelli	On file	D Gamble	On file	7/10/2025
S3	0	M.Vukovic	C.Pignatelli	On file	D Gamble	On file	20/10/2025

GHD Pty Ltd | ABN 39 008 488 373
Contact: Carla Pignatelli, Service Line Leader - Engagement and Communication | GHD
133 Castlereagh Street, Level 15
Sydney, New South Wales 2000, Australia
T +61 2 9239 7100 | **F** +61 2 9239 7199 | **E** sydmail@ghd.com | **ghd.com**

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Appendices

1. Introduction

1.1 Project overview

LMS Energy Pty Ltd (LMS) proposes to upgrade the biogas management infrastructure at the Lucas Heights Resource Recovery Park (LHRRP), by upgrading the existing power station (the project) to produce renewable energy from biogas generated at the LHRRP.

The new bioenergy facility would be a like for like replacement of the existing power station biogas generators within the existing power station site, with improvements that comply with modern standards and regulations and forecasted biogas generation capacity requirements. The project ensures appropriate capacity to manage forecast peak recoverable biogas and renewable energy generation would effectively continue through the remaining landfilling and post closure periods for the landfill.

1.2 Purpose of this report

This report provides a summary of the community and stakeholder communication, and consultation undertaken during the development of the Environmental Impact Statement (EIS) for the proposed bioenergy facility, located at the LHRRP. The consultation process involved both community consultation and statutory EIS activities. The report includes a summary of feedback received throughout the EIS stage, as well as any incoming enquiries. All feedback received has been considered by LMS to inform and refine the projects development.

1.3 Scope and limitations

Accessibility of documents

If this report is required to be accessible in any other format, this can be provided by GHD upon request and at an additional cost if necessary.

2. Consultation approach

2.1 Consultation scope

The consultation approach was based on guidance from two key documents: the NSW Government Undertaking Engagement Guidelines for State Significant Projects (SSP Guidelines) (NSW DPHI, 2024), and the Secretary's Environmental Assessment Requirements (SEARs) issued on 6 March 2025. In consultation with The NSW Department of Planning, Housing and Infrastructure (DPHI) the project SEARs remained applicable to the amended project footprint.

2.1.1 SSP guidelines

The SSP guidelines set out the requirements for effective engagement on State Significant projects in NSW, recognising that effective engagement requires everyone involved to do their part, at the appropriate stage in the process.

These documents provide guidance on:

– planning their approach to engagement
– undertaking engagement to inform the development of the project and contribute to better planning outcomes
– reporting back and demonstrating how engagement has shaped the project being assessed.

A summary of the project's responsibilities for engagement, and how the guidelines have been met are outlined in Table 2.1.

Table 2.1 Summary of consultation requirements – NSW Government Undertaking engagement guidelines for state significant projects

Action	Summary	Activities
Plan early (Pg. 8)	Identify stakeholders and determine appropriate engagement activities.	Stakeholders were identified shortly after receiving the SEARs, and a stakeholder register was developed in consultation with LMS and Cleanaway.
Engage as early as possible (Pg. 8)	Engage throughout the project lifecycle and incorporate community feedback.	Consultation with the Community Reference Group (CRG) and other community stakeholders began at the project inception. Following a change in the project location, the project team met with CRG at the to provide an update.
Ensure engagement is effective (Pg. 9)	Provide clear information, create opportunities for participation, and respond to concerns.	The fact sheet (see Appendix A) sent to community stakeholders clearly outlined the project and opportunities for participation. The GHD community email and 1800 number were displayed on all collateral. Further technical project details were offered at the CRG meeting, to allow representatives with a greater knowledge of bioenergy to ask questions on behalf of the community.
Ensure engagement is proportionate to the scale and impact of the project (Pg. 9)	Tailor engagement to the project's scale and impact.	All businesses, landowners, and community organisations within a 2km radius were informed of the project and opportunities to comment.
Be innovative (Pg. 10)	Use a variety of engagement methods and be transparent about influence.	In person and online methods were used during consultation. Transparency was maintained with LMS attendance at the CRG meetings, and LMS branding on all collateral.
Implement the community participation objectives (Pg. 11)	Involve the community in planning, seek to understand concerns, and demonstrate consideration of diverse perspectives.	A diverse range of stakeholder groups were informed of the development and opportunities to comment, including a Local Aboriginal Land Council, schools, sporting Clubs, and environmental groups.

2.1.2 Secretary's Environmental Assessment Requirements

The DPHI Secretary's Environmental Assessment Requirements (SEARs) (DPHI, 2025) outline the necessary scope of investigation in relation to stakeholder engagement during the EIS phase. The SEARs for the Project identified the following stakeholders for consultation:

- Sutherland Shire Council
- Department of Climate Change, Energy, the Environment and Water, specifically the:
  - Environment Protection Authority
  - Environment and Heritage Group
  - Water Group
- Heritage NSW
- Transport for NSW
- Fire & Rescue NSW
- NSW Rural Fire Service
- Australian Nuclear Science and Technology Organisation
- Department of Defence
- Lucas Heights Resource Recovery Park Community Reference Group
- surrounding local landowners, businesses and stakeholders
- local and regional community, sport and environmental groups
- any other public transport, utilities or community service providers.

2.2 Consultation methodology

The project team conducted a comprehensive engagement process, which included sending notification letters, facilitating email correspondence and organising stakeholder meetings. These efforts aimed to inform stakeholders and community members about the project, guide them to sources of additional information and provide opportunities for feedback.

The consultation approach was structured into three key phases: planning, implementation and reporting, ensuring a thorough and transparent engagement process throughout.

2.2.1 Planning

During the planning phase, the following activities were successfully carried out:

- Conducted a review of previous consultations in the area to identify any existing issues or concerns related to the site that may require attention
- Developed a detailed communication and stakeholder engagement plan to guide consultation efforts throughout the EIS development phase, ensuring alignment with the SSP guidelines
- Created a stakeholder identification and analysis register, encompassing stakeholder groups, local businesses, landowners within a 2 kilometre radius of the site and stakeholders listed in the SEARs
- Building on these insights, we developed the key collateral materials to facilitate effective communication with community and stakeholders about the project including:
  - Factsheets (see Appendix A)
  - Briefing presentation
  - Webpage.

2.2.2 Delivery

Activities undertaken as part of delivery phase included:

– Participating in an extraordinary CRG meeting facilitated by Cleanaway at the LHRRP to introduce the project and LMS
– Attending a regular scheduled CRG meeting facilitated by Cleanaway at the LHRRP to provide a project update including the revised location of the proposed facility
– Engaged with nearby community stakeholders including sporting clubs, schools and businesses by notifying them about the proposed project and informing them of opportunities to provide feedback during the EIS exhibition phase.

Engagement with government departments, agencies and emergency services was conducted in accordance with statutory requirements. Table 2.2 and Table 2.3 illustrate the key communication and consultation activities as well as the tools employed throughout the development of the EIS.

Table 2.2 Communication and consultation activities

Consultation activity	Purpose	Target stakeholders
Statutory consultation (see Section 3.2)	To better understand the needs and concerns of the community and to establish a continuous channel of communication for ongoing dialogue and consultation. The CRG meeting, facilitated and hosted by Cleanaway, also offers a platform for discussion among community representatives.	– Government stakeholders – Emergency services
Off-cycle Community Reference Group meeting – *Attendance on 8/05/2025*	To understand the needs and concerns of the community, and to maintain an ongoing channel of communication for any further consultation. The CRG meeting, facilitated and hosted by Cleanaway also provides access to discussion across many invited stakeholders.	– Community representatives – Cleanaway – Sutherland Shire Council – Elected officials
Project notification email – *Sent on 9/05/2025*	To inform stakeholders about the proposed project and provide an opportunity for the community to ask any questions about the project. Project notification also informed recipients about the opportunity to provide formal comments during the EIS exhibition phase.	– Community members – Local and regional community, sport, and environmental groups – Local businesses
Quarterly Community Reference Group meeting - *Attendance on 11/09/2025*	The primary aim of the second CRG meeting was to review and reaffirm the proposed project, the approvals process and discuss the recent updates to the project location. Additionally, the meeting offered the CRG an opportunity to receive immediate answers to any questions about the proposed project.	– Community representatives – Cleanaway – Sutherland Shire Council – Elected officials
Project update email – *Sent on 24/09/2025*	To inform stakeholders of the change in site location and provide an opportunity to ask any questions regarding the project. The project update also highlighted the opportunity for recipients to submit formal comments during the EIS exhibition phase – which had been updated.	– Community members – Local and regional community, sport, and environmental groups – Local businesses

Table 2.3 Consultation tools

Consultation tools	Purpose	Target stakeholders
Fact sheets (see Appendix A)	Fact sheets which provided the following: – A background to LMS – An introduction to LMS and Cleanaway's partnership for the project – An artist's impression of the bioenergy facility and project location – An outline of project need and community benefit	– Community stakeholders – Cleanaway – Sutherland Shire Council

Consultation tools	Purpose	Target stakeholders
	– Opportunities to offer feedback on the project and contact for further enquiries – How a bioenergy facility works – An update to the project site.	
Presentation (see Appendix B)	The project presentation included the information from the fact sheet, and also featured: – Projections of LHRRP biogas collection until 2040 – A detailed site layout plan – Generator module configuration.	– Community reference group – Cleanaway – Sutherland Shire Council
Project website (See Appendix C)	The project website (**https://www.lms.com.au/lucas-heights**) offers comprehensive information initially derived from the fact sheet and presentation. As the project advances, the website will offer updates with the latest developments.	– Community members – Industry stakeholders – Government stakeholders
Statutory consultation letter (See Appendix D)	To inform stakeholders in accordance with SEARs requirements and invite their feedback, including formal submissions during the EIS exhibition phase.	– Government stakeholders – Emergency services

3. Community and stakeholder feedback

3.1 Community feedback

Community feedback is summarised in Table 3.1.

Table 3.1 Community feedback

Engagement method	Feedback	EIS response
Community Reference Group	Where are the modules made for the project?	The engines of the generator modules are manufactured in the United States of America, while remaining components of the module is produced in Australia.
	Are LMS connecting to current gas recovery system?	LMS are enhancing its capacity to accommodate increasing the gas flow over the next five years through the implementation of a modular system, which will seamlessly connect to the facility.
	Will the site contain gas storage?	The current scale of gas production and energy generation renders gas storage impractical at this time.
	Will the operational noise level change in comparison to the current facility?	While LMS cannot precisely forecast fluctuations in noise levels, it is anticipated that operational will be minimal beyond 20 meters from the site. Additionally, a noise assessment will be incorporated into the EIS, outlining potential noise concerns and proposed mitigation strategies to ensure minimal disturbance.
	Are the artists impressions of the colours and aesthetics final?	The artist's impression provides an indication of the size and scale of the Bioenergy facility. The final colour scheme will be determined in accordance with manufacturer specifications for the generator components. Once available, colours will be carefully selected to ensure visual integration with the future parkland setting.
	Will the gas consumption rate would change between the current facility and the proposed facility?	The bioenergy facility is engineered to accommodate the projected peak in landfill gas production anticipated in the coming years. LMS offers precise control over gas consumption and energy output, with the capacity to regulate and optimise the distribution of gas between flares and bioenergy generators.
	Is the facility a part of the baseload energy system?	Yes, the facility will be integrated into the network's baseload energy system.
	What are the specifications of the communications system?	The facility will be integrated with a with the fibre optic cable network in accordance with Ausgrid requirements, enabling reliable remote operation around the clock.
	Will the site contain a battery energy storage system as a part of this proposal, or in the future?	A battery energy storage system is not included in the project.
	What is the expected completion date?	LMS is aiming to achieve completion mid to late 2026.
	How would the current facility be decommissioned?	Following the energisation of the new bioenergy facility, the existing generators will be systematically decommissioned. Above-ground components will be removed from site with recyclable materials sent for processing and parts stored for future maintenance needs.

Engagement method	Feedback	EIS response
	What is the expected design life for the proposed facility?	The new bioenergy facility is designed to operate effectively for 20 to 30 years, supporting continuous gas management at LHRRP throughout the remaining landfill period and into eventual post-closure phase of operations.
Community Email (see Appendix C)	No concerns have been raised through the community email	The Southern Sydney Model Aero Club was the sole stakeholder to respond to the engagement process and expressed no objections to the project.

3.2 Statutory consultation and feedback

A summary of the stakeholders who were engaged with as per the SEARs is summarised in Table 3.2.

Table 3.2 Statutory consultation

Stakeholder	Consultation date	Stakeholder response received	EIS response
NSW DCCEEW - NSW EPA	10/02/2025 Meeting on 4/04/2025	Agency Advice Letter – 24/02/2025 EIS must include: – Air Quality Impact Assessment – Noise and Vibration Impact Assessment LMS should consider: – Assessment of water and wastewater management if required – Reviewing NSW EPA Energy from Waste Policy Statement – In the meeting, NSW EPA discussed: – General support of the project noting the environmental benefits – Licencing requirements No specific issues identified for the project, however noted that air quality and odour should be a key focus in the studies.	Sections 6.2 and 6.3
NSW DCCEEW - Environment and Heritage	BDAR Waiver Submitted	No further consultation	
NSW DCCEEW – Water Group	03/06/2025	No response received	
Heritage NSW	10/02/2025	Agency Advice Letter – 24/02/2025 – Recommends no SEARs be included with respect to Aboriginal cultural heritage – Letter submitted on 20/02/2025 regarding heritage assessment requirements for the project	Section 7.3
Fire and Rescue NSW	10/02/2025	Agency Advice Letter – 12/02/2025 FRNSW will likely recommend a Fire Safety Study (FSS) be developed in accordance with the Hazardous Industry Planning Advisory Paper No 2 as a condition of consent.	Preliminary Hazard Assessment and Bushfire risk assessment included as Technical Report 3 and 4 (Section 6.4 and 6.5 of EIS). Fire safety study recommended to be undertaken as a condition of consent in accordance with HIPAP 2.

Stakeholder	Consultation date	Stakeholder response received	EIS response
Transport for NSW	10/02/2025	Agency Advice Letter – 20/02/2025 EIS must include: – Traffic Impact Assessment Additionally: – The preparation of a preliminary Construction Traffic and Pedestrian Management Plan to demonstrate the proposed management of the impact in relation to construction traffic.	Technical Report 7 and Section 6.8
ANSTO	20/05/2025	ANSTO SIA Interview, in which the following concerns were raised: – Vibration during construction which could impact operations – Project impacts on stakeholders within the area during construction including Mill Creek Mountain Bike Trails.	Section 7.4
Sutherland Shire Council	10/02/2025 Ongoing meetings between SSC and LMS Progressive review of EIS and technical studies	Response on 26/02/2025, which outlined the following concerns: – Scope of engagement – Consideration of future users post closure – Decommissioning of existing facility – Traffic and access Review comments on draft EIS chapters and technical reports provided by Sutherland Shire Council	Sections 5. 7.1, 7.2, 7.3, and 7.4
NSW Rural Fire Service (RFS)	5/05/2025	Agency advice letter – 5/05/2025 NSW RFS recommended a Fire Safety Study (FSS) be developed in accordance with the Hazardous Industry Planning Advisory Paper No 22 as a condition of consent.	Preliminary Hazard Assessment and Bushfire risk assessment included as Technical Report 3 and 4 (Section 6.4 and 6.5 of EIS) Fire safety study recommended to be undertaken as a condition of consent in accordance with HIPAP 2
Department of Defence	03/06/2025	No response received	

4. Next steps

If the project proceeds into detailed design and construction phases, LMS will maintain its commitment to ongoing community engagement and stakeholders collaboration by providing:

– Active participation in the CRG through attendance at scheduled quarterly meetings.
– Continued partnership with Cleanaway, leveraging their strong community connections as dedicated community information line, a project-specific email address and continued updates on the project website to ensure transparent and accessible communication.

5. References

Department of Planning, Housing and Infrastructure. (2025). *SEARs Lucas Heights Bioenergy 6 March 2025.*

New South Wales Department of Planning, Housing and Infrastructure. (2024). *Undertaking Engagement Guidelines for State Significant Projects.*

Appendices

Appendix A

Project factsheets

Project introduction: 9/05/2025

LUCAS HEIGHTS BIONERGY FACILITY

LMS Energy and Cleanaway: powering the future

LMS Energy is proposing to install a new bioenergy facility at the Lucas Heights Resource Recovery Park (LHRRP). This facility will replace the existing on-site power station, which has been operating since 1998, with upgraded technology that continues the sustainable reuse of landfill biogas.

As Australia's leading landfill biogas company, LMS Energy has delivered **more than 65 biogas projects** across Australia, New Zealand and the United States over the last 30 years. Collectively, these projects generate enough renewable energy to power around 250,000 homes each day, reducing more than 5 million tonnes of carbon dioxide equivalent emissions annually.

Figure 1: Artist' Impression of the Bioenergy Facility

LMS Energy and Cleanaway are proud to collaborate on this project to deliver long-term environmental benefits to the Sutherland Shire region and showcase best-practice environmental management and leadership.

Seeking Community Feedback

- As a State Significant Development (SSD), this project requires comprehensive assessments, including potential environmental impacts.
- We're currently developing an Environmental Impact Statement (EIS) and want to hear from the community.
- The EIS is expected to be on public exhibition in **June 2025.**

The new bioenergy facility at Lucas Heights will:

- Generate up to 190,000 megawatt hours per year of renewable electricity, equivalent to powering around 30,000 homes.
- Reduce more than 1 million tonnes of carbon dioxide equivalent greenhouse gas emissions.

Benefits to the Sutherland Shire Community

This project will:

- Reduce landfill gas emissions through capture and sustainable energy recovery.
- Improve emission reduction activities in the Sutherland Shire.
- Have a minimal disruption to the community, as the new facility will be built adjacent to the existing power station at the LHRRP.

LUCAS HEIGHTS BIONERGY FACILITY

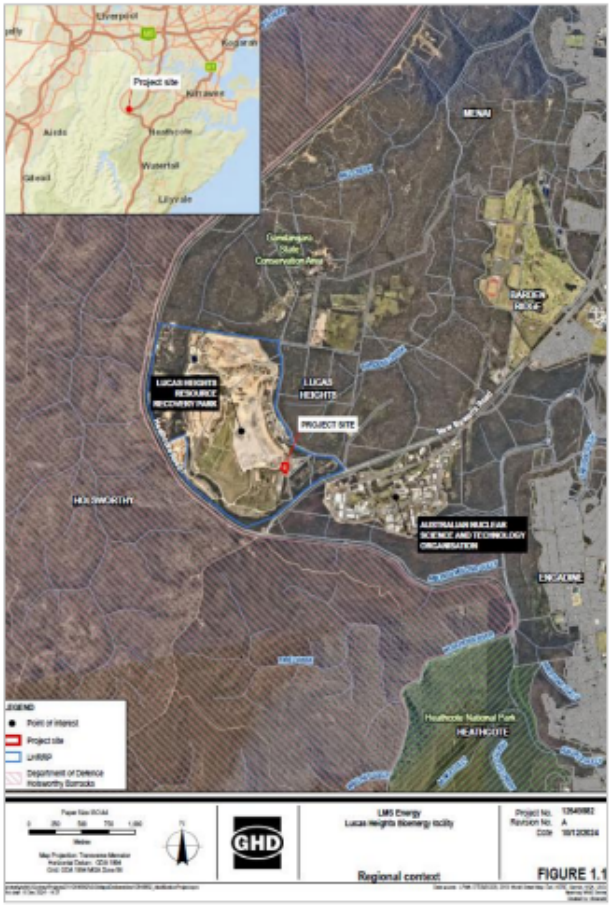


Figure 2: Project Site Location

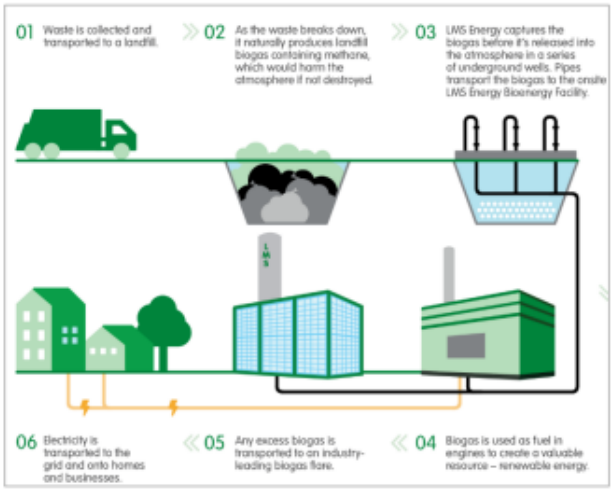


Figure 3: How it Works

Next steps:

- External consultant GHD has been engaged to prepare an Environmental Impact Statement (EIS)
- The EIS will follow the framework set by the Department for Planning, Housing and Infrastructure (DPHI) for all state significant developments
- This process includes engaging with relevant government and community stakeholders, and evaluating the impact of this project on the surrounding area
- Community feedback is welcomed as we develop the EIS
- We aim for the release of the EIS for public viewing in June 2025 to allow community members to make a formal submission on the project
- The DPHI will assess the project for a final determination by the NSW Minister for Planning (or delegate)

For more information, visit www.lms.com.au/lucas-heights

Your Feedback:

For further information or to make a comment, please use the following contact details:

Email: cominput@GHD.com
Phone: 1800 810 680

Scan the QR for more details on this project

Feedback must be given before 29 May 2025 to be considered within EIS. When making an enquiry, please reference 'Lucas Heights Bioenergy Facility'.

Project update: 24/09/2025

LUCAS HEIGHTS BIOENERGY FACILITY

LMS Energy and Cleanaway: Project Update

LMS Energy is proposing to install a new bioenergy facility at the Lucas Heights Resource Recovery Park (LHRRP). This modern facility will replace the existing on-site power station, which has been in operation since 1998, with upgraded technology designed to enhance the sustainable capture and conversion of landfill biogas into renewable energy.

Updated location

The bioenergy facility was initially proposed to be situated along the western boundary of the existing power station adjacent to the existing landfill and planned parklands (see Figure 3 for a map of the revised Project Site layout).

However, an opportunity has since been identified to relocate the proposed footprint to the existing power station site itself. This relocation offers improved integration with the existing gas infrastructure and provides greater separation from future open space parklands.

The current power station will continue operating throughout the construction and commissioning phases of the new facility.

Once the new facility is fully operational, the old infrastructure will be gradually decommissioned, with a portion retained to support ongoing operations.

About LMS Energy

As Australia's leading landfill biogas company, LMS Energy has delivered more than 65 biogas projects across Australia, New Zealand and the United States over the last 30 years.

LMS Energy and Cleanaway are proud to partner on this project, aiming to provide lasting environmental benefits to the Sutherland Shire region while demonstrating best-practice environmental management and leadership.

Figure 1: Artist Impression of the Bioenergy Facility

Seeking Community Feedback

- As a State Significant Development (SSD), this project requires comprehensive assessments, including potential environmental impacts.
- We are currently preparing the Environmental Impact Statement (EIS) and we want to hear from the community.

LUCAS HEIGHTS BIOENERGY FACILITY

The new bioenergy facility at Lucas Heights will:

- Generate up to 190,000 megawatt-hours of renewable electricity, equivalent to powering around 30,000 homes.
- Achieve a reduction of over 1 million tonnes of carbon dioxide equivalent greenhouse gas emissions.
- Minimise landfill gas emissions through enhanced capture and sustainable energy recovery.

Benefits to the Sutherland Shire Community

This project will:

- Enhance emission reduction efforts within the Sutherland Shire
- Maintain effective management of landfill gas emissions through the post closure period at the LHRRP
- Ensure minimal disruption to the community, by constructing the new facility adjacent to the existing power station.

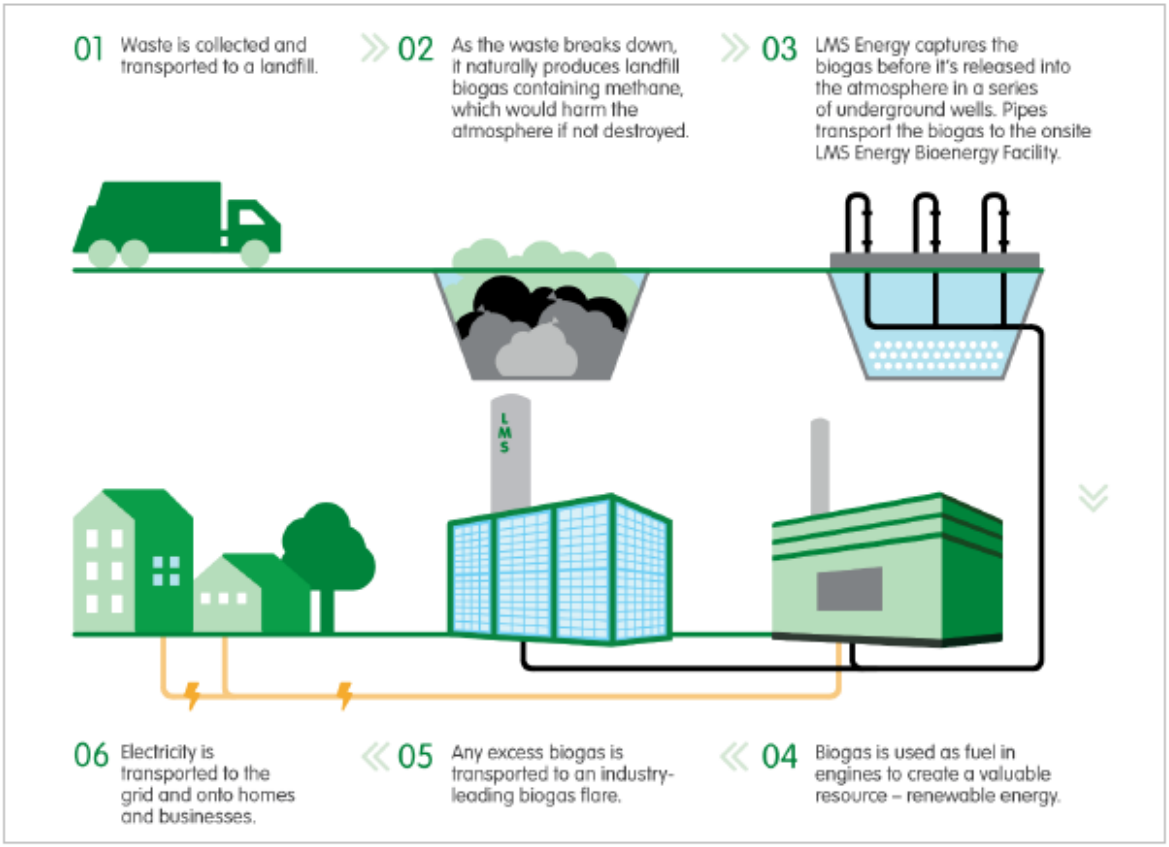


Figure 2: How a bioenergy facility works

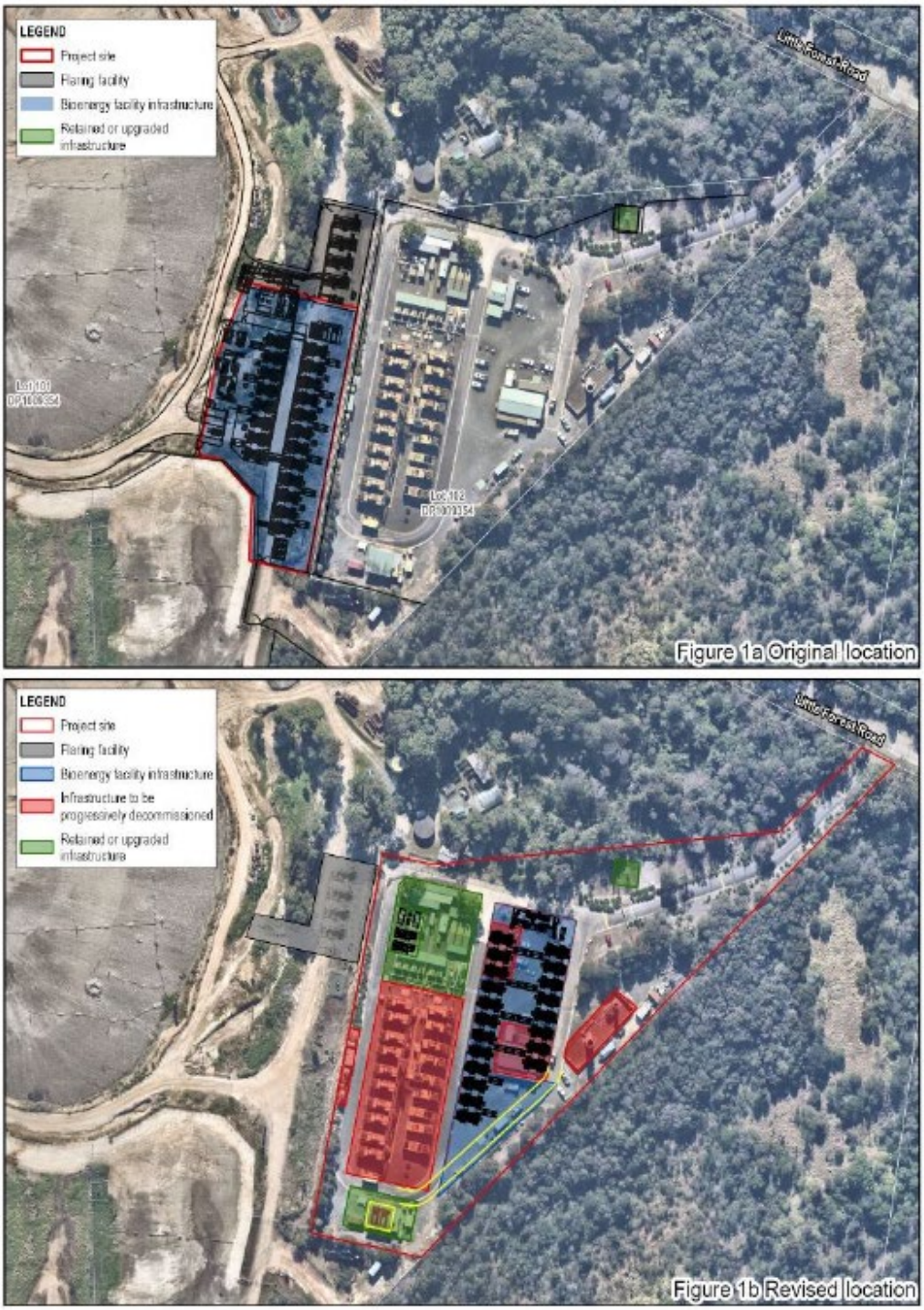


Figure 3: Project site layout

LUCAS HEIGHTS BIOENERGY FACILITY

Next steps:

- We aim for the release of the EIS for public exhibition in October 2025 to allow community members to make a formal submission on the project
- The Department of Planning, Housing and Industry will assess the project for a final determination by the NSW Minister for Planning

For more information, visit www.lms.com.au/lucas-heights.

Your Feedback:

For further information or to make a comment, please use the contact details below and include "Lucas Heights Bioenergy Facility" in the subject line:

Email: cominput@GHD.com
Phone: 1800 810 680

Scan the QR for more details on this project

Please ensure all feedback is submitted by 10 October 2025 to be considered as part of the EIS.

Appendix B

Project presentation

Lucas Heights Bioenergy Facility

8 May 2025

Agenda

- About LMS and our team
- About this project
- Project need
- Project description
- How a bioenergy facility works
- Next steps

Acknowledgment of Country

We acknowledge the land that we meet on today is Dharawal Country and pay our respects to their Elders, past and present. We recognise their national historic significance and continuing connection to lands, waters and communities.

LMS Energy and our team

Australia's largest and most successful landfill biogas company

66 biogas projects across Australia, NZ and the US

Power 250,000 people per day with renewable energy

Abate more than **5m tonnes of CO_2e a** year

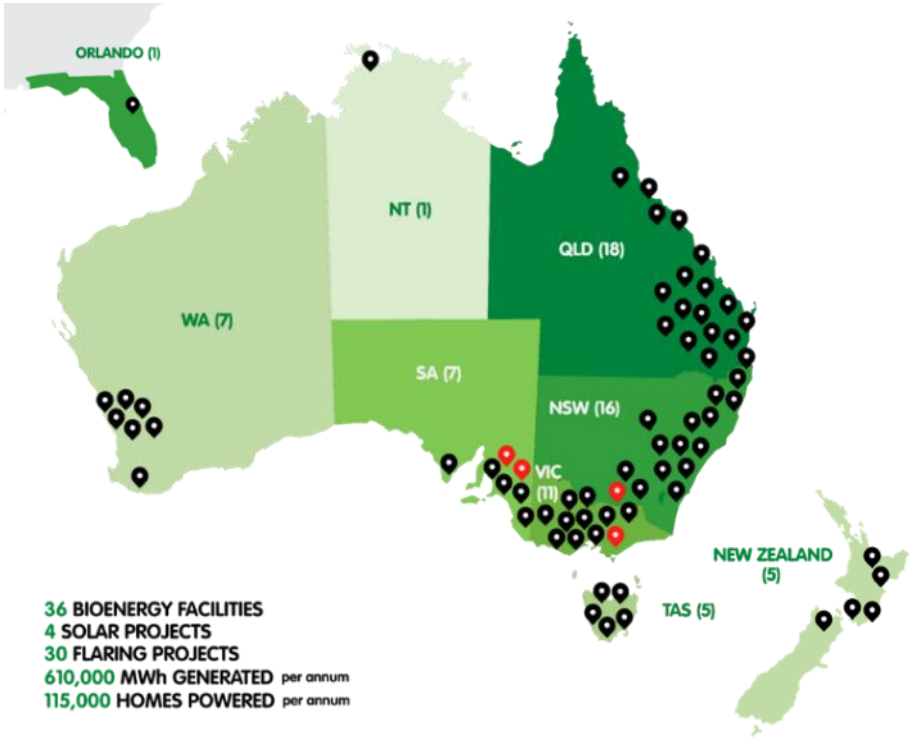
Equivalent to planting **68 million** trees

In-house **Australian manufacturing**

~300 dedicated biogas employees

Jon Varcoe
Chief Scientist

Fiona Lambert
Group Manager - Project Development & Compliance



LMS Energy NSW Snapshot

LMS Energy are the applicant / proponent and independent operator on all of these projects

Abates more than **825,000 tonnes** of CO_2e a year in NSW

11 unique local government clients across NSW

18 methane abatement projects in NSW

4 facilities licenced by NSW EPA

Generating **102,635** MWh in NSW

Powering **23,500** homes in NSW

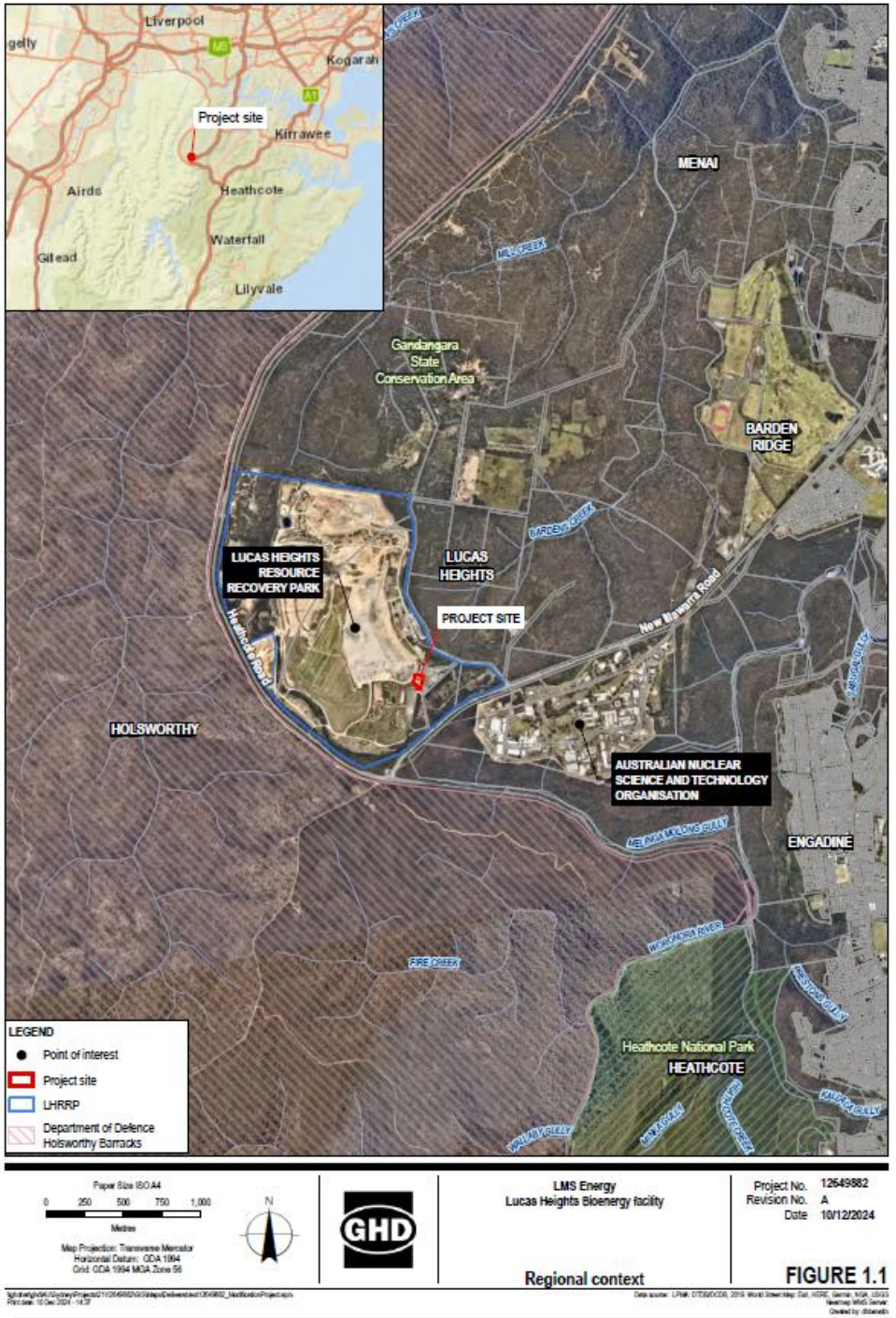
About the project

- LMS Energy is proposing the installation of a **new bioenergy facility and flaring capacity**
- This project will **replace** the existing power station with **upgraded technology**
- The project will provide a modern version of existing power station with **20 x 1.1 MW generator units**
- Bioenergy facility designed to meet contemporary operational standards and **regulatory compliance** requirements
- The new facility will enable continuing **renewable energy generation and landfill biogas management** consistent with landfill after care requirements
- Flaring capacity will also be installed for combustion of up to 13,000 m3/h to meet **peak landfill gas generation**

Need for Project

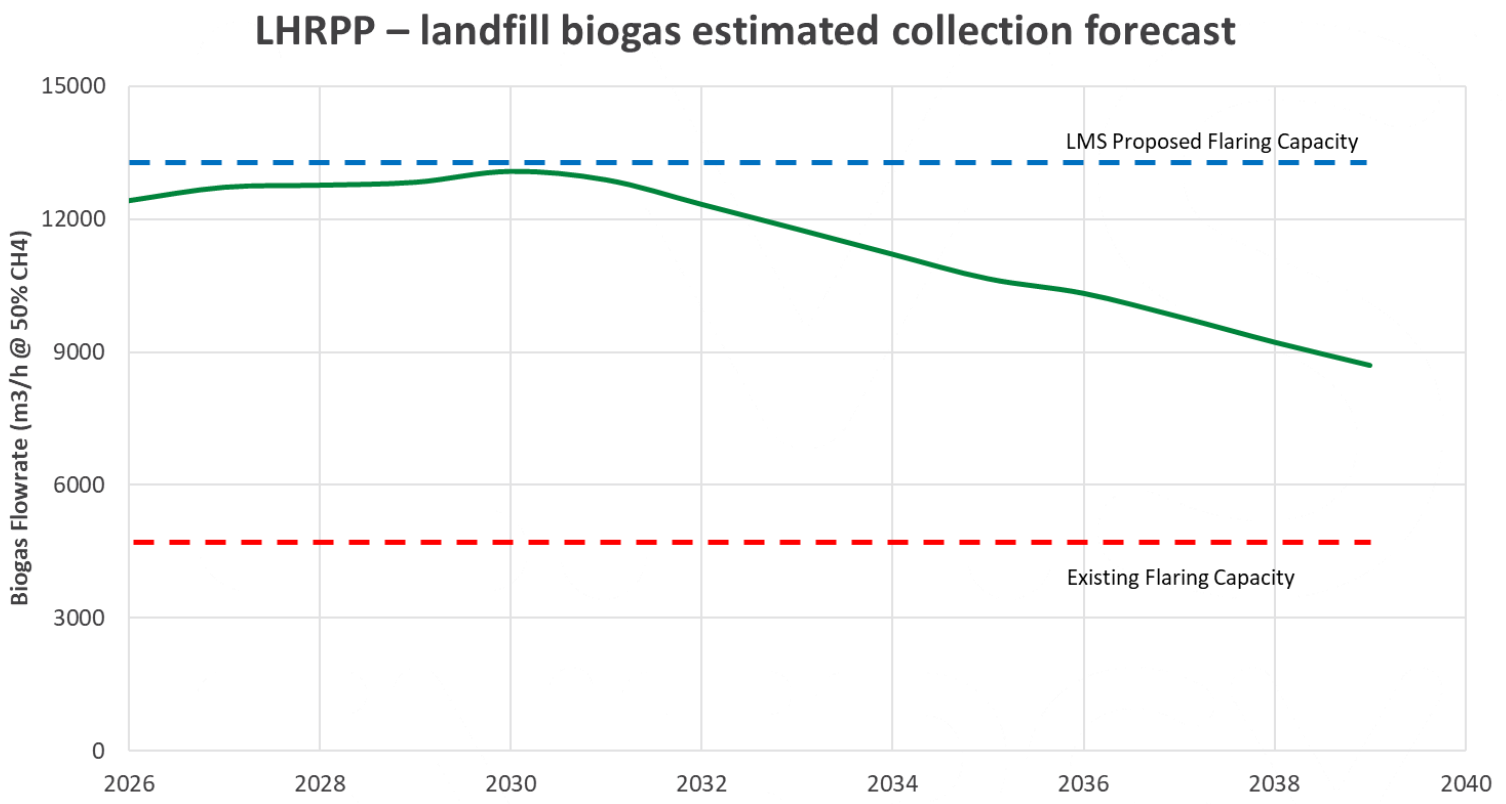
Creating a resilient asset for the Sutherland Shire

- A power station has operated at the Lucas Heights Resource Recovery Park for nearly 30 years and is nearing **the end of its design life**
- Existing facility includes 15 generation units and two flares of c5000m3/h capacity
- **The existing facility does not have sufficient capacity** to actively manage the forecast 13,000 m3/h peak landfill gas generation in the next 5 years
- Upgrading gas infrastructure is vital for continued operation of the landfill to manage **landfill gas emissions and generate renewable energy**



Need for Project

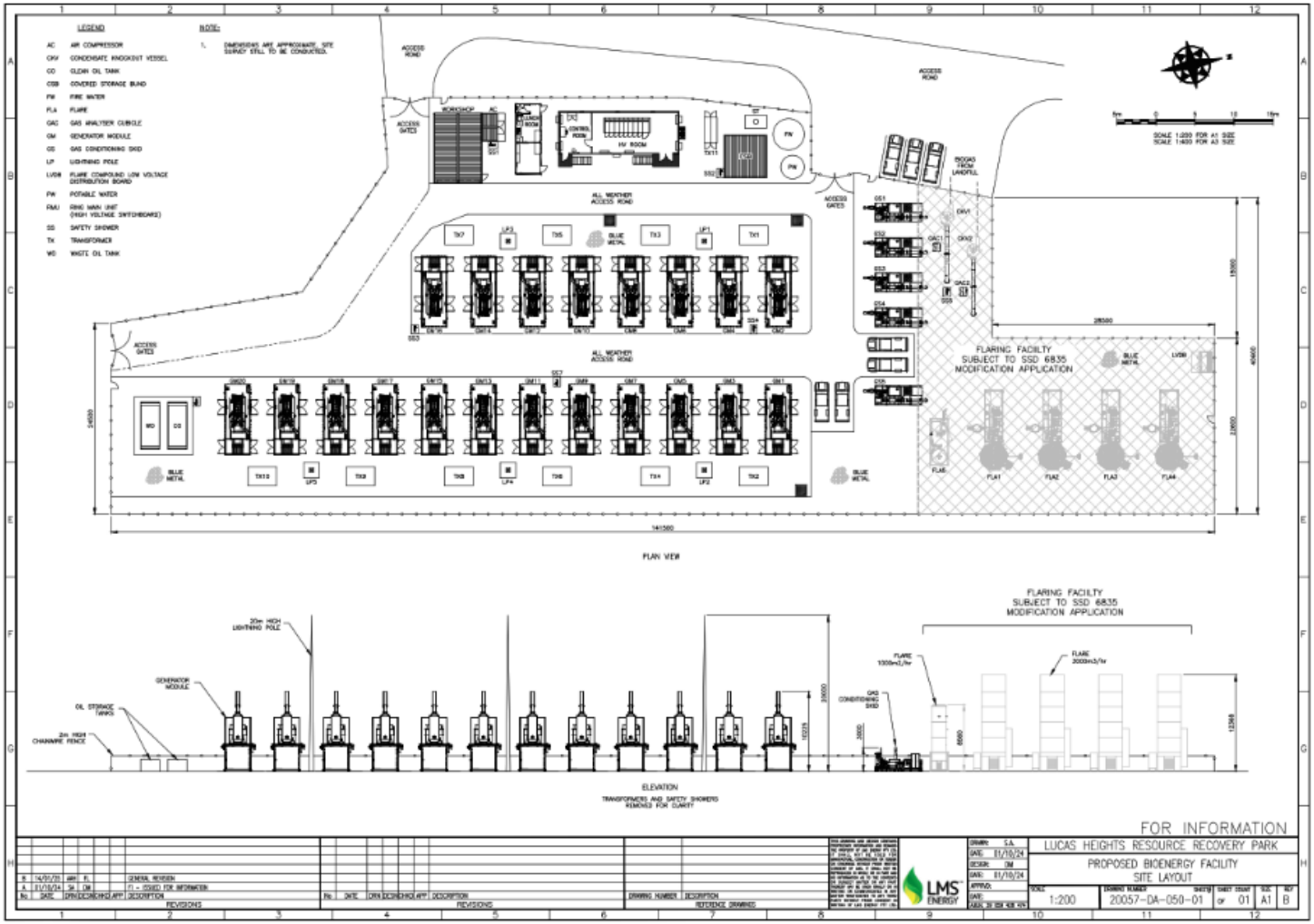
LMS has proposed an upgrade to ensure full contingency for landfill gas management



Project Description

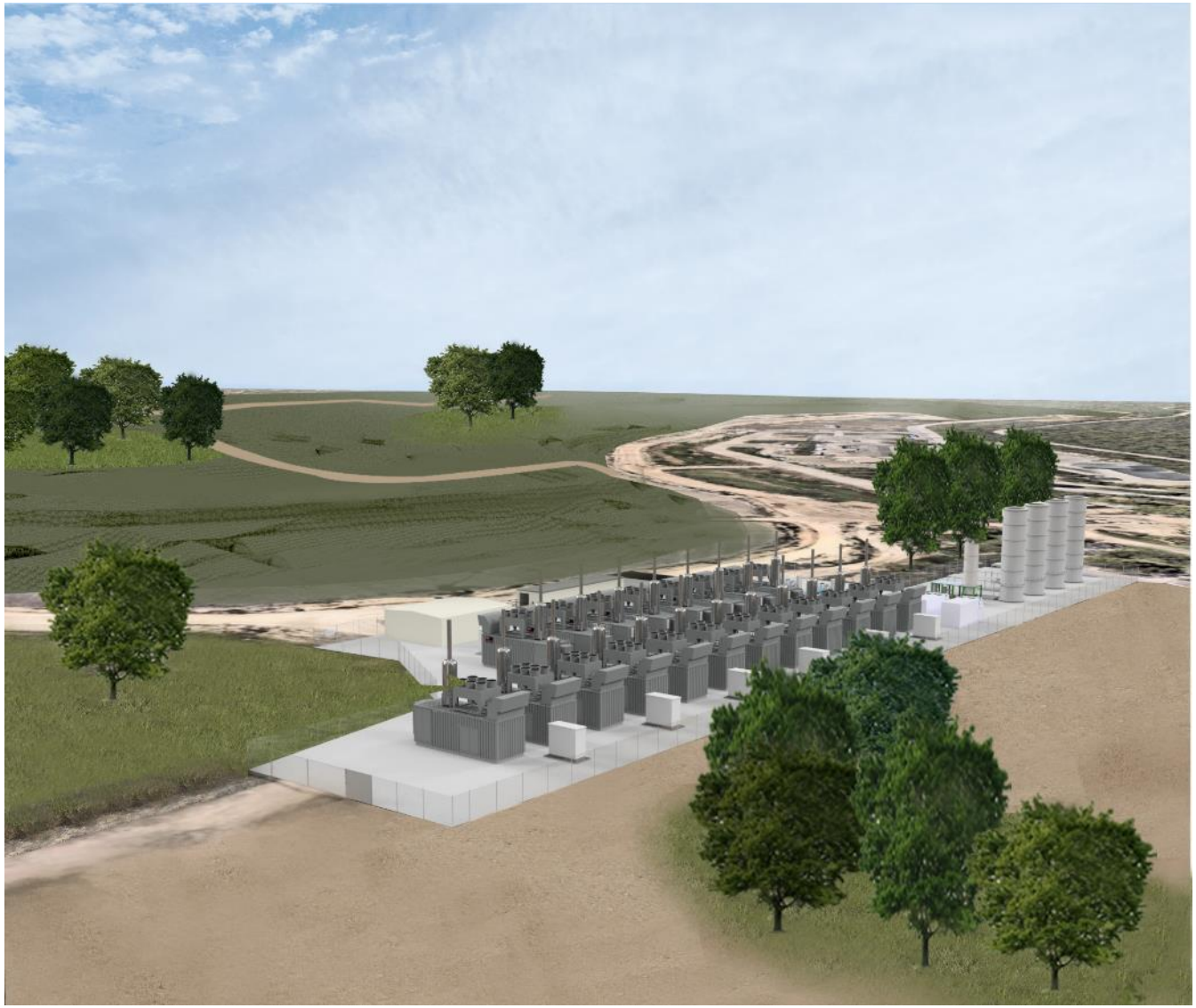
Site Layout

- 20 x 1.1MW generators
- Electrical transformers
- Gas delivery and drying equipment
- Site office / lunchroom
- HV switch room
- Bunded chemical storage
- Lightning protection and earth grid
- Security fencing



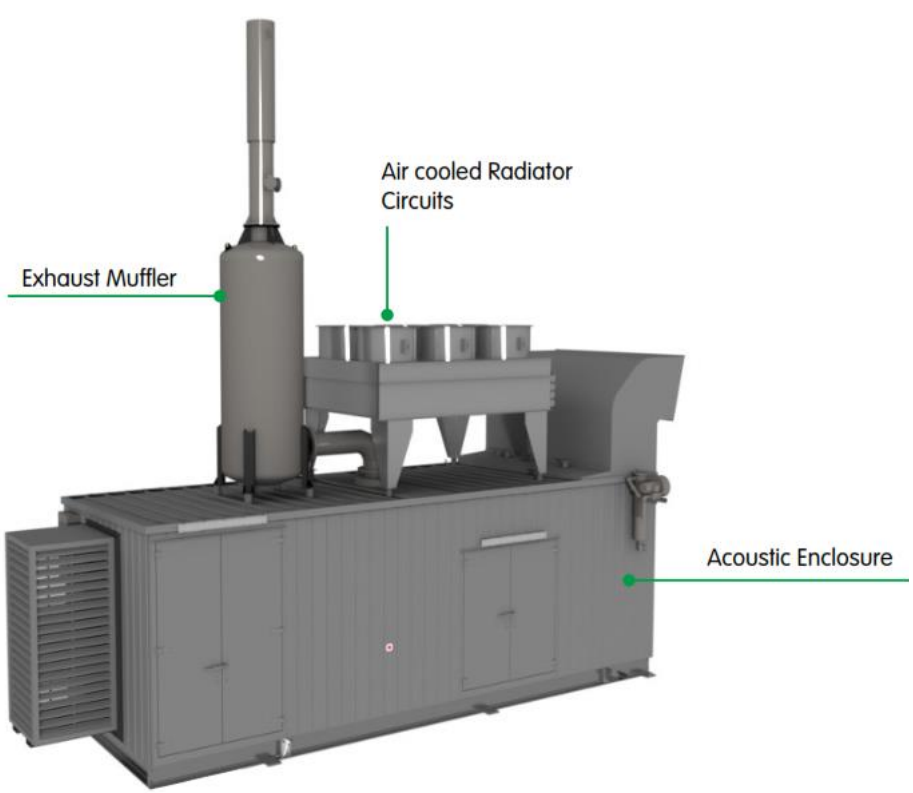
Project 3D Layout

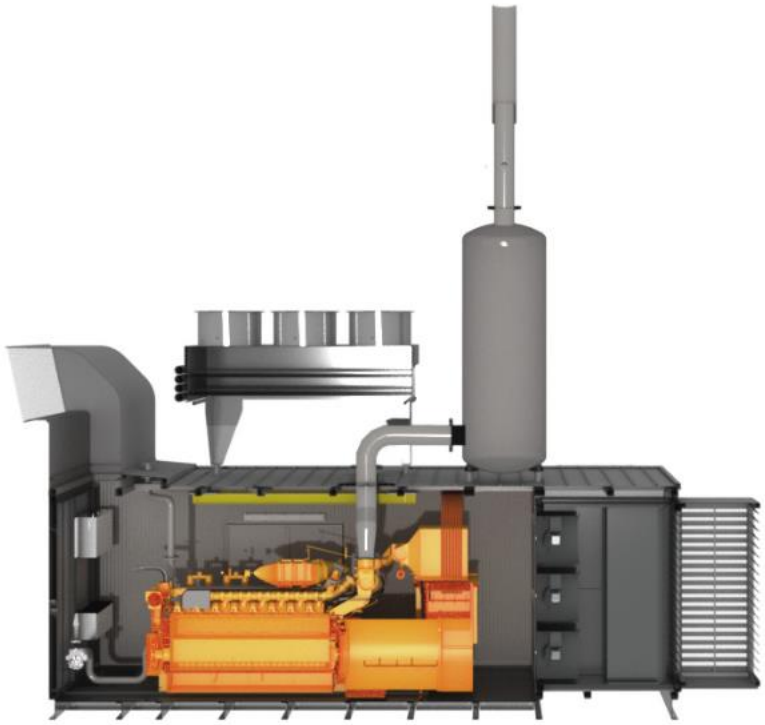
Site Layout



Generator Module Layout

Module Section View





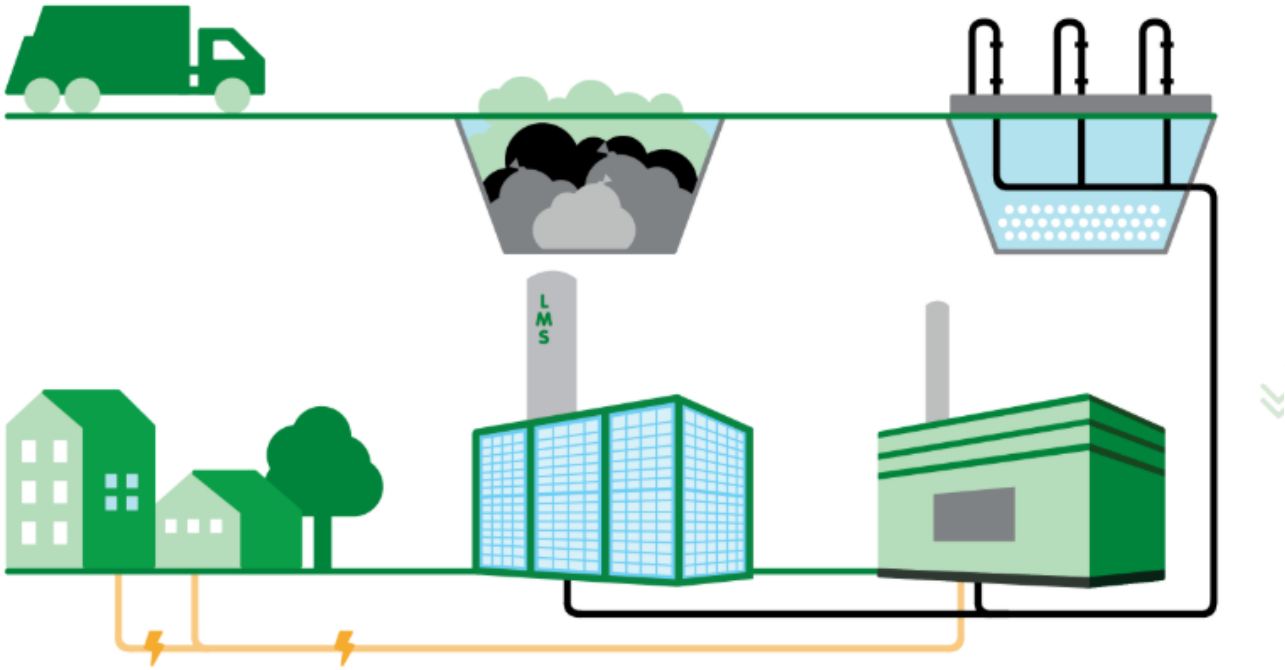
How it works

How LMS coverts landfill biogas into electricity

01 Waste is collected and transported to a landfill.

02 As the waste breaks down, it naturally produces landfill biogas containing methane, which would harm the atmosphere if not destroyed.

03 LMS Energy captures the biogas before it's released into the atmosphere in a series of underground wells. Pipes transport the biogas to the onsite LMS Energy Bioenergy Facility.



04 Biogas is used as fuel in engines to create a valuable resource – renewable energy.

05 Any excess biogas is transported to an industry-leading biogas flare.

06 Electricity is transported to the grid and onto homes and businesses.

Next steps

Your contributions to this development

- LMS have engaged external consults **GHD Pty Ltd** to support with planning approvals and stakeholder engagement for the project
- A **modification to the LHRRP** consent has been lodged with Department of Planning, Housing and Infrastructure (DPHI) for installation of **flare facility**
- A new **State Significant Development** application is required for the bioenergy facility including preparation of an Environmental Impact Statement (EIS)
- The EIS will follow the assessment framework for all state significant developments under the ***EP&A Act, 1979***
- Aiming to have EIS on public exhibition in **June 2025** to enable community members to make a formal submission on the project
- DPHI will undertake assessment of the project for determination by NSW **Minister for Planning** (or delegate)

LMS proposed engagement plans

- Community & Stakeholder Engagement Plan developed and implemented as part of EIS
- Following the IAP2 Spectrum for engagement approach to meet project objectives and deliver best practice engagement
- NSW Govt Engagement Guidelines for State Significant Developments (proportionate to the likely level of impact and interest from the community)
- Key objectives:
  - Build and maintain community and stakeholder relationships
  - Inform the local community and stakeholders about the project
  - Provide the community and stakeholders an opportunity to ask questions
  - Provide direct feedback to the project team
  - Effectively and proactively identify and manage issues
  - Manage, monitor and evaluate stakeholder feedback

Engagement Action Plan

Surrounding community & Local Businesses		Government Agencies	Directly impacted stakeholders and site operators	
– Community reference group – Lucas Heights and district residents – Lucas Heights and district businesses – Advocacy groups – Sporting and recreation groups		– NSW EPA – Department of Planning, Housing & Infrastructure (DPHI) – Sutherland Shire Council – Emergency Services – Other NSW Government Agencies	– ANSTO – Cleanaway – Sutherland Shire Council – Lucas Heights Resource Recovery Staff	– EDL – Department of Defence (Holsworthy Army Barracks)
Issues and interests				
– Odour – Noise – Traffic impacts – Biodiversity impacts	– Land clearing and / or management – Bushfires – Impact of community assets	– Adherence to NSW statutory requirements – Environmental impact – Community sentiment	– Land use and lease negotiations – Impact to ANSTO operations – Landfill operations – Project timing – Stakeholder and community sentiment – Construction impacts	– Gas management contract – Decommissioning responsibilities for existing power station under existing consent. – Licencing requirements – Construction impacts – Traffic
Engagement activities				
– 1800 phone line and email address available during working hours throughout the project – Distribution of the project newsletter to stakeholder groups and networks – All collateral available on client webpage – Attendance at a CRG meeting – Availability to meet online or in person for stakeholders who request it.		– Attendance at ongoing meetings with key regulatory stakeholders such as DPHI and the NSW EPA – Briefings as needed with other organisations identified as part of the SEARs – Briefings with Sutherland Shire Council – Submission of application to Sutherland Shire Council for review and input	– Regular meetings with these stakeholder groups required as the project progresses.	
Collateral				
– Project update newsletter – Project notification email to interested stakeholders – CRG briefing presentations		– Project update newsletter – Project briefing presentation	– Project briefing presentations – Meeting minutes	

Project Feedback

Opportunities for project feedback will be available through the following channels:

Email: cominput@GHD.com

Please reference “Lucas Heights Bioenergy Facility” before sending feedback to the GHD community email

Phone: 1800 810 680

Please select option #3 of GHD’s community line and reference “Lucas Heights Bioenergy Facility ” before sending feedback over the phone.

Project information can also be viewed online at www.lms.com.au/lucas-heights

Thank you

Leaders in methane abatement
and bioenergy
lms.com.au

CORPORATE HEAD OFFICE
118 Greenhill Rd, Unley 5061
South Australia
T: + 61 8 8291 9000
info@lms.com.au

Appendix C

Emails to community stakeholders

The following emails were sent with the respective fact sheets in Appendix B:

1. **9/05/2025**

Good morning,
LMS Energy are proposing to install a new bioenergy facility at the Lucas Heights Resource Recovery Park. This project will be a replacement of the existing on-site power station which has been operated since 1998.

LMS have engaged external consults GHD to prepare an Environmental Impact Statement (EIS). The EIS involves engaging with relevant government and community stakeholders and evaluating the impact of this project on the surrounds.
Attached is a factsheet with more information about the project. For additional details, the project site is available here **— LMS**.

For comments and questions about the project, community members and stakeholders can contact GHD at 1800 810 680 or ***cominput@ghd.com***.

We will be in touch once the EIS is available for public comment.
Kind regards,
Community and Stakeholder Engagement team
GHD Pty Ltd.

2. **24/09/2025**

Good afternoon,

LMS Energy are proposing to install a new bioenergy facility at the Lucas Heights Resource Recovery Park. This project will be a replacement of the existing on-site power station which has been operated since 1998. The site will maintain the same footprint as the existing facility.

LMS have engaged external consults GHD to prepare an Environmental Impact Statement (EIS). The EIS involves engaging with relevant government and community stakeholders and evaluating the impact of this project on the surrounds.

Attached is a factsheet with more information about the project, including changes to the sites original proposed location. For additional details, the project site is available here — LMS.

For comments and questions about the project, community members and stakeholders can contact GHD at 1800 810 680 or cominput@ghd.com.

We will be in touch once the EIS is available for public comment.

Kind regards,
Community and Stakeholder Engagement team
GHD Pty Ltd.

Recipient list:

Email register

Stakeholder type	Stakeholder name
Community organisation or group	Sutherland Lions Club
	Sutherland Shire Business Chamber
Local Aboriginal Land Council	Gandangara Local Aboriginal Land Council
Environmental organisations	Greater Sydney Landcare
	Sutherland Shire environment Centre
	Southern Sydney Model Aero Club

Stakeholder type	Stakeholder name
Sporting and recreational organisations	Barden Ridge Netball Club
	Illawong Little Athletic Club
	The Ridge Driving Range and Golf Club
	Barden Ridgebacks Football Club
	Bangor Brumbies Football Club
	Menai Rugby Union Club
	Mills Creek Trial Association
	Bangor-Barden Ridge Cricket Club
	Sutherland PCYC Minibike Club
Local businesses	Menai Sand and Soil
	ANSTO Motel
	Cyclotek
	Affirmer Pty Ltd
Local schools	Lucas Heights Community School
	Engadine West Public School
	Shire Christian School

Appendix D

Statutory letter example

133 Castlereagh Street, Level 15
Sydney, New South Wales 2000
Australia
ghd.com

Your ref: [redacted]
Our ref: 12649882

[redacted]

[redacted]

Lucas Heights Bioenergy Facility – SSD- 79933225

Dear [redacted]

Project background

LMS Energy Pty Ltd (LMS) is proposing to install a new bioenergy facility at the Lucas Heights Resource Recovery Park (LHRRP). The project would be a like for like replacement of the existing power station, with improvements that comply with modern standards and regulations and forecasted biogas generation capacity requirements. The project ensures appropriate capacity to manage forecast peak recoverable biogas and renewable energy generation would effectively continue through the remaining landfilling and post closure periods for the landfill. An outline of the project is provided in the attached factsheet.

The proposed facility would be located immediately to the west of the existing facility south east of the landfill within the LHRRP (refer Attachment 1).

State significant development

LMS is seeking approval for State significant development (SSD) application (SSD 79933225) for the project under Part 4, Division 4.7 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

In support of the SSD application, an Environmental Impact Statement (EIS) is currently being prepared by GHD Pty Ltd (GHD) on behalf of LMS for the proposed facility. The EIS will comprehensively assess the projects potential impacts on the environment and community and recommend measures to avoid or minimise those impacts. The EIS will address the Secretary's Environmental Assessment Requirements (SEARs) for the project.

The SEARs along with a copy of the Scoping Report which provides more detail on the project is available on the NSW Department of Planning, Housing and Infrastructure major projects website: **Lucas Heights Bioenergy facility | Planning Portal - Department of Planning and Environment**.

Consultation

Consultation is an integral component of the project as it allows relevant government agencies and community to stay informed and provide feedback. It also allows the project team to integrate feedback during EIS document preparation.

We welcome any questions, comment or feedback you may have regarding the project and would appreciate responses via email to **cominput@GHD.com** using the reference Lucas Heights by 20 June 2025.

We also welcome the opportunity to provide you with a project briefing should this assist you responding to this consultation request. Please contact me through the below details should you have any questions.

Regards

Karl Rosen
Technical Director - Environment

+61 2 92397682
karl.rosen@ghd.com

Attachments: 1. Fact sheet

Appendix E

Project website

https://www.lms.com.au/lucas-heights

Lucas Heights Bioenergy Facility

LMS Energy is proposing to install a new bioenergy facility at the Lucas Heights Resource Recovery Park (LHRRP) located at Little Forest Road, Lucas Heights, NSW. The existing on-site power station, developed and operated by a different provider since 1998, will be replaced by LMS Energy's modern bioenergy facility which will continue the sustainable reuse of landfill biogas.

As Australia's leading landfill biogas company, LMS Energy has delivered **more than 65 biogas projects** across Australia, New Zealand and the United States over the last 30 years. Collectively, these projects generate enough renewable energy to power around 250,000 homes each day, reducing more than 5 million tonnes of carbon dioxide equivalent emissions annually.

Figure 1: Artists' Impression of the Bioenergy Facility

The new Bioenergy Facility at Lucas Heights will:

- Generate up to **190,000 megawatt** hours per year of renewable electricity, equivalent to powering around **30,000 homes**.
- Reduce more than **1 million tonnes** of carbon dioxide equivalent greenhouse gas emissions.

Benefits to the Sutherland Shire Community

This project will:

- Reduce landfill gas emissions through capture and sustainable energy recovery.
- Improve emission reduction activities in the Sutherland Shire.
- Have a minimal disruption to the community, as the new facility will be built adjacent to the existing power station at the LHRRP.

Where will it be located?

The below Figure 3 shows the location of the proposed facility in relation to the LHRRP.

The project is located within the Sutherland Shire local government area, about 30 kilometers southwest of the Sydney central business district within the suburb of Lucas Heights. Lucas Heights sits between the Royal National Park, Heathcote National Park and the Cubbitch Barta National Estate Area, which is managed by the Department of Defence as a part of the Holsworthy Barracks.

The Bioenergy Facility is proposed to have an area of about 0.5 hectares and would be located on Lot 101 DP 1009354 within the LHRRP to the west of the existing power station.

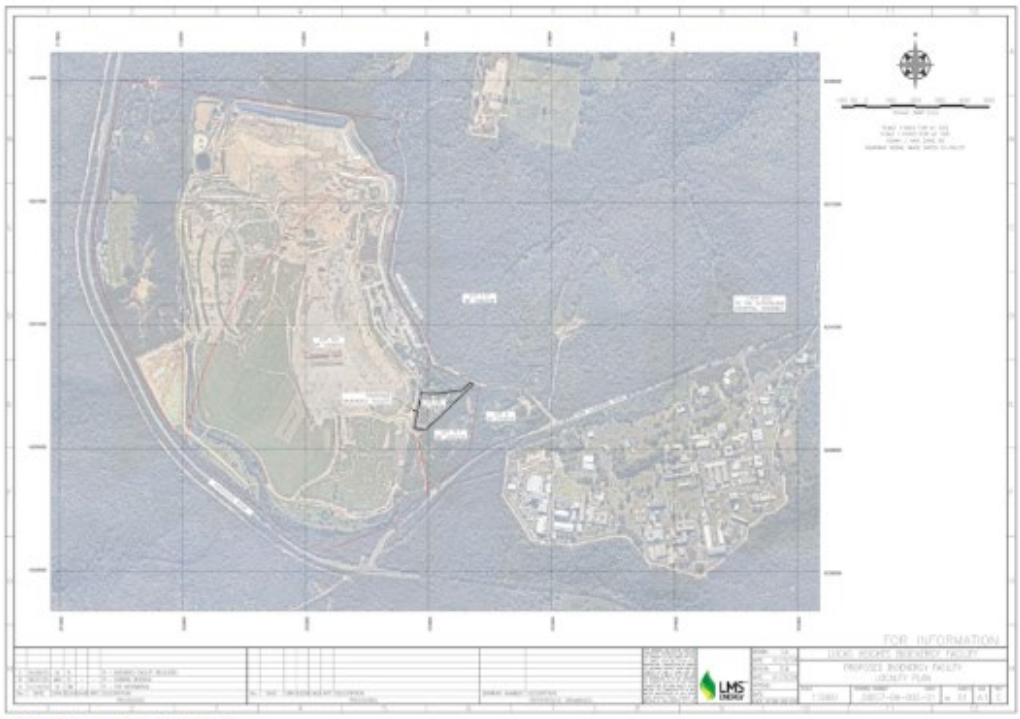


Figure 2: Project Site Location

The Bioenergy Facility was initially proposed to be situated along the western boundary of the existing power station adjacent to the landfill and planned parklands. However an opportunity was identified to relocate the proposed footprint to the existing power station site itself. The relocation offers improved integration with the existing gas infrastructure and provides greater seperation from future open space parklands. Figure 3 shows the original and revised locations for the development. The EIS application will address the impacts of the revised location.

Figure 3 - Site Layout & Location Change

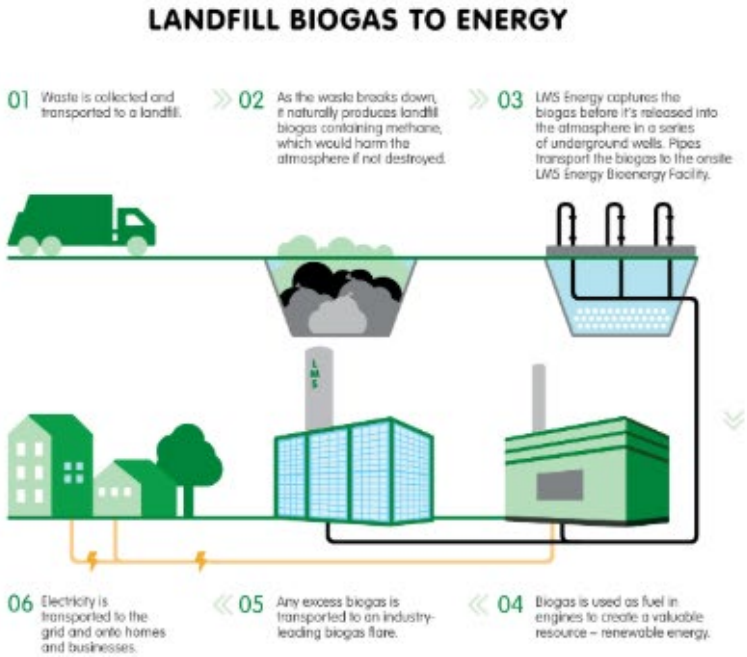
How does it work?

The below infographic shows the basic process flow.

Once waste is collected and deposited in the landfill, the organic material naturally breaks down over time, decomposing to release biogas. The biogas is primarily methane and 'biogenic' carbon dioxide.

The biogas is collected via a network of underground pipes that transport the gas to the Bioenergy Facility. Here the gas is used in the engines to generate renewable electricity. During times of network outage, or if any excess gas is available, the biogas is flared. This ensures continuous combustion of gas at the same rate that it is produced within the landfill.

The electricity is then exported from the site into the local Ausgrid distribution system, and onto homes and business in the network.



What are the next steps for the project?

- External consultant GHD has been engaged to prepare an Environmental Impact Statement (EIS)
- The EIS will follow the framework set by the Department for Planning, Housing and Infrastructure (DPHI) for all state significant developments
- This process includes engaging with relevant government and community stakeholders, and evaluating the impact of this project on the surrounding area
- Community feedback is welcomed as we develop the EIS
- We aim for the release of the EIS for public viewing in **October 2025** to allow community members to make a formal submission on the project
- The DPHI will assess the project for a final determination by the NSW **Minister for Planning** (or delegate)

Read our Bioenergy Facility Fact Sheet.

Read our Bioenergy Facility Fact Sheet.

Your Feedback

Your feedback and enquiries on the proposed project is welcomed, and can be provided via the below contacts:

cominput@GHD.com | P. 1800 810 680

When providing feedback, please reference 'Lucas Heights Bioenergy Facility'.

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Appendix E

Compilation of mitigation measures

Table E.4 Compiled table of mitigation measures

ID	Environmental aspect	Mitigation measure	Responsibility	Timing
Air quality				
AQ1	Air quality	The CEMP will include measures to minimise the potential for impacts on air quality including dust suppression (e.g. water spraying), vehicle speed limits, and management of exposed surfaces.	Contractor	Pre-construction / Construction
AQ2	Emissions testing	Stack emission testing will be documented in the OEMP. Testing to occur in accordance with the Approved Methods for the Sampling and Analysis of Air Pollutants in NSW (NSW EPA, 2022b) as follows: – within 4 weeks of commissioning – within 9–15 months from commissioning, and – every 5 years to confirm ongoing compliance.	LMS	Commissioning / Operation
Noise				
NV1	Construction noise and vibration management	The CEMP will detail processes, responsibilities and measures to manage noise and vibration and minimise the potential for impacts, including mitigation measures NV2 to NV7 and the management measures listed in section 8.1 of Technical Report 2. Measures that mitigate potential noise and vibration at the source will be prioritised.	Contractor	Pre-construction / Construction / Operation
NV2	Plant noise levels	The noise levels of plant and equipment should have an operating sound power lower to the levels presented in Table 5.1 of Technical Report 2 or similar.	Contractor	Pre-construction / Construction
NV3	Maintain equipment	Regularly inspect and maintain equipment to ensure it is in good working order. to prevent excessive noise emissions from deteriorating or faulty components, particularly for critical noise sources such as radiator fans, attenuators, and exhaust openings. Equipment must not be operated until it is maintained or repaired, where maintenance or repair would address the annoying character of noise identified.	Contractor	Construction
NV4	Plant noise levels	Selection and design of low-noise equipment to ensure operational sound power levels remain at or below the reference levels used in the assessment. This includes the following design measures: – acoustic enclosure for CAT G3516LE generators – intake attenuators – discharge attenuators – silencers on generator exhausts – selection of low-noise radiator fans.	LMS Energy	Detailed design
NV5	Noise monitoring	Compliance noise monitoring to be completed within 12 months of commencement of operation. Noise monitoring undertaken at the boundary of the power station will be compared to the predicted noise levels presented in Table 5.3 of Technical Report 2 and used to validate predicted noise levels at sensitive receivers presented in this report.	LMS Energy	Operation
Hazards – industrial				
HM1	Hazard management	LMS will document comprehensive safety management measures detailed in HM3 – HM5 for the site in the Safety Management Plan).	LMS	Operation

ID	Environmental aspect	Mitigation measure	Responsibility	Timing
HM2	Fire safety	A fire safety study during detailed design to HIPAP No. 2 should be included as a condition of development consent to cover the fire safety strategy and fire protection systems for the bioenergy facility, including any fire water storage on-site, and retention systems to contain fire water in any fire scenario.	LMS	Detailed design
HM3	Hot work permit system	A hot work permit system will be required on-site for any welding or cutting activities.	Contractor	Pre-construction / Construction
HM4	Loss of LPG containment	Where cylinder valve covers are fitted, such as for the LP Gas Cylinders, these are not to be removed during handling and storage. All gas cylinders are to be stored in dedicated cylinder cages or racks in accordance with AS4332- 2005 - *The storage and handling of gases in cylinders*.	LMS	Operation
HM5	Final hazard assessment	If substantial changes are made to the design, such as a large increase in the proposed pressure of the biogas fuel for the gas engines, LMS should conduct a final hazard analysis to HIPAP No.6. The FHA should include a revised estimate of the risk at the site boundary for worst case events.	LMS	Pre-construction
Hazards – bushfire				
BF1	Bushfire Emergency Management and Evacuation Plan	A Bushfire Emergency Management and Evacuation Plan will be prepared and implemented for construction of the project in accordance with the Guide to Developing a Bush Fire Emergency Management and Evacuation Plan (RFS, 2014). Evacuation procedures will be consistent with the LHRRP Emergency Response Plan (Cleanaway 2025).	LMS	Construction / Operation
BF2	Asset protection zone	A BAL-29 APZ would be applied to the structures where combustible goods are stored and site offices are located. The southeasternmost generator units do not have enough space to support a BAL-29 APZ due to proximity to the boundary, however it is recommended that the APZ be established up to the boundary to minimise the risk of ember attacks and radiant heat to the most vulnerable units.	LMS / Contractor	Operation
BF3	Bushfire management	Details of fire management are to be outlined in the bush fire emergency management and evacuation plan, including: – Requirements for emergency access and egress including nomination of an alternative access route. – Formal preparedness procedures for staff and contractors to maintain awareness of and respond to escalating forecast fire danger including identification of firefighting equipment and fire water supply. – Formal pre-rehearsed procedures for staff and contractors to respond to respond to a formal bushfire warning being issued by emergency services, including identification of escape routes and refuge areas.	LMS Energy / Contractor	Construction / Operation

ID	Environmental aspect	Mitigation measure	Responsibility	Timing
BF4	Construction requirements	Building work will comply with BAL-12.5 construction requirements as applicable to Class 5 to 8 structures. The southeasternmost generator units will comply with BAL-FZ.	LMS / Contractor	Construction
BF5	Water supply and fire suppression	A reticulated potable water supply will be provided on site to service amenities, hose reels, and safety systems. The high-voltage switchroom will be fitted with an internal fire and smoke detection system.	LMS	Operation
BF6	Access	The site is accessible directly via Little Forest Road.	LMS	Construction / Operation
Soils and contamination				
C1	Soil and contamination management	Preparation of a Construction Environmental Management Plan (CEMP) to manage potential contaminant exposure risks during construction works and to manage unexpected finds. A monitoring program should be implemented which includes a higher frequency of monitoring events that aligns with construction activities, particularly those that will disturb the ground surface. The CEMP should include an Unexpected Finds Protocol (UFP), while a site-specific Construction Safety Management Plan (CSMP) will be developed.	LMS / Contractor	Pre-construction / Construction
C2	Environmental monitoring	To reduce the potential for future workers to be exposed to contamination (if present), implement an environmental monitoring programme to assess for the presence of landfill gas at the project site (surface and subsurface) targeting underground services and buildings/structures where enclosed spaces are likely.	LMS	Operation
Water resources				
W1	Soil and water management	A detailed Construction Environmental Management Plan (CEMP) would be prepared and implemented for the Project. The CEMP would contain environmental control measures and a detailed Stormwater Management Plan (SMP) and Erosion and Sediment Control Plan (ESCP). The ESCP will outline the implementation of erosion and sediment control measures in accordance with Blue Book (Landcom, 2004), a key resource for the design and construction of stormwater management. It is expected that erosion and sediment controls would be installed in accordance with *Managing Urban Stormwater: Soils and construction – Volume 1* (Landcom, 2004). Specific controls that are applicable to the project would be included in the ESCP, including: – Minimising the risk of erosion and sedimentation, with a priority on minimising the extent and duration of disturbance. Disturbed areas should be vegetated and stabilised as soon as practicable to do so. – Handling, management and disposal of soils, including the management of unexpected finds of contaminated materials, as recommended in the Preliminary Site Investigation (GHD, 2025a). – Handling of hazardous materials and procedures to manage spills to reduce and address soil and	W1	Soil and water management

ID	Environmental aspect	Mitigation measure	Responsibility	Timing
		water contamination, including fuel storage and management of transformer oils. – Identifying procedures, approvals and requirements in case of unexpected groundwater interception. Prior to any soil disturbance or activities that pose a water quality risk during construction, drainage and other erosion sediment and environmental controls would first be implemented, in accordance with the ESCP.		
W2	Detailed design water management	The management of stormwater quantity and quality should be considered as part of the detailed design of the project. The detailed design of the stormwater management system would be undertaken following project approval and should include the following: – Sizing of stormwater infrastructure to convey stormwater around the facility with consideration to Landcom, 2004 and DECC, 2008. – Incorporate any detailed design mitigation measure identified within the Contamination Preliminary Site Investigation (GHD, 2025a), with regard to potential contaminated soil and any geotechnical concerns.	W2	Detailed design water management
W3	Environmental controls	Operational controls relevant to water should be included in the site-specific Operational Environment Management Plan (OEMP). The relevant document should include the following measures relevant to water: – Procedures to maintain drainage features at the site, including open channels, culverts, stormwater control infrastructure, and sediment control basins and outlets. These should be maintained in accordance with the original design and kept free-draining. – Identifying methods to appropriately handle hazardous materials such that they can be contained within the site within appropriate bunding during the operational phase. Specified responses to a pollution incident should be documented, in the form of a pollution incident response management plan (PIRMP), for the unlikely event that hazardous materials are conveyed outside of the site boundary.	W3	Environmental controls
Traffic and access				
T1	Traffic and pedestrian management Plan	The Construction Traffic and Pedestrian Management Plan (CTPMP) will be updated prior to the commencement of construction to maintain the safety of all workers and road users within the vicinity of the project site. The CTPMP will include measures (as detailed in sections 5.2.1 – 5.23 of Technical Report 7. The CTPMP will provide guidance on the safe and efficient management of staff and vehicle access to the site. At a minimum, the CTPMP will provide a description of: – the proposed activities – the type and number of vehicles that would be generated during each stage of the works	LMS / Contractor	Pre-construction / Construction

ID	Environmental aspect	Mitigation measure	Responsibility	Timing
		– access arrangements and routes for vehicles entering and egressing the site. The CTPMP will outline strategies to: – manage vehicular traffic movement associated with the project – minimise the impact of site-generated vehicle traffic on the operation of the adjoining road network – facilitate the continuous, safe, and efficient travel of workers, contractors, and the general public.		
Visual landscape and future land use				
V1	Visual amenity	External finishes and colours of the new bioenergy facility will be selected to match or complement the existing infrastructure, with neutral, recessive tones to minimise contrast with the surrounding environment.	LMS	Detailed design / Construction
V2	Lighting	All external lighting will be directed downward, shielded, and comply with AS/NZS 4282:2019 (Control of the obtrusive effects of outdoor lighting) to avoid light spill into surrounding areas, particularly the future parkland.	LMS	Operation
Biodiversity				
B1	Unexpected presence of fauna	Ensure physical barriers are in place to minimise the potential for wild fauna to enter the construction site, and ensure works cease temporarily to avoid harm to any fauna. Native trees within 10 m of the construction footprint will be fenced of as NO-GO-ZONES as per the CEMP.	Contractor	Construction
Cultural heritage				
AB1	Unexpected finds of heritage items	In the event of an unexpected find of an Aboriginal item, works within the area will cease and a suitably qualified heritage professional will be engaged to assess the significance and management of the finds. An unanticipated discovery protocol will be implemented in the CEMP that details measures to be undertaken if heritage objects/sites not previously recorded in the project site are detected during construction works (unexpected finds).	Contractor	Construction
Social and economic				
SO1	Social impacts, communication and engagement	LMS Energy will continue to develop and implement the Community Stakeholder Engagement Plan (CSEP) to guide the management and delivery of community and stakeholder engagement in the lead up to and during construction, and as required during operation and decommissioning, to ensure that: – accurate and accessible information about the project is provided – feedback from the community is encouraged – opportunities for input are provided – community members and stakeholders with the potential to be affected by construction activities are notified in a timely manner about the timing of activities and potential for impacts – enquiries and complaints are managed, and a timely response is provided for concerns raised.	LMS Energy	Pre-construction / Construction / Operation / Decommissioning

ID	Environmental aspect	Mitigation measure	Responsibility	Timing
		The plan will include approaches and protocols to: – communicate with potentially affected residents, other community members, businesses and other key stakeholders to provide information about the project, and the likely nature, extent and duration of changes – identify and engage with vulnerable persons that might be affected by the project – communicate information about potential access changes – share information about the project with other regional stakeholders to assist with managing cumulative impacts on local and regional communities.		
SO2	Social impacts, communication and engagement	An enquiries and complaints management systems will be developed, outlined in the CSEP, and implemented during all phases of the project. The complaints management systems will be maintained throughout the construction period and for a minimum of 12-months after construction finishes.	LMS Energy	Pre-construction / Construction / Operation / Decommissioning
Waste management				
WA1	Minimising waste during materials procurement	Detailed design would include measures to minimise quantities of waste requiring off-site disposal and careful procurement of construction materials to minimise excess waste materials.	LMS	Design
WA2	Construction and decommissioning waste classification	All construction and decommissioning waste that is removed from site would be classified in accordance with the *Waste Classification Guidelines* (EPA 2014) and the waste provisions contained within the POEO Act and other relevant legislative and policy requirements with appropriate records retained.	Contractor	Construction
WA3	Preparation of construction and decommissioning waste management plan	A construction and decommissioning waste management plan would be prepared and implemented as part of the CEMP for the project. The plan would adopt the waste hierarchy principles contained in the *Waste Avoidance and Resource Recovery Act 2001* and detail processes, responsibilities and measures to manage waste and minimise the potential for impacts during construction and decommissioning. This would include waste separation, handling, storage, transport and off-site re-use, recycling and disposal locations.	Contractor	Construction
WA4	Preparation of operational waste management plan	The Operational Environmental Management Plan (OEMP) includes a waste management plan which incorporates the requirements of relevant guidance documents and the waste management hierarchy principles contained in the *Waste Avoidance and Resource Recovery Act 2001*. This would include: – all key operational waste streams and expected quantities – waste classification procedures and details of how all waste streams would be recycled or disposed of in accordance with the Waste Classification Guidelines (EPA 2014) and the waste provisions contained within the POEO Act and other relevant legislative and policy requirements – details of off-site recycling and disposal locations – record keeping and reporting requirements.	LMS	Operation

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